NOTICE INVITING TENDER

FOR

RENOVATION OF ADMINISTRATIVE BUILDING AND BUNGALOWS

AT

GORAKHPUR, UTTAR PRADESH

NIT NO. : PNPM/PC160/E/G-240

PREPARED AND ISSUED BY

PROJECTS & DEVELOPMENT INDIA LTD.
(A Govt. of India Enterprise)
PDIL Bhawan, A-14, Sector-1,
NOIDA-201301, U.P., India

July, 2018

LETTER INVITING BID

NIT NO. : PNPM/PC160/E/G-240

SUBJECT : RENOVATION OF ADMINISTRATIVE BUILDING AND BUNGALOWS AT GORAKHPUR, UTTAR PRADESH

(OPEN DOMESTIC COMPETITIVE BIDDING)

Dear Sir(s),

Projects and Development India Limited (PDIL), hereinafter referred to as CONSULTANT on behalf of Hindustan Urvarak & Rasayan Ltd. (HURL), hereinafter referred as OWNER, has the pleasure of inviting eligible bidders to submit Bid ONLINE through Central Public Procurement (CPP) Portal in Single Phase Two Bid System, for the subject Project in compliance with the NIT. The entire set of Bidding documents is also placed on the website at HURL website www.hurl.net.in, PDIL website www.pdilin.com, and CPP Portal http://eprocure.gov.in/cppp/

BRIEF SCOPE OF WORK:

The scope of work under this includes construction / execution, providing necessary engineering supervision through qualified and technical personnel, skilled and unskilled labor, etc. and mobilization of all relevant and adequate plants, tools and tackles, equipment, machineries, etc., to carry out all civil and structural works for successful completion of the proposed **"RENOVATION OF ADMINISTRATIVE BUILDING AND BUNGALOWS".**

REFER PART-II, TECHNICAL PART FOR DETAILED SCOPE OF WORK

NIT Document consists of:

PART-I : COMMERCIAL PART
PART-II : TECHNICAL PART

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SALIENT FEATURES OF NIT :		
1.	**NIT NO.**	**PNPM/PC160/E/G-240**
2.	Issue Date	06.07.2018
3.	Last Date & Time for Submission of Technical & Commercial Bid and Priced Bid (ONLINE through CPP)	**23.07.2018, at 12:00 hrs. (IST)**
4.	Date & Time of opening of EMD and Technical and Commercial Bid	24.07.2018, 12:00 hrs. (IST) onwards, at PDIL, Noida
5.	Earnest Money Deposit (EMD)	Rs.4,57,500.00 (Rupees Four Lakh Fifty Seven Thousand Five Hundred only)
6.	Submission of EMD, in Original, at PDIL Noida	On or before bid submission date i.e. 23.07.2018.
7.	Time Schedule	**06 Months** from the Effective Date of Contract
8.	**Address for Communication with**	
8.1.	Projects & Development India Limited (PDIL)	Projects & Development India Limited, Project Management Department PDIL Bhawan, A-14, Sector-1, Noida, U.P., India Kind Attention: Mr. Sumit Kumar Project Manager Tel no. : 0120-2529842, Extn. 374 Fax no. : +91-120-2529801 E-mail : sumit.kumar@pdilin.com
8.2.	Hindustan Urvarak & Rasayan Limited (HURL)	Hindustan Urvarak & Rasayan Ltd., Core-2, 2nd Floor, Scope Minar, Laxmi Nagar District Centre, Delhi-92 Kind Attention : Mr. Manish Goyal Senior Project Manager Tel no. : 011-22502267 Email : goyalm@hurl.net.in
8.3.	Contact Person for Site visit	Contact Person: Mr. Subodh Dixit Senior Project Manager, HURL Fertlizer Plant (FCI), Gorakhpur Mob.: +91-551-2261758 E-mail: subodhdixit@hurl.net.in
8.4.	NIT overview on websites	"Letter Inviting Bid" & "Instruction to Bidders" is available at following websites: HURL (www.hurl.net.in) PDIL (www.pdilin.com) CPP Portal (www.eprocure.gov.in)

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The bidder shall submit the bid ONLINE through Central Public Procurement (CPP) Portal. However, Earnest Money Deposit (EMD) in original / Documentary evidences regarding EMD Exemption along with No Deviation Certificate and Integrity Pact shall be submitted at PDIL, Noida on or before bid submission date. The owner allows only those bids to be opened whose EMD in original / Documentary evidences in support of claiming EMD exemption for MSEs and PSEs has been received by the owner before the Techno-Commercial bid opening.

MSEs (Micro & Small Enterprises) are also exempted from submission of EMD in accordance with the provisions of PPP-2012. MSEs (Micro & Small Enterprises) are exempted from submission of EMD in accordance with the provisions of PPP-2012. However, Traders/Dealers/Distributors/Stockiest/Wholesaler are not entitled for exemption of EMD.

Owner/Consultant reserves the right to accept/reject any or all Bids without assigning any reason whatsoever.

Bids complete in all respects should reach on or before the Bid Due Date and time. **Bids through Fax / E-mails will not be accepted**. OWNER / CONSULTANT take no responsibility for delay, loss or non-receipt of Bid sent by post/courier. Please be noted that all the dates mentioned herewith are firm and OWNER / CONSULTANT expect strict adherence since this is a priority project.

Transfer of Bidding Document is not permissible.

Bidder may depute their representative with proper authorization letter to attend Technical and commercial opening of bids.

Eligible bidders are requested to confirm their intention, within seven (07) days from the placement of NIT at CPP Portal, to participate in subject bidding through a letter or fax message

Thanking you,

For & on behalf of
Hindustan Urvarak & Rasayan Ltd.

Sumit Kumar
Project Manager
PDIL, Noida

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NIT NO. : PNPM/PC160/E/G-240
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INSTRUCTIONS TO BIDDERS

(ITB)

PART-I : COMMERCIAL

SECTION – 1.0

INSTRUCTIONS TO BIDDERS

0	22.06.2018	FOR TENDER	PKC	SK	RRK
REV.	**DATE**	**PURPOSE**	**PREPARED**	**REVIEWED**	**APPROVED**

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INSTRUCTION TO BIDDERS

1.0 INTRODUCTION

1.1. Government of India has formed a joint venture company of M/s. National Thermal Power Corporation Ltd. (NTPC), M/s. Coal India Limited (CIL), M/s. Indian Oil Corporation Ltd. (IOCL) & FCIL/HFCL by name M/s Hindustan Urvarak & Rasayan Ltd. (HURL) hereinafter also referred to as "OWNER", for setting up a brown field Ammonia Urea Complex along with its associated offsite & utility facilities at existing fertilizer complex of HFCL, Gorakhpur, in the State of Uttar Pradesh.

1.1.1 Projects & Development India Ltd. (PDIL) has been retained as Consultant for providing Engineering Consultancy Services and Project Management Services for the aforesaid project.

1.2 LOCATION OF THE PROJECT SITE

The existing Gorakhpur Fertilizer unit of FCIL is located at about 12 km north from Gorakhpur town in eastern part of Uttar Pradesh on NH-28. It has good connectivity both by road and rail. The nearest airport Gorakhpur Air Port which is 21 km from Gorakhpur Fertiliser unit and has flights to and from Delhi via Lucknow and Kolkata via Patna.

2.0 SCOPE OF PROPOSAL

The scope of work under this includes construction/ execution, providing necessary engineering supervision through qualified and technical personnel, skilled and unskilled labor, etc. and mobilization of all relevant and adequate plants, tools and tackles, equipment, machineries, etc., to carry out all civil and structural works for successful completion of the proposed **"RENOVATION OF ADMINISTRATIVE BUILDINGS AND BUNGALOWS".**

REFER PART-II, TECHNICAL FOR DETAILED SCOPE OF WORK

3.0 BIDDING DOCUMENTS

The bidder is expected to examine the bidding documents, including all instructions, Pre-Qualification Criteria, Forms, Annexure, Terms and Conditions of Contract, Specifications, Drawings and other documents and to fully familiarize itself with the requirements of the bidding documents. Failure to furnish all the information required by the Bidding Documents or the submission of a bid not substantially responsive to the Bidding Documents in every respect may result in the rejection of the Bid.

In case of any inconsistency, in the interpretation of meaning of any part of this Tender Documents, the BIDDER shall give his best endeavor to resolve the inconsistency by expressing his assumption through his proposal to OWNER.

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4.0 AMENDMENT OF BIDDING DOCUMENTS

Bidders shall examine the Bidding documents thoroughly and inform the OWNER of any apparent conflict, discrepancy or error.

At any time prior to the deadline for submission of bids as well as up to priced bid opening, the OWNER may, for any reason whether at its own initiative or in response to a clarification or modification requested by any prospective Bidder(s), modify the Bidding documents, if required.

Notice of issuance of any Amendment to the bidding document (Corrigendum/Addendum/Amendment) if any, shall be hosted on PDIL website and shall not be advertised in press. The same shall also be notified in the websites of any one or more of the JV companies comprising HURL (viz. IOCL, NTPC, CIL & FCIL/HFCL). Bidders are therefore advised to visit the website regularly for downloading the details of amendment to bidding document. The Bidders will be required to acknowledge notification of any such amendment to the Bidding documents. Bidders shall confirm the inclusion of Addendum/Corrigendum in their bid and shall follow the instructions issued along with addendum/corrigendum

In order to afford Bidders reasonable time to take the amendment, issued prior to submission of Bids, into account in preparing their Bids, OWNER may, at its discretion, extend the deadline for the submission of Bids.

5.0 LANGUAGE OF THE BID

The Bid prepared by the Bidders and all correspondence and documents relating to the Bid exchanged by the Bidder and the CONSULTANT/ OWNER shall be written in the English language and all units shall be in Metric system. Any printed literature furnished by the Bidder may be written in another language, provided that such literature is accompanied by an English translation, in which case, for purpose of interpretation of the Bid, the English translation shall govern.

6.0 TIME SCHEDULE

6.1 Bidder shall be required to complete the WORK under the CONTRACT in accordance with the following:

Project Completion Date	**06 Months from Effective Date of Contract**

6.2 The **"Effective Date of Contract"** shall be the date of issuance of LOI (Letter of Intent) by the Owner.

6.3 The basic consideration and essence of the Contract is the strict adherence to the time schedules for performing the specified works as stipulated in the Contract.

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7.0 SIGNATURE ON BIDS

7.1 The Bid must contain the name, designation and place of business of the person or persons making the Bid and must be signed and sealed, on each page, by the Bidder with his usual signature. The names of all persons signing should also be typed or printed below the signature. The Bidder shall submit authority letter / Power of Attorney / Board Resolution in favour of the authorized signatory(s) of the Bid. The Bidder's name stated on the proposal shall be the exact legal name of the Bidder.

7.2 Bids by bodies corporate/ limited Companies must be signed with the legal name of the Corporation/Limited Company by the President, Managing Director or by the Company Secretary or any other person or persons holding Power of Attorney for signing their Bid.

7.3 Power of Attorney issued by the Board of Directors / CEO / MD / Company Secretary of the Bidder/ all partners in case of Partnership Firm / Proprietor in favor of the authorized employee(s) of the Bidder, in respect of the particular tender for signing the Bid and all subsequent communications, agreements, documents etc. pertaining to the tender and to act and take any and all decision on behalf of the Bidder, is to be submitted. The authorized employee(s) of the Bidder shall be signing the Bid and any consequence resulting due to such signing shall be binding on the Bidder.

7.4 Bid shall contain no cuttings, erasures or overwriting except as necessary to correct errors made by the Bidder in which case each such corrections or other changes in the Bid documents shall carry the initials of the person(s) signing the Bid.

7.5 Bids not conforming to the above requirements of signing may be disqualified.

8.0 PRE-QUALIFICATION CRITERIA (PQC)

Evaluation of Technical and Commercial offers shall be carried out for only those Bidders who shall meet the Pre-qualification Criteria.

8.1 TECHNICAL CRITERIA

8.1.1 The Bidder, meeting the requirements must have executed **Similar Works*** during last seven (07) years ending last day of the month previous to the one on which NIT is invited, should be either of the following:

One completed Work with contract value not less than **INR 2.90 Crore**

OR

Two completed Works each works with contract value not less than **INR 1.80 Crore**

OR

Three completed Works each works with contract value not less than **INR 1.45 Crore**

***Similar Works means: Construction / Renovation of Building including Civil & Electrical Works.**

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To meet the criteria (8.1.1) above, the bidder shall submit attested photo copies as a documentary proof of the following documents-

i. Work Orders with full technical details including Detailed Scope of the Work and Completion Period.
ii. Completion Certificate regarding satisfactory completion indicating the period of completion and contract value.

For clause 8.1.1, a Job executed by a Bidder for its own plant/ project cannot be considered as experience for the purpose of meeting PQC of the tender. However, jobs executed for Subsidiary / Fellow subsidiary / Holding company will be considered as experience for the purpose of meeting PQC subject to submission of tax paid invoice (s) duly certified by Statutory Auditor of the Bidder towards payments of statutory tax in support of the job executed for Subsidiary / Fellow subsidiary / Holding company. Such Bidders to submit these documents in addition to the documents specified to meet PQC.

8.2 FINANCIAL CRITERIA

8.2.1 Average Annual financial turnover during three (03) financial years i.e. 2016-17, 2015-16, and 2014-15 of the bidder meeting the requirement as per clause above experience criteria should be at least **INR 1.10 Crore.**

8.2.2 Net Worth of the Company should be positive during the last financial year ending 31st March 2017.

8.2.3 The Bidder will submit Solvency certificate not more than six months old from the date of issue of NIT from their Banker for a value not less than **INR 1.45 Crore** or minimum credit ratings of “A” from ICRA/CRISIL etc OR equivalent reputed institutions, OR financing / unutilized credit limits from bank of value not less than **INR 1.45 Crore** valid as on date of issue of ITB.

To meet the criteria (8.2.1 & 8.2.2) above, bidder shall submit Audited Annual Statements (Balance Sheet and Profit & Loss account) of the company for three (3) financial years i.e. 2016-17, 2015-16, and 2014-15.

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8.3 AUTHENTICATION OF ALL DOCUMENTS SUBMITTED AGAINST PQC

All documents in support of Technical criteria of PQC to be furnished by the bidders shall necessarily be:

Duly certified / attested by **Notary Public** with legible stamp.

In support of Financial criteria of PQC, bidder is required to submit following

Shall submit "Details of Financial capability of Bidder" in prescribed format (as per Annexure-1.21), duly signed & stamped by a Chartered Accountant. Further, a copy of Audited Annual Financial Statements submitted in bid shall be duly certified / attested by **Notary Public** with legible stamp.

Note : The Authentication of PQC Documents of the Bidders Qualified after Techno-commercial (unpriced) Evaluation may be checked through Original documents.

9.0 EARNEST MONEY DEPOSIT (EMD) AND COMPLIANCE TO ALL THE PROVISIONS OF THE BIDDING DOCUMENT/NIL DEVIATION

9.1 EARNEST MONEY DEPOSIT (EMD)

9.1.1 Bids must be accompanied with 'Earnest Money Deposit (EMD) / Bid Security' in the form of 'Demand Draft' or 'Banker's Cheque' or 'Bank Guarantee'. The amount of EMD shall be as indicated in the LIB (Letter Inviting Bid). The Bidder shall furnish as part of his Bid, EMD in the form of a Bank guarantee.

9.1.2 In case EMD is submitted in form of BG, then the EMD offered shall be an irrevocable Bank Guarantee, issued by any scheduled nationalized bank on a non judicial stamp paper of appropriate value, on a stamp paper of appropriate value. Proforma of the Bank guarantee is enclosed as Annexure-1.11.

9.1.3 The Bank Guarantee shall be valid for a period of three (3) months beyond validity of the Bid. The amount shall be as indicated in the Letter Inviting Bid for this NIT. The Bank Guarantee shall be extended suitably if there is a delay in awarding the contract. The relevant extension shall be on Bidders' account.

OR

EMD can also be furnished in the form of Demand Draft in favour of **M/s. Hindustan Urvarak & Rasayan Limited, payable at Delhi** for value as outlined in the Letter Inviting Bid for this NIT.

EMD will not carry any interest.

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9.1.4 However, Central / State Public Sector Undertaking / Enterprise (PSU/PSE) are exempted from submission of above bid security. Bidders claim such exemption needs to submit necessary valid documents as a proof of their eligibility.

9.1.5 MSEs (Micro & Small Enterprises) are also exempted from submission of EMD in accordance with the provisions of PPP-2012. MSEs (Micro & Small Enterprises) are exempted from submission of EMD in accordance with the provisions of PPP-2012. However, Traders/Dealers/Distributors/Stockiest/Wholesaler are not entitled for exemption of EMD.

9.1.5.1 The bidders shall submit the following documents in support of claiming the exemption of EMD:

a) Documentary evidence that the bidder is a Micro or Small Enterprises registered with District Industries Centers or Khadi and Village Industries Commission or Khadi and Village Industries Board or Coir Board or National Small Industries Corporation or Directorate of Handicrafts and Handloom or MSEs who are having Udyog Aadhaar Memorandum or any other body specified by Ministry of Micro, Small and Medium Enterprises.

b) The above document submitted by the bidder shall be duly certified (in original) by Notary or the Statutory Auditor of the bidder or a practicing Chartered Accountant (not being an employee or a Director or not having any interest in the bidder's company/firm) where audited accounts are not mandatory as per law or duly notarized by any Notary Public in the bidder's country.

c) If the bidder does not provide the appropriate document or any evidence to substantiate the above, then it will be presumed that they do not qualify for any preference admissible in the Public Procurement Policy, 2012.

9.2 COMPLIANCE TO ALL THE PROVISIONS OF THE BIDDING DOCUMENT / NIL DEVIATION

The Bidders are advised that while making their Bid and quoting prices, all conditions may appropriately be taken into consideration. No deviation, whatsoever, is permitted by the Owner to the provisions of Bidding Documents and its subsequent Amendment(s) / Clarification(s) / Addenda / Errata if any, issued by the Employer. Bidders are required to certify their full compliance to the complete Bidding Documents and its subsequent Amendment(s) / Clarification(s) / Addenda / Errata if any, issued by the owner by submitting the 'No Deviation Certificate' as per Annexure-1.3 in the tender documents. In case the Certificate as per Annexure-1.3 duly signed and stamped is not furnished, the bid shall be rejected.

Acceptance of above shall be considered as Bidder's confirmation that any deviation to the Bidding Documents found anywhere in their Bid Proposal, implicit or explicit shall stand unconditionally withdrawn, without any cost implication whatsoever to owner, failing which the bid shall be rejected and bid security shall be forfeited

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9.2.3 Bidders shall submit their EMD in original / Documentary evidences regarding EMD Exemption along with No Deviation Certificate and Integrity Pact, at following address:

The envelope shall be super scribed with:

"RENOVATION WORKS FOR ADMINISTRATIVE BUILDING AND BUNGALOWS (PACKAGE-VI) AT GORAKHPUR, UP"

PROJECTS & DEVELOPMENT INDIA LTD.
(A Govt. of India Enterprise)
PDIL Bhawan, A-14, Sector-1,
Noida-201301, U.P., India

Kind Attention : Mr. Sumit Kumar, Project Manager
EPBX No. + 91-120-2529842 / 43 / 47 / 51 / 53 / 54 Extn. 374
Fax no. + 91-120-2529801 / 91
E-mail : sumit.kumar@pdilin.com

9.3 The bid must be accompanied by EMD in original along with No Deviation Certificate and Integrity Pact. The owner allows only those bids to be opened whose EMD in original / Documentary evidences (as per clause no 9.1.4 & 9.1.5) in support of claiming EMD exemption for MSEs and PSEs has been received by the owner before the Techno-Commercial bid opening.

9.4 The EMD of unsuccessful Bidders will be returned by OWNER/CONSULTANT without any interest to the unsuccessful Bidders as promptly as possible on acceptance of Bid of the successful Bidder or when the Bidding process is cancelled by OWNER/CONSULTANT, whichever is later. Bidders may indicate the name and address in whose favour the said EMD shall be returned.

9.5 The successful Bidder's EMD will be discharged upon the Bidder accepting and signing the Contract and furnishing the Security cum Performance Bank Guarantee.

9.6 The EMD shall be forfeited and appropriated by OWNER/CONSULTANT in regard to the NIT without prejudice to any other right or remedy to OWNER under the following conditions:

a) If a Bidder withdraws his Bid during the validity or extended validity period.
b) If the bid is varied or modified in a unilaterally by the bidder during the validity or extended validity period.
c) Any effort by the bidder to influence the Owner on bid evaluation, bid comparison or contract award decision.
d) In the case of a successful Bidder, if the Bidder fails to duly sign the CONTRACT within the stipulated timeframe, and/or meet the stipulations for signing the CONTRACT within the said timeframe.

OR

If the successful bidder is seeking modifications to the agreed terms and conditions after issue of Letter of Intent ("LOI") and prior to signing of the Contract.

OR

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If the successful bidder fail to furnish Security cum Performance Bank Guarantee within 30 days of issuance of the LOI.

10.0 COST OF BIDS

The Bidder shall bear all costs associated with the preparation and submission of the Bid, and OWNER / CONSULTANT will, in no case be responsible or liable for these costs, regardless of the conduct or outcome of the bidding process.

11.0 MODIFICATION AND WITHDRAWAL OF BIDS

11.1 The Bidder may modify or withdraw its Bid after the Bid's submission, but before the last date and time of Bid submission as specified in this NIT provided that written notice of the modification or withdrawal is received by OWNER/ CONSULTANT prior to the deadline prescribed for submission of Bids.

11.2 A withdrawal notice may also be sent by E-mail in signed and scanned form not later than the deadline for submission of Bids.

11.3 In case any clarifications are sought by the OWNER/CONSULTANT after opening of tenders, then the replies of the Bidder should be restricted to the clarification sought. Any modification of a Bid by the Bidder (including a modification which has the effect of altering the value of the said Bid) after opening of Technical and Commercial Bids without specific reference by the OWNER shall render the Bid liable to be rejected without notice and without further reference to the Bidder.

11.4 No bid may be withdrawn in the interval between the deadline for the submission of bids and the expiration during the validity or agreed extension validity period duly agreed by the bidder. Withdrawal or unsolicited modification of a bid during this interval shall result in the Bidder's forfeiture of its EMD.

12.0 INFORMATION REQUIRED WITH THE BID

12.1 All technical information shall be furnished as per Part-II, Technical. In addition, the bidder shall ensure that Technical and Un-priced Commercial Bid has been submitted.

12.2 Requirement of Manpower / Equipment / Tools & Tackles for timely completion of the project.

12.2.1 Bidder shall furnish tentative month wise manpower requirement till completion of the job.

12.2.2 Bidder shall also furnish a tentative break up of equipments, tools & tackles for timely execution of job.

13.0 PRELIMINARY EXAMINATION

13.1 Full compliance to the complete provisions of the Bidding Documents and its subsequent Amendment(s) / Clarification(s) / Addenda / Errata if any, issued by the owner will be checked first in terms of para clause 9.2 above and other requirements of the bidding documents in respect of No deviation Certificate and Integrity pact. In case those documents duly signed and stamped are not found in separate envelope / techno-commercial bid and / or they are not found as per format of the bidding document, the

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bidder will be asked to furnish the same as per the format before price bid opening. Failure to comply with this requirement, the bid shall be rejected.

13.2 The Owner/Consultant will examine the bids to determine whether they are complete, whether any computational errors have been made, whether the documents have been properly signed, whether validity of the Bid is in conformity with ITB and whether the bids are generally in order.

13.3 Prior to the detailed evaluation, the Owner/Consultant will determine the substantial responsiveness of each Bid with reference to the bidding documents. For purpose of this article a substantially responsive Bid is one, which conforms to all the terms and conditions of the bidding documents without material deviations. The Owner/Consultant's determination of a Bid's responsiveness is to be based on the contents of the Bid itself, without recourse to extrinsic evidence.

13.4 A Bid determined as substantially non-responsive is liable to be rejected by the Owner/Consultant and may not subsequently be made responsive by the Bidder by correction of the non-conformity.

13.5 The Owner/Consultant may waive any minor informality or non-conformity or irregularity in a Bid, which does not in their opinion constitute a material deviation.

13.6 Under two stage bidding system, after a preliminary screening based on both technical and un-priced commercial evaluation, Bidders will be short-listed. In the event that any clarifications are required, then such clarifications shall be obtained from such short listed bidders only. Based on the clarifications, the technically acceptable Bidders shall be asked to submit the revised price.

14.0 LOCAL CONDITIONS

14.1 It will be imperative on each Bidder to fully make aware himself of all local conditions and factors which may have any effect on the execution of the works covered under these specifications and documents. Bidder shall inspect the site, examine and obtain at its cost and responsibility, all information required and satisfy himself regarding all matters and things such as access to site, communications, transport, right of way, the type and number of equipment and facilities required for the work, availability of local labour, materials and their rates, local working conditions, weather, flood levels, sub-soil conditions, natural drainage, and all information that may be necessary for preparing its Bid, performance of work and other obligations and related matters. By submitting the Bid the Bidder shall be deemed to have acknowledged and agreed that ignorance of the site and other said conditions shall not be basis for any claim for compensation or extension of time or loss of profits etc. and the OWNER shall not be liable on account thereof in any manner whatsoever to the Bidder or any person claiming through or under the Bidder.

14.2 Bidders must before submission of their Bids, acquaint themselves with all applicable regulatory and other legal requirements pertaining to insurance and health, safety and environment requirement in India and rules related to work permit and visa requirements in India or in any way or manner affecting the performance of Scope of Work, the Contractor and the Plant operation and performance including social security, safety, pollution control, permits, licenses, and the other statutory requirements and regulations. The submission of a Bid by the Bidder will be construed as evidence that such an examination was made and the Bidder shall not raise at any time later any claims/disputes against the Owner and the Owner shall not be liable for the same in any manner whatsoever.

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14.3 The Owner shall not entertain any request for clarification from the bidder, regarding such local conditions.

14.4 The Bidder shall be deemed to have prepared the Bid on the basis of its independent judgment and to have made all necessary allowances and provisions to ensure that the PROJECT will meet all technical specification prescribed hereunder in the tender document and will be entirely suitable for the purpose for which it is intended. Accordingly, at the time of submission the Bid Price will, without extra price and/or extension of time, be held to include everything implicitly or otherwise required or necessary for the proper and timely completion of the WORK in accordance with the CONTRACT. Further, in case of any contract awarded under these specifications and documents, neither any change in the time schedule of the Contract nor any financial adjustments arising thereof shall be permitted by the Owner, which are based on the lack of such clear information or its effect on the cost of the works to the Bidder.

14.5 Visit to site at BIDDER's cost and expense.

15.0 PRICE BASIS & CURRENCY OF BIDS

15.1 The Bidder shall quote in Indian Rupees only.

15.2 The price/rate to be quoted by the Contractor shall be fixed and firm shall be valid until completion of the Contract to be executed with the successful Bidder pursuant hereto and shall not be subject to variation/escalation on any account except as otherwise specifically provided in the Contract documents.

15.3 Site is located at Gorakhpur, Uttar Pradesh, India and the bidder are required to check & confirm before bidding for applicability of all taxes & duties for the procurement of supply and service by them for the execution of contract.

15.4 The Bidders shall quote in their proposals, the firm price for the entire scope of work as per Schedule of Rates, **(Refer Section-5 of Part-II, Technical)**, inclusive of all taxes, duties, levies etc. except GST as applicable. GST amount will be quoted separately which will be paid at actual by the owner limited to the GST amount indicated by the bidder in their bid.

15.5 All bank charges of bidders bankers shall be to the Bidder's account and all Bank charges of Owner's bankers shall be to Owner's account.

15.6 Income Tax, or any other tax and surcharge as applicable shall be deducted at source from the bills of the contractor and a certificate to that effect shall be issued by the Owner.

16.0 CONSORTIUM BIDS

Joint Venture / Consortium Bids are not acceptable.

17.0 NUMBER OF BIDS

17.1 A bidder shall on no account submit more than one bid either directly or indirectly.

17.2 A bidder shall be deemed to have submitted an indirect bid if a subsidiary of the bidder is also a direct or indirect bidder in an independent bid or if the bidder or its subsidiary has

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with its consent been indicated as a sub-contractor in any other bid or even if not so indicated has entered into any arrangement (whether disclosed or undisclosed) with any other bidder or with a sub-contractor of that bidder for the performance of any work for that other bidder upon an award of the work to that other bidder.

17.3 If a bidder makes more than one bid and/or directly or indirectly participates in another bid as contemplated under 17.2 above, all the bids of the bidder, including the bid of the bidder in whose bid the first named bidder has directly or indirectly participated, may be considered as cartel bids and may be rejected. If the factum of such bid(s) is discovered after the notification of award, the resultant contract shall be liable to be terminated pursuant to the provisions for termination contained in the General Conditions of Contract.

18.0 CONFIDENTIALITY OF DOCUMENTS

Bidders shall treat the bidding documents and contents therein as strictly confidential.

19.0 TAXES AND DUTIES

19.1 The Prices/Rates shall include all taxes & duties, levies etc. including but not limited to custom duty, personnel and corporate tax, except GST. GST amount will be paid extra at actual by the owner limited to the GST amount quoted by the bidder in their bid.

19.2 Bidders are required to ascertain themselves the prevailing rates of applicable taxes & duties including income tax rates as applicable on the scheduled date of submission of price bids and Owner would not undertake any responsibility whatsoever in this regard. However, due to any subsequent change in law, liability of the Owner as regards to payment of duties and taxes would be governed by Clause 39.0 of Special Conditions of Contract on subsequent legislation.

19.3 Please note that the responsibility of payment of above taxes thereupon lies with the Service Provider only. Contractor providing taxable service shall issue an Invoice as per the law, a Bill or as the case may be, a Challan which is signed, serially numbered and in accordance with GST rules. The invoice shall also contain the following:

(a) Name, Address & GST Registration No. of such Person/Contractor
(b) Name & Address of the Person/Contractor receiving Taxable Service
(c) Description, Classification & Value of Taxable Service provided like HSN/SAC Code.
(d) GST Amount & Cess thereupon, if any.

Payments to Service Provider for claiming GST amount will be made provided the above formalities are fulfilled. Further, OWNER may seek copies of challan and certificate from Chartered Accountant for deposit / submission of Return of GST thereupon collected from Owner.

Any changes in statutory rules and regulations under GST regime shall be followed by Contractor.

Refer Annexure-1.20 of Part-I (Commercial) for General Guidelines for Goods & Service Tax (GST).

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20.0 DETERMINATION OF BID'S RESPONSIVENESS

20.1 The Owner's determination of a bid's responsiveness is to be based on the contents of the bid itself without recourse to extrinsic evidence. If a bid is not substantially responsive, it will be rejected by the Owner, and may not subsequently be made responsive by the Bidder by correction of the nonconformity.

20.2 It is important that Bidder clearly demonstrates his experience and capability, giving OWNER/CONSULTANT a high level of confidence that if awarded, the Bidder will be able to perform the works within the stipulated Time Schedule and quoted rate/price and meeting all other requirements listed in the Bidding document.

20.3 Bidder is requested to furnish the complete and correct information required for evaluation of his Bid. If the information with regard to resources and concurrent commitments or any other information/documentation forming basis of evaluation is found incomplete/incorrect, the same may be considered as adequate ground for rejection of the Bid.

20.3 Examination of bids and determination of responsiveness

20.3.1 The owner's determination of bid's responsiveness is based on the content of the bid only. Prior to the detailed evaluation of Bids, the Owner will determine whether each Bid:-

(a) Meets the "Pre-Qualification Criteria" of the Bidding Documents;
(b) Has been properly signed;
(c) Is accompanied by the required 'Earnest Money;
(d) Is substantially responsive to the requirements of the Bidding Documents; and
(e) Provides any clarification and/or substantiation that the Owner may require to determine responsiveness pursuant to Clause-20.3.2 of this ITB

20.3.2 A substantially responsive Bid is one which conforms to all the terms, conditions and specifications of the Bidding Documents without material deviations or reservations or omissions for this purpose Owner defines the foregoing terms below:-

(a) "Deviation" is departure from the requirement specified in the tender documents.
(b) "Reservation" is the setting of limiting conditions or withholding from complete acceptance of the requirement in the tender documents.
(c) "Omission" is the failure to submit part or all of the information or documentation required in the tender document.

20.3.3 A material deviation, reservation or omission is one that,

(a) If accepted would,

i) Affect in any substantial way the scope, quality, or performance of the job as specified in tender documents.
ii) Limit, in any substantial way, inconsistent with the Tender Document, the Owner's rights or the tenderer"s obligations under the proposed Contract.

b) If rectified, would unfairly affect the competitive position of other bidders presenting substantially responsive bids.

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20.3.4 The Owner shall examine all aspects of the bid to confirm that all requirements have been met without any material deviation, reservation or omission.

20.3.5 If a Bid is not substantially responsive, it may be rejected by the Owner and may not subsequently be made responsive by correction or withdrawal of the material deviation, reservation or omission.

21.0 SUBMISSION OF BIDS

21.1 The Bid shall be submitted in electronic format (through CPP portal) as per time schedule mentioned in the Letter Inviting Bid.

The Bidder shall submit Bid Security / EMD in physical form only at the address mentioned at Clause 9.0 of Instruction to Bidders.

21.2 **Instruction for Online Submission of Bid**

Instructions to the Bidders to submit the bids online through the Central Public Procurement Portal for e-Procurement at *https://eprocure.gov.in/eprocure/app*

1) Possession of valid Digital Signature Certificate (DSC) and enrolment/registration of the contractors/bidders on the e-procurement / e-tender portal is a prerequisite for e-tendering.

2) Bidder should do the enrolment in the e-procurement site using the “Click here to Enroll” option available on the home page. Portal enrolment is generally free of charge. During enrolment/registration, the bidders should provide the correct/true information including valid email id. All the correspondence shall be made directly with the contractors/bidders through email id provided.

3) Bidder need to login to the site thro’ their user ID/ password chosen during enrolment/registration.

4) Then the Digital Signature Certificate (Class II or Class III Certificates with signing key usage) issued by SIFY / TCS / nCode / eMudra or any Certifying Authority recognized by CCA India on eToken / SmartCard, should be registered.

5) The DSC that is registered only should be used by the bidder and should ensure safety of the same.

6) Bidder may go through the NIT / tenders published on the site and download the required NIT documents/schedules for the tenders he/she is interested.

7) After downloading / getting the NIT/ Tender document/schedules, the Bidder should go through them carefully and then submit the documents as asked, otherwise bid will be rejected.

8) If there are any clarifications, this may be obtained online thro’ the tender site, or thro’ the contact details. Bidder should take into account the corrigendum published before submitting the bids online.

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9) Bidder then logs in to the site through the secured log in by giving the user id/ password chosen during enrolment/registration and then by giving the password of the e-Token / Smart Card to access DSC.

10) Bidder selects the tender which he/she is interested in by using the search option & then moves it to the 'my tenders' folder.

11) From my tender folder, he / she selects the tender to view all the details indicated.

12) It is construed that the bidder has read all the terms and conditions before submitting their offer. Bidder should go through the tender schedules carefully and upload the documents as asked otherwise, the bid will be rejected.

13) Bidder, in advance, should get ready the bid documents to be submitted as indicated in the tender document/schedule and generally, they can be in PDF/xls/rar/zip/dwf formats. If there is more than one document, they can be clubbed together and can be provided in the requested format. Each document to be uploaded through online for the tenders should be less than 2 MB. If any document is more than 2MB, it can be reduced through zip/rar and the same can be uploaded, if permitted. Bidders Bid documents may be scanned with 100 dpi with black and white option. However of the file size is less than 1 MB the transaction uploading time will be very fast.

14) If there are any clarifications, this may be obtained through the site, or during the pre-bid meeting if any. Bidder should take into account the corrigendum published from time to time before submitting the online bids.

15) The Bidders can update well in advance, the documents such as certificates, annual report details etc., under My Space option and these can be selected as per tender requirements and then send along with bid documents during bid submission. This will facilitate the bid submission process faster by reducing upload time of bids.

16) Bidder should submit the EMD as specified in the tender. The original should be posted/couriered/given in person to the Tender Inviting Authority, within the bid submission due date & time for the tender. Scanned copy of the instrument should be uploaded as part of the offer.

17) While submitting the bids online, the bidder reads the terms & conditions and accepts the same to proceed further to submit the bid packets.

18) The bidder has to select the payment option as offline to pay the Tender FEE/ EMD as applicable and enter details of the instruments.

19) The details of the DD/any other accepted instrument, physically sent, should tally with the details available in the scanned copy and the data entered during bid submission time. Otherwise submitted bid will not be acceptable.

20) The bidder has to digitally sign and upload the required bid documents one by one as indicated. Bidders to note that the very act of using DSC for downloading the bids and uploading their offers shall be deemed to be a confirmation that they have read all sections and pages of the bid document including General conditions of contract without any exception and have understood the entire document and are clear about the requirements of the tender requirements.

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21) The bidder has to upload the relevant files required as indicated in the cover content. In case of any irrelevant files, the bid will be rejected.

22) If the price bid format is provided in a spread sheet file like BoQ_xxxx.xls, the rate offered should be entered in the allotted space only and uploaded after filling the relevant columns. The Price Bid / BOQ template must not be modified/ replaced by the bidder; else the bid submitted is liable to be rejected for this tender.

23) The bidders are requested to submit the bids through online e-tendering system to the Tender Inviting Authority (TIA) well before the bid submission end date & time (as per Server System Clock). The TIA will not be held responsible for any sort of delay or the difficulties faced during the submission of bids online by the bidders at the eleventh hour.

24) After the bid submission (i.e. after Clicking “Freeze Bid Submission” in the portal), the acknowledgement number, given by the system should be printed by the bidder and kept as a record of evidence for online submission of bid for the particular tender and will also act as an entry pass to participate in the bid opening date.

25) The time settings fixed in the server side & displayed at the top of the tender site, will be valid for all actions of requesting, bid submission, bid opening etc., in the e-tender system. The bidders should follow this time during bid submission.

26) All the data being entered by the bidders would be encrypted using PKI encryption techniques to ensure the secrecy of the data. The data entered will not viewable by unauthorized persons during bid submission & not be viewable by any one until the time of bid opening.

27) Any bid document that is uploaded to the server is subjected to symmetric encryption using a system generated symmetric key. Further this key is subjected to asymmetric encryption using buyers/bid openers public keys. Overall, the uploaded tender documents become readable only after the tender opening by the authorized bid openers.

28) The confidentiality of the bids is maintained since the secured Socket Layer 128 bit encryption technology is used. Data storage encryption of sensitive fields is done.

29) The bidder should logout of the tendering system using the normal logout option available at the top right hand corner and not by selecting the (X) exit option in the browser.

Note: A bidder shall submit only one bid in the same bidding process. A Bidder who submits more than one bid will cause all their bids disqualified in the said bidding process.

21.3 The Bidder is expected to examine all instructions, forms, terms and conditions in the NIT. The NIT together with all its attachments thereto, shall be considered to be read, understood and accepted by the Bidders. Failure to furnish all information required or submission of a Bid not responsive to the NIT in every respect will be at the Bidder’s risk and may result in the rejection of the Bid.

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21.4 Pre-qualification Bid and **Technical & Commercial Bid** in two Sections, as specified below.

SECTION-I : PRE-QUALIFICATION BID (Refer Clause 8.0)

i.	Letter of Submission
ii.	Pre Qualification Criteria in favour of **Experience Criteria as per Exhibit-1** along with Copies of Work Orders, Certificates from End User/OWNER and completion certificates in support of prequalification requirement.
iii.	Pre Qualification Criteria in favour of **Financial criteria as per Exhibit-2** along with copies of Work Orders, Completion/ Acceptance certificates and Annual audited Report for the last three financial years. Annual Reports shall be a verifiable statement of annual accounts certified by a Chartered Accountant or Public Accountant in the form of printed annual reports or similar document.
iv.	**Format for Financial Capability of Bidder** as per Annexure-1.21
v.	**Solvency Certificate** from Bidder's bankers as per Annexure-1.18. Date of Issue of this certificate should not more than six months old from the date of issue of NIT.

SECTION-II : TECHNICAL AND COMMERCIAL BID

i)	Photocopy of Earnest money Deposit (EMD)
ii)	Power of Attorney of Bid Signatory from the Competent Authority
iii)	Tender Acceptance Letter as per Annexure-1.1
iv)	Commercial Questionnaire as per Annexure-1.2
v)	No Deviation Certificate as per Annexure-1.3
vi)	Details of Similar Works Executed as per Annexure-1.4
vii)	Current Commitments of the Bidder as per Annexure-1.5
viii)	Deployment Schedule of Supervisory Personnel as per Annexure-1.6
ix)	Deployment Schedule of Construction Equipment as per Annexure-1.7
x)	Details of Equipment Proposed to be used for this work as per Annexure-1.8
xi)	Contents of Bid and Check List as per Annexure-1.9
xii)	A declaration shall be submitted as per Annexure-1.14 to the effect that Bidder have or had not been banned or blacklisted/del-listed by any PSU / Government Organizations.
xiii)	Declaration by Bidder regarding Bidding Document as per Annexure-1.16
xiv)	Photocopy of Integrity Pact as per Annexure-1.17
xv)	EFT details as per Annexure-1.19
xvi)	A declaration shall be submitted to the effect that Bidder submitting their Bid is not under liquidation, court receivership or similar proceedings as per Annexure-1.22

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xvii)	Declaration by bidder for Past Safety Record as per Annexure-1.24
xviii)	Bidder to furnish PAN Number, TIN Number, PF/ESI Number, GST Number, Labor License Registration Number, Latest Income Tax Clearance Certificate / ITR etc. along with the bid.
xix)	**Price confirmation copy** - A Photocopy of the Schedule of Prices, to be submitted strictly as per **Section-5 of Part-II, Technical**, prices being blanked out and in place indicating "**Quoted**" against each head**,** shall be submitted duly signed and stamped.
xx)	Master Index along with a copy of complete set of Bidding Documents of all technical and commercial amendments/addendums if any issued, duly signed and stamped on each page as a token of having received and read all parts of the bidding document and having accepted and considered the same in preparing their bid.
xxi)	Any other information required in the Bidding Documents or considered relevant by the Bidder.

For convenience, the Bid shall be compiled in the form of Specific Sections conforming to the above. In case of non-submission of above documents or submission of incomplete documents, the OWNER/CONSULTANT reserves the right not to evaluate such offers further and not to enter into correspondence in this regard after opening the Technical and Commercial Bid.

21.5 **PRICED BID**

21.5.1 Priced Bid shall consist of in the following manner:

(i) Preamble to Price Bid.

(ii) Priced Bid, duly filled in and completed in all respects, as per **Section-5 of Part-II, Technical** given in the Bidding Documents.

21.5.2 Priced Bid shall be submitted duly signed and stamped on each page. This part shall not contain any condition whatsoever failing which the Bids shall be liable to be rejected. In case of any correction, the bidder shall put its signature and its stamp. Eraser fluid will not be allowed for making any correction.

If the bidder fails to quote for any item in the price bid, it will be implied that such item is included elsewhere in the quoted prices. Also, wherever bidder has indicated "Not Applicable" / "Nil" / "NA" / "kept the space blank" and the same is required during execution of the contract it will be considered as included in the price.

21.5.3 Prices must be strictly filled in format for "Schedule of Rates as per Section-5 of Part-II, Technical" enclosed as part of bidding document. If quoted in separate typed sheets and any variation in description, unit is noticed, the bid is liable to be rejected. In any case Bidder shall be presumed to have quoted against the description of work and the same shall be binding on the Bidder.

21.6 The Priced Bid shall also indicate total prices in figures as well as in words. The prices should be strictly quoted as specified in **Section-5 of Part-II, Technical** otherwise the Bid

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may be rejected. The priced Bid containing any comments, remarks, conditions deviations etc, which is not indicated in the Technical and Commercial Bid, is liable to be rejected.

22.0 DEADLINE FOR SUBMISSION OF BIDS:

22.1 Bids must be submitted not later than the time and date as specified in the Letter inviting Bid.

22.2 The OWNER/ CONSULTANT may extend this deadline for the submission of Bids by amending the NIT documents in accordance with Clause No. 4.0 above. In such case all rights and obligations of the OWNER and Bidders under this NIT shall be subject to the extended deadline.

22.3 Any bid received after the deadline specified in the NIT or as extended shall be liable to be rejected.

23.0 OPENING OF BIDS

23.1 Owner / Consultant will open Bids in the presence of Bidder's representatives who choose to attend at Date and time specified on cover page of NIT or as informed by Owner / Consultant. The Bidder's representative(s) present during the Bids opening shall sign a Bids opening record sheet evidencing their attendance.

23.2 The Bidder's name, modifications, Bid withdrawal and such other details, as the Owner / Consultant at its discretion may consider appropriate, will be announced during Bids opening. The owner allow only those bids to be opened whose EMD in original has been received by the owner before the Techno-Commercial bid opening.

23.3 The Bids shall be opened and evaluated in two stages:

23.3.1 STAGE-I: OPENING & REVIEW OF EMD, PRE-QUALIFICATION BID, TECHNICAL AND COMMERCIAL BIDS

On the date of Public Bid opening as indicated on the Letter Inviting Bid of this NIT, cover containing EMD shall be opened and reviewed.

The OWNER / CONSULTANT will review the Bank Guarantee (BG) submitted by Bidder against EMD, with respect to:

a. its value,
b. validity &
c. issuing Bank.
d. the format attached with the tender document.

In case, the Bidder has not submitted the EMD or the BG submitted by the Bidder is not as per the requirement of NIT with respect to the above mentioned parameters, the Bids submitted by them may be rejected.

If the EMD submitted by the Bidder is found to be in order with respect to above mentioned parameters but if there is a minor deviation with respect to the format enclosed with the NIT, the OWNER /CONSULTANT may at its discretion inform the Bidder who shall have to rectify the same before the date of opening of the Price Bid. In case the

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Bidder fails to rectify the EMD, its Bids will be rejected and the Bidder will be informed to take back its Bid, including the Price Bid.

EMD exemption will be applicable for PSE / Micro and Small Enterprises (MSEs) subject to submission of documents as bought out at clause no 9.1.4 & 9.1.5.

In case of MSEs the certificate will be verified for registration and validity. The certificate shall be valid as on date of opening of bid. If the bidder meets this requirement, their bid will be processed further. If not, the bidder will be asked to submit the EMD. In case the bidder does not submit the EMD within 7 calendar days of HURL/PDIL intimation, then their bid shall be rejected.

Thereafter, OWNER / CONSULTANT will open, Pre-qualification Bid, Technical and Commercial Bids of those Bidders, whose EMD is found to be in order as described here above.

OWNER / CONSULTANT will first review Pre-qualification requirement. Technical and Commercial Bids shall be evaluated only for those bidders whose bid is found to be Pre-qualified based on the Pre-qualification Criteria.

The owner, at its discretion, may hold post bid discussions with any one or all the bidders at a mutually suitable date & time. However, it will not be construed from invitation/ holding of post bid discussions that the bidders have been considered eligible for opening of their Price Bid. The discussion will cover all the aspects of bidder's offer in the Techno-commercial proposal

23.3.2 STAGE – II: OPENING OF PRICE BID

Before opening the Priced Bid of the technically and commercially acceptable Bidders, if required, a meeting with the Bidders shall be arranged. Date and Venue of such meeting shall be informed at the appropriate time.

The date of the opening of the Price Bid shall be intimated to technically and commercially acceptable Bidders. The price bids of such shortlisted Bidders will be opened in the presence of Bidder's representative who chooses to attend, on the date and time to be intimated. The bidder's name, bid price and such other details as the OWNER at its discretion may consider appropriate, will be announced at the opening of price bids.

The evaluation of the priced Bids shall be done as described under Clause No. 30.0 of the ITB.

23.3.3 If the Bids as judged by the OWNER are unresponsive, the NIT may be declared void and a new procedure for selection of CONTRACTOR as deemed appropriate by OWNER may be adopted.

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24.0 CORRECTION OF ERRORS

Bids determined to be substantially responsive will be checked by the Owner / Consultant for any arithmetic errors. Errors will be corrected by the Owner / Consultant as follows:

(i) When there is a difference between the rates in figures and words, the rate which corresponds to the amount worked out by the Bidder (by multiplying the quantity and rate) shall be taken as correct.

(ii) When the rate quoted by the Bidder in figures and words tallies but the amount is incorrect, the rate quoted by the contractor shall be taken as correct and not the amount and the amount shall be re-calculated/ corrected accordingly.

(iii) When it is not possible to ascertain the correct rate, in the manner prescribed above, the rate as quoted in words shall be adopted and the amount worked out, for comparison purposes.

(iv) All errors in totaling in the amount column and in carrying forward totals shall be corrected.

The amount stated in the Bid will be adjusted by the Owner / Consultant in accordance with the above procedure for the correction of errors. If the Bidder does not accept the corrected amount of Bid, its Bid will be rejected, and the EMD shall be forfeited.

25.0 POLICY FOR BID UNDER CONSIDERATION

Bids shall be deemed to be "Under Consideration" immediately after they are opened and until such time that the official intimation of award / rejection is made by the OWNER / CONSULTANT to the Bidders. While the bids are under consideration, bidders and/or their representatives or other interested parties are advised to refrain from contacting by any means, the OWNER / CONSULTANT and/or his employees / representatives on matters related to the bids under consideration.

The OWNER / CONSULTANT, if necessary will obtain clarifications on the bids by requesting for such information from any or all the Bidders, either in writing or through personnel contact as may be necessary. The Bidder will not be permitted to change the substance of the bid after the bid had been opened.

26.0 DISCUSSIONS WITH BIDDERS DURING TECHNO- COMERCIAL EVALUATION

After opening of the Bids, to assist in the examination, evaluation and comparison of Bids, OWNER / CONSULTANT may, at its discretion, ask the Bidder for clarification on its Bid. The request for such clarification and the response shall be in writing either through fax or email.

Further OWNER / CONSULTANT may ask BIDDER to visit OWNER's/ CONSULTANT's office for technical, commercial or financial clarifications.

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BIDDER is expected to undertake such visits and participate in such meetings as and when called by the OWNER/ CONSULTANT. All costs related to such visits shall be borne by BIDDER.

Consequent upon the discussions, if required OWNER / CONSULTANT may issue final amendment to the bid document. Bidders shall be required to submit their unconditional acceptance to final amendment.

Bidder may be given a chance to furnish supplementary price bid indicating the price implication in view of final amendment, if any. The price implication (positive/negative) shall be given in the Section-5S of Part-II, Technical. Section-5S of Part-II, Technical shall be the exact replica of Section-5 of Part-II, Technical, ~~SCHEDULE OF RATES~~ super scribed as SUPPLEMENTARY PRICE BID. The same shall be considered for the purpose of evaluation. OWNER/ CONSULTANT's decision in this regard shall be final and binding on the bidders.

After opening of the Price Bid, no change in the quoted rate/price shall be sought, offered or permitted.

27.0 EFFECT AND VALIDITY OF BID

27.1 The submission of any bid connected with these documents and specifications shall constitute an agreement that the Bidder shall have no cause of action or claim against the OWNER/ CONSULTANT for rejection of his bid. The OWNER / CONSULTANT shall always be at liberty to reject or accept any bid or bids at his sole discretion and any such action will not be called into question and the Bidder shall have no claim in that regard against the OWNER/ CONSULTANT.

27.2 The bids should be kept valid for acceptance for a period of 120 Days from the date of opening of Technical and Commercial Bids. A Bid valid for shorter period may be rejected by the Owner as being non-responsive.

Under the exceptional circumstances, prior to expiry of the original Bid validity period, the OWNER/ CONSULTANT may request the Bidder for a specified extension in the period of validity. The request and the responses thereto shall be made in writing or by telefax or by E-mail.

27.3 In the event of OWNER/ CONSULTANT seeking extension of period of validity of the Priced Bids, the validity of EMD shall also be suitably extended.

27.4 A Bidder agreeing to the request of OWNER/ CONSULTANT seeking extension will not be required nor permitted to modify his bid, and will be required to extend the validity of his EMD correspondingly. However, Bidders request for revision/adjustment of Priced Bid under such circumstances may be considered by the OWNER/ CONSULTANT. The provisions of Clause-9.0 regarding discharge and forfeiture of EMD shall continue to apply during the extended period of Bid Validity.

28.0 COMPLETE SCOPE OF SUPPLIES / WORK

28.1 The complete scope of supplies and work/services has been defined in the bidding documents. Only those bidders who take complete responsibility and who bid for the complete scope of supplies and work/services as contained in the bidding document shall be considered for further evaluation subject to meeting Pre-Qualification Criteria.

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28.2 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 OWNER.

28.3 If a proposed sub-contractor has been approved by the OWNER, the CONTRACTOR shall not replace such approved sub-contractor with another sub-contractor without obtaining the OWNER's prior approval for the proposed replacement.

29.0 FIRM RATES / PRICE

The price quoted by the Contractor shall be fixed & firm and shall be valid until completion of the Contract, pursuant hereto and shall not be subject to variation / escalation on any account except as otherwise specifically provided in the Contract documents. The rates shall include all taxes & duties, levies etc. except GST. GST shall be paid extra at actual.

30.0 EVALUATION AND COMPARISON OF BIDS

30.1 General

30.1.1 The OWNER wishes to finalise the award of work of the facilities covered under this bidding documents within a limited time schedule. The bidders are advised to submit their bids complete in all respects conforming to all terms and conditions of the bid document.

30.1.2 Bids shall be evaluated based on the information / documents available in the bid. Hence bidders are advised to ensure that they submit appropriate and relevant supporting documentation along with their proposal in the first instance itself. Bids not complying with the requirements of Bid Documents are liable to be rejected. Bidders are advised to fill up all Annexure carefully and provide reference to all relevant documents given in their bid offer.

30.1.3 Bidders shall quote their prices on firm price basis. **The prices should be strictly quoted as specified in Section-5 of Part-II, Technical** otherwise the bid may be rejected. Any conditional discount offered by the bidder shall not be considered for the purpose of evaluation, however, the same shall be considered for purpose of award.

Correction of Errors (if any) shall be done as per clause 24.0 above. The comparison shall be on the basis of summation of the arithmetically corrected PRICE in SCHEDULE OF RATES (i.e. the Total of Section-5 of Part-II, Technical). The Owner's evaluation will also include the costs resulting from application of the evaluation procedures described in ITB Clause 30.2. Any adjustments in price that result from the below procedures as per ITB Clause 30.2 shall be added, for the purposes of comparative evaluation only.

30.1.4 The work is not bifurcated. Hence, evaluation of bids shall be done as per clause no. 30.2 below. The order will be placed on overall lowest basis.

30.2 The financial comparison for selection of Lowest (L-1) Bidder / Contractor shall be arrived by using the following methodology:

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30.2.1 TOTAL EVALUATED PRICE

Total Evaluated Price shall be derived as follows:-

a) Total Price quoted by the bidder plus GST (after arithmetical corrections as per clause no. 24.0 if any) in the Schedule of Rates (SOR).

31.0 PRICE VARIATION

The Bidder shall quote firm rate in the **"Schedule of Rates (Section-5 of Part-II, Technical)"**. Firm rate shall not be subject to any escalation on any account. Bids with variable prices shall be disqualified.

32.0 REBATE

32.1 No suo-moto reduction in price(s) by Bidders is permissible after opening of the price bid. If any Bidder unilaterally reduces the price(s) / percentage quoted by him in his bid after opening of price bids, such reduction shall not be considered for comparison of prices but shall be binding on the Bidder if he happens to be selected for award of work

33.0 CONTACTING OWNER

33.1 A Bidder shall not contact the OWNER/CONSULTANT on any matter relating to his bid from the time of priced bid opening to the time that the Contract is awarded, unless requested to do so in writing. Any effort by a Bidder to influence the OWNER/CONSULTANT in the OWNER's/ CONSULTANT's decisions in respect of bid evaluation or contract award will result in the rejection of that Bid.

34.0 AWARD OF CONTRACT

34.1 Subject to ITB Clause 36.0, the OWNER will award the CONTRACT to the successful Bidder whose Technical and Commercial bid has been determined to be qualified, substantially responsive and Price Bid to be the lowest evaluated Bid, further provided that the Bidder is determined to be qualified to perform the CONTRACT satisfactorily.

34.2 After selection, Letter of Intent s ("LOIs") as per mode of contracting shall be released by the OWNER to the selected Bidder. The selected bidder will return the duplicate copy duly signed & stamped as token of acceptance within 15 days.

34.3 The Bidder shall enter into a Contract Agreement with the OWNER as per clause 35.0, failing which the Bid Security/EMD is liable to be forfeited.

35.0 SIGNING OF CONTRACT

35.1 At the same time as the OWNER notifies the successful Bidder that its Bid has been accepted, the OWNER will send to the Bidder a draft of the Contract provided in the Bidding Documents, incorporating all agreements between the parties.

35.2 Within Thirty (30) days of receipt of the CONTRACT, the successful Bidder shall sign and date the Contract Agreement and return it to the OWNER. Cost of execution of the Contract, including payment of stamp duty thereon, shall be borne by the Bidder.

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36.0 OWNER'S RIGHT TO ACCEPT / REJECT BIDS

36.1 The OWNER reserves the right to accept or reject any Bid and to annul the bidding process and reject all Bids at any time prior to award of Contract without thereby incurring any liability to the affected bidder(s) or any obligation to inform the affected bidder(s) of the ground of OWNER's action.

36.2 It is observed that many bidders indulge in trading in contracts by entering into undisclosed back-to-back arrangements for the whole or a substantial portion of a CONTRACTOR's obligations under the contract. If a bidder proposes to enter into any such arrangements upon a successful award of work or has in place any such arrangement which will become operative upon the award of work, the bidder must make a complete disclosure of such arrangement or proposed arrangement in its proposal, and all provisions applicable to sub-contractor(s) in terms of bidding documents shall apply to such arrangements.

36.3 If the existence of such an undisclosed arrangement is reasonably apprehended by the OWNER in the case of a bidder, the OWNER may reject such bidder's bid as not responsive.

36.4 If such an undisclosed arrangement is discovered after the award of work, such arrangement(s) shall be deemed to constitute an assignment of contract and a ground of termination pursuant to the provisions of termination under the General Conditions of Contract.

36.5 Owner/Consultant reserves the right to accept or reject any tender in whole or part and/or accept other than the lowest quotation without assigning any reason. The whole work may be split up between two or more contractors if considered expedient by the Owner/Consultant on their sole and absolute discretion. The bidder shall have no claim in this regards whatsoever.

37.0 CONTRACT SECURITY CUM PERFORMANCE BANK GUARANTEE (CPBG)

37.1 As a Contract Security, a successful Bidder, to whom the work is awarded, shall be required to furnish a Security cum Performance Bank Guarantee in the form attached as Annexure-1.12 within thirty (30) days of issuance of LOI. This Bank Guarantee shall be an irrevocable Bank Guarantee, issued by any scheduled nationalized bank on a non judicial stamp paper of appropriate value. The Bank Guarantee amount shall be equal to ten per cent (10%) of the TOTAL CONTRACT PRICE and it shall guarantee the faithful performance of the CONTRACT in accordance with the terms and conditions specified in these documents and specifications. The Performance Bank Guarantee shall be valid for a period till Project Completion Date / Preliminary Acceptance of Work by Owner plus Defect Liability period of 12 months plus a claim period of 06 months. In case of breach of contract the guarantee amount shall be payable to the Owner without any conditions whatsoever.

37.2 Failure of the successful Bidder to comply with the requirement of Clause 37.1 hereof shall constitute sufficient grounds for forfeiture of Bid Security/EMD without prejudice to its rights and remedies as set forth in this NIT or otherwise in law.

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38.0 INCOME TAX & CORPORATE TAX

38.1 Income tax deduction shall be made from all payments made to the contractor as per the rules and regulations in force and in accordance with the Income Tax Act prevailing from time to time.

38.2 Corporate Tax liability, if any, shall be to the contractor's account.

38.3 MENTIONING OF PAN NO. IN INVOICE / BILL

As per CBDT Notification No. 95/2015 dated 30.12.2015, mentioning of PAN no. is mandatory for procurement of goods / services/works/consultancy services exceeding Rs. 2 Lacs per transaction.

Accordingly, supplier/ contractor/ service provider/ consultant should mention their PAN no. in their invoice/ bill for any transaction exceeding Rs. 2 lakhs. As provided in the notification, in case supplier/ contractor/ service provider/ consultant do not have PAN no., they have to submit declaration in Form 60 along with invoice/ bill for each transaction.

Payment of supplier/ contractor / service provider/ consultant shall be processed only after fulfillment of above requirement.

39.0 GENERAL INSTRUCTIONS

39.1 TRANSFER OF TENDER DOCUMENTS/PROPOSAL

39.1.1 Transfer of Bid submitted by one BIDDER to another is not permitted. No alteration in the essence of a Bid, once submitted, shall be permitted.

39.1.2 OWNER/CONSULTANT reserves the right to verify all statements/information submitted to confirm the Bidder's claim on experience on the performance of equipment offered and capabilities of the Bidder to perform the Scope of Work. OWNER/CONSULTANT may inspect similar facilities built by the Bidder. Bidder shall co-ordinate and arrange for visit. However all expenses of such visit of OWNER's Officials / OWNER's Representative will be borne by OWNER.

39.1.3 OWNER/CONSULTANT shall not entertain any correspondence with any Bidder on acceptance or rejection of any Bid.

39.1.4 Oral statements made by the Bidder at any time regarding any matter including quality, or arrangement of the equipment or any other matter will not be considered and will not be binding on the OWNER/CONSULTANT.

39.1.5 Standard catalogue pages and other documents of the Bidder may be used in the Bid to provide additional information and data as deemed necessary by the Bidder.

39.1.6 Bidder will furnish the Bid with all relevant information's as called for. Bids with incomplete information are liable for rejection.

39.1.7 If at any later date, it is found that documents, information and data submitted by the Bidder in the Bid, and based on which the Bidder has been considered eligible or successful or has been awarded the Contract is incorrect or false to the extent that had the correct or true information been made available to the OWNER at the time of Bid

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evaluation, the bid would have been declared ineligible or unsuccessful, the Bidder shall be forthwith disqualified or, as the case may be, the contract awarded based on such incorrect or false information shall be cancelled and the EMD/PBG shall be liable to be forfeited.

40.0 INTEGRITY PACT

Bidders are required to unconditionally accept the "Integrity Pact (IP)", as per Annexure 1.17, (executed on plain paper) and submit the same duly signed on all pages by the bidder's authorized signatory along with the EMD / Documentary evidences in support of EMD exemption for MSEs & PSEs. In case, Annexure-1.17 duly signed & stamped is not found in the sealed envelope / techno-commercial bid and / or is not found as per the format required as per the bidding document, the bidder will be asked to furnish the same before price bid opening. Failure to comply with this requirement, the bid shall be rejected.

41.0 RATES FOR EXTRA ITEMS

Rates for additional, altered or substituted work shall be determined by the Engineer-in-Charge as follows:-

a) If the rate for the additional, altered or substituted item of work is not specified in the said schedule of quantities, the rate of that item shall be derived from the rate for the nearest similar item specified therein.

b) If the rate for any additional, altered or substituted item of work cannot be determined in the manner specified in sub-para (a), then such item of work shall be carried out at the rate entered in the C.P.W.D. Delhi Schedule of Rates, 2016. The contractor to quote the % above or below the rates as mentioned in CPWD Schedule of Rates Delhi 2016.

c) If the rate for any additional, altered of substituted item of work cannot be determined in the manner specified in sub para (a) to (b), the contractor shall within 7 days of the date of receipt of the order to carry out the said work, inform the Engineer-in-charge of the rate which he proposes to Claim for such item of work, supported by analysis of the rate claimed by the rate of labour and materials. In the event of the contractor failing to inform the Engineer-in-Charge within the stipulated period of time and rate which he proposes to claim, the rate for such item shall be determined by the labour and materials and quantum of labour and materials as per actual observation, provided all these elements are justifiable, plus 15% to cover the contractor’s profit and over head.

d) If any altered, additional or substituted item of work ordered comprises of more than one part/sub item and each part/sub item could be priced in different manners according to the principles laid in sub para a to c, the decision of the Engineer-in-Charge as the appropriate principle of pricing applicable to the particular part/sub item shall be final.

e) No deviation from specifications stipulated in this contract shall be made or additional items of work shall be carried out by the contractor unless the rates of such substituted, altered or additional items have been approved in writing by the Engineer-in-Charge failing which Owner shall not be liable to pay any claim on this account.

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42.0 BIDDER TO QUOTE FOR ALL ITEMS

The bidders shall quote their rates with reference to each item and must tender for each and all the items shown in the attached schedule of quantities.

43.0 BIDDER TO SIGN ALL PAGES

All pages of the tender documents shall be signed and stamped by the bidder.

44.0 ERASURES AND ALTERATIONS

Tenders containing erasures and alterations in the tender documents may be rejected. All rates shall be indicated both in words and figures. Where there is a difference between the rates quoted in words and figures, the rates given in words shall prevail.

45.0 INCOMPLETE AND LATE TENDER

Unsolicited/Incomplete/late tenders are liable to rejection without any further reference.

46.0 EXECUTION OF CONTRACT

The successful bidder shall be required to execute contract with Owner within reasonable time.

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SECTION-2.0

GENERAL CONDITIONS OF CONTRACT

(GCC)

PART-I : COMMERCIAL

SECTION - 2.0

GENERAL CONDITIONS OF CONTRACT

0	22.06.2018	FOR TENDER	PKC	SK	RRK
REV.	**DATE**	**PURPOSE**	**PREPARED**	**REVIEWED**	**APPROVED**

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GENERAL CONDITIONS OF CONTRACT

ARTICLE-1: DEFINITIONS

In this contract the following words shall have the meaning herein assigned to them respectively.

a. **i-"Tenderer"** means any person, firm or company invited to submit their tenders; including their authorised representative for the work.

ii-"Bid/Tender" shall mean offer/proposal/document that the bidder/tenderer submit in the required and specified form in accordance with the provisions of NIT duly signed by the bidder or authorized signatory under the seal of firm document, LOI.

b. "**The Work**" means all duties, responsibilities and obligations to be discharged by the Contractor pursuant to the Scope of Work and Technical Specifications mentioned in the contract.

c. "**The Contractor's Equipment**" means all machinery, apparatus, materials and equipment to be provided by the Contractor pursuant to the Contract for and in connection with the work but not forming or intending to form a permanent part of Plant.

d. "**Site**" shall mean the plants location at Gorakhpur for which this Purchase Order/Contract has been issued and where the Equipment / Works to be erected / executed. The location of plant site is in Gorakhpur, Uttar Pradesh.

e. "**Date of Completion**" means the date specified in the body of the contract hereto or such later date as may be agreed to in writing from time to time by the Owner/Consultant.

f. "**Month**' shall mean English Calendar month.

g. "**Contractor**" **or "Supplier" or "Vendor"** shall mean any person, firm or company awarded the work through Letter of Intent and accepted by him/them.

h. **"Purchaser / Owner / HURL"** shall mean **HINDUSTAN URVARAK & RASAYAN LIMITED (HURL)** having their site at Gorakhpur, Uttar Pradesh, India.

i) **"Consultant"** shall mean M/s Projects & Development India Ltd (PDIL) having their office at A-14, Sector-1, Noida, Dist.-Gautam Budh Nagar, UP- 201301, India is acting for and on behalf of M/s. Hindustan Urvarak & Rasayan Limited (HURL) for providing Consultancy Services for the Project.

ii) **"Engineer-In-Charge"** shall mean person designated as such by HURL or his duly authorized representative and includes those who are expressly authorized to act for and on its behalf respectively for operation of the contract and who will be in-

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charge of the works and under whose supervision and direction the work shall be carried out.

i. "**Principal Rotating Equipment**" shall mean those items of equipment comprising of centrifugal compressors, steam turbines, high pressure boilers feed pumps, from 3300 volts electric motors, turbine generator, diesel generator and gear boxes associated with any of these equipment.

j. "**Goods**" means all of the Equipment, machinery, and/or other materials which the Supplier/Contractor is required to supply/execute to the purchaser under the Purchase Order/Contract.

k. "**Services"** means supervision to installation, commissioning, provision of technical assistance, training and other such obligations of the Supplier covered under the Purchase Order.

l. "**Subcontract**" shall mean Order/Contract placed by the Supplier/Contractor, for any portion of the Order or Work, after necessary consent of Owner/Consultant.

m. "**Subcontractor**" or "Sub Vendor" or "Sub Supplier"- shall mean any person or persons or firm or their legal representatives, successors, assignees to whom part of Order has been sub-let by the Supplier/Contractor.

n. "**Battery Limit**" shall mean the area within which Plant/Equipment are to be located.

o. "**Plant"** shall mean entire assembly of the Equipment within specified Battery Limit.

p. "**Drawings"** shall mean and include Engineering drawings, sketches showing plants, sections and elevations related to the Purchase Order/Contract together with modifications and/or revisions thereto.

q. "**Specifications**" shall mean and include schedules, detailed description, statement of technical data, performance characteristics, standards (Indian as well as international) as applicable and specified in the Purchase Order/ Contract.

r. "**Engineer**" shall mean the Engineer or Executive-in-charge at Site nominated by Owner/Consultant.

s. "**Inspector**" shall mean any person or outside agency nominated or agreed by Owner/Consultant to inspect Equipment stage-wise as well as final inspection, before despatch, at Supplier's/Contractor's work and on receipt at Site as per the terms of the Purchase Order/ Contract.

t. "**Tests"** shall mean such process or processes to be carried out by the Supplier as are prescribed in the Purchase Order/Contract or considered necessary by Owner/Consultant or their representatives in order to ascertain quality, workmanship, performance and efficiency of Equipment or part thereof.

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u. **"Approval**" shall mean and include the written consent, either manuscript, type - written or printed statement, under signature or seal, as the case may be, of the Owner/Consultant or their authorized representative on documents, drawings or other particulars in relation to the Purchase Order.

v. **"Work Order/Contract"** means the agreement entered into between Owner/Consultant and the Supplier, as recorded in the Purchase Order form, signed by the Owner & accepted by Supplier, including all attachments and Annexure thereto and all documents incorporated by reference therein together with any subsequent modifications thereof in writing.

w. "**Work Order/Contract Price"** means the price payable to the Supplier under Purchase Order for the full and proper performance of his contractual obligations.

x. **"Schedule of rates"** shall mean the rates/percentage quoted by the tenderer with his tender/bid and which have been finally accepted by Owner.

y. **"Effective date of Work Order''** shall be the date of Issuance of Notification of Award (Letter of Intent) by Fax/Email unless otherwise agreed.

z **"Act/code"** shall mean any law, rules, regulations, notification, issued and passed by Central/State or local authority for the time being in force in India.

z^1. "**Completion period"** shall mean the period of date on/by which the work shall be completed in all respect as agreed to between Owner and the contractor.

ARTICLE-2: CONTRACTOR'S SERVICES

a. The Contractor shall supply material under scope and provide, execute, complete and maintain the work in Accordance with the Contract. The contractor shall also perform the services described in various sections of Invitation to Tender.

b. The contractor undertakes to cooperate with the Consultant/Owner and other contractor's appointed by the Owner for the Plant and agrees to exchange technical information as may be reasonably asked for to obtain most efficient and economical Plant for owner.

c. The contractor shall be responsible for ensuring that the positions, levels and dimensions of the work are correct according to the Contract notwithstanding that he may have been assisted by the Consultant in setting out the said positions, levels and dimensions. Any discrepancies shall be promptly intimated to the Owner/Consultant for his final decision.

d. The work to be done under the contract shall be executed with all due diligence and in the manner specified in the Contract and to the satisfaction of the Owner/Consultant. The contractor hereby undertakes that work shall be ready for tests on completion not later than the date of completion.

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e. The contractor shall carryout all such tests as are specified in the Contract and/or required in accordance with good engineering practices or directed by Owner/Consultant for ensuring the quality and performance of the equipment and materials supplied and work done under the contract at his own cost.

f. Contractor shall arrange for all handling, safe storage and security of all the equipment/ material issued to him for erection.

g. Contractor shall arrange all tools, tackles, cranes and other material handling equipment's, welding equipment and cables, welding rods, scaffoldings (metallic only), consumable stores, safety equipment & appliances and all other equipment/accessories required for execution of work including erection and testing. These shall not be removed from the site without the written permission of the Owner.

h. Contractor shall bear all postage/courier, telephone/fax, telegraph and other communications etc. expenditure during his work at the site.

I. Contractor shall provide necessary supervisory staff and inspectors, erection engineers, skilled and unskilled labour, clerical staff, watch and ward staff, store keepers, drivers, etc. required in connection with the execution of the contract.

j. Contractor shall provide all amenities, including but not limited to, accommodation/ conveyance to his staff and labour employed by him for the work at the site.

ARTICLE-3: CONTRACT PRICE

a. The Owner shall pay to the Contractor sum not exceeding to what is set out in the Letter of Intent /Work Order, reduced or increased by such sums (if any) as under the Contract are to be taken into account in ascertaining the Contract Price. The Contractor shall take written permission from Owner for carrying out works beyond stipulated contract value as and when such situation arises.

b. The contractor shall credit the Owner with the sums which may become allowable or due under the Contract at the times and in the manner hereinafter specified.

c. The prices shall be fixed for the duration of the contract and shall not be subject to escalation of any description including extension of time, if any granted by owner on any ground, what-so-ever it may be.

ARTICLE-4: OWNER'S REPRESENTATIVE/CONSUTLANT

a. All instructions and orders to the Contractor shall, except as herein otherwise provided, be given by the Owner through his nominated representative(s).

b. All the work shall be carried out under the direction of and to the satisfaction of the Owner/Consultant.

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c. The contractor shall proceed with the work in accordance with decisions and orders given by Owner/Consultant in accordance with the contract provided that:

i. If the contractor being given any decision, instruction or order other than in writing and if the contractor without any undue delay require it to be confirmed in writing, such decision, instruction or order shall not be effective until written confirmation thereof has been received by the contractor, and

ii. If the contractor after receiving any decision, instruction from the Owner/Consultant in writing or written confirmation thereof, intimates within fourteen days any dispute or questions the decision, instruction, or order by written notice to the Owner/Consultant giving his reasons for so doing, either party shall be at liberty to refer the matter to arbitration pursuant to Article-35 hereof, but such an intimation shall not relieve the contractor of his obligations to proceed with the work in accordance with the decision, instruction, or order in respect of which the intimation has been given.

ARTICLE-5: CONTRACTOR TO INFORM HIMSELF FULLY

The contractor shall be deemed to have carefully examined the specifications, schedules and drawings and also to have satisfied himself as to the nature and character of the work to be executed and, the Site conditions and other relevant matter in detail, before entering in to the contract. No claim whatsoever, if subsequently made in this regard, shall be entertained by the owner/consultant.

ARTICLE-6: FINANCIAL GUARANTEE FOR SECURITY AND PERFORMANCE

A) The Contractor shall provide the Owner with the financial guarantee for the due and faithful performance of the contract for a sum equal to 10% (ten percent) of the contract value or the sum as defined in the body of the contract. Such guarantee shall be in the form of a Bank Guarantee from any Scheduled/ Commercial Bank recognised by Reserve Bank of India on the format attached herewith. Contractor shall inform the Owner/Consultant name and address of its banker along with Fax Number and E-Mail.

The Bank Guarantee shall be furnished within 15 days of placement of letter of intent and shall be valid until expiry of the maintenance period referred to in Article - 31.

B) For increase of 20% in contract value, performance guarantee originally submitted shall remain valid. For increase beyond 20% additional guarantee to cover total increase from original contract value shall be submitted by the contractor.

C) The validity of performance guarantee shall be suitably extended in accordance with final date of completion of work plus 12 months maintenance period from the date of certified final completion of work plus 6 months (claim period).

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D) The proceeds of performance security shall be appropriated by the Owner/Consultant as compensation for any loss resulting from the Supplier's/Contractor's failure to complete its obligations under the Purchase Order without prejudice to any of the rights or remedies the Owner/Consultant may be entitled to as per terms and conditions of Purchase Order/Contract.

ARTICLE-7: DRAWING AND DESIGNS

a. The drawings and detailed technical specification shall be supplied in stages, after the award of work, keeping in view the site requirements.

b. All drawings, designs, specifications and other documents furnished by the Owner/ Consultant to the contractor, including all features whether patented or patentable or not, or whether separately or collectively shown, are the exclusive property of the Owner and shall be confidential and shall not be lent or reproduced in whole or in part nor used for any purposes other than in execution of the Contract without the previous written consent of the Owner/Consultant. Such drawings, designs and other documents are loaned by the Owner/Consultant to the Contractor and subject to return on demand.

c. Where with the written permission of the Owner/Consultant the Contractor reproduces any drawing or design in whole or part, the contractor shall stamp it as follows:

This drawing/design, including all patented and patentable features separately or collectively shown is reproduced from a drawing/design which has been furnished by the (Owner/Consultant) and is not to be reproduced or used for any purpose other than those specifically permitted in writing by the (Owner/Consultant).

d. Any reproduction of any such drawings, designs, specification or any other document shall be equally subject to return on demand or on completion of work as the clause (b) above, whichever is earlier.

ARTICLE-8: PATENT AND OTHER RIGHTS

a. The contractor shall fully indemnify the Owner against any action, claim or demand, costs or expenses, arising from or incurred by reason or any infringement or alleged infringement of any letters, patent, registered design, trade mark of name copy right or other protected right in respect of the work or method of using, fixing, or working the Equipment's authorised or recommended by the Contractor.

b. The Owner warrant on their part that any design or instructions furnished or given by him for performance of work hereunder to the contractor shall not be such as will cause the contractor to infringe any letters patent, registered design, trademarks or copy right in the performance of the contract.

In the event of any action being brought or any claim or demand being made against owner on account of any such matter as aforesaid, the Contractor shall immediately be notified

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and he shall at his own expenses fully cooperate with Owner and shall do all that the Owner may reasonably require in defence in such action or to resist such claim or demand.

ARTICLE-9: ROYALTIES

All payments and royalties payable in respect of any letters, patent and other rights whether payable in one lump-sum or by installments or otherwise are included in the Contract Price. Owner/consultant shall not be liable to pay such dues or sums.

ARTICLE-10: ASSIGNMENT AND SUBLETTING

a. The Contractor shall not without the consent in writing of the Owner/Consultant assign or transfer the contract or benefits or obligations or any part thereof to or enter into any sub-contract with any other person. Any such consent shall not relieve the Contractor from his obligations under the Contract.

b. If any sub-contractor engaged upon the work with due permission from Owner/Consultant at the site executes any work which in the opinion of the Owner/Consultant is not of the requisite standard (the opinion of the Owner/ Consultant being final in this regard), the Owner/Consultant may by written notice to the Contractor require the Contractor to terminate such sub-contract, and contractor shall upon the receipt of such instructions terminate such sub-contract at the risks and cost of the Contractor, and shall keep Owner/Consultant indemnified against all the consequences.

ARTICLE-11: GUARANTEE

a. All Equipment supplied and work done by the Contractor pursuant to the Contract shall be guaranteed by the Contractor to be in accordance with the specifications contained in the contract, new and of the best quality and workmanship and to be of expert design conforming to generally accepted Indian/International standard to be of sufficient size and capacity and of proper materials so as to fulfill in all respects requirements specified in regard thereto.

b. If at any time during the execution of the work or during the maintenance period specified in Article-31 hereof, the Owner/Consultant shall decide that any equipment supplied or work done by the contractor fails in any respect to conform to the guarantees given by the contractor in paragraph (a) hereof, the Owner/Consultant may as soon as reasonably practicable, give the contractor a notice in writing of the respects in which the equipment supplied or the work fails to conform to the such guarantee and the contractor shall thereupon, at his own expense, replace any equipment and carry out any further work that may be necessary to ensure that the equipment supplied and the work done conforms to such guarantee.

c. If the contractor fails within a reasonable time not exceeding 15 days from the date of notice in this behalf from the Owner/Consultant to take such steps as may be necessary to

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fulfill his obligations under paragraph (b) hereof then the Owner/Consultant may, at the expense of the contractor shall conform to such guarantee.

d. If any replacement of equipment or the work done by the contractor pursuant to this article shall be of such a nature as to effect the efficiency or performance of the whole or any portion thereof, Owner/Consultant may give notice to the contractor in writing requiring that a test or tests shall be carried out at the expense of the contractor and in accordance with the technical standards prescribed by Bureau of Indian Standards.

ARTICLE-12: VARIATIONS AND OMISSIONS

a. The contractor shall not; alter any of the work except as directed in writing by the Owner/Consultant but the Owner/Consultant shall have the full power from time to time during the execution of the contract by notice in writing to direct the contractor to alter, amend, omit, add to, or otherwise carry out any of the work, and the contractor shall carry out such variations, and be bound by the contract so far as applicable as though the said variations were stated in the contract. In any case, in which, the contractor has received any such direction from the Owner/Consultant which either then, or in the opinion of the contractor, will later involve an increase or decrease in the contract price, the contractor shall within seven (7) days of such direction, advise the Owner/Consultant in writing to that effect. The Owner/ Consultant shall thereupon approve in writing such variations which are to be given effect together with the amount of increase or decrease in the contract price on that account. The contractor shall then give effect to such variations. The difference in cost, if any, occasioned by any such variations, shall be added to or deducted from the contract price and paid in the same way as the contract price.

b. If in the opinion of the contractor any such variation is likely to prevent or prejudice him from fulfilling any of obligations under the contract, he shall notify the Owner/ Consultant thereof, in writing and the Owner in consultation with consultant shall decide forth with whether or not such variations; shall be carried out. If the Owner/ Consultant amends his instructions in writing, the said obligations shall be modified to such an extent as may be agreed in writing between the owner and the contractor, provided however, that the contractor may not call upon the owner to agree to any such variations as would in any way, have the effect of modifying the obligations of the contractor under the provisions of Article-8 and 11 hereof.

If any variation in the scope of work necessitates any extension in the time for completion, the provisions of Article-25 here of shall apply.

ARTICLE-13: EXECUTION OF WORK IN INCLEMENT WEATHER

The contractor shall, during inclement, weather, carryout the work in accordance with the contract and the contractor shall not be entitled to any additional payment over and above the contract price by reason of his being unable to carry out the work owning to inclement weather.

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It is presumed that the Contractor has familiarized himself with the weather conditions prevailing in the area therefore in such weather parameters if it appears to the Engineer –in –charge (EIC) that certain weather condition may damage the work or specified quality of the work can be achieved without stoppage of the work, the EIC in such conditions may require the Contractor to stop the work till such time as he thinks fit and appropriate. It is understood by the contractor that no compensation will be admissible on this count. However in exceptional circumstances at the recommendation of the EIC, Consultant/owner may grant reasonable extension of Time.

ARTICLE-14: CONTRACTOR'S DEFAULT

If the contractor shall fail or neglect to execute the work with all diligence and expedition, or shall refuse or neglect to comply with any reasonable orders given to him in writing by the Owner /Consultant in connection with the work, or shall contravene the provisions of the contract, the Owner/Consultant may give notice in writing to the contractor specifying the time within which to make good such failures, neglect or contravention. Should the Contractor fail to comply with the notice within the time specified in the notice, then the Owner either on its own or in consultation with the consultant shall be at liberty forthwith to make good such failure, neglect or contravention and to execute such part of the work as the contractor may have failed or neglected to do, all without prejudice to other rights the owner may have under contract, to take the work wholly or in part out to the contractor's hands and enter into contract with any other person, firm or company to complete the work or any part thereof, and in such events the owner shall have free use of all contractor's hands and enter into contract with any other person, firm or company to complete the work or any part thereof, and in such events the owner shall have free use of all contractor's equipment and other things that may be at any time on the site in connection with the work, without being responsible to the contractor, for fair wear and tear thereof, and to the exclusion of any right of the contractor over the same, and the owner shall be entitled to retain any balance amount which may be otherwise due under the contract to the contractor or such part thereof as may be necessary to the payment of the cost of executing the said part of the work or of completing the work as the case may be and of meeting claims of third parties against the owner and arising from or in consequence of the contractor's failure, neglect, refusal or contravention as aforesaid, if the cost of completing the work or executing a part thereof or of meeting claims of third parties as aforesaid shall exceed the balance due to the contractor under this contract the owner shall have right to recover the balance from amounts payable to the contractor under any other contract or from his performance guarantee. The contractor shall not resort to unilateral stoppage of work due to any reason whatsoever. If he does so, it shall be treated as default and breach of contract.

ARTICLE-15: BANKRUPTCY AND WINDING UP

If the contractor shall become bankrupt or insolvent or have a liquidator/receiver appointed over his company, or compound with his creditors, or being a corporation, commence to be wound up, not being a member's voluntary winding up for the purpose of reconstruction, or

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carry on its business under a receiver for the benefit of its creditors or any of them, the owner shall be at liberty -

a. to terminate the contract forthwith by notice in writing to the contractor or to The Receiver or Liquidator or any person in whom the contract may become vested, and to act in the manner provided in Article-14 hereof as referred to in such Article and the work had been wholly taken out of contractor's hands or

b. to give such receiver, liquidator, or other person the option of carrying out the contract subject to his providing guarantee for the due and faithful performance of the contract to the extent of work desired by the owner and upto the amount to be agreed within; the over all contract value.

ARTICLE-16: INSPECTION AND TESTING

a. The representatives of the Owner and the consultant shall be entitled at all reasonable time to inspect the work or any part thereof. The contractor shall provide all necessary assistance to the Owner/Consultant and shall make available all such tools to enable the owner/consultant may require carrying out such tests/inspection. The contractor shall uncover any part of the work or make openings for inspection as the Owner/Consultant direct and shall reinstate and make good such part to the reasonable satisfaction of the Owner/Consultant. The contractor shall ensure that his sub-contractors and vendors also provide such facilities for inspection and tests by the Owner/Consultants that have been mentioned in this clause.

b. On receiving notice from the contractor that the work is ready for inspection, the Owner/Consultant shall without unreasonable delay, attend for the; purpose of inspecting the said work. The Owner/Consultant reserves the right to waive participation in any test requirements, which however shall not absolve the contractor of his liabilities herein. When the tests have been completed satisfactorily, the contractor shall furnish the test certificates for owner/consultant's signatures within two days of completion of such tests.

c. The owner/consultant shall have the right, according to his judgment and specifications to for-bid the use and the dispatch of all such materials which, during tests and inspections, fail to comply with requirements.

d. The contractor shall not dispatch any equipment without the completion of final inspection by the owner/consultant. The waiver from participation in the final inspection shall be made by the owner only.

e. Whenever it is necessary to cover up any work in respect of which previous inspection is desired and the contractor has been notified accordingly by the owner/consultant in writing, the contractor shall give notice in writing to the owner/consultant before the work is covered up. No such work shall be covered up or built upon unless it has been inspected and approved by the owner/Consultant or unless the owner's consent in writing to this was being done without his previous inspection and approval has been obtained in advance.

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f. Inspection/waiver by Owner/Consultant shall not, however, relieve the contractor of its obligations including guarantees and warranty obligations hereunder.

ARTICLE-17: ORIGIN OF MATERIALS

a. The Owner shall have the right, at any time, to call upon the contractor for evidence of origin of raw materials and parts of equipment.

b. All equipment supplied or used shall be new and of first class and quality of the grade specified.

ARTICLE-18: MILL CERTIFICATES

All mill certificates covering physical and analytical tests are to be produced as called for by the owner/consultant at no extra cost.

ARTICLE-19: FLAME PROOF ELECTRICAL EQUIPMENT

Where the equipment include flame-proof electrical equipment to a recognized Indian Standard or code of practice, then the contractor shall forward copies of the relevant certificates to the owner at no extra cost.

ARTICLE-20: TEST CERTIFICATES

The contractor will, if so required by the owner/consultant supply specified numbers of test certificates and/or materials analysis certificates. Reports from recognized agencies of repute (The agencies shall be approved by consultant/owner). In case of any doubt the contractor shall repeat the test at his own cost.

ARTICLE-21: ACCESS TO AND POSSESSION OF THE SITE

a. Subject to paragraph (c) hereof, access to and possession of the site shall be afforded to contractor by the owner/consultant in reasonable time.

b. In the execution of the work, no persons other than contractor's employees or labours shall be allowed on the site, except by the written permission of the owner, but facilities to inspect the work at all times shall be afforded to the owner/consultant and his representatives and other authorized officials or representatives of the owner/consultant.

c. The access to and possession of the site referred to in paragraph (a) hereof shall not be exclusive to the contractor but only such as shall to enable him to execute the work. The contractor shall afford to the owner/consultant, and to other contractors authorized by

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owner/consultant every reasonable facility for the execution of work concurrently with his own.

d. Unless otherwise provided in the contract, the owner shall give contractor facilities as far as possible for carrying out the work on the site continuously during the normal working hours as fixed by the owner, the owner may, after consulting with the consultant direct that the work shall be done at other times if it shall be practicable in the circumstances for the work to be so done.

e. Construction Water and Power shall be arranged by Contractor at their own cost.

ARTICLE-22: CONTRACTOR'S EQUIPMENT

a. The contractor shall, at his own risk and expenses, provide all equipment necessary to execute and complete the work, If any equipment is available with owner at the site, the contractor may, with the written consent of the owner, use the same on payment of necessary charges as fixed by the owner.

b. All contractors' equipment shall be used solely for the purpose of the work at site and shall not be removed from site by the contractor, without the permission in writing of the Owner, and the contractor shall be liable for the loss or destruction thereof or damage thereto. If there shall be any due owing or accruing to owner, from the contractor any money in respect of this contract, the owner shall be at liberty, at the cost of the contractors, to sell and dispose of any such (Contractors) equipment, as the owner shall think fit, and to apply the proceeds in or towards the satisfaction of such money as aforesaid.

ARTICLE-23: CONTRACTOR'S REPRESENTATIVES AND WORKMEN AT SITE

a. The contractor shall employ one or more competent and authorized representative whose name or names with specimen signature shall have previously been communicated in writing to the owner/consultant by the contractor, to superintend and carrying out the work. The said representative shall be present at site during working hours and any orders or instructions which the owner/consultant may give to the said representative shall be deemed to have been received by the contractor.

b. The consultant and/or owner shall be at liberty to serve by notice in writing to the contractor to object to any representative or person employed for execution or otherwise for the work, who, in the opinion of the owner/consultant, misconduct himself or is incompetent or negligent. On receipt of such notice, the contractor shall remove such person from the site forthwith.

c. The consultant and owner shall be given the opportunity to approve the employment of casual labour hired for the work.

d. The contractor and his employees shall abide by the site working rules.

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e. The contractor shall immediately notify the owner/consultant in writing of any labour dispute affecting the work. Such notice shall describe the nature of labour dispute and the actions being taken by the contractor to settle the disputes.

f. The contractor shall keep the owner/Consultant indemnified from and against all personal and third party claims whatsoever (inclusive of all costs incurred between attorney and client) arising out of any act, omission or intermission on part of contractor, any sub contractor or agent, sub-agent, consultant or employee of the contractor or any sub-contractor whether committed, omitted or arising within or without the scope of the contract, sub-contract agency or employment, as the case may be.

ARTICLE-24: LIABILITY FOR ACCIDENTS, DAMAGE AND INSURANCE

a. The contractor shall, during the execution of the work, properly cover up and protect any part of the work liable to injury by exposure to the weather and; shall take every reasonable precaution against accident or injury to the work from any cause.

b. All contractors' equipment shall be at the sole risk of the contractor.

c. The contractor will insure all his personnel employed for the execution of the work against any personal injury that may be sustained by them as a result of the execution of the work and present satisfactory evidence to the owner/consultant that such insurance is in force.

d. The contractor shall be responsible for workman's compensation insurance and all other statutory requirements in regard to the personnel in the contractor's employment.

e. Owner will be taking storage / erection policy. The contractor at his own cost shall arrange, secure and maintain all insurance that may be pertinent to the works and obligatory in terms of law to protect his interest and interest of the owner against all points including accident insurance in the joint names of contractor and the owner. Contractors All Risk Insurance Policy covering a) fire & lightening / lighting, b) accident damage during construction for example due to dropping or falling or defective workmanship and materials, lack of skill, negligence, malicious act or human error, c) water damage, flood, storm, tempest inundation, earthquake, d) Collapse, collisions, impact e) theft and burglary, malicious damage f) subsidence, land slide, rock slide. The period of insurance cover shall be from commencement of work upto completion and handing over of the work to the owners. The sum insured should represent the completed value of work done including cost of all materials etc.

ARTICLE-25: TIME FOR COMPLETION

a. The terms and conditions agreed upon with respect to this agreement shall be subject to 'Force Majeure'. 'Force Majeure' shall be deemed to be only cause beyond the reasonable control of the contractor or the owner, as the case may be, which prevents or impedes the due performance of the agreement and which by the due diligence the affected party is

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unable to avoid or overcome through its individual concerted effort. For the purpose of this Article, Force Majeure shall mean and be limited to the following:

i) Any war or hostilities;

ii) Any riots or civil commotion;

iii) Any earthquake, flood, tempest, lightening or other natural physical disaster;

iv) Any accident fire or explosion not caused by the negligence of the contractor;

v) Any legal strike / lock-out or other industrial disturbance (only those exceeding 10 continuous days in duration) affecting the performance of the contractual obligation.

vi) Any law or order of any Government Department or other authority which delays or impedes the contractor in the execution of the work.

b. If either party is prevented or inordinately delayed in the performance of any of its obligations under the agreement by Force Majeure and if affected party gives written notice to the other party specifying the matter constituting Force Majeure with necessary evidence that a contractual obligation is thereby prevented or delayed, and the further period which it is estimated that such prevention or delay will continue, then the effected party shall be excused the performance or delayed performance as the case may be of such obligations as from the date of such notice for so long as may be justified.

c. Any occurrences of Force Majeure shall be informed in writing within seven days of occurrence otherwise it shall not be deemed as force majeure. Such Force Majeure shall be effective from the date of receipt of such notice from either party. Continuance of Force Majeure shall be informed every week.

d. If by virtue of the proceeding paragraphs either party shall be excused the performance or punctual performance of any obligation for a continuous period of six months the parties shall consult together with a view to agreeing what action should in the circumstances be taken and what amendments to the terms of the contract ought to be made.

e. For variation in the scope of work resulting into additional 25% in estimated contract value, no extension in completion time shall be admissible. Notwithstanding any other provision in the contract, the Owner/Consultant may at any time of its own initiative or at the request of the contractor, if satisfied of the existence of any ground (s) may extend the completion period by duration as deemed reasonable. The decision of the Owner/Consultant in this regard shall be final and binding upon the contractor.

f. Within (7) seven days from the date of receipt of work Order the contractor shall submit to the owner/consultant for approval in respect of each job site or groups of work or a detailed Progress schedule in graphical or other suitable form giving dates of starting and finishing of various operations and works related to the work providing sufficient margin to cover for contingencies and for final testing and consequential repair etc., if any required. The owner/consultant and contractor shall thereafter within seven days settle the progress schedule and the progress schedule so settled shall be the approved progress schedule and shall form part of the contract with attendant obligations upon contractor to commence

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the various works/operations involved on or before the date(s) mentioned in; the progress schedule and to conclude the said work(s)/ operation(s) on or before date mentioned in this behalf in the approved progress schedule, and default by contractor to commence or complete within prescribed date(s) any work or operation shall be deemed to be a breach of contract by the contractor to which the provisions of clause 30 relating to termination of contract shall be applicable, but without prejudice to any other rights or remedies that owner may have in this behalf.

g. **PREDETERMINED AGREED DAMAGES FOR DELAY**

If for reasons not attributable to the owner or due to conditions not constituting force majeure as defined in this contract the work is not completed in accordance with the provisions hereof within and in accordance with the Time Schedule hereto/the TIME FOR COMPLETION, it is clearly understood and agreed that the Owner shall be entitled to and the contractor shall pay to the Owner the following as mutually agreed damages for delay (which are a genuine pre-estimate made by the parties of the loss which the Owner would have suffered on account of such delay in completion of the work) after taking into consideration all circumstances and not as penalty and without the owner being required to establish and prove the actual loss/damage suffered by the owner on account of such delay :

i. The pre estimated mutually agreed damages for delay pursuant hereto shall be payable at the rate of 1/2% (half percent) of total contract value per week or part thereof delay in completion of the work subject to a maximum of 5% of final value of work. It is expressly agreed by and between the owner and the contractor that no prior notice will be required to be given by the owner to the contractor, before effecting recovery of compensation amount from their bills/other due if any.

ii. Notwithstanding anything to the contrary contained in this Contract and without prejudice to the rights of the Owner under this CONTRACT and the entitlement to the said pre-estimated mutually agreed compensation for delay and in addition and not in derogation or substitution thereof the owner shall be entitled to terminate this contract in whole or in part without being liable to the contractor in any manner whatsoever or to have the uncompleted portion of the work to be executed/performed pursuant hereto by the contractor completed/ executed/performed at the risk and cost of the contractor in the event of, and despite 30 days notice in writing the contractor failing to complete/execute/perform all or any part of the work to be completed / executed / performed pursuant hereto by the contractor within and in accordance with the Time Schedule hereto/the TIME FOR COMPLETION as extended in accordance with the provisions hereof or by the owner.

ARTICLE-26: COMPLETION TEST

Completion test if applicable shall be carried out as per technical specification in Contract / BIS.

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ARTICLE-27: TAKING OVER

a. taking over shall be done at one stage after completion of the entire job except where desired by owner otherwise. Only one completion certificate shall be issued after completion of all jobs.

b. Within 15 days of carrying out final inspection of the works at any job site covered by the contract, the contractor shall clear the job site covered by the contract, the contractor shall clear the job site of all scaffolding, wiring, pipes, surplus materials, contractor's labour's equipment and machinery and shall, demolish, dismantle and remove all contractor's site offices and quarters and other temporary works, structures and constructions and other items and things whatsoever brought upon or erected at the job site or any land allotted to the contractor by the owner and not incorporated in the permanent works and shall remove all rubbish from the job site and the land allotted to contractor and shall clear level and dress the job site and said land to the satisfaction of the owner/consultant and shall put the owner in undisputed custody and possession of the job site and all land allotted by the owner to the contractor, and unless the contractor shall have fulfilled the provisions of this clause the works shall not be deemed to have been completed.

c. The contractor shall submit following documents as desired by owner before completion certificate is issued:

i) The Technical Documents according to which the work was carried out;
ii) Complete set of working drawings showing therein corrections and modifications (if any) made during the course of execution of the works, signed by the owner;
iii) Certificates of final levels as set for various works, signed by the owner;
iv) Final Test Certificate;
v) Certificates of owner; of satisfactory fulfillment of the provisions as above hereof;
vi) List of owner supplied surplus materials returned to owner's stores, signed by the owner;
vii) Materials-at-site accounting for owner supplied materials, signed by the owner;
viii) List of the scrap materials returned to store, signed by the owner.
ix) Discharge certificate in respect of owner supplied equipment and machinery signed by the owner.
x) Any other certificate/document which owner/consultant may find necessary.

d. The issue of completion certificate shall be without prejudice to the owner's rights and contractor's liabilities under the contract, including the contractors liability for the defect liability period nor shall the issue of a completion certificate in respect of the works or work at the job site be construed as a waiver of any right or claim of the owner against the contractor in respect of work or the works at the job site in respect of which the completion certificate has been issued.

e. Upto and until issue of the completion certificate as provided for herein above in respect of the works or the works at job site the relative work(s) shall be and remain at the risks of the

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contractor in all respects, including (but not limited to) accident, fire, lightning, earthquake, flood, store, tempest, riot, civil commotion and /or war.

ARTICLE-28: SUSPENSION OF WORK ON INSTRUCTION OF OWNER/ CONSULTANTS

a. The Contractor shall on the written order of the owner/consultant, delay or suspend the progress of the work for such time or times and to such extent and in such manner as owner/consultant may specify.

b. All reasonable expenses incurred by the contractor by reason of such delay or suspension by the owner/consultant otherwise than in consequence of some default on the part of the contractor shall be added to the contract price, provided that no claim shall be made under this article unless the contractor has within 7 days, after the event giving rise to the claim, give notice in writing to the owner/consultant of his intention to make such claim. However, no compensation for suspension of work by the consultant or the owner shall be payable to the contractor if the period of suspension is 30 days or less.

c. If in the opinion of the contractor the suspension shall necessitate any extension in the time of completion, the provision of article no. 25 hereof and related article in respect of extension of time shall apply.

ARTICLE-29: CANCELLATION OF CONTRACT

a. The owner shall be entitled at any time at its discretion to cancel the contract if, in the opinion of the owner, the cessation of the work becomes necessary owing to any cause whatsoever, and a notice in writing from the owner to the contractor of such cancellation and the reason(s) therefore shall be conclusive proof of such cancellation and the reasons thereof.

b. Upon cancellation of the contract, the owner shall take over from the contractor the approved materials lying at job site on the date of the cancellation at the rate(s) for such material(s) as specified in relative item(s) of the schedule of rates, and if the rate(s) for any material(s) be not (in the opinion of the owner which shall be final) specified in the schedule of rates at market rate(s) for such material(s) current on the date of the cancellation. The decision of the owner/consultant as to the approved materials lying at site on the date of cancellation and the quantities and market rate(s) thereof shall be final and binding upon the contractor.

c. The contractor shall not be entitled to any compensation in addition to the payment for the work actually performed by rates as a result of such cancellation notwithstanding that such cancellation may have resulted in the performance of quantities of work below the quantities indicated in the form of schedule of rates and/or of a value below the total contract value indicated in the work order.

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ARTICLE-30: TERMINATION

1 (a) The Owner may, for breach of any provision of the contract by the contractor at any time by notice in writing to the contractor, terminate the contract.

(b) In the event of termination pursuant to paragraph(s) of this Article-

i) The contractor shall carry out instructions of the owner in connection with such termination including the cancellation of orders and the termination of contracts which the contractor may have placed with others.

ii) The owner shall pay the contractor for all materials used and work executed pursuant to the contract, but unpaid at the date of such termination together with any costs necessarily incurred by the contractor in connection with the work as a result of such termination provided that owner shall not be liable for any indirect loss, any business loss or damage or loss of profit suffered by the contractor as a result of such termination.

iii) For the purpose of determining the amount due to the contractor joint measurements shall be taken for the work completed and material supplied as on the date of termination. Bill prepared by the contractor on the basis thereof shall be deemed to be the final bill.

(c) The contractor shall upon receiving notice from the owner in accordance with paragraph (a) of this Article, notify the owner within a reasonable time of the sums for materials used and work executed as mentioned in paragraph (b) (ii) of this Article. These sums and all terms and conditions of termination pursuant to this Article may be agreed in writing between the owner and the contractor.

2. In the event of any breach of the provisions of the agreement or default in the performance of the obligations by the contractor not being remedied by him within 30 days of receipt of notice in that behalf from the owner, the owner shall be entitled to terminate the contract forthwith without prejudice to its other rights and remedies hereunder, by a communication in writing to the contractor and as such on termination the contractor shall be liable to pay to the owner for all loss and damages and sums that may be suffered and incurred by the owner including the additional costs incurred in rectifying default and/or completing unfinished work notwithstanding anything contrary contained in this contract.

3. Upon termination of the contract pursuant to this Article, obligations of the parties hereto shall cease except as to the liabilities of either party to the other for obligations accrued prior to the date of such termination.

4. Within 15 days of completion of measurements, the contractor shall clear the job site of all scaffolding, wiring surplus materials, labours, construction tools, equipment & machinery and shall dismantle, demolish and remove site office, labours quarters etc. or any other thing instructed by owner. Should the contractor fail to comply with the instructions of

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owner in this regard, owner shall be entitled to take undisputed possession of site and take action for site clearance at the risk and cost of contractor.

ARTICLE-31: MAINTENANCE PERIOD

FOR ALL WORKS

i) The contractor guarantees that the work shall perform in accordance with the contract. He shall protect the work until the completion of same as certified in writing by the owner/consultant.

ii) He shall also maintain in good and substantial repair, fair wear and tear expected, the whole of the works until the expiration of the maintenance period of 12 months after the certified completion of the works as whole and he shall also be liable for the soundness and stability thereof, and be responsible for injury to any person or property owing to any settlement, failure, defect, damage or fault due to any cause whatsoever other than earthquake or fire during this period. This liability and responsibility shall not be affected or removed by any certificate of satisfaction or for payment of money which the owner/consultant may at any time give or have given. Moreover, the contractor shall at his own cost, restore such settlement, failure, defect, damage or fault without charge to the owner or the owner may restore such settlement; failure, defect or damage at the contractor's risk and cost. In any case, the contractor shall be liable for and shall pay and make good to the owner or other person or parties being entitled thereto, all losses, costs and expenses they or any of them may put to or be liable to be by reason or in consequence of the settlement, failure, damage or defect and the owner may deduct the amount of losses, cost or expenses from any sum due or to become due to the contractor, or may recover the same from his performance guarantee.

iii) The defects or other faults which may appear within the said maintenance period and which in the opinion of the owner/consultant who shall be the sole deciding authority in this respect have arisen from material or workmanship not in accordance with the contract, shall be rectified by the contractor at his own cost to the satisfaction of the owner/consultant within the period mentioned in the notice to be issued by the owner/consultant specifying the defects and directing the rectification thereof. Failing this rectification the owner will be at liberty to rectify the said defects by and through any other agency at their sole discretion entirely at the risk and cost of the contractor. In the event of such rectification being carried out by the owner on default of the contractor Owner shall deduct from the contractor's dues such sum of money as may be certified by the owner/consultant for the rectification for the said defects. The certificate of the owner/consultant in this respect as aforesaid shall be final, binding and conclusive to the contractors, Provided always that the liability of the contractor under this condition shall not extend beyond the maintenance period as aforesaid except as regards the defects and faults which the owner/consultant may have previously given notice to the contractor to rectify.

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ARTICLE-32: PAYMENT DUE FROM THE CONTRACTOR

All costs, damages or expenses for which the contractor is liable under the contract may be deducted from any money due or becoming due to the contractor on any account whatsoever or may be recovered by action at law or arbitration.

ARTICLE-33: PAYMENTS

Payment Terms shall be applicable as per Annexure-1.10 of Part-I, Commercial Part.

ARTICLE-34: OBSERVANCE AND COMPLIANCE OF STATUTORY RULES/ LAWS

a. The rights and obligations of owner and contractor and provisions of the agreement shall be governed by the Indian Laws.

b. The contractor will be fully responsible for all matters arising out of the performance of the contract and shall comply at his own expenses with all the laws/ enactment's/ orders/ regulations/ statutory obligations, whatsoever, of the Government of India/State Govt./any Statutory or non-statutory authority. The contractor hereby agrees to indemnify and keep harmless the owner/consultant against all liabilities in this respect. The contractor shall be fully and exclusively responsible for the work, conduct, supervision and control of all their own personnel and personnel employed by the sub-contractor engaged by them and owner/consultant shall in no way be responsible for supervision, control etc. of these personnel. Since the contractor shall have full and exclusive supervision and control over the contract awarded to him, and the people engaged for this purpose, the contractor or his sub-contractor, as the case may be, shall be the principal employer under the contract labour (Regulation & Abolition) Act. 1970 and the contractor shall register himself as such; and the owner/consultant shall have no responsibility and liability on this account.

c. The contractor shall observe all safety rules so that no harm or damage is done to the owner's employees or property. The owner/consultant shall have their right to object to any unsafe practices followed by the contractor or their subcontractors. If on account of the contractor or sub-contractor, owner's property or personnel are likely to suffer any damage in such cases any directions, issued by owner/consultant shall be complied with by the contractor and their sub - contractors.

d. The contractor shall at all times be responsible for work under the supervision and control of all its personnel in connection with the work awarded to him under this contract, whether the personnel are employed by the contractor or by any sub-contractor engaged by him.

e. If, in the opinion of owner, any employee or employees of the contractor or his sub-contractor is found to be suffering from any disease, infections or otherwise or if any employee of the contractor or his sub-contractor is found to commit any misconduct including use of intoxicants or on account of any other reasonable cause, owner/consultant

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at its sole discretion may if require, the contractor to remove such employee(s) without questioning the decision of the owner/consultant in this respect and owner will be entitled to restrain such employee(s) from entering the premises.

f. The contractor shall engage sufficient number of personnel with suitable qualification and experience so that the work and job assigned to the contractor are completed as per the specifications and within the time schedule.

g. Contractor shall be responsible to keep himself informed of all the statutory laws, rules and Regulations of Central Government, Municipality etc. Contractor shall be responsible to secure compliance with all central and state laws as well as the rules, regulations, bye-laws and orders of the local authorities and statutory bodies as may be in force from time to time.

h. Contractor shall be responsible to ensure that no loss or damage is caused to the adjoining property around the battery limits of the project. In case of any damage or loss to adjoining property which is attributable to them, the contractor shall make good the loss or damage at his own cost.

i. **PAYMENT OF WAGES BY THE CONTRACTOR**

The wages of every labourer employed by the contractor under this contract shall be paid by him before the expiry of 7 days after the last day of the month in respect of which the wages are payable (i.e. wages of the previous month). The minimum wages rates. As notified from time to time by the Government as per the minimum wages act. 1948 and/or such other authority will have to be paid by the contractor to all his workers. The payments shall be disbursed against muster roll in the presence of the owner's representative and the same shall be affected during working hours in the factory premises. In case of any default/delay, the company will have the right to disburse the due payments to the contractor's workmen and the amount so disbursed together with any other expense incurred by the company to meet the contractor's pending bills/security deposit, if any besides, the owner shall also have the right to cancel the contract forthwith.

j. **PROVIDENT FUND:**

The contractor will also strictly observe the provisions of employees provident fund act. The contractor shall have their own P.F. code. The contractor shall have to submit documentary evidence of his P.F. code otherwise bid not be considered. The contractor shall be required to submit documentary proof requiring remittance of P.F. of their workers during execution of work otherwise their bills not be cleared.

k. Contractor shall be responsible to observe and comply with all statutory requirements including Contract Labour Act 1970, Minimum Wages Act 1948, ESI Act 1948, Employees Provident Fund Act 1952, Labour Laws and Regulation and subsequent amendment etc. in vogue of Central Government. Owner/Consultant shall be kept indemnified against any action brought against it for any violation/ non compliance of any Act, Rules and Regulations including contribution under ESI Act, 1948, EPF Act 1952, Wages Act 1948,

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Payment of Wages Act 1936, payment of Bonus Act 1965, Payment of Gratuity Act 1972 etc. and subsequent amendments etc. All expenses for compliance of above Acts and Regulations shall be borne by the contractor. Contractor shall submit documentary evidence against statutory dues like PF, ESI, Bonus etc. for the personnel deputed at site. Deputation of workers on duty and payment of their wages and other benefits (i.e. ESI contribution, PF contribution, overtime, bonus etc.) shall be strictly as per the notification of the Central Government from time to time and all other applicable statutory acts, rules and regulations in force and as amended from time to time.

l. The contractor will provide access to their records so that Owner can check regular and just payment of the minimum wages and remittances of PF of the workmen to their account. In case any discrepancy is noticed or any complaint is received from the personnel deployed regarding non-payment of wages, PF, ESI and / or any other statutory dues, stern action will be taken against the contractor by the Owner.

ARTICLE-35: RESOLUTION OF DISPUTES/ARBITRATION

35.1 The Owner/Consultant and the Supplier shall make every effort to resolve amicably by direct informal negotiations any disagreement or dispute arising between them under or in connection with the Purchase Order.

35.2 If, after thirty (30) days from the commencement of such informal negotiations, the Owner/Consultant and the Supplier have been unable to resolve amicably a Purchase Order dispute, either party may require that the dispute, be referred for resolution to the formal mechanisms as specified hereunder.

35.3 **LEGAL CONSTRUCTION**

Subject to provision of Article 35.4, the Work Order shall be, in all respects, construed and operated as an Indian contract and in accordance with Indian laws as in force for the time being and is subject to the exclusive jurisdiction of the court at Delhi only.

35.4 **ARBITRATION**

a. Any dispute or difference whatsoever arising between the parties out of relating to the construction, meaning, scope, operation or effect of this contract or the validity or the breach thereof shall be settled by arbitration in accordance with the provisions of the Arbitration & Conciliation Act, 1996 and any amendments thereafter, and the award made in pursuance thereof shall be binding on the parties.

b. The performance under this contract shall not stop for any reason whatsoever during the said dispute/proceedings, unless the contractor/supplier is specifically directed by Owner/Buyer to desist from working in this behalf.

c. The Jurisdiction Venue of all arbitration shall be at Delhi only.

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d. The language of proceedings shall be English.

e. The Law governing the substantive issues between the parties shall be the Laws of India.

ARTICLE- 36: RECOURSE

The Owner shall have recourse to the contractor for any costs, claims, demands, proceedings, damages and expenses whatsoever arising out of or in connection with any failure of the contractor to perform any of his obligations under the terms of contract.

ARTICLE- 37: ADVERTISEMENT

No advertisement, publicity matter or other literature in relation to the contract or the work is to be published or utilized by the contractor except with prior written permission of the owner.

ARTICLE-38: CONSTRUCTION OF CONTRACT

The contract to the exclusion of all other agreement, statements or representation whether oral or written constitutes the full agreement between the parties hereto for the work to be performed hereunder.

ARTICLE-39: INTERPRETATION OF CONTRACT

a. The several contract documents forming the contracts are to be read together as a whole and are to be taken as mutually explanatory.

b. Should there be any doubt or ambiguity in the interpretation of the contract documents or error, omission or contradiction therein or in any of them, the contractor shall prior to commencing the relative work, apply in writing to the owner for his decision in resolution of the doubt, ambiguity or contradiction or correction of the error or omission, as the case may be. Should the contractor fail to apply to the owner for his decision, as aforesaid prior to commencing the relative work, the contractor shall perform said work as per interpretation of owner whose decision shall be final and binding on contractor.

ARTICLE-40: SECRECY CLAUSE

The technical information, drawings, specifications & other related documents forming part of the WORK ORDER are the property of OWNER and shall not be used by CONTRACTOR for any other purposes, except for the execution of the WORK ORDER. All rights including rights in the event of grant of a patent and registration of design are reserved. The technical information, drawings, specification records and other documents shall not be copied, transcribed, traced or reproduced in any other form or otherwise in

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whole or in part and/or duplicated, modified, divulged and/or disclosed to a third party nor misused in any other form whatsoever without OWNER's prior written consent except to the extent required for the execution of WORK ORDER. CONTRACTOR confirms that he/it has read and understood the secrecy and confidentiality obligations of the OWNER as provided in this W.O. and agrees to abide by the obligations (including indemnity obligation) cast upon the OWNER. Successful bidder will have to execute secrecy agreement with owner, format of which shall be mutually agreed.

ARTICLE -41: INDEMNIFICATION

Supplier does hereby agree to indemnify and hold harmless the Owner/Consultant from all claims, losses demand clauses of action or suit arising out of the services, labour, equipment and materials furnished by supplier.

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SECTION-3.0

SPECIAL CONDITIONS OF CONTRACT (SCC)

PART-I : COMMERCIAL

SECTION - 3.0

SPECIAL CONDITIONS OF CONTRACT

0	22.06.2018	FOR TENDER	PKC	SK	RRK
REV.	**DATE**	**PURPOSE**	**PREPARED**	**REVIEWED**	**APPROVED**

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SPECIAL CONDITIONS OF CONTRACT

1.0 RATES

1.1 The rates shall be deemed to allow for all minor extras and constructional details which are not specifically shown on drawings or given in the specifications but are essential in the opinion of the Owner/Consultant to the execution of work to conform to good workmanship and sound engineering practice. The Owner / Consultant reserve the right to make any minor changes during the execution without any extra payment.

1.2 The Owner / Consultant decision to classify any item 'minor changes', 'minor extras' and 'constructional details' shall be final conclusive and binding on the Contractor.

1.3 The Rates quoted shall include for payment of royalties for obtaining earth, morrum, sand, aggregates, stones, etc. Nothing extra shall be paid to the Contractor on this account.

1.4 Contractor shall be responsible for making all necessary approach roads to the sites of execution for taking his rigs, cranes & equipments. No extra claim in this regard shall be entertained.

1.5 Schedule of rates submitted by the Tenderer shall be the true copy of the schedule of rates enclosed with the tender documents

1.6 Without prejudice to stipulation in General Conditions of Contract, the Bidder should quote firm prices inclusive of all taxes & duties (except GST) and other levies on which no variation will be allowed. Further any statutory variations in respect of other taxes & duties, if any, shall be governed by Clause 39.0 of the SCC.

2.0 SPECIFICATIONS

2.1 If specification for an item of work is not covered by CPWD/BIS specifications or Technical Specifications, the same shall be decided by the Owner/Consultant and shall be binding on the Contractor.

2.2 The Owner/Consultant shall have the right to cause the Contractor to purchase and use such materials of particular make or from a particular source which may in his opinion be necessary for proper and reasonable compliance with the specifications and execution of work.

2.3 (a) As and when required by the Owner/Consultant, the Contractor shall provide all facilities at site or at manufacture's works or in approved laboratory for testing of materials and/or workmanship. All the expenditure in respect of this shall be borne by the Contractor. The Contractor shall, when required to do so by the Owner/Consultant, confirm that the materials have been tested in accordance with requirements of the specifications.

(b) Neither the omission by the Owner/Consultant to test the materials nor the production of manufacturer(s) certificate, etc. shall affect the right of the Owner/Consultant to reject, after delivery, the materials found not in accordance with the specifications.

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3.0 GATE PASSES

All tools, plant and materials shall be brought by the Contractor to the works site through a covering note to be submitted in 3 copies. One copy of the covering note will be delivered to the security staff and one copy to the Owner/Consultant. The third copy shall be retained by the Contractor. The Contractor shall follow all rules and regulations for entry / exit of their men and materials in/from project site as framed by Owner/Consultant.

4.0 CONSTRUCTION SCHEDULE

If at any time, the Owner/Consultant is of opinion that the Contractor has fallen behind the approved construction schedule, the Owner/Consultant may, without any cost to Owner/Consultant, require the Contractor to take such steps as may be necessary to improve his progress, especially require him to employ overtime operations, increase the number of shifts, work on holidays and Sundays or increase the capacity of his construction plant and equipment and require him to submit evidence demonstrating the manner in which the Contractor proposes to comply with the construction schedule. Failure of the Contractor to comply with the above will be considered a failure to execute the work with due diligence.

5.0 CONTRACTOR TO BE LIABLE FOR ALL TAXES ETC.

The Prices / Rates quoted by the Contractor shall be inclusive of all labour, materials, tools and tackles necessary for executing the work and all other miscellaneous expenditure for/or incidental tools in connection with the execution of the contract including but not limited to all taxes & duties, custom duty, personnel and corporate tax etc. except GST. GST which will be paid extra as actual by the owner limited to the amount quoted by the bidder.

Further any statutory variations in respect of other taxes & duties, if any, shall be governed by Clause 39.0 of the SCC.

Payment of taxes etc., is the responsibility of the Contractor and shall not be payable by OWNER. The Contractor shall indemnify OWNER against levy of any taxes, duties, etc., in regard to the contract and in the event of OWNER being assessed for any of the said imports, the OWNER shall have the right to recover the total amount so assessed from the Contractor's dues and the Contractor shall also be responsible for all costs or expenses that may be incurred by OWNER in connection with any proceeding or Litigation in respect of the same.

Refer Annexure-1.20 of Part-I (Commercial) for General Guidelines for Goods & Service Tax (GST)

6.0 ISSUE OF WORKING DRAWINGS

Approved working drawings marked "Good for execution/construction" shall be issued by Owner/Consultant to the Contractor progressively during the pendency of the contract. Sufficient quantum of workings drawings will be issued at the beginning. The Contractor on this account shall not be entitled to put forth any claim whatsoever.

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7.0 COST OF TRANSPORT OF MATERIALS ISSUED BY OWNER

Cost of transport, loading, unloading etc. from Owner's stores to work site etc., will be on Contractor's account.

8.0 ROLE OF OWNER/CONSULTANT

8.1 The Owner/Consultant shall have authority to stop the work, whenever such stoppage may become necessary to ensure the proper execution of the contract. He shall also have authority to inspect and reject all work and materials which do not conform to specifications, to direct the application of Contractor's forces to any portion of the work, as in his judgment is required, and to order the said force increased or diminished and to decide questions which arise in the execution of the work.

8.2 The Owner/Consultant reserve the right to suspend the work or part thereof at any time and no claim whatsoever on this account shall be entertained. In case of any clarification the Contractor may appeal to the Owner whose decision shall be final and binding thereupon.

8.3 The above inspection shall, however, not relieve the Contractor of his responsibilities in regard to defective materials or workmanship and the necessity for rectifying or replacing the same.

8.4 The judgment of Owner/Consultant for determining the category of an item not mentioned in the schedule shall be final.

9.0 SERVICE OF NOTICES OF CONTRACT

The Contractor shall furnish to the Owner/Consultant the name, designation and address of his authorized Agent for the purpose of service of notice(s) regarding all complaints, communications and references and shall be deemed to have been duly given to the Contractor if delivered to the Contractor or his authorized agent or left at or posted to the address so given and shall be deemed to have reached such address in the ordinary course of post or on the day on which they were so delivered or left. In the case of contract by partners, any change in the constitution of the firm shall be forthwith informed by the Contractor to the Owner/ Consultant.

10.0 CONTRACTOR'S GUARANTEE

The Contractor agrees to give the guarantee of his works in the following manner which shall remain valid till the validity of performance guarantee.

i. All equipments / materials incorporated in the work shall be new and both workmanship and materials shall be of good quality.

ii. Should, at a subsequent date, any inside honeycomb/hollowness be detected within a concrete member, he shall investigate other nearby sections for similar occurrence and shall rectify all these members by Pressure grouting at his own cost and as per direction of the Owner/ Consultant.

iii. Should, any element of the structure be detected afterwards not exactly tallying with the working drawing, he shall re-do the element at his own cost and as per instruction of the Owner/Consultant.

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iv. Should, at a subsequent date, any equipment / materials or fittings or workmanship or any element of the structure be detected as of sub-standard quality he shall either remove the same and shall re-do at his own cost or shall accept an equitable deduction in the contract price should the Owner/ Consultant deemed it inexpedient to correct the work.

v. All liquid retaining concrete structures shall be demonstrated about their efficiency or water tightness by filling the said structures with water and retaining it for 72 hours at his own cost. Should the result be found unsatisfactory he shall rectify the structures by pressure grouting at his own cost and as per direction of the Owner/Consultant.

vi. Should, at a subsequent date, the basement wall/floor been noted seeping/leaking he shall rectify the same by pressure grouting at his own cost and as per direction of the Owner/Consultant.

11.0 CONTRACTOR FULLY RESPONSIBLE FOR LAYOUT OF WORK

The Contractor shall remain fully responsible to provide detailed layout of different structures according to the coordinates and reduced levels incorporated in the working drawings by taking reference from the Bench Marks of both the coordinates and the reduced levels which shall be given at a convenient place in the works site by Owner/ Consultant. The Contractor shall provide necessary protection to keep the Bench Marks Undisturbed throughout the pendency of the contract. The accuracy of detailed layout of any element of a structure shall remain exclusively with the Contractor. The Contractor shall have to maintain a number of after beams; Theodolite and levels instruments etc. in good working conditions at site for the above purpose throughout the pendency of the contract, and shall make them available to Owner/Consultant for their use.

12.0 NOTHING EXTRA FOR ADVERSE SUB-SOIL CONDITION

There may be variation in nature of sub-soil both horizontally and vertically. The Contractor shall have to take necessary precaution during excavation against any happening like collapsing of sides etc. Any slip or fall in excavation shall have to be cleared by the Contractor at his own cost. In case of excessive heaving, it shall have to be cut and refilled with lean concrete by the Contractor at his own cost. The Contractor shall have to adopt underwater work in case of occurrence of piping/quick conditions without any cost to Owner/Consultant.

13.0 R.C.C. ELEMENT SHALL BE INTEGRAL FINISHED

For all RCC elements, both underground and above ground, only new plywood and steel shuttering shall be used to produce the concrete surface reasonably plain and smooth which will be integrally finished surface. Any little unevenness shall be made good by rubbing with carborandum stones only. Unless otherwise mentioned, plastering will not be allowed to manipulate and make the surface plain and smooth.

If the surfaces after stripping off the shuttering are found to be contrary to the above conditions then the Contractor shall have to dismantle the member and re-do the same to attain the aforesaid surfaces at his own cost.

14.0 FABRICATION DRAWINGS FOR STRUCTURALS

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a) The CONTRACTOR shall prepare and submit fabrication drawings in **triplicate** for preliminary **approval** of CONSULTANT. Fabrication drawings shall be based on design drawings issued by CONSULTANT. One copy of these preliminary drawings duly corrected and signed wherever necessary shall be returned to CONTRACTOR for incorporation of the corrections. After incorporating the corrections, the CONTRACTOR shall submit in 8 (eight) copies of the drawings for **final approval**. Each drawing shall be accompanied by:-

i) Bill of materials giving all details including sizes, numbers and weights.

ii) Two copies of design calculations for the design of joints. All the joints shall be designed for full strength of members; unless otherwise specified.

Nothing extra shall be payable to Contractor for preparation of fabrication drawings, material lists design calculation etc.

Approval of fabrication drawings, however, will not absolve the CONTRACTOR of his responsibility for the safety and correctness of the fabrication details.

iii) In case the CONTRACTOR wants to get the fabrication drawings prepared from other agencies, Owner/Consultant's approval for appointing such agencies shall be obtained by CONTRACTOR before appointing the agency. For this, CONTRACTOR must submit the credentials of the agency along with the request for approval.

iv) The Contractor shall supply three (3) sets of as built drawings also,after completion of work but well before the submission of final bill.

15.0 CONTRACTOR SHALL SUBMIT BAR BENDING SCHEDULE

The Contractor shall prepare bar bending schedule from the detailed RCC working drawings supplied by Owner/Consultant for execution of work and nothing shall be paid on this account. Four copies of such bar bending schedule shall be made available to the Owner/Consultant for his approval and effecting payment there under.

16.0 CONTRACTOR'S RESPONSIBILITY FOR THE MANNER OF EXECUTION OF WORK

The Contractor shall be responsible for the manner and the method of executing the work. The work shall be subject to the approval of Owner/ Consultant from time to time for purposes of determination of the question whether the work is executed by the Contractor in accordance with the contract.

17.0 NO WORK SHALL BE UNDERTAKEN WITHOUT APPROVED WORKING DRAWINGS

No work shall be undertaken at Site by the Contractor until detailed approved working drawings marked "Good for execution/construction" for the same is issued by Owner/ Consultant. Any work done without the aforesaid working drawing shall be at the Contractor's own risk and costs.

18.0 CONTRACTOR SHALL KEEP FOUNDATION PITS/TRENCHES DRY

The Contractor, during the pendency of contract, shall keep in dry condition of pits, trenches, which are not yet back filled due to technical reasons, if not shall be Bail-

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out/Pump-out all accumulation at his own cost for the safety of the structure /element. During pumping, the Contractor shall have to ensure that 'Loss of Ground' does not occur. Other approved methods shall be undertaken by the Contractor to avoid 'Loss of Ground' if occurred, at his own cost.

19.0 NOTHING EXTRA FOR INTRICATE CONCRETE SHUTTERING OR REINFORCEMENT WORK

Nothing extra shall be paid for any intricate concrete, shuttering or reinforcement work for foundations of equipment and machinery and for other foundation/superstructure works or for any delay inherent in concreting in small and thin sections in concrete or RCC works etc.

20.0 NOTHING EXTRA FOR REBATING ETC.

Nothing extra shall be paid in concrete/RCC works for all rebating, chamfering, grooving, sinking, trotting weathering, molding, etc. to accord with the details shown on the working drawings.

21.0 CONSTRUCTION JOINTS

21.1 In case of execution of massive concrete elements both in foundation and in superstructure and in some other locations as would be permitted except where specified in the working drawings, the work shall be carried out in one single operation without any break in concreting within time limit that would be specified by the Owner / Consultant without any additional cost to Owner/ Consultant.

21.2 All specified construction joints, either horizontal or vertical, in any element of concrete member shall be provided with shear keys of such dimensions as would be determined by the Owner/Consultant. Before adopting the next operation for the other half of the element these shear keys along with the entire surface of the joint shall be roughened and deepened to above 20 mm by chipping, washing and cleaning thoroughly. The Contractor shall provide cement slurry in sufficient quantity over the cleaned surface for proper bond as per the direction of Owner/Consultant. The Contractor shall not be entitled to any extra/payment; on this account.

22.0 SUBMISSION OF BILL

Contractor is to submit the bills and record of measurements in three (3) copies on approved proforma of Owner for works executed by him.

22.1 FOR R/A BILLS:

Contractor is to submit the bills and record of measurements complete in all respect duly certified by Owner/Consultant in three copies on approved proforma of Owner for works executed by him progressively.

22.2 MEASURMENT OF WORKS

Measurement of work shall be made in the units mentioned in the schedule of rates.

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22.3 SUBMISSION OF FINAL BILL

The final bill complete in all respect shall be submitted after certified completion of work. The bill should be accompanied with the following documents:

i. Job completion certificate.
ii. O & M Manuals / Drawings / Other relevant docs. in respect of equipments supplied
iii. No claim certificate on OWNER's prescribed proforma.
iv. Site clearance certificate.
v. Performance guarantee duly amended to cover certified maintenance period.
vi. Indemnity certificate towards labours payment and all other statutory payments.

No claim shall be entertained after receipt of final bill. Settlement of final bill shall be made within 1 (one) month period subject to furnishing of all required documents / clarification and extension of time, if any, by OWNER's competent authority.

In case any claim with regard to the wages of any labour employed by Contractor for the subject job is pending/ reported, OWNER shall be fully entitled to withhold payment of final bill pending finalisation of such claims.

23.0 PROVISION FOR MULTIFARIOUS CHECKING OF WORK

Before commencement of the actual concreting operation the position and layout of foundations, pedestals, inserts, pockets, recess, reinforcement and form work shall be checked repeatedly by Owner/Consultant. No claim whatsoever shall be entertained on this account. The level of foundations shall be accurately maintained as shown in the drawings or as directed by the Owner/Consultant. No padding, plastering or chipping shall be allowed for achieving the results.

24.0 DEFECT LIABILITY PERIOD

Defect Liability Period shall be 12 months from the date of certified Final completion of Sub-station work.

25.0 NO COMPENSATION FOR ALTERATION IN OR RESTRICTION OF WORK TO BE CARRIED OUT

If at any time after the commencement of the work, Owner/Consultant shall, for any reason whatsoever, not require the whole work thereof as specified in the tender to be carried out, the Owner/Consultant shall give notice in writing of the fact to the Contractor who shall have no claim of any payment or compensation whatsoever on account of any profit or advantage which he might have derived from the execution of work in full, but which he did not derive in consequence of the amount of the work not having been carried out, neither shall be Contractor have any claim for compensation by reasons of any alternations having been made in original specifications, drawings and instructions which shall involve any curtailment of the work as originally contemplated.

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26.0 ACTION AND COMPENSATION PAYABLE IN CASE OF BAD WORK

If it shall appear to the Owner/Consultant or his representative, 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 of the work are unsound or of a quality inferior to at contracted for, or otherwise not in accordance with the contract, the Contractor shall, on demand in writing from the Owner/Consultant specifying the work/materials/articles complained, notwithstanding that the same may have been inadvertently 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 other unsuitable materials or articles so specified within a period specified by the Owner/Consultant at his own cost.

27.0 CLEARING, FILLING AND LEVELING OF SITE

The site shown on the layout plan shall be cleared by the Contractor of all obstructions, loose stones, materials, rubbish of all kinds of bushes, trees, grass as well as brush wood. All holes/hollow, whether originally existing or produced by removal of loose stones or brush wood, shall be carefully filled up with earth, well rammed and leveled off as directed by the Owner/ Consultant. The Contractor will not be entitled to any payment in his regard.

28.0 CONTRACTOR TO COMPLY ALL LAWS

28.1 The contract shall be governed by the law in force in the Republic of India.

28.2 The Contractor shall comply with all laws etc. The Contractor shall be responsible to secure compliance with the Central and States Laws as well as the Rules, Regulations, by-laws and orders of the legal authorities and statutory bodies which are in force or as may be in force from time to time. He shall give to the Municipal Corporation Committees, police and other relevant authorities all such notices, etc. as may be required by law and obtain all requisite license for temporary constructions, enclosures, etc. and pay all fees, taxes and such other dues or charges which may be leviable on account of any of his operations in executing the works under this contract. Owner/Consultant shall not pay anything extra to the Contractor on this account. The Contractor shall also make good at his own cost, any damage done by him to any adjoining property, during execution of work.

29.0 CONTRACTOR TO USE THE MATERIALS ONLY AFTER THE APPROVAL OF OWNER

The Contractor shall use the materials only after the approval of Owner/ Consultant, before incorporation of the same in the works.

30.0 COMPLIANCE OF ENTIRE PROVISIONS IS OBLIGATORY TO CONTRACTOR

It shall always prevail, unless otherwise specifically stated, that the entire provisions of the Tender Document have been accepted for compliance by the Contractor without any reservation.

31.0 GENERAL

31.1 The location and general information regarding site on which the proposed work is to be executed is furnished in Attachment-I hereto.

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31.2 Contractor shall acquaint himself with access to site, availability of local facilities such as railway siding, transport facilities, materials and labour and shall provide suitable allowances in his Bid, Contractor's quoted rate being firm, it should take into account all expenses likely to arise in this regard.

31.3 Contractor shall be deemed to have visited site and familiarized himself thoroughly with site conditions before submitting his Bid. Non-familiarity with site conditions will not be considered a reason either for extra claims or for not carrying out work in strict conformity with drawings and specifications.

32.0 DELIVERY AND DOCUMENTS

Delivery of the Goods shall be made by the Contractor in accordance with the terms specified by the Owner/Consultant in the schedule of requirements in Technical Specifications. and the special conditions of purchase, if any and the Goods shall remain at the risk of the Contractor until Delivery has been completed.

33.0 INCIDENTAL SERVICES

33.1 As specified in the special conditions of purchase, the Contractor may be required to provide any or all of the following services:

i) Supervision of on-Site assembly and/or of the supplied Goods.

iii) Performance or supervision or maintenance and/or repair of the supplied Goods, for a period of time agreed by the parties, provided that this service shall not relieve the Contractor of any warranty obligations under this Purchase Order, and

33.2 Price charged by the Contractor for the preceding incidental services, if not included in the contract price for the Goods shall be agreed upon in advance by the parties and shall not exceed the prevailing rates charged to other parties by the Contractor for similar services.

33.6 At the request of Consultant or Owner, Contractor shall at his expense, dismiss from work and replace any such employee as Owner/Consultant, may deem incompetent or careless or whose continued employment is deemed inimical to the interest of the Owner/Consultant or against public interest.

33.7 Other conditions of work at Site shall be mutually discussed and settled.

34.0 WORK AND WORKMANSHIP GUARANTEE

34.1 Contractor shall make arrangements to provide at no extra charge all temporary approaches to and within the site, after obtaining prior approval of Owner/Consultant of the layout of such approaches.

34.2 To determine the acceptable standard of workmanship, Owner/Consultant may order Contractor to execute certain portions of work and services such as wall, flooring, joinery, finishes, roads and the like under the close supervision of Owner/Consultant. On approval, these items shall be labeled as guiding samples and work shall be executed to conform to these samples. These samples shall be prepared at the cost of Contractor.

34.3 Workmanship shall be of best possible quality and all the work shall be carried out by skilled workmen except for those which normally require unskilled persons. If the laws of local government, municipal or other authorities require employment of licensed or

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registered workmen of various trades, Contractor shall arrange to have the work done by such registered or licensed persons.

34.4 Workmanship shall be in accordance with the specifications, standards and codes which are part of this tender as well as the established engineering practices for this type of work. For any portion of work executed by Contractor and considered defective by Owner/Consultant, the Contractor shall have to take necessary remedial measures, to the complete satisfaction of Owner/Consultant, to make the defective good in order at his own cost without any liability to Owner/Consultant.

The Contractor shall be responsible for the proper workmanship and shall not be relieved of his obligation in this regard just because no objection was raised by Owner/ Consultant during the progress of work. The workmanship guarantee period will be 12 months from the date of final completion as a whole, certified by Owner.

If any defects are found due to bad workmanship during this period, the Contractor shall undertake to rectify the same at his cost, most expeditiously. The workmanship guarantee for rectified portion of work shall commence from the date of rectification for a subsequent period of 12 months. The decision of Owner/Consultant regarding bad workmanship shall be final binding and conclusive.

The Contractor shall be required to submit the performance guarantee accordingly.

35.0 PRIORITY OF DOCUMENTS

The following is the order of priority in descending order. High priority document shall take precedence over low priority document in case of any conflict:-

1. Drawings
2. Schedule of Rates
3. Scope of work & Technical Specifications
4. Special condition of contract
5. Terms of Payment
6. General Conditions of Contract
7. Site working and safety conditions
8. Standards (Standards here shall mean National/ International Standards & Specifications).
9. Issue of Materials

36.0 WEATHER CONDITIONS

Owner/Consultant may order Contractor to suspend any work which in the opinion of Owner/Consultant may be subject to damage by prevailing weather conditions. No claim whatsoever on this account shall be entertained.

“It is presumed that the Contractor has familiarized himself with the weather conditions prevailing in the area therefore in such weather parameters if it appears to the Engineer –in –charge (EIC) that certain weather condition may damage the work or specified quality of the work can be achieved without stoppage of the work, the EIC in such conditions may require the Contractor to stop the work till such time as he thinks fit and appropriate. It is understood by the contractor that no compensation will be admissible on this count. However in exceptional circumstances at the recommendation of the EIC, Consultant/owner may grant reasonable extension of Time.

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37.0 TIME SCHEDULE AND PROGRESS REPORTING

37.1 **Time schedule network/bar chart.**

37.1.1 Together with the Work Order/Contract confirmation, Contractor shall submit to Owner/Consultant, his time schedule regarding the documentation, supply of materials as well as information about of his Subcontracts to be placed with their parties, including the dates on which Contractor intends to issue such Subcontracts.

37.1.2 The time schedule will be in the form of a network or a bar chart clearly indicating all main or key events regarding documentation, supply of materials, delivery and site fabrication, erection, inspection, testing and completion.

37.1.3 The original issue and subsequent revisions of Contractor's time schedule and or Sub-contractor's time schedules shall be sent to Consultant in two copies (of which one shall be in Soft copy) and two copies to Owner.

37.1.4 The time schedule network/bar chart shall be updated at least every fortnight.

37.2 **Progress Trend Chart/Monthly Report**

37.2.1 Contractor shall report weekly to Owner/Consultant the progress of the execution of Work Order/Contract and achievement of targets set out in time bar chart.

37.2.2 The progress will be expressed in percentages shown in the progress trend chart.

37.2.3 The first issue of the progress trend chart will be forwarded together with the time bar chart along with the Work Order confirmation.

37.2.4 The fortnightly reporting will bear the updating of the progress trend chart.

37.2.5 All reporting will be done on e-mails and hard copies wherever required will follow.

38.0 INSTRUCTIONS, DIRECTIONS AND CORRESPONDENCE

38.1 The work described in Work Order is to be executed according to the standards, data sheets, tables, Specifications and Drawings attached hereto and/or enclosed with the Work Order itself and according to all conditions both general and specific enclosed with the Work Order, unless any or all of them shall have been modified or cancelled in writing as a whole or in part.

i) All instructions and orders to Contractor shall, excepting what is herein provided, be given by Owner/Consultant.

ii) All the work shall be carried out under the direction of and to the satisfaction of Owner/Consultant.

iii) All communications including technical/commercial clarifications and/or comments shall bear reference to the Work Order /Contract.

iv) Invoice for payment against Work Order /Contract shall be addressed to Owner/ Consultant.

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v) The WORK Order/Contract number shall be shown on all invoices, communications, packing lists, containers and bills of lading etc.

38.2 All correspondence from Contractor shall be forwarded in duplicate (2 copies) to CONSULTANT and 02 copies to OWNER at following addresses:

CONSULTANT	OWNER
Projects & Development India Ltd., PDIL Site Office, Gorakhpur, UP Kind Attention : Engineer In-charge / Resident Construction Manager Tel no. : _____ Fax no. : _____ E-mail : _____	Hindustan Urvarak & Rasayan Ltd., Core-2, 2nd Floor, Scope Minar, Laxmi Nagar District Centre, Delhi-92 Kind Attention : Mr. Manish Goyal Sr. Project Manager Tel no. : 011-22502267 Email : goyalm@hurl.net.in

38.3 Correspondence on technical and commercial matters shall be dealt with in separate letters for each Work Order /Contract and each copy of the letter shall be complete with all Annexures. Wherever possible, correspondence should be through e-mail to the above personnel so as to save time.

38.4 Correspondence for expediting and inspection shall be done directly with inspector with a copy to consultant & owner at above mentioned address.

39.0 STATUTORY VARIATION IN TAXES AND DUTIES

39.1 If any new taxes or duties (including any increase in rate of any existing taxes or duties) are levied in India after the date of submission of bids on any payments due to the CONTRACTOR under the CONTRACT other than tax on income, wealth or profits of the CONTRACTOR, the OWNER shall reimburse the CONTRACTOR the amount of such taxes or duties lawfully paid and borne by the CONTRACTOR against proof of payment. However, this is applicable within the GUARANTEED COMPLETION DATE only and shall not be reimbursed by OWNER during the delayed contractual project completion attributable to CONTRACTOR"S account.

39.2 If any existing taxes or duties are withdrawn or the rate is decreased after the date of submission of the bids on any payments due to the CONTRACTOR under the CONTRACT other than tax on income, wealth or profits of the CONTRACTOR, the OWNER shall be entitled to discount in the amount payable to the CONTRACTOR of amount equivalent to the amount of such taxes or duties. This is applicable within the GUARANTEED COMPLETION DATE and also during the delayed contractual Project completion.

39.3 In case of delayed completion beyond the GUARANTEED COMPLETION DATE even though extension of completion time is allowed by OWNER, for reasons solely attributable to Contractor, all extra costs on account of changes of statutory regulations/ acts, or increase in price on any other account including price variation clause, if any, shall not apply to the Contract price and shall be borne by the CONTRACTOR.

However, any decrease in taxes and duties during the delayed period shall be passed on to the OWNER.

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40.0 QUALITY ASSURANCE / QUALITY CONTROL

40.1 Bidder shall include in his offer the Quality Assurance Programme containing the overall quality management and procedures which is required to be adhered to during the execution of contract. After the award of the contract detailed quality assurance programme shall be prepared by the Contractor for the execution of contract for various works which will be mutually discussed and agreed to.

40.2 The Contractor shall establish document and maintain an effective quality assurance system outlined in recognized codes.

40.3 Quality Assurance System plans/procedures of the Contractor shall be furnished in the form of a QA manual. This document should cover details of the personnel responsible for the Quality Assurance, plans or procedures to be followed for quality control in respect of Design, Engineering, Procurement, Supply, Installation, Testing and completion in all respect till final acceptance by Owner. The quality assurance system should indicate organizational approach for quality control and quality assurance of the construction activities, at all stages of work at site.

40.4 The Owner/Consultant or their representative shall reserve the right to inspect/witness, review any or all stages of work at shop/site as deemed necessary for quality assurance.

40.5 The Contractor has to ensure the deployment of quality Assurance and Quality Control Engineer(s) depending upon the quantum of work.
This QA/QC group shall be fully responsible to carry out the work as per standards and all code requirements. In case Engineer-in-charge feels that Contractor's QA/QC Engineer(s) are incompetent or insufficient, Contractor has to deploy other experienced Engineer(s) as per site requirement and to the full satisfaction of Engineer-In-Charge.

40.6 In case Contractor fails to follow the instructions of Engineer-in-charge with respect to above clauses, next payment due to him shall not be released unless until he complies with the instructions to the full satisfaction of Engineer-in-charge.

40.7 The Contractor shall adhere to the approved quality assurance system

41.0 HEALTH SAFETY AND ENVIRONMENT (HSE) MANAGEMENT

The Contractor, during entire duration of the Contract, shall adhere to HSE requirement as per Specification enclosed in the Bidding Document.

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EXHIBITS TO PART-I

EXHIBIT-1

EXPERIENCE CRITERIA

PART-I : COMMERCIAL

EXHIBIT-1

EXPERIENCE CRITERIA

EXHIBIT-1

SUBJECT: TENDER DOCUMENT FOR RENOVATION OF ADMINISTRATIVE BUILDING AND BUNGALOWS (PACKAGE-VI) AT GORAKHPUR, UTTAR PRADESH

EXPERIENCE CRITERIA

Bidder shall furnish their Experience details with reference to the work, which pre-qualify them in line with Experience Criteria mentioned under Clause 8.0 of "Instructions to Bidders".

(MARK √ FOR APPLICABILITY IN BOX)

1.0 EXPERIENCE AS CONTRACTOR

SL. NO.	DESCRIPTION	DETAILS	
1.	Name of Project, Location (Executed by Bidder)		
2.	Description of work		
3.	Name of Owner, Postal Address, Phone / Fax No. / E-mail		
4.	Name of Consultant / Postal Address, Phone / Fax No. / E-mail.		
5.	Project Status • Date of Award • Scheduled Mechanical completion date. • Actual Mechanical completion date • Actual Project completion date (handover) • Delay in months (if any) • Reasons for delay (if any)		
6.	Scope of work executed by Bidder's organization	• Construction / Renovation of Building including Civil & Electrical Works.	☐

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7.	Completion Status	Specify - Completion Date • Whether completion certificate enclosed YES ☐ NO ☐	Date Act.	 Sch.
7.1	LD imposed/ Bonus claimed	YES/NO ; if yes, brief the reason:		
8.0	Document Furnished			
8.1	Copy of work order / Contract Agreement enclosed	YES ☐ NO ☐		
8.2	Documentary proof from the End User/OWNER regarding satisfactory performance indicating the period of completion.	YES ☐ NO ☐		

Note :

1. Bidder shall furnish the experience details as above of Projects which they consider suitable for their pre-qualification. OWNER / CONSULTANT reserve the right not to evaluate any other Project details.
2. Bidder to note that this exhibit form shall be filled as per the Proformas as stated, along with wherever applicable, copies of work order and completion certificates.
3. **Bidder to note that non-submission of relevant supporting documents may lead to rejection of their bid.** It is to be ensured that all relevant supporting documents shall be submitted alongwith the bid in the first instance itself. Pre-qualification may be completed based on the details so furnished without seeking any subsequent additional information.

For and on behalf of ....
Stamp & Signature : .....
Name : .....
Designation : .....
Date : .....

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EXHIBIT-2

FINANCIAL CRITERIA

PART-I : COMMERCIAL

EXHIBIT-2

FINANCIAL CRITERIA

EXHIBIT-2

SUBJECT: TENDER DOCUMENT FOR RENOVATION OF ADMINISTRATIVE BUILDING AND BUNGALOWS (PACKAGE-VI) AT GORAKHPUR, UTTAR PRADESH

FINANCIAL CRITERIA

Bidder shall furnish details with reference to the work, which pre-qualify them in line with Financial Criteria mentioned under Clause 8.0 of "Instructions to Bidders".

1.0 DETAILS OF PROJECT REFERENCES AS PER CLAUSE 8.0 OF "INSTRUCTIONS TO BIDDERS"

SL. NO.	DESCRIPTION	PROJECT – 1, 2 etc. (Separate sheets for each Project)
1.	Project name and description	
2.	(a) Awarded contract value (INR) One completed Work with contract value not less than **INR 2.90 Crore** OR Two completed Works each works with contract value not less than **INR 1.80 Crore** OR Three completed Works each works with contract value not less than **INR 1.45 Crore**	
	(b) Final executed contract value (INR)	
3.	Name of Owner	
	(a) Name and address of Owner's contact person	
	(b) Telephone and Fax No. (c) Mobile No. (d) Email No.	
4.	(a) Date / month / year of award / commencement of Project	
	(b) Date / month / year of Scheduled Completion of the Project.	
	(c) Date / month / year of Actual Completion of the Project.	
5.	Document Furnished	YES/NO

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SL. NO.	DESCRIPTION	PROJECT – 1, 2 etc. (Separate sheets for each Project)
5.1	Copy of work order / Contract Agreement enclosed	
5.2	Completion / Acceptance certificate identifying the successful commissioning of project.	

2.0 ANNUAL TURNOVER

SL. NO.	FINANCIAL YEAR	TURNOVER (IN INR)
1	FY: 2016-2017	
2	FY: 2015-2016	
3	FY: 2014-2015	

3.0 NET WORTH

Net worth as on the last day of the financial year ending 31st March 2017:	: ……

Whether copies of balance sheet and annual turnover statements for the above three financial years submitted	YES / NO

4.0 SOLVENCY CERTIFICATE

NAME & ADDRESS OF BANK	ISSUE DATE	AMOUNT (INR)

Note:

1. Bidder shall furnish the experience details as above of Projects which they consider suitable for their pre-qualification. OWNER / CONSULTANT reserve the right not to evaluate any other Project details.

2. Bidder to note that this exhibit form shall be filled as per the Proformas as stated, along with wherever applicable, copies of work order and completion certificates.

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3. The bidder shall attach fresh solvency certificate issued by his banker. The solvency certificate shall not be more than six months old from the date of issue of NIT OR minimum credit ratings of "A" from ICRA/CRISIL etc OR equivalent reputed institutions, OR financing/credit limits from bank of value not less than **INR 1.45 Crore** valid as on date of issue of ITB.

4. **Bidder to note that non-submission of relevant supporting documents may lead to rejection of their bid.** It is to be ensured that all relevant supporting documents shall be submitted alongwith the bid in the first instance itself. Pre-qualification may be completed based on the details so furnished without seeking any subsequent additional information.

For and on behalf of : ……
Stamp & Signature : ……
Name : ……
Designation : ……
Date : ……

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ANNEXURE TO PART-I

ANNEXURE-1.1 TO 1.25

PART-I : COMMERCIAL

ANNEXURE-1.1

TENDER ACCEPTANCE LETTER

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TENDER ACCEPTANCE LETTER
(To be given on Company Letter Head)

Date: _____

To,

Sub: Acceptance of Terms & Conditions of Tender.
NIT No: _____

Name of Tender/Work:-

_____

Dear Sir,

1. I / We have downloaded/obtained the tender document(s) for the above mentioned 'Tender/Work' from the web site(s) namely: _____ as per your advertisement, given in the above mentioned website(s).

2. I / We hereby certify that I/ we have read the entire terms and conditions of the tender documents (including all documents like annexure(s), schedules(s), etc.,), which form part of the contract agreement and I / we shall abide hereby by the terms / conditions/ clauses contained therein.

3. The corrigendum(s) issued from time to time by your department/ organization too has also been taken into consideration, while submitting this acceptance letter.

4. I / we hereby unconditionally accept the tender conditions of above mentioned tender document(s) corrigendum(s) in its totality / entirety.

5. In case any provisions of this tender are found violated, then your department/ organization shall without prejudice to any other right or remedy be at liberty to reject this tender/ bid including the forfeiture of the full said Earnest Money Deposit absolutely.

Yours Faithfully,

Signature of Bidder with Seal :
Name :
Date :
Email Address :
Contact Number :

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PART-I : COMMERCIAL

ANNEXURE-1.2

COMMERCIAL QUESTIONNAIRE

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SUBJECT: TENDER DOCUMENT FOR RENOVATION OF ADMINISTRATIVE BUILDING AND BUNGALOWS (PACKAGE-VI) AT GORAKHPUR, UP

Note:

1) The Bidder shall submit reply to each query.
2) The Bidder's reply/ confirmation as furnished in the Commercial Questionnaire (CQ) shall supersede the stipulation mentioned else where in the bid.

Sl. No.	OWNER'S/PDIL'S QUERY	BIDDER's REPLY / CONFIRMATION
1.	Please confirm that Master Index and copies of all technical and commercial amendments/addendums if any issued, duly signed and stamped on each page as a token of having received and read all parts of the bidding document and having accepted and considered the same in preparing their bid.	
2.	Please confirm that you have studied complete Bidding Document including Pre-Qualification Criteria, Technical and Commercial Part and your Bid is in accordance with the requirements of the Bidding Document.	
3.	Please confirm Bid Submission as per tender i.e. in Single Phase Two Bid System.	
4.	Please confirm that the Price Part does not include any terms and condition. In case any terms and condition is mentioned in the price part, the same shall be treated as null and void.	
5.	**Price confirmation copy** : Please confirm a Photocopy of the Schedule of Price, to be submitted strictly as per **Section-5 of Part-II, Technical**, Rates being blanked out and in place indicating "**Quoted**" against each head**,** shall be submitted duly signed and stamped as confirmation to quoted rate failing which bid may be rejected.	
6.	Please confirm your compliance to total scope of work mentioned in the Bidding Document. CONTRACTOR's scope shall include supply of all materials and services required for completion of Work irrespective of whether such materials and services are mentioned in the Bidding Document or not.	
7.	Please confirm your acceptance for Time Schedule as mentioned in Instructions to Bidders.	
8.	Please confirm your acceptance for Payment Terms as per Bidding Documents.	
9.	Please confirm that your bid is valid for 120 days from the date of opening of Technical and Unpriced Commercial Bid.	

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Sl. No.	OWNER'S/PDIL'S QUERY	BIDDER's REPLY / CONFIRMATION
10.	Please confirm EMD Validity as Bid Validity (120 Days) plus 03 Months.	
11.	Please confirm Damages for delay in completion as per Article-25 of General Condition of Contract.	
12.	Please confirm Guarantee/Warranties as per Article-11 of General Conditions of Contract (GCC).	
13.	Please confirm that your Bid is substantially responsive to the requirements of the Bidding Document and you have not stipulated any material deviation and submitted all details as specified in the Bidding Document.	
14.	Please confirm that adequate numbers of construction equipments, tools, tackles, etc. have been proposed which will be sufficient to complete the work as per the time schedule.	
15.	Please confirm that you have proposed adequate project / site organization with qualified supervisory personnel having sufficient experience.	
16.	Please confirm that all costs resulting from safe execution of Work, such as safety induction, use of protective clothing, safety glasses and helmet, safety precaution taken during monsoon, or any other safety measures to be undertaken by the CONTRACTOR for execution of Work are included in the Lump sum Price.	
17.	Please confirm that all safety rules & regulations as mentioned in Bidding Document or notified at later date by OWNER during execution shall be adhered by CONTRACTOR.	
18.	The CONTRACTOR shall include safety rules & regulation and apply the same during the execution of the contract. Contractor shall also follow the safety guidelines of OWNER during the execution period of the contract.	
19.	Please confirm the following :- "The planning schedule, manpower deployment schedule, construction equipment deployment schedule etc. submitted by the bidder with his bid are indicative and shall not be basis for extra compensation in case actual needs are higher. Detailed planning schedule developed by CONTRACTOR after Contract award may be subject to fluctuations depending upon actual progress of the project and available Work front.	

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Sl. No.	OWNER'S/PDIL'S QUERY	BIDDER's REPLY / CONFIRMATION
	Co-ordination and making available by CONTRACTOR of all staff, manpower, construction equipment, tools, cranes, etc. and materials as required for a timely completion of all Work as per OWNER's construction and priority schedule and in accordance with the available Work front are to be included in the pricing". Notwithstanding the above provision, the bidder shall submit these details in accordance with the volume of work, which may be reviewed and commented by us during pre award stage /post award stage.	
20.	Please note that the scope of this bid package consists of mainly but not limited to the followings:- Briefly scope of work under this includes construction/ execution, providing necessary engineering supervision through qualified and technical personnel, skilled and unskilled labor, etc. and mobilization of all relevant and adequate plants, tools and tackles, equipment, machineries, etc., to carry out all civil and structural works for successful completion of the proposed **"RENOVATION OF ADMINISTRATIVE BUILDING AND BUNGALOWS".**	
21.	The safety measures as mentioned in Tender Document/GCC/SCC shall not be considered as limitative. The CONTRACTOR will be required to develop their stringent safety measures and submit the same to Engineer-in-Charge with the provision of a dedicated safety group closely monitoring the construction activities in all working shifts.	
22.	Please confirm the following that, a photocopy of the documents listed below has been enclosed in the bid:- 1. PAN Number 2. TIN Number 3. PF/ESI Number 4. GST Number 5. Labour Licence Registration Number 6. Latest Income Tax Clearance Certificate / ITR 7. Audited Balance Sheets	

For and on behalf of : .....

Stamp & Signature : .....

Name : .....

Designation : .....

Date : .....

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PART-I : COMMERCIAL

ANNEXURE-1.3

NO DEVIATION CERTIFICATE

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(Self Declaration on Bidder's Letter Head as per below performa)

DECLARATION

1. With reference to our Bid Proposal No. …… dated …….. for Renovation Of Administrative Building And Bungalows (Package-VI) At Gorakhpur, Uttar Pradesh, we hereby confirm that we comply with all terms, conditions and specifications of the Bidding Documents read in conjunction with Amendments(s) / Clarification(s) / Addenda / Errata (if any) issued by the Owner prior to opening of Techno – Commercial Bids and the same has been taken into consideration while making our Techno – Commercial Bid & Price Bid and **we declare that we have not taken any deviation / exceptions in this regards.**

2. We further confirm that any deviation variation or additional conditions etc or any mention, contrary to the Bidding Documents and its Amendments(s) / Clarification(s) / Addenda / Errata (if any) as mentioned at 1.0 above found anywhere in our Techno – Commercial Bid and / or price Bid, implicit or explicit, shall stand unconditionally withdrawn, without any cost implication whatsoever to the Owner, failing which the Bid Security shall be forfeited.

For and on behalf of : ……

Stamp & Signature : ……

Name : ……

Designation : ……

Date : ……

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PART-I : COMMERCIAL

ANNEXURE-1.4

DETAILS OF SIMILAR WORKS EXECUTED

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SUBJECT: TENDER DOCUMENT FOR RENOVATION OF ADMINISTRATIVE BUILDING AND BUNGALOWS (PACKAGE-VI) AT GORAKHPUR, UTTAR PRADESH

NAME OF THE PROJECT: BIDDER TO FILL

SL. NO.	FULL POSTAL ADDRESS OF CLIENT AND NAME OF OFFICER IN-CHARGE WITH PHONE/CELL NO AND E-MAIL	DESCRIPTION OF THE WORK	VALUE OF CONTRACT	DATE OF COMMENCEMENT OF WORK	SCHEDULED COMPLETION PERIOD	ACTUAL COMPLETION DATE	REMARKS

Note : 1) Description of work should be in detail.
2) Please also indicate the major problems if any, faced during construction of works.

STAMP & SIGNATURE OF BIDDER : _____

NAME OF BIDDER : _____

DATE : _____

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PART-I : COMMERCIAL

ANNEXURE-1.5

CURRENT COMMITMENTS

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SUBJECT: **TENDER DOCUMENT FOR RENOVATION OF ADMINISTRATIVE BUILDING AND BUNGALOWS (PACKAGE-VI) AT GORAKHPUR, UTTAR PRADESH**

SL. NO.	DESCRIPTION OF WORK	FULL POSTAL ADDRESS OF CLIENT & NAME OF OFFICER IN CHARGE	CONTRACT VALUE	DATE OF COMMENCEMENT OF WORK	SHEDULED COMPLETION PERIOD	% AGE COMP. AS ON DATE	EXPECTED DATE OF COMPLETION	REMARKS

STAMP & SIGNATURE OF BIDDER : _____

NAME OF BIDDER : _____

DATE : _____

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PART-I : COMMERCIAL

ANNEXURE-1.6

DEPLOYMENT SCHEDULE FOR SUPERVISORY PERSONNEL

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SUBJECT: TENDER DOCUMENT FOR RENOVATION OF ADMINISTRATIVE BUILDING AND BUNGALOWS (PACKAGE-VI) AT GORAKHPUR, UTTAR PRADESH

SL. NO.	DESCRIPTION	DEPLOYMENT SCHEDULE						TOTAL
		M1	M2	M3	M4	M5	M6	
1.	PROJECT MANAGER							
2.	CONSTRUCTION MANAGER							
3.	PLANNING ENGINEER							
4.	ELECTRICAL ENGINEER							
5.	CIVIL & STRUCTURAL ENGINEER							
6.	SUPERVISORS							
7.	ADMINISTRATION MANAGER							
8.	WAREHOUSE PERSONNEL							
9.								
10.								

NOTE : Bidder may add more personnel as per job assessment / experience

STAMP & SIGNATURE OF BIDDER : _____

NAME OF BIDDER : _____

DATE : _____

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PART-I : COMMERCIAL

ANNEXURE-1.7

DEPLOYMENT SCHEDULE FOR CONSTRUCTION EQUIPMENT

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SUBJECT: TENDER DOCUMENT FOR RENOVATION OF ADMINISTRATIVE BUILDING AND BUNGALOWS (PACKAGE-VI) AT GORAKHPUR, UTTAR PRADESH

SL. NO.	DESCRIPTION	CAPACITY (Bidder to specify)	DEPLOYMENT SCHEDULE						TOTAL
			M1	M2	M3	M4	M5	M6	
1.	DIESEL GENERATORS								
2.	WELDING MACHINE								
3.	TRACTORS								
4.	TRAILERS / TRUCKS								
5.	CONCRETE MIXER								
6.	OTHER TOOLS & TACKLES								
7.									
8.									
9.									
10.									
11.									
12.									

NOTE : Bidder may add more Equipments as per job assessment / experience.

STAMP & SIGNATURE OF BIDDER : _____

NAME OF BIDDER : _____

DATE : _____

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PART-I : COMMERCIAL

ANNEXURE-1.8

DETAILS OF EQUIPMENT PROPOSED FOR TENDERED WORK

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SUBJECT: TENDER DOCUMENT FOR RENOVATION OF ADMINISTRATIVE BUILDING AND BUNGALOWS (PACKAGE-VI) AT GORAKHPUR, UTTAR PRADESH

DETAILS OF PROPOSED EQUIPMENTS, TOOLS & TACKLES

The bidder shall submit the details of construction equipments, Tools & tackles etc. in the following format, proposed to be deployed for this works.

Sl. No.	EQUIPMENTS LIST REQUIRED TO BE DEPLOYED				STATUS OF EQUIPMENT		SCHEDULE DEPLOYMENT DATE AT SITE	SCHEDULED COMPLETION DATE OF WORK	REMARKS
	Description of Equipment	Make	Year	Capacity	Own by Contractor	If on Hiring (Give Detail Address)			

Note : 1. In case of equipment are to be hired, bidder shall indicate the source of hiring and enclosed and enclose the consent the letter from such sources.
2. Bidder shall clearly indicate the expected data of availability of owned / hired equipment.

NOTE : Bidder may add Equipments as per job assessment / experience.

SIGNATURE OF BIDDER : ……
NAME OF BIDDER : ……..
COMPANY SEAL : …….

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PART-I : COMMERCIAL

ANNEXURE-1.9

CONTENTS OF BID AND CHECK LIST

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SUBJECT: TENDER DOCUMENT FOR RENOVATION OF ADMINISTRATIVE BUILDING AND BUNGALOWS (PACKAGE-VI) AT GORAKHPUR, UTTAR PRADESH

Bidder is requested to fill this check list and ensure that all details /documents have been furnished under relevant section as called for in the Bidding Document duly filled in, signed & stamped.

Please tick the box and ensure compliance:

SECTION-I : PRE-QUALIFICATION BID: (Refer Clause 8.0 of Instructions to Bidders)

S.NO.	DESCRIPTION	SUBMITTED
i)	Letter of submission	☐
ii)	Pre Qualification Criteria in favour of Experience Criteria as per **Exhibit-1** along with Copies of Work Orders, Certificates from End User/OWNER and completion certificates in support of prequalification requirement.	☐
iii)	Pre Qualification Criteria in favour of Financial criteria as per **Exhibit-2** along with copies of Work Orders, Completion/ Acceptance certificates and Annual audited Report for the last three financial years. Annual Reports shall be a verifiable statement of annual accounts certified by a Chartered Accountant or Public Accountant in the form of printed annual reports or similar document.	☐
iv)	**Solvency Certificate** as per Annexure-1.18. Date of Issue of this certificate should not more than six months old from the date of issue of NIT.	☐
v)	Format for **Financial Capability** of Bidder as per Annexure-1.21	☐

SECTION-II : TECHNICAL AND COMMERCIAL BID:

S.NO.	DESCRIPTION	SUBMITTED
i.	Photocopy of Earnest money Deposit (EMD) / Documentary evidences regarding EMD Exemption	☐
ii.	Power of Attorney of Bid Signatory from the Competent Authority	☐
iii.	Tender Acceptance Letter as per Annexure-1.1	☐
iv.	Commercial Questionnaire as per Annexure-1.2	☐
v.	No Deviation Certificate as per Annexure-1.3	☐
vi.	Details of Similar Works Executed as per Annexure-1.4	☐

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S.NO.	DESCRIPTION	SUBMITTED
vii.	Current Commitments of the Bidder as per Annexure-1.5	☐
viii.	Deployment Schedule of Supervisory Personnel as per Annexure-1.6	☐
ix.	Deployment Schedule of Construction Equipment as per Annexure-1.7	☐
x.	Details of Equipment Proposed to be used for this work as per Annexure-1.8	☐
xi.	Contents of Bid and Check List as per Annexure-1.9	☐
xii.	A declaration shall be submitted as per Annexure-1.14 to the effect that Bidder have or had not been banned or blacklisted/del-listed by any PSU / Government Organizations.	☐
xiii.	Declaration by Bidder regarding Bidding Document as per Annexure-1.16	☐
xiv.	Photocopy of Integrity Pact as per Annexure-1.17	☐
xv.	EFT details as per Annexure-1.19	☐
xvi.	A declaration shall be submitted to the effect that Bidder submitting their Bid is not under liquidation, court receivership or similar proceedings as per Annexure-1.22	☐
xvii.	Declaration for Past Safety Record as per Annexure-1.23	☐
xviii.	Bidder to furnish PAN Number, TIN Number, PF/ESI Number, GST Number, Labor License Registration Number, Latest Income Tax Clearance Certificate / ITR etc. along with the bid.	☐
xix.	**Price confirmation copy** - A Photocopy of the Schedule of Rates, to be submitted strictly as per **Section-5 of Part-II, Technical**, prices being blanked out and in place indicating "**Quoted**" against each head**,** shall be submitted duly signed and stamped. However, Bidder shall not hide the percentage of taxes and duties considered in the priced bid.	☐
xx.	Master Index along with a copy of complete set of Bidding Documents of all technical and commercial amendments/addendums if any issued, duly signed and stamped on each page as a token of having received and read all parts of the bidding document and having accepted and considered the same in preparing their bid.	☐
xxi.	Any other information required in the Bidding Documents or considered relevant by the Bidder.	☐

For and on behalf of : …… ……
Stamp & Signature : ……
Name : ……
Designation : ……
Date : ……

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PART-I : COMMERCIAL

ANNEXURE - 1.10

TERMS OF PAYMENT

0	22.06.2018	FOR TENDER	PKC	SK	RRK
REV.	**DATE**	**PURPOSE**	**PREPARED**	**REVIEWED**	**APPROVED**

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TERMS OF PAYMENT

1.0 FINANCIAL GUARANTEE FOR PERFORMANCE

The contractor shall provide financial guarantee within 15 days of award of work for due & faithful performance of the contract as per Article 6 of General Conditions of Contract.

2.0 PAYMENT TERMS

Following terms of payment shall be applicable :

2.1. MOBILIZATION ADVANCE

Mobilization Advance not exceeding 10% of contract value shall be payable on submission of Bank Guarantee for the equivalent amount from a Nationalized / Scheduled Bank in the prescribed proforma, subject to furnishing the Performance Bank Guarantee. **An interest @ 10% per annum shall, however, be charged on the above Mobilization Advance till it is recovered.** Recovery of this Advance shall be made @ 15% from each bill so that full Mobilization Advance including interest is recovered by the time 75% work is done. The interest shall be calculated on the advance up to the date of release of payment(s). Mobilization Advance shall be paid only on acceptance of LOI / Work Order and establishment of Site Office by Contractor. The payment of Mobilization Advance shall be released with certification by Consultant/Owner.

2.2. RUNNING ON ACCOUNT PAYMENT

2.2.1 90% against value of actual work done shall be paid against running bills within 30 days of certification by OWNER/CONSULTANT after recovery of the following:

- Mobilization Advance as indicated above.
- Statutory deduction such as Income-Tax as applicable.
- Any other recovery if become due.

2.2.2 Balance 10% (Retention Money) of the SOR shall be released along with final bill.

2.3. The Running Account Bills shall be submitted on Monthly basis. However, kindly note that in addition of Running Account Bill, the contractor has to submit the Monthly Progress Report (Refer Annexure 1.24) duly approved by the Engineer-in-charge/ Resident Construction Manager at site. This report will acts as a mandatory document for submission of the bill. Failing in submission of the report, the invoice will not be processed further for payment.

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2.4. RELEASE OF 1st R/A BILL

Payment will be released against 1st R/A bill only on submission of following documents by contractor to the indenting department.

i. Monthly Progress report approved by Engineer-in-charge/ Resident Construction Manager at site.
ii. Financial Guarantee for Performance
iii. Labour License (as per statutory requirements)
iv. EPF Code Registration number with RPFC/ARPFC
v. Insurance Contractor All Risk (CAR) Policy
vi. Workmen compensation policy

2.5. SUBMISSION OF FINAL BILL

The final bill complete in all respect shall be submitted after certified completion of work. The bill should be accompanied with the following documents:

i. Job completion certificate.
ii. No claim certificate on HURL's prescribed proforma.
iii. Site clearance certificate.
iv. Performance guarantee duly amended to cover certified maintenance period.
v. Indemnity certificate towards labours payment and all other statutory payments.

No claim shall be entertained after receipt of final bill. Settlement of final bill shall be made within 1 (one) month period subject to furnishing of all required documents / clarification and extension of time, if any, by HURL's competent authority.

3.0 PRICE

The prices shall be firm during the entire contract period including all extensions granted on whatsoever ground may be.

4.0 INSTRUCTION FOR INVOICING & PAYMENT DOCUMENTATION

4.1. INVOICING

Invoicing shall be in compliance with the stipulations of the Work Order and the following instructions. Contractor is liable for all costs arising from noncompliance with the instructions.

As far as possible, description of Works in invoice shall match the description in Work Order. **Invoice for payment shall be addressed to Owner.**

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The invoices shall be issued in the name of:

Hindustan Urvarak & Rasayan Limited,
Core-2, 2nd Floor, Scope Minar,
Laxmi Nagar District Centre, Delhi-92

Attn : Mr. Manish Goyal
Sr. Project Manager
Tel No. : 011-22502267
Email : goyalm@hurl.net.in

The invoice shall contain the following information:

i. Work Order No.
ii. Item no., quantity and complete description
iii. Item-wise net price (unit and total) of the works where applicable.
iv. Net amount payable by deducting advance payment already invoiced, if any, and the guarantee retention amount, if any, from the total value of the Works being invoiced.

The signed invoices, original and copy shall be made on Contractor's letter head and shall be duly signed.

Invoices for progress payment(s) shall state the information under (i), (ii) and (iii). Invoices for guarantee retention money shall state the information under (i) to (iv).

4.2. PROGRESS PAYMENT

1) Invoice for _____ in original and two (2) copies duly certified by Owner / Consultant.

2) Performance certificate in one (1) original plus two (2) copies from the beneficiary to the effect that progress achieved is equal to progress invoiced, duly certified by Owner/Consultant.

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PART-I : COMMERCIAL

ANNEXURE - 1.11

PROFORMA OF BANK GUARANTEE FOR EARNEST MONEY DEPOSIT (EMD) / BID SECURITY

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(To be stamped in accordance with Stamp Act,
if any, of the Country of the issuing Bank)

Bank Guarantee No. .....
Date.....

To:
[Owner's Name and Address]

Dear Sirs,

In accordance with Invitation for Bids under your Bid Document No. ..... M/s..... having its Registered/Head Office at..... (here-in-after called the 'Bidder') wish to participate in the said bid for ……..*[Name of Project]*…….....

As an irrevocable bank guarantee against Bid Security for an amount of .....(*).....valid for..... days from.....(**).....required to be submitted by the Bidder as a condition precedent for participation in the said bid which amount is liable to be forfeited on the happening of any contingencies mentioned in the Bidding Documents.

We, the .....*[Name & address of the Bank]*.....having our Head Office at.....(#).....guarantee and undertake to pay immediately on demand by.....*[Name of the Owner]* (hereinafter called the 'Owner')..... the amount of .....(*).....without any reservation, protest, demand and recourse. Any such demand made by the 'Owner' shall be conclusive and binding on us irrespective of any dispute or difference raised by the Bidder.

This Guarantee shall be irrevocable and shall remain valid upto .....(@)..... If any further extension of this guarantee is required, the same shall be extended to such required period (not exceeding one year) on receiving instructions from M/s ..... *[Bidder's Name]*..... on whose behalf this guarantee is issued. In witness where of the Bank, through its authorised officer, has set its hand and stamp on this.....day of.....20.....at.....

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

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NOTE :

1. (*) The amount shall be as specified in Letter Inviting Bid.
   (**) This shall be the date of opening of Technical and Commercial bids.
   (#) Complete mailing address of the Head Office of the Bank to be given.
   (@) This date shall be three (3) months beyond bid valid.

2. The Stamp Paper of appropriate value shall be purchased in the name of Bidder / Bank issuing the guarantee.

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PART-I : COMMERCIAL

ANNEXURE - 1.12

PROFORMA OF SECURITY CUM PERFORMANCE BANK GUARANTEE / SECURITY DEPOSIT

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(To be submitted on non judicial stamp paper of appropriate value)

PROFORMA OF BANK GUARANTEE FOR CONTRACT PERFORMANCE

(This guarantee should be executed on non-judicial stamp paper of appropriate value)

In Consideration of **Hindustan Urvarak & Rasayan Limited, having its Registered Office at Coal Bhawan, 7th Floor, Plot No. AF-III, Action Area-1A, Newtown, Kolkata-700156**, (hereinafter referred to as the 'Owner' which expression shall unless repugnant to the context or meaning thereof include its successors, administrators and assigns) having awarded to M/s. _____ with its registered / Head Office at _____ (hereinafter referred to as the 'Contractor' which expression shall unless repugnant to the context or meaning thereof, include its successors, administrators, executors and assigns), a Contract by issue of Owner's Letter of Intent No. _____ dated _____ and the same having been unequivocally accepted by the Contractor, resulting in a contract _____(*scope of contract*) _____ and the Contractor having agreed to provide a Contract Performance Guarantee for the faithful performance of the entire Contract equivalent to Rs. _____ (%) _____ per cent) of the said value of the Contract to the Owner.

We _____ (*name and address*)_____ having its Head Office at _____ (hereinafter referred to as the `Bank' which expression shall, unless repugnant to the context or meaning thereof, include it successors, administrators, executors and assigns) do hereby guarantee and undertake to pay the Owner, on demand any and all monies payable by the Contractor to the extent of _____ as aforesaid at anytime upto _____ (days/month/year) without any demur, reservation, context, recourse or protest and/or without any reference to the Contractor. Any such demand made by the Owner on the Bank shall be conclusive and binding notwithstanding any difference between the Owner and the Contractor or any dispute pending before any Court, Tribunal, Arbitrator or any other authority. The Bank undertakes not to revoke this guarantee during its currency without previous consent of the Owner and further agrees that the guarantee herein contained shall continue to be enforceable till the Owner discharge this guarantee.

The Owner shall have the fullest liberty without affecting in any way the liability of the Bank under this guarantee, from time to time to extend the time for performance of the Contract by the Contractor. The Owner shall have the fullest liberty, without affecting this guarantee, to postpone from time to time the exercise of any powers vested in them or of any right which they might have against the Contractor, and to exercise the same at any time in any manner, and either to enforce or to forbear to enforce any covenants, contained or implied, in the contract between the Owner and the Contractor or any other course or remedy or security available to the Owner. The bank shall not be released to its obligations under these presents by any exercise by the Owner of its liberty with reference to the matters aforesaid or any of them or by reason of any other act of omission or commission on the part of the Owner or any other

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indulgences shown by the Owner or by any other matter or thing whatsoever which under law would, but for this provision have the effect of relieving the Bank.

The Bank also agrees that the Owner at its option shall be entitled to enforce this Guarantee against the Bank as a principal debtor, in the first instance without proceeding against the Contractor and notwithstanding any security or other guarantee the Owner may have in relation on to the Contractor's liabilities.

Notwithstanding anything contained herein above our liability under this guarantee is restricted to Rs. _____ and it shall remain in force upto till _____. Unless a demand or claim under this performance bond is filed against us within six months from the expiry date of this Guarantee, i.e. on or before _____ all the rights under this performance bond shall be forfeited and we shall be relieved and discharged from all liability there under.

IN WITNESS, the Principal and surety have executed this performance bond and have affixed their seals on the date set forth.

Dated this _____ ____ day of _____ 200 ___ at _____.

PRINCIPAL

CORPORATE SURETY

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PART-I : COMMERCIAL

ANNEXURE - 1.13

BANK GUARANTEE FOR ADVANCE / PROGRESS PAYMENT

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(To be submitted on non judicial stamp paper of appropriate value)

PROFORMA OF BANK GUARANTEE FOR ADVANCE PAYMENT

(To be stamped in accordance with Stamp Act)

In Consideration of **Hindustan Urvarak & Rasayan Limited, having its Registered Office at Coal Bhawan, 7th Floor, Plot No. AF-III, Action Area-1A, Newtown, Kolkata-700156**, (hereinafter referred to as the `Owner' which expression shall unless repugnant to the context or meaning thereof include its successors, administrators and assigns) having awarded to M/s. _____ (hereinafter referred to as the `Contractor' which expression shall unless repugnant to the context or meaning thereof, include its successors, administrators, executors and assigns), a Contract by issue of Owner's Letter of Intent No. _____ dated _____ and the same having been unequivocally accepted by the Contractor, resulting in a Contract _____ *(scope of contract*)_____ and the Owner having agreed to make an advance payment to the Contractor for performance of the above Contract amounting Rs. _____ (Rupees _____ only) as an advance against Bank Guarantee to be furnished by the Contractor.

We _____ *(name of the bank)* _____ having its Head Office at _____ (hereinafter referred to as the `Bank', which expression shall, unless repugnant to the context or meaning thereof, include its successors, administrators, executors and assigns) do hereby guarantee and undertake to pay the Owner, immediately on demand any or, all monies payable by the Contractor to the extent of _____ as aforesaid at any time upto _____ @ _____ without any demur, reservation, context, recourse or protest and/or without any reference to the Contractor. Any such demand made by the Owner on the Bank shall be conclusive and binding notwithstanding any difference between the Owner and the Contractor or any dispute pending before any Court, Tribunal, Arbitrator or any other authority. We agree that the Guarantee herein contained shall be irrevocable and shall continue to be enforceable till the Owner discharges this guarantee.

The guarantee herein contained is not revocable by notice during the currency and will remain in full force until (a) payment has been made to the owner by the Bank of the aggregated amount payable herein under or (b) the said advance has been fully adjusted and extinguished, as hereafter set forth, whichever is earlier.

The Owner shall have the fullest liberty without affecting in any way the liability of the Bank under this guarantee, from time to time to vary the advance or to extend the time for performance of the Contract by the Contractor. The Owner shall have the fullest liberty without affecting this guarantee, to postpone from time to time the exercise of any powers vested in them or of any right which they might have against the Contractor and to exercise the same at any time in any manner, and either to enforce or to forbear to enforce any covenants, contained or implied with Contract between the Owner and the Contractor or any other course or remedy or security available to the Owner. The bank shall not be released of its obligations under these presents by any exercise by the Owner of its liberty with reference to the matters aforesaid or any of them or by reason of any other act or forbearance or other acts of omission or commission on the part of the Owner or any other indulgence shown by the Owner or by any

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other matter or thing whatsoever which under law would but for this provision have the effect of relieving the Bank.

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

Notwithstanding anything contained herein above our liability under this guarantee is limited to _____ and it shall remain in force upto and including _____ @ _____ and shall be extended from time to time for such period (not exceeding one year), as may be desired by M/s. _____ on whose behalf this guarantee has been given.

Dated this _____ day of _____ 200___ at _____

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PART-I : COMMERCIAL

ANNEXURE - 1.14

PROFORMA FOR BLACKLISTED

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(Self Declaration on Bidder's Letter Head as per below proforma)

DECLARATION

To ,

…….
…….
……

NIT NO. : PNPM/PC160/E/G-240

SUBJECT : TENDER DOCUMENT FOR RENOVATION OF ADMINISTRATIVE BUILDING AND BUNGALOWS (PACKAGE-VI) AT GORAKHPUR, UTTAR PRADESH

Sir ,

We hereby declare that M/s ……. is neither put on Holiday or Black-listed by any Government / PSU / Private firm or Financial Institution.

Signature

Name :
Designation :
Seal of the Bidder:

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PART-I : COMMERCIAL

ANNEXURE - 1.15

FORMAT OF CONTRACT AGREEMENT

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FORMAT OF CONTRACT AGREEMENT

(To be executed on non-judicial stamp paper of appropriate value)

THIS CONTRACT AGREEMENT is made on_____day of_____, 20____.

BETWEEN

(1) *[Name of Owner]*, a corporation incorporated under the laws of India and having its principal place of business at *[address of Owner*] (hereinafter called "the Owner"), and (2) [name of Contractor], a corporation incorporated under the laws of India and having its principal place of business at [address of Contractor] (hereinafter called "the Contractor")

WHEREAS the Owner desires to engage the Contractor to *……..[scope of work]…….* and the Contractor have agreed to such engagement upon and subject to the terms and conditions hereinafter appearing.

NOW IT IS HEREBY AGREED as follows:

ARTICLE 1. CONTRACT DOCUMENTS

1.1 The following documents shall constitute the Contract between the Owner and the Contractor, and each shall be read and construed as an integral part of the Contract:

a) This Contract Agreement and the Appendices hereto
b) Letter of Award
c) Amendment to the NIT document.
d) Instruction to Bidders
e) Special Conditions of Contract
f) General Conditions of Contract
g) Technical Specifications and Drawings
h) The Bid and Schedule of Prices including Supplementary Price *(delete if not applicable)* submitted by the Contractor
i) Integrity Pact (IP) signed between the Owner and the Bidder / Contractor

1.2 **Order of Precedence**

The following is the order of priority in descending order. High priority document shall take precedence over low priority document in case of any conflict:-

1. Drawings
2. Schedule of Rates
3. Scope of work & Technical Specifications
4. Special condition of contract
5. Terms of Payment
6. General Conditions of Contract
7. Site working and safety conditions
8. Standards (Standards here shall mean National/ International Standards & Specifications).
9. Issue of Materials

1.3 **Definitions**

Capitalized words and phrases used herein shall have the same meanings as are ascribed to them in the General Conditions of Contract.

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ARTICLE 2. CONTRACT PRICE AND PAYMENT TERMS

2.1 **Contract Price**

The Owner hereby agrees to pay to the Contractor the Contract Price in consideration of the performance by the Contractor of its obligations hereunder. The Contract Price shall be *[amount in words], [amount in figures],* or such other sums as may be determined in accordance with the terms and conditions of the Contract.

2.2 **Payment Terms**

Payment shall be made by the Owner to the Contractor as per the provisions of Bidding Documents.

ARTICLE 3. EFFECTIVE DATE FOR DETERMINING TIME FOR COMPLETION

The Completion period of the Project shall be determined from the date of Letter of Award.

ARTICLE 4. NON-ASSIGNABILITY

The Contract and benefits and obligations thereof shall be strictly personal to the CONTRACTOR and shall not on any account be assignable or transferable by the CONTRACTOR.

ARTICLE 5. GOVERNMENT OF INDIA NOT LIABLE

It is expressly understood and agreed by and between the Contractor and the Owner that the Owner is entering into this Agreement solely on its own behalf and not on behalf of any other person or entity. In particular it is expressly understood and agreed that the Government of India is not a party to this Agreement and has no liabilities, obligations or rights hereunder. It is expressly understood and agreed that the Owner is an Independent legal entity with power and authority to enter into contracts solely on its own behalf under the applicable laws of India and the general principles of Contract Law. The Contractor expressly agrees, acknowledges and understands that the Owner is not an Agent, Representative or Delegate of the Govt. of India. It is Further understood and agreed that the Government of India is not and shall not be liable for any acts, omissions, commissions, breaches or other wrongs arising out of the Contract. Accordingly, the Contractor expressly waives, releases and foregoes any and all actions or claims, including cross claims, impleader claims or counter claims against the Government of India arising out of this Contract and covenants not to sue the Government of India as to any manner, claim, cause of action or thing whatsoever arising of or under this Contract.

ARTICLE 6. APPENDICES

The Appendices listed in the attached list of Appendices shall be deemed to form an integral part of this Contract Agreement. Reference in the Contract to any Appendix shall mean the Appendices attached hereto, and the Contract shall be read and construed accordingly.

ARTICLE 7. NO LIABILITY ON DIRECTOR AND EMPLOYEE

No Director, employee, consultant or agent of the OWNER or other person representing the OWNER or acting on behalf of the OWNER in or pursuant to the Contract or in the discharge of any obligation to the OWNER under the Contract or otherwise in relation to the Contract shall have any personal liability to the CONTRACTOR or any Sub-Contractor, agent, representative,

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director or employee of the CONTRACTOR or to any other person acting for or on behalf of the CONTRACTOR and the CONTRACTOR on its own behalf and on behalf of its Sub Contractors, directors, employees, agents and representatives hereby waives and disclaims any and all right of action which it or they may have whether under tort or Contract or otherwise against the OWNER or any director, employee, agent, consultant or representative of the OWNER for act of omission or commission done or omitted to be done.

ARTICLE 8. WAIVER

No failure or delay by the OWNER in enforcing any right or remedy of the OWNER in terms of the CONTRACT or any obligation or liability of the CONTRACTOR in terms thereof, shall be deemed to be a waiver of such right, remedy, obligation or liability, as the case may be, by the OWNER and notwithstanding such failure or delay, the OWNER shall be entitled at any time to enforce such right, remedy, obligation or liability, as the case may be.

ARTICLE 9. LANGUAGE OF CONTRACT AND COMMUNICATION

The language of the Contract shall be English and all communications, drawings, design, data, information, codes specifications and other document whatsoever supporting the bid or otherwise exchanged under the Contract shall be in English. In the event that any technical documentation is in any language other than English, the document should be translated and presented to the OWNER/Project Manager in English and English document/translated document shall be regarded as the only authentic document.

IN WITNESS WHEREOF the Owner and the Contractor have caused this Agreement to be duly executed by their duly authorized representatives the day and year first above written.

Signed by for and on behalf of the Owner

_____

[*Signature*]

_____

[*Title*]

in the presence of _____

Signed by for and on behalf of the Contractor

_____

[Signature]

_____

[Title]

in the presence of _____

CONTRACT AGREEMENT

dated the_____ day of_____, 20_____

BETWEEN

_____

["the Owner"]

and

_____

["the Contractor"]

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PART-I : COMMERCIAL

ANNEXURE - 1.16

DECLARATION BY BIDDER REGARDING BIDDING DOCUMENT

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(Declaration on Bidder's Letter Head as per below performa)

SUBJECT: TENDER DOCUMENT FOR RENOVATION OF ADMINISTRATIVE BUILDING AND BUNGALOWS (PACKAGE-VI) AT GORAKHPUR, UTTAR PRADESH

We _____ (Name of the Bidder) hereby represent that we have gone through and understood the Bidding Documents, **NIT NO: PNPM/PC160/E/G-240 DATED** _____ (including but not limited to) the Commercial & Technical Requirements/ Specifications in **Part-I : Commercial and Part-II : Technical of the Bidding documents and Amendments**, if any, and that our Bid has been prepared accordingly in compliance with the requirements stipulated in the said documents.

We are submitting a copy of complete set of Bidding Documents, **Part-I : Commercial and Part-II : Technical and Amendments**, if any, as part of our Bid duly signed and stamped on each page in token of our acceptance. Further we undertake that in the event of award of work to us, all the parts shall be considered for constitution of Contract Agreement.

For and on behalf of : …….....……

Stamp & Signature : ……

Name : ……

Designation : ……

Date : ……

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PART-I : COMMERCIAL

ANNEXURE - 1.17

FORMAT FOR INTEGRITY PACT

INTEGRITY PACT

This pre-bid pre-contract Agreement (hereinafter called the Integrity Pact) is made on ____ day of the month of _____ 2018, between **M/s Hindustan Urvarak & Rasayan Ltd.,** registered under Companies Act, 2013, having its registered office at **having its Registered Office at Hindustan Urvarak & Rasayan Limited, having its Registered Office at Coal Bhawan, 7th Floor, Plot No. AF-III, Action Area-1A, Newtown, Kolkata-700156**, (hereinafter referred to as [HURL], which expression shall mean and include, unless the context otherwise requires, its successors and assigns) of the First Part and M/s _____ a Company, firm incorporated under _____ Laws to which it is subject to (hereinafter called the "Bidder/Seller", which expression shall mean and include, unless the context otherwise requires, its successors, heirs / legal representatives / administrator in office and assigns) of the Second Part.

Whereas

HURL has issued NIT_____ dated_____ inviting bids from Parties for undertaking-the Project /Work of_____ at its unit located at_____ (hereinafter referred to as the Project /Work). The BIDDER is a private Company/Public Company/Government Undertaking / Partnership / registered export agency, constituted in accordance with the relevant law in the matter and HURL is joint venture company incorporated by Indian Oil Corporation Ltd. (IOCL), National Thermal Power Corporation Ltd. (NTPC), Coal India Ltd. (CIL), The Fertilizer Corporation of India Ltd. (FCIL) and Hindustan Fertiliser Corporation Ltd. (HFCL).

The Bidder is willing to offer/ has offered to carry out the Project/ Work and understands that this Integrity Pact has to be executed between the parties before HURL can consider the offer.

NOW, THEREFORE,

To avoid all forms of corruption by following a system that is fair, transparent and free from any influence/prejudiced dealings prior to, during and subsequent to the currency of the contract to be entered into with a view to :-

Enabling HURL to undertake the Project/Work at a competitive price in conformity with the defined specifications by avoiding the high costs and the distort nary impact of corruption on public procurement, and

Enabling BIDDER to abstain from bribing or indulging in any corrupt practices in order to secure the contract by providing assurance to them that their competitors will also abstain from bribing and other corrupt practices and HURL will commit to prevent corruption, in any form, by its officials by following transparent procedures.

In respect of the Project/Work an Independent Monitor shall be appointed by HURL to verify facts and to take necessary action, legal or otherwise as may be deemed appropriate including criminal proceedings, against the persons and /or Organizations indulging in the corrupt practice.

NOW, THEREFORE IN CONSIDERATION OF THE MUTUAL COVENANTS CONTAINED HEREIN, THE PARTIES AGREE AS UNDER:

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1.0 COMMITMENTS OF HURL:

1.1 HURL undertakes that no official of HURL, connected directly or indirectly with the Project/Work, will demand, take a promise for or accept, directly or through intermediaries, any bribe, consideration, gift, reward, favour or any material or immaterial benefit or any other advantage from the BIDDER, either for themselves or for any other person, organization or third party related to the contract in exchange for an advantage in the bidding process, bid evaluation, contracting or implementation process related to the contract.

1.2 HURL will, during the pre-contract stage, treat all BIDDERs alike, and will provide to all BIDDERs the same information and will not provide any such information to any particular BIDDER which could afford an advantage to that particular Bidder in comparison to other BIDDERs.

1.3 HURL will report to the Independent Monitor of any attempted or completed breaches of the above commitments as well as any substantial suspicion of such a breach. HURL will also report to appropriate Government Office wherever necessary".

2.0 PRECEDING MISCONDUCT:

2.1 In case any preceding misconduct on the part of any official(s) is reported by the BIDDER to the Independent Monitor with full and verifiable facts and the same is prima facie found to be correct by the Independent Monitor, necessary disciplinary proceedings, or any other action as deemed fit, including criminal proceedings may be initiated by HURL or the Independent Monitor and such a person shall be debarred from further dealings related to contract process. In such a case while an enquiry is being conducted by HURL the proceedings under the contract would not be stalled.

3.0 COMMITMENTS OF BIDDER:

3.1 The BIDDER commits itself to take all measures necessary to prevent corrupt practices, unfair means and illegal activities during any stage of its bid or during any pre-contract or post-contract stage in order to secure the contract or in furtherance to secure it and in particular commit itself to the following:

3.2 The BIDDER will not offer, directly or through intermediaries, any bribe, gift, consideration, reward, favour, any material or immaterial benefit or other advantage, commission, fees, brokerage or inducement to any official of the HURL, connected directly or indirectly with the bidding process, or to any person, organization or third party related to the contract in exchange for any advantage in the bidding, evaluation, contracting and implementation of the contract.

3.3 The BIDDER further undertakes that it has not given, offered or promised to give, directly or indirectly any bribe, gift, consideration, reward, favour, any material or immaterial benefit or other advantage, commission, fees, brokerage or inducement to any official of HURL or otherwise in procuring the Contract or forbearing to do or
having done any act in relation to the obtaining or execution of the contract or any other contract with HURL for showing or forbearing to show favour or disfavour to any person in relation to the contract or any other contract with HURL.

3.4 BIDDER shall disclose the name(s) and address(es) of foreign principals, associates, agents and distributors, advisors, representatives and sub-contractors.

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3.5 BIDDER shall disclose the payments to be made by them to agents/ brokers or any other intermediary, in connection with this bid/ contract.

3.6 The BIDDER further confirms and declares to HURL that he has not engaged any individual or firm or company, whether Indian or foreign, to intercede, facilitate or in any way to recommend to HURL or any or its functionaries, whether officially or unofficially to the award of the contract to the BIDDER, nor has any amount been paid, promised or intended to be paid to any such individual, firm or Company in respect of any such intercession, facilitation or recommendation.

3.7 The BIDDER, either while presenting the bid or during pre-contract negotiations or before signing the contract, shall disclose complete details of any payments made, is committed to or intends to make to any officials of HURL or their family members, agents, brokers or any other intermediaries in connection with the contract and the details of services agreed upon for such payments.

3.8 The BIDDER will not collude with other parties, interested in the contract, to impair the transparency, fairness and progress of the bidding process, bid evaluation, contracting and implementation of the contract.

3.9 The BIDDER will not accept any advantage in exchange for any corrupt practice, unfair means and illegal activities.

3.10 The BIDDER shall not use improperly, for purposes of completion or personal gain, or pass on to others, any information provided by HURL as part of the business relationship, such as plans, technical proposals and business details including information contained in any electronic data carrier. The BIDDER also undertakes to exercise due and adequate care to ensure that no information is divulged to others.

3.11 The BIDDER commits to refrain from giving any complaint in connection with the Project, directly or through any other manner, without supporting it with full and verifiable facts.

3.12 The BIDDER shall not instigate or cause to instigate any third party to commit any of the actions aforestated.

3.13 If the BIDDER or any employee of the BIDDER or any person acting on behalf of the BIDDER, either directly or indirectly, is a relative of any of the employees of HURL, or, if any relative of an employee of HURL has financial interest/stake in the BIDDER, the same shall be disclosed by the BIDDER at the time of filing the tender.

The term `relative' for this purpose would be as defined in Companies Act, 2013 or any modifications thereof.

3.14 The BIDDER shall not lend to or borrow any money from or enter into any monetary dealings or transactions, directly or indirectly, with any employee of HURL.

4.0 PREVIOUS TRANSGRESSION

4.1 The BIDDER declares that no previous transgression occurred in the last three years immediately before signing of this Integrity Pact with HURL, in respect of any corrupt practices

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envisaged hereunder, and/or with any Public Sector Enterprises/ Government department that could justify BIDDERs exclusion from the tender process.

4.2 The BIDDER agrees that if it makes incorrect statement on this subject, BIDDER can be disqualified from the tender process of the contract, and if already awarded, the Contract can be terminated for such reason.

5.0 EARNEST MONEY / SECURITY DEPOSIT:

5.1 While submitting commercial bid, the BIDDER shall deposit an amount _____ as Earnest Money/Security Deposit, with HURL through any of the following instruments:

(i) Bank draft or pay order in favour of

(ii) A confirmed guarantee by an Indian Nationalized Bank, promising payment of the guaranteed sum to the Buyer on demand within three working days without any demur whatsoever and without seeking any reasons whatsoever. The demand for payment by the Buyer shall be treated as conclusive proof of payment

(iii) Any other mode or through any other instrument

5.2 The amount and validity of the earnest money / Security Deposit shall be as mentioned in the NIT.

5.3 In case of the successful BIDDER a clause would also be incorporated in the Article pertaining to Performance Bond in the purchase contract that the provisions of Sanctions for Violation shall be applicable for forfeiture of Performance Bond in case of the decision by the BUYER to forfeit the same without assigning any reason for imposing sanction for violation of this Pact.

5.4 No interest shall be payable by the HURL to the BIDDER on Earnest Money/ Security Deposit for the period of its currency.

6.0 SANCTIONS FOR VIOLATIONS

6.1 Any breach of the aforesaid provisions by the BIDDER or any one employed by it or acting on its behalf (whether with or without the knowledge of the BIDDER or any one employed by it or acting on its behalf (whether with or without the knowledge of the BIDDER) shall entitle HURL to take all or any one of the following actions, wherever required:-

i. To immediately call off the pre contract negotiations without assigning any reason or giving any compensation to the BIDDER. However, the proceedings with the other BIDDER(s) would continue.

ii. The Earnest Money Deposit (in pre-contract stage) and /or Security Deposit/Performance Bond (after the contract is signed) shall stand forfeited either fully or partially, as decided by HURL, without assigning any reason thereof.

iii. To immediately cancel the contract, if already signed, without giving any compensation to the BIDDER.

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iv. To recover all sums already paid by HURL, together with interest thereon at 2% higher than the prevailing Lending Rate of State Bank of India or at 2% higher than LIBOR as may be applicable based on whether the bidder is an Indian party or a foreign party. If any outstanding payment is due to the BIDDER from HURL in connection with any other contract for any other Project/Work/ Supply, such outstanding payment could also be utilized to recover the aforesaid sum and interest.

v. To encash the advance bank guarantee and performance bond/ warranty bond, if furnished by the BIDDER, in order to recover the payments, already made by HURL, along with interest.

vi. To terminate all or any other Contracts with the BIDDER. The BIDDER shall be liable to pay compensation for any loss or damage to HURL resulting from such termination and RCF shall be entitled to deduct the amount so payable from the money(s) due to the BIDDER.

vii. To debar/blacklist the BIDDER from participating in future bidding processes of HURL for a minimum period of five years, which may be further extended at the discretion of HURL.

viii. To recover all sums paid, in violation of this Pact by BIDDER to any middleman or agent or broker, with a view to securing the contract.

ix. In case where irrevocable Letters of Credit have been opened in respect of any contract signed by HURL with the BIDDER, the same shall not be operated.

x. Forfeiture of Performance Bond in case of a decision by HURL to forfeit the same without assigning any reason for imposing sanction for violation of this Pact.

6.2 HURL will be entitled to take all or any of the actions mentioned at para 6.1 (i) to (x) of this Pact also on the Commission by the BIDDER or any one employed by it or acting on its behalf (Whether with or without the knowledge of the BIDDER) of an offence as defined in Chapter IX of the Indian Penal code, 1860 or Prevention of Corruption Act, 1988 or any other statute enacted for prevention of corruption.

6.3 The decision of HURL to the effect that a breach of the provisions of this Pact has been committed by the BIDDER shall be final and conclusive on the BIDDER. However, the Bidder can approach the Independent Monitor appointed for the purposes of this Pact.

7.0 INDEPENDENT MONITOR:

7.1 HURL has appointed following persons as Independent Monitor for this Pact:

(i) Name :. ……
Address:
Email:
Mobile:

(ii) Name :. ……
Address:
Email:
Mobile:

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7.2 The task of the Monitor shall be to review independently and objectively, whether and to what extent the parties comply with the obligations under this Pact.

7.3 The Monitor shall not be subject to instructions by the representatives of the parties and perform his functions neutrally and independently.

7.4 Both the parties accept that the Monitor has the right to access all the documents relating to the project/ procurement, including minutes of meetings.

7.5 As soon as the Monitor notices, or has reason to believe a violation of this Pact, he will so inform the Authority designated by HURL.

7.6 Notwithstanding any Confidentiality Agreement/ clause agreed between HURL and Bidder, the BIDDER accepts that the Monitor has the right to access, without restriction, to all Project documentation of HURL including that provided by the BIDDER. The BIDDER will also grant the Monitor, upon his request and demonstration of a valid interest, unrestricted and unconditional access to this project documentation. The same is applicable to Subcontractors. The Monitor shall be under contractual obligation to treat the information and documents of the BIDDER/ Subcontractor (s) with confidentiality.

7.7 HURL will provide to the Monitor sufficient information about all meetings among the parties related to the supply provided such meetings could have an impact on the contractual relations between the parties. The parties will offer to the Monitor the option to participate in such meetings.

7.8 The Monitor will submit a written report to the designated Authority of HURL within 8 to 10 weeks from the date of reference or intimation to him by HURL/ BIDDER and should the occasion arise, submit proposals for correcting problematic situations.

8.0 FACILITATION OF INVESTIGATION

In case of any allegation of violation of any provisions of these terms or payment of commission, HURL shall be entitled to examine all the project documents of the BIDDER and the BIDDER shall provide necessary information and documents in English and shall extend all possible help for the purpose of such examination.

9.0 LAW AND PLACE OF JURISDICTION

This Pact is subject to Indian Law. The place of performance and jurisdiction is the registered office of HURL.

10.0 OTHER LEGAL ACTIONS

The Actions stipulated in this Integrity Pact are without prejudice to any other legal action that may follow in accordance with the provisions of the extant law in force relating to any civil or criminal proceedings.

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11.0 VALIDITY

11.1 The validity of this Integrity Pact shall be from date the NIT is issued and extend upto two years from the date of last payment under the contract. In case BIDDER is not awarded Contract/Purchase Order, this Integrity Pact shall expire after twelve months from the date of issue of the NIT.

11.2 Should one or several provisions of this Pact turn out to be invalid, the remainder of this Pact shall remain valid. In this case, the parties will strive to come to an agreement to their original intentions.

12.0 The parties hereby sign this Integrity Pact, through their authorized representative, for having accepted the conditions contained hereinabove.

HURL	**BIDDER**
( )	*( )*
Date: *Place:*	*Date:* *Place:*
Witness	Witness
1. _____ 2. _____	1. _____ 2. _____

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PART-I : COMMERCIAL

ANNEXURE - 1.18

PROFORMA FOR SOLVENCY CERTIFICATE

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PROFORMA FOR SOLVENCY CERTIFICATE

(on Bank's Letter Head)

REF NO:…… DATE:…….....

To Whomsoever Concerned

This is to certify that to the best of our knowledge and information, M/s_____ (Bidders name with complete address), a customer of our Bank, is respectable, and is capable of executing orders to the extent of Rs. _____ (Rupees_____). M/s _____ have been our customer since _____ to date and has been granted the following limits, at present, against various facilities granted by the Bank:

…… ……..
…… ……...

This certificate is issued without any guarantee, risk or responsibility on behalf of the Bank or any of its officials.

This certificate is issued at the specific request of the customer.

Yours faithfully,

(Bank Official's signature & stamp)

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PART-I : COMMERCIAL

ANNEXURE - 1.19

FORMAT FOR EFT DETAILS

FORMAT FOR EFT DETAILS

I / WE hereby agree to receive the payment against our bills raised to M/s Hindustan Urvarak & Rasayan Ltd. directly in our bank account as per details given below through Electronic Fund Transfer Mechanism. Necessary details are given as below:

1	Name, Branch and address of Payee's bank	:	_____
2	Title of the account	:	_____
3	Account number	:	_____
4	Nature of the Account	:	_____
5	Branch MICR code number	:	_____
	[Enclose photocopy of cancelled cheque]	:	_____
6	Permanent Account Number	:	_____
	[PAN] of the Payee	:	_____
7	IFSC Code	:	_____

STAMP & SIGNATURE OF BIDDER : _____

NAME OF BIDDER : _____

DATE : _____

PART-I : COMMERCIAL

ANNEXURE - 1.20

GENERAL GUIDELEINS FOR GOODS & SERVICE TAX (GST)

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GENERAL GUIDELINES FOR GOODS & SERVICE TAX (GST)

1.0 GST (CGST & SGST/UTGST or IGST)

1.1. Bidders are required to submit copy of the GST Registration Certificate while submitting the bids wherever **GST** is applicable.

1.2. Quoted prices should be inclusive of all taxes and duties, except GST (CGST & SGST or IGST or UTGST).Please note that the responsibility of payment of GST (CGST & SGST or IGST or UTGST) lies with the Supplier of Goods / Services only. Supplier of Goods/ Services (Service Provider) providing taxable service shall issue an Invoice/Bill, as the case may be as per rules/ regulation of GST. Further, returns and details required to be filled under GST laws & rules should be timely filed by Supplier of Goods/Services (Service Provider) with requisite details.

1.3. Payments to Contractor/Supplier/Service Provider for claiming GST amount will be made provided the above formalities are fulfilled. Further, OWNER may seek copies of challan and certificate from Chartered Accountant for deposit of GST collected from Owner.

1.4. In case CBEC (Central Board of Excise and Customs)/ any equivalent government agency brings to the notice of OWNER that the Contractor/Supplier/Service Provider of Goods / Services has not remitted the amount towards GST collected from OWNER to the government exchequer, then, that Contractor/Supplier/Service Provider of Goods / Services shall be put under Holiday list of OWNER for period of six months.

1.5. In case of statutory variation in GST, other than due to change in turnover, payable on the contract value during contract period, the Contractor/Supplier/Service Provider of Goods / Services shall submit a copy of the 'Government Notification' to evidence the rate as applicable on the Bid due date and on the date of revision.

1.6. In case contract completion is delayed for the reasons not attributable to Owner then any increase in the rate of GST beyond the contractual delivery period shall be to Contractor/Supplier/Service Provider’s account whereas any decrease in the rate GST shall be passed on to the Owner.

1.7. In case contract completion is delayed for the reasons attributable to Owner then any increase in the rate of GST beyond the contractual delivery period shall be to Owner’s whereas any decrease in the rate GST shall be passed on to the Owner.

1.8. Claim for payment of Statutory variation GST, should be raised within two [02] months from the date of issue of 'Government Notification' for payment of differential (in %) GST, otherwise claim in respect of above shall not be entertained for payment of arrears. The base date for the purpose of applying statutory variation shall be the Bid Due Date.

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1.9. Where owner has the obligation to discharge GST liability under reverse charge mechanism and owner has paid or is / liable to pay GST to the Government on which interest or penalties becomes payable as per GST laws for any reason which is not attributable to Owner or ITC with respect to such payment is not available to Owner for any reason which is not attributable to Owner shall be entitled to deduct / setoff / recover such amounts against amounts paid or payable or payable by Owner to Contractor / Supplier.

1.10. Contractor shall ensure timely submission of invoice(s) as per rules/ regulations of GST with all required supporting document(s) within a period specified in Contracts/ LOI to enable OWNER to avail input tax credit. Further, returns and details required to be filled under GST laws & rules should be timely filed by supplier with requisite details.

1.11. If input tax credit with respect to GST (CGST&SGST/UTGST or IGST) is not available to OWNER for any reason which is not attributable to OWNER, then OWNER shall not be obligated or liable to pay or reimburse GST (CGST&SGST/UTGST or IGST) charged in the invoice(s) and shall be entitled to / deduct/ setoff /recover the such GST (CGST&SGST/UTGST or IGSTUTGST) thereupon together with all penalties and interest if any, against any amounts paid or payable by OWNER to Supplier of Goods / Services.

2.0 ANTI-PROFITEERING CLAUSE

As per Clause 171 of GST Act, it is mandatory to pass on the benefit due to reduction in rate of tax or from input tax credit to the consumer (Owner in this case) by way of commensurate reduction in prices. The Contractor/Supplier/Service Provider of Goods/Services may note the above and quote their prices accordingly.

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PART-I : COMMERCIAL

ANNEXURE - 1.21

FORMAT FOR FINANCIAL CAPABILITY OF BIDDER

(On Chartered Accountant's Letter Head)

FORMAT FOR CHARTERED ACCOUNTANT CERTIFICATE FOR FINANCIAL CAPABILITY OF THE BIDDER

We have verified the Annual Accounts and other relevant records of M/s…… (Name of the bidder) and certify the following

A. ANNUAL TURNOVER OF LAST 3 YEARS:

Year	Amount (INR)
Year 1: 2016-17	
Year 2: 2015-16	
Year 3: 2014-15	

B. FINANCIAL DATA FOR LAST AUDITED FINANCIAL YEAR :

Description	FY Closing as on 31.03.2017
	Amount (INR)
Current Assets	
Current Liabilities	
Working Capital (Current Assets-Current liabilities)	
Net Worth (Paid up share capital and Free Reserves & Surplus)	

Name of Audit Firm:
Chartered Accountant
Date:

[Signature of Chartered Accountant]
Name:
Designation:
Seal:
Membership no.:

Instructions:

1. The financial year would be the same as one normally followed by the bidder for its Annual Report.
2. The bidder shall provide the audited annual financial statements as required for this Tender document. Failure to do so would result in the Proposal being considered as non responsive.
3. For the purpose of this Tender document, (i) Annual Turnover shall be "Sale value/ Operating Income" (ii) Working Capital shall be "Current Assets less Current liabilities" and (iii) Net Worth shall be "Paid up share capital and Free Reserves & Surplus"
4. **This certificate is to be submitted on the letter head of Chartered Accountant.**

PART-I : COMMERCIAL

ANNEXURE - 1.22

FORMAT FOR BIDDER NOT UNDER LIQUIDATION, COURT RECEIVERSHIP OR SIMILAR PROCEEDINGS

(Self Declaration on Bidder's Letter Head as per below performa)

DECLARATION

To ,

…….
…….
…….

NIT NO. : PNPM/PC160/E/G-240

SUBJECT : TENDER DOCUMENT FOR RENOVATION OF ADMINISTRATIVE BUILDING AND BUNGALOWS (PACKAGE-VI) AT GORAKHPUR, UTTAR PRADESH

Sir ,

We hereby declare that M/s ……. is not under liquidation, court receivership or similar proceedings as on date.

Signature

Name :
Designation :

Seal of the Bidder.

PART-I : COMMERCIAL

ANNEXURE - 1.23

FORMAT FOR PAST SAFETY RECORD

(Self Declaration on Bidder's Letter Head as per below performa)

DECLARATION

To ,

……
……
……

NIT NO. : PNPM/PC160/E/G-240

SUBJECT : TENDER DOCUMENT FOR RENOVATION OF ADMINISTRATIVE BUILDING AND BUNGALOWS (PACKAGE-VI) AT GORAKHPUR, UTTAR PRADESH

Sir ,

We hereby declare that, we have taken up all safety measures during the past 5 years while executing the works awarded to me.

No deviation and casualty has been found during execution of the contract.

The above information is true and correct to the best of my knowledge and belief.

Signature

Name :

Designation :

Company Name :

Seal of the Bidder :

PART-I : COMMERCIAL

ANNEXURE - 1.24

FORMAT FOR DAILY / WEEKLY / MONTHLY PROGRESS REPORT

CLIENT	**HINDUSTAN URAVARAK RASAYAN LIMITED (HURL)**
CONSULTANT	**PROJECTS & DEVELOPMENT INDIA LIMITED (PDIL)**
CONTRACTOR	
PROJECT DETAILS	
PROJECT LOCATION	
LOI Ref. NO.	
PROJECT ZERO DATE	
SCHEDULE COMPLETION DATE	

SAMPLE FORMAT

PROJECT STATUS AS OF ----------

ANNEXURE NO.	DESCRIPTION
ANNEXURE-1	OVERALL PROGRESS SUMMARY
ANNEXURE-2	ENGINEERING STATUS
ANNEXURE-3	PROCUREMENT STATUS
ANNEXURE-4	CONSTRUCTION PROGRESS STATUS

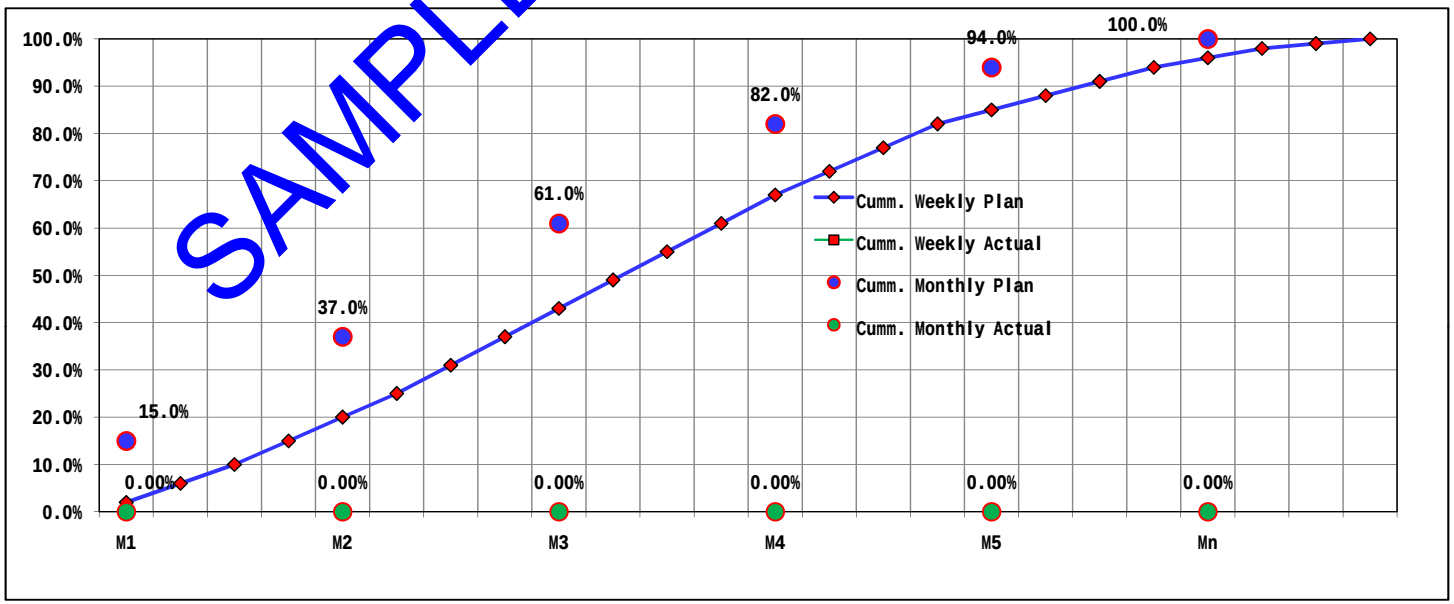
ANNEXURE-1

CLIENT	HINDUSTAN URAVARAK RASAYAN LIMITED (HURL)	STATUS AS OF:	
CONSULTANT	PROJECTS & DEVELOPMENT INDIA LIMITED (PDIL)		
CONTRACTOR			
PROJECT DETAILS:			
LOI Ref.			
PROJECT ZERO DATE			
SCHEDULE COMPLETION DATE			

DETAILED OVERALL PROGRESS REPORT

Sr No	Descrption		WTG	M_1				M_2				M_3				M_4				M_5				M_n			
				W1	W2	W3	W4	W5	W6	W7	W8	W9	W10	W11	W12	W13	W14	W15	W16	W17	W18	W19	W20	Wn1	Wn2	Wn3	Wn
1	Engineering	Plan	10%																								
		Actual																									
2	Procurement	Plan	50%																								
		Actual																									
3	Construction	Plan	30%																								
		Actual																									
4	Commissioning (As per System / Stream wise)	Plan	10%																								
		Actual																									
5	TOTAL PROJECT PROGRESS %	Weekly Plan	100%	2.0%	4.0%	4.0%	5.0%	5.0%	5.0%	6.0%	6.0%	6.0%	6.0%	6.0%	6.0%	6.0%	5.0%	5.0%	5.0%	3.0%	3.0%	3.0%	3.0%	2.0%	2.0%	1.0%	1.0%
		Weekly Actual																									
		Cumm. Weekly Plan	100%	2.0%	6.0%	10.0%	15.0%	20.0%	25.0%	31.0%	37.0%	43.0%	49.0%	55.0%	61.0%	67.0%	72.0%	77.0%	82.0%	85.0%	88.0%	91.0%	94.0%	96.0%	98.0%	99.0%	100.0%
		Cumm. Weekly Actual																									
		Cumm. Monthly Plan	100%	15.0%				37.0%				61.0%				82.0%				94.0%				100.0%			
		Cumm. Monthly Actual		0.00%				0.00%				0.00%				0.00%				0.00%				0.00%			

SAMPLE FORMAT



CLIENT HINDUSTAN URAVARAK RASAYAN LIMITED (HURL)

CONSULTANT PROJECTS & DEVELOPMENT INDIA LIMITED (PDIL)

CONTRACTOR

PROJECT DETAILS:

LOI Ref.

PROJECT ZERO DATE

SCHEDULE COMPLETION DATE

STATUS AS OF:

ANNEXURE NO. 2

ENGINEERING PROGRESS REPORT FOR .....

						1ST SUBMISSION				2ND SUBMISSION				3RD SUBMISSION				
ACTIVITY HEAD	S. no.	Descrption	Documents No	WTG [1]	Progress %	Schedule Date	Actual Date	Approval / Comments date	Approval Code	Schedule Date	Actual Date	Approval / Comments date	Approval Code	Schedule Date	Actual Date	Approval / Comments date	Approval Code	Remarks
ENGINEERING	1	Document 1		5.00%														
	2	Document 2		5.00%														
	3	Document 3		5.00%														
	4	Document 4		5.00%														
	5	Document 5		5.00%														
	6	Document 6		5.00%														
	7	Document 7		5.00%														
	8	Document 8		5.00%														
	9	Document 9		5.00%														
	10	Document 10		5.00%														
	11	Document 11		5.00%														
	12	Document 12		5.00%														
	13	Document 13		5.00%														
	14	Document 14		5.00%														
	15	Document 15		5.00%														
	16	Document 16		5.00%														
	17	Document 17		5.00%														
	18	Document 18		5.00%														
	19	Document 19		5.00%														
	20	Document 20		5.00%														
ENGINEERING PROGRESS %				100.00%	0.00%													

(1) Weightages to be assigned as per volume of work

SAMPLE FORMAT

CLIENT HINDUSTAN URAVARAK RASAYAN LIMITED (HURL)

CONSULTANT PROJECTS & DEVELOPMENT INDIA LIMITED (PDIL)

CONTRACTOR

PROJECT DETAILS:

LOI Ref.

PROJECT ZERO DATE

SCHEDULE COMPLETION DATE

STATUS AS OF:

ANNEXURE NO. 3

PROCUREMENT PROGRESS REPORT FOR .....

ACTIVITY HEAD	S. no.	DESCRPTION	ITEM NO / ENQUIRY NO	DELIVERY SCHEDULE	LOI NO. & Date	VENDOR NAME	MFG. LOCATION	WTG (2)	ACTUAL PROGRESS %	ORDERING 10%		INSPECTION 50%		DISPATCHED 80%		RECEIPT AT SITE 100%		REMARKS
										SCH	ACTUAL	SCH	ACTUAL	SCH	ACTUAL	SCH	ACTUAL	
PROCUREMENT	1	Item1																
PROCUREMENT	2	Item2																
PROCUREMENT	3	Item3																
PROCUREMENT	4	Item4																
PROCUREMENT	5	Item5																
PROCUREMENT	6	Item6																
PROCUREMENT	7	Item7																
PROCUREMENT	8	Item8																
PROCUREMENT	9	Item9																
PROCUREMENT	10	Item10																
PROCUREMENT	11	Item11																
PROCUREMENT	12	Item12																
PROCUREMENT	13	Item13																
PROCUREMENT	14	Item14																
PROCUREMENT	15	Item15																
PROCUREMENT	16	Item16																
PROCUREMENT	17	Item17																
PROCUREMENT	18	Item18																
PROCUREMENT	19	Item19																
PROCUREMENT	20	Item20																
PROCUREMENT PROGRESS %								**100%**										

(2) Weightages to be assigned as per Cost of Items

SAMPLE FORMAT

CLIENT — HINDUSTAN URAVARAK RASAYAN LIMITED (HURL)
CONSULTANT — PROJECTS & DEVELOPMENT INDIA LIMITED (PDIL)
CONTRACTOR
PROJECT DETAILS:
LOI Ref.
PROJECT ZERO DATE
SCHEDULE COMPLETION DATE

ANNEXURE NO. 4

PROGRESS DATE:
REPORT DATE:

SITE WEATHER :
HOLIDAY INFORMATION:

MANPOWER DEPLOYED
SKILLED :
UNSKILLED :
STAFF :
TOTAL MANOPOWER :

CONSTRUCTION DAILY PROGRESS REPORT FOR ..... AS OF DD-MM-YYYY.....

S. NO.	ACTIVITY	SOR. SR. NO.	DESCRPTION AS PER SOR	UNIT	SOR CUMM. QTY [A]	RATE	VALUE	WTG (3) [W%]	NAME OF SUB-CONTRACTOR (IF ANY)	Front Available	Progress Quantity				Balance qty.	Monthly Plan	Monthly Cumulative Achieved	Backlog	% Progress = [B] / [A] x [W%]	Remarks
											Upto Prev. day	Today plan	Today Executed	Cumulative [B]						
A	CIVIL WORK																			
B	MECHANICAL ERECTION WORK																			
C	ELECTRICAL WORK																			
D	INSTRUMENTATION WORK																			
E	ANY OTHER WORK																			
	TOTAL CONSTRUCTION PROGRESS							100.0%											0.0%	

(3) Weightages to be assigned as per Cost & Effort

SAMPLE FORMAT

PART-I : COMMERCIAL

ANNEXURE - 1.25

FORMAT FOR POWER OF ATTORNEY

POWER OF ATTORNEY
(to be submitted on the Non-Judicial stamp paper)

Tender er No.:
Description of work:
Name of Bidder:_____

"The undersigned _____ (Name of LEGAL PERSON, i.e. CEO/MD/ CHAIRMAN /C&MD/Company Secretary/Partners/Proprietor) is lawfully authorized to issue this POA* on behalf of the company M/s _____ (Name of bidder) whose registered address is _____ _____ and does hereby appoint Mr./Ms _____ (name of authorized person signing the bid document) _____ (Designation) of M/s _____ (Name of bidder) whose signature appears below to be the true and lawful attorney/(s) and authorize him/her to sign the bid, conduct negotiation, sign contracts and execute all the necessary matter related thereto, in the name and on behalf of the company in connection with the tender no. _____.

The signature of the authorized person/(s) herein constitutes unconditional obligations of M/s _____ (Name of bidder).

This Power of Attorney (POA) shall remain valid and in full force and effect before we withdraw it in writing (by fax, or mail or post). All the documents signed (within the period of validity of the Power of Attorney) by the authorized person herein shall not be invalid because of such withdrawal.

(*)

1. In case of a Limited Company, if the POA is issued by other than CEO/MD/ CHAIRMAN /C&MD/Company Secretary, then the POA must be accompanied by a "Board Resolution" of the bidder's company authorizing the "Legal Person" to issue POA.
2. For a Partnership Firm, the POA must be signed by all Partners and a copy of Partnership Deed of the Company must be enclosed with bid.
3. For a Proprietorship firm, if the bid is signed by any person other than the Proprietor, then legal person shall be the Proprietor of the firm.

SIGNATURE OF THE LEGAL PERSON

_____
(Name of person with Company seal)

SIGNATURE OF THE AUTHORIZED PERSON
(FOR SIGNING THE BID)

_____
(Signature)
Name of person: _____
E-mail id:

PART-II : TECHNICAL

SECTION-1.0

PROJECT - GORAKHPUR FERTILIZER PLANT

TENDER DOCUMENT

FOR

RENOVATION OF

ADMINSTRATIVE BUILDING & BUNGALOWS

AT HURL, GORAKHPUR

REV	DATE	PURPOSE	PREPARED	REVIEWED	APPROVED
0	19.06.18	ISSUED FOR TENDER	NY	SA	UPT
P	25.05.18	ISSUED FOR REVIEW	NY	SA	UPT

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CONTENTS

SL. No.	DESCRIPTION	DOCUMENT NO.
1.0	GENERAL SPECIFICATIONS FOR CIVIL, STRUCTURAL AND OTHER ALLIED WORKS	PC160-PNCV-GS-0203
2.0	TECHNICAL SPECIFICATIONS FOR CIVIL, STRUCTURAL AND OTHER ALLIED WORKS	ES-2516

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GENERAL SPECIFICATIONS FOR

CIVIL STRUCTURAL

&

OTHER ALLIED WORKS

REV	DATE	PURPOSE	PREPARED	REVIEWED	APPROVED
0	19.06.18	ISSUED FOR TENDER	NY	SA	UPT
P	25.05.18	ISSUED FOR REVIEW	NY	SA	UPT

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CONTENTS

SL. NO.	DESCRIPTION	SHEET NUMBER
1. 0	GENERAL	3
2.0	SCOPE OF WORK	3

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1. 0 GENERAL

1. 1 This section of the tender Documents deals mainly with the Scope and Technical Specifications needed for the execution and construction of complete Civil, Structural steel Works and other Allied Works on Item Rate basis. The work shall have to be carried out both below and above ground level and construction of all civil, structural, and other allied works associated with the **"RENOVATION WORKS FOR ADMINISTRATIVE BUILDING AND BUNGALOWS AT GORAKHPUR, UTTAR PRADESH- INDIA**" as per the items indicated in the "Schedule of Rates".

1.2 In the event of conflict between the requirements of two or more clauses of the specifications/ Documents, the more stringent requirement as per the interpretation of the Owner/ Consultant shall prevail.

1.3 The Contractor shall inspect and examine the site and its surrounding and shall satisfy himself before submitting his bid as to the nature of the ground and subsoil, the form and nature of the site, the quantum and the nature of work and material necessary for successful completion of the works and the means of access to site and in general shall himself obtain all necessary information as to risks, contingencies and other circumstances which may influence or affect his Tender. Under no circumstances, extra payment consequent on any misunderstandings or otherwise on the part of the Contractor shall be allowed.

1.4 Works covered herein below may have to be executed also in operating plant, if required. The Contractor shall have to take all safety precaution to protect all the existing equipment, structures, facilities and buildings etc. from damage. In case, any damage occurs due to the activities of the Contractor on account of negligence, ignorance, accidental or any other reasons whatsoever, the damage shall be made good by the Contractor at his own cost to the satisfaction of the Owner / Consultant. The Contractor shall have to take also all necessary safety measure, at his own cost, to avoid any harm/ injury to his workers and staff and facilities of the existing plant.

2.0 SCOPE OF CIVIL STRUCTURAL AND OTHER ALLIED WORKS

The scope of work under this includes construction/ execution, providing necessary engineering supervision through qualified and technical personnel, skilled and unskilled labor, etc. and mobilization of all relevant and adequate plants, tools and tackles, equipment, machineries, etc., to carry out all civil and structural works for successful completion of the proposed **"RENOVATION WORKS FOR ADMINISTRATIVE BUILDING AND BUNGALOWS**".

All the civil & structural works shall be carried out strictly in accordance with the "Technical Specifications (ES 2516), Preamble to schedule of rates and "Schedule of Rates (PC160-PNCV-SOR-REN-GKP-0202) enclosed with this document. The complete civil and structural Steel works associated with the proposed project, consists of mainly but not limited to the following:

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Scope of work for Renovation of Administrative Building (Part-A (i))

1. Renovation of part of ground floor and part of first floor.

2. Removal of wall panels, glass partition and false flooring in part of Hall and tiling works in the area where false flooring will be removed.

3. Tiling work in rooms at ground floor.

4. Rubbing / Polishing of Floor of entire area except Toilets and area in Point no. 3.

5. Putty and Plastic emulsion painting in rooms

6. Oil Bound Distemper (OBD) in all rooms and corridor except at point no 5.

7. Complete renovation of toilets i.e. two at ground floor & two at first floor.

8. Granite slab in kitchen/ pantry.

9. Water proofing of roof for conference room and part of 2nd floor.

10. OBD painting of main & side entrance lobby at Ground floor.

11. Repair/ replacement of windows & doors as per requirement.

Scope of work for Renovation of Bungalows (Part-A(ii))

Type B (9 Nos.), Type C (2 Nos.) & Type D (10 Nos.) Bungalows

1. Complete tile work in B and C type quarters and floor repair in D type quarters.

2. Putty and Plastic emulsion paint for inside wall finish.

3. Exterior wall finish by plastering and Cement Paint

4. Overhead tank, Septic tank, termite treatment.

5. Granite slab in kitchen.

6. Complete replacement of doors (wooden and wire mesh) & windows (glass and wire mesh).

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7. Repair / providing MS railing at roof / stairs.

8. Repair of boundary wall.

9. Complete renovation of plumbing & sanitary fittings of Kitchens, Toilets & Bathrooms, including replacement of plumbing and sanitary pipes.

10. Waterproofing of roof.

11. Area cleaning around quarters.

12. Provision / Replacement / repair of wooden shutters for existing wardrobes.

13. Repairing and painting of doors of garage, flooring repair and OBD in garage.

14. Floor repair, OBD for interior walls, cement paint on exterior surfaces in servant room.

15. Paver block for pathway between road & quarter, and in front of quarter.

16. Drain along boundary wall and connection to main drain.

17. Plinth protection around the building.

New Boring & Water Tank with structure.

1. Construction of a new submersible boring and setting up of 2 water tanks with structure in Bungalows area and 1 water tank with structure in Administrative building.

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SECTION-2.0

TECHNICAL SPECIFICATIONS

FOR

CIVIL, STRUCTURAL

AND

OTHER ALLIED WORKS

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1	**28.02.2009**	**30.01.2009**	**REVISED & ISSUED FOR IMPLEMENTATION**		**RVV**	**MKS**
0	15.01.99		FOR EMPLEMENTATION			
REV	REV DATE	EFF DATE	PURPOSE	PREPD	REVWD	APPD

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1.0 GENERAL

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1.1 Specifications of materials and workmanship shall be as described in the Central Public Works Department Specifications Vol. I to VI (latest) including latest amendments, unless otherwise specified. These CPWD Specifications shall be deemed to form part of this contract. The **CONTRACTOR** shall procure and maintain copies of the latest CPWD Specifications at site for reference.

1.2 These technical Specifications shall be supplementary to the specifications contained in the CPWD specifications, wherever at variance, these Particular Specifications shall take precedence over the provisions in the CPWD Specifications.

1.3 Site clearing - Site clearing means the cutting of trees, bushes, shrubs etc. and the pulling out of roots and stumps to effect a general cleaning of the site area. All these materials shall be removed from the site area at the **CONTRACTOR'**s expenses and responsibility and shall be disposed off as directed by **Engineer-in-Charge**. Trees, bushes, roots, stumps and other materials shall not be disposed off by burning within the site boundaries unless the **Engineer-in-Charge** permits.

2.0 REFERENCE CODES & STANDARDS

2.1 Wherever reference of BIS Specifications/ or BIS Codes of Practice are made in the Specifications/ Schedule of Rates or Preambles, reference shall be to the latest edition of BIS (Bureau of Indian Standards).

BIS - 109 Ready mixed paint, brushing, priming, plaster to Indian Standard colour No. 631 & 361 white and off-white.

BIS - 248 Sodium bisulphite, technical (sodium metabisuphite).

BIS - 383 Coarse & Fine aggregates from natural sources for concrete.

BIS - 419 Putty, for use on window frames.

BIS - 427 Distemper, dry, colour as required.

BIS - 432 Mild Steel & Medium tensile steel bars.

BIS - 456 Code of Practice for Plain and Reinforced Concrete.

BIS - 515 Natural and Manufactured aggregates for use in mass concrete

BIS - 730 Hook bolts for corrugated sheet roofing

BIS - 800 Code of Practice for General Construction in Steel

BIS - 814 Covered electrodes for manual metal arc welding of carbon and carbon manganese steel.

BIS - 815 Classification coding of covered electrodes for metal arc welding of structural steels.

BIS - 816 Metal Arc Welding for General Construction of Mild Steel.

BIS - 817 Code of practice for training and testing of metal arc welders.

BIS - 883 Code of practice for structural timber in building.

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BIS - 1038	Steel doors, windows and ventilators
BIS - 1079	Hot rolled carbon steel sheets & strips
BIS - 1081	Code of practice for fixing and glazing of metal (steel & aluminium) doors, windows and ventilators.
BIS - 1161	Steel tubes for structural purposes.
BIS - 1285	Wrought aluminium & aluminium alloy extruded round tube and hollow sections
BIS - 1361	Steel windows for Industrial Buildings.
BIS - 1363	Hexagon head bolts, screws & nuts of product grade C : Part - I Hexagon head bolts (size range M5 to M64)
BIS - 1367	Technical supply conditions for threaded steel fasteners
BIS - 1566	Hard - Drawn steel wire fabric for concrete reinforcement.
BIS - 1786	High strength deformed steel bars & wires for concrete reinforcement.
BIS - 2062	Steel for general structural purposes.
BIS - 2116	Sand for masonry mortars.
BIS - 2212	Code of practice for brickwork.
BIS - 2386	Methods of test for aggregates.
BIS - 2553	Safety glass: Part-I General purpose.
BIS - 2835	Flat transparent sheet glass
BIS - 3007	Code of practice for laying of asbestos cement sheets.
BIS - 4021	Timber door, window and ventilator frames
BIS - 4923	Hollow Steel sections for structural use.
BIS - 4925	Concrete batching and mixing plant.
BIS - 5410	Cement Paint
BIS - 6477	Dimensions for wrought aluminium & aluminium alloys, extruded hollow sections.
BIS - 7318	Fusion welding of steel.
BIS - 10262	Recommended guidelines for concrete mix design.
IS - 14871	Products in Fibre Reinforced Cement – Long Corrugated or Asymmetrical Section Sheets and Fittings for Roofing and Cladding - Specification

3.0 EARTHWORK

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3.1 EXCAVATION

3.1.1 Excavation shall be carried out in soil of any nature and consistency, in the presence of water or in the dry, met on the site to the lines, levels and contours shown on the detailed drawings and **CONTRACTOR** shall remove all excavated materials to soil heaps on site or transport for use in filling on the site or stack them for reuse as directed by the **Engineer-in-Charge**.

3.1.2 Surface dressing shall be carried out on the entire area occupied by the buildings including plinth protection as directed without any extra cost. The depths of excavation shown on the drawings are the depths after surface dressing.

3.1.3 The site around all buildings and structures to a width of 3 metres beyond the edge of plinth protection, ramps, steps, etc. shall be dressed and sloped away from the buildings.

3.1.4 Black cotton soil, and other expansive or unsuitable soils excavated shall not be used for filling in foundations, and plinths of buildings or in other structures including manholes, septic tanks etc. and shall be disposed off within the contract area marked on the drawings, as directed, leveled and neatly dressed.

3.1.5 In case of trenches exceeding 2 metres depth or where soil is soft or slushy, the sides of trenches shall be protected by timbering and shoring. The **CONTRACTOR** shall be responsible to take all necessary steps to prevent the sides of trenches from caving in or collapsing. The extent and type of timbering and shoring shall be as directed by the **Engineer-in-Charge**.

3.1.6 Where the excavation is to be carried out below the foundation level of adjacent structure, the precautions to be taken such as under pinning, shoring and strutting etc. shall be determined by **Engineer-in-Charge**. No excavation shall be done unless such precautionary measures are carried out as per directions of **Engineer-in-Charge**.

3.1.7 Specification for Earth work shall also apply to excavation in rock in general. The excavation in rock shall be done such that extra excavation beyond the required width and depth as shown in drawings is not made. If the excavation done in depth greater than required /ordered. The **CONTRACTOR** shall fill the extra excavation with concrete of mix 1:5:10 as the foundation concrete at his own cost.

3.1.8 **CONTRACTOR** shall make all necessary arrangements for dewatering / defiling as required to carry out proper excavation work by bailing or pumping out water, which may accumulate in the excavation pit from any cause/ source whatsoever.

3.1.9 **CONTRACTOR** shall provide suitable draining arrangements at his own cost to prevent surface water entering the foundation pits from any source.

3.1.10 The **CONTRACTOR i**s forbidden to commence the construction of structures or to carry out concreting before **Engineer-in-Charge** has inspected, accepted and permitted the excavation bottom.

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3.1.11 Excavation in disintegrated rock means rock or Boulders including brickbats which may be quarried or split with crow bars. This will also include laterite and hard conglomerate.

3.1.12 Excavations in hard rock - meant excavation made in hard rock to be done manually, or by blasting using only explosives and / or pneumatic hammers. In case of blasting, control blasting should be adopted depending on site conditions. For using explosives **CONTRACTOR** shall follow all provisions of Indian Explosives Act / Rules 1983, corrected / revised up to date.

3.1.13 In case of hard rock excavation to be carried out using explosives the, **CONTRACTOR** shall obtain the written approval in advance.

3.1.14 The measurements for excavations shall be restricted and limited to minimum excavation line as per drawing for payment purposes.

3.1.15 Adequate protective measures shall be taken to see that the excavation does not affect or damage adjoining structures. The **CONTRACTOR** shall take all measures required for ensuring stability of the excavation and safety of property and people in the vicinity. The **CONTRACTOR** shall erect and maintain during progress of work, temporary fences around dangerous excavations at no extra cost.

3.1.16 Excavation in ordinary soil means excavation in ordinary hard soil including stiff heavy clay, hard shale, or compact murum, or any material, which can be removed by the ordinary application of spades, shovels, picks and pick axes. This shall also include removal of isolated boulders each having a volume not more than 0.50m^3.

3.1.17 Excavation in soft rock includes limestone, sandstone, laterite, hard conglomerates, etc. or other rock which can be quarried or split with crowbars or wedges. This shall also include excavation of tarred pavements, masonry work and rock boulders each having a volume of not more than 0.25m^3.

3.1.18 Excavation in hard rock includes any rock bound in ledges or masses in its original form or cement concrete for which in the opinion of the **Engineer-in-Charge**, requires the use of compressed air, equipment, sledge hammer and blasting or non-explosive materials viz. Acconex manufactured by A.C.C. Ltd. Specifications and instructions for use shall be as per manufacturer.

3.1.19 In case of any difficulty concerning the interpretation of type of soil as mentioned above, the Engineer-in-Charge shall decide whether the excavation in a particular material is in ordinary soil, soft rock or hard rock and his decision in this matter shall be final and binding on the **CONTRACTOR** and without appeal.

3.2 FILLING

3.2.1 Back filling of excavations in trenches, foundations and elsewhere shall consist of one of the following materials approved by **Engineer-in-Charge**.

i. Soil

ii. Sand

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iii. Moorum

iv. Hard-core

v. Stone/gravel

All back filling material shall be approved by the **Engineer-in-Charge**.

3.2.2 Soil filling - Soil material shall be free from rubbish, roots, hard lumps and any other foreign organic material. Filling shall be done in regular horizontal layers each not exceeding 20 Cm. depth.

3.2.3 Back filling around completed foundations, structures, trenches and in plinth shall be done to the lines and levels shown on the drawings.

3.2.4 Back filling around pipes in the trench shall be done after hydro testing is done.

3.2.5 Back filling around liquid retaining structures shall be done only after leakage testing is completed and approval of **Engineer-in-Charge** is obtained.

3.2.6 Sand used for filling under foundation concrete, around foundation and in plinth etc. shall be fine/ coarse, strong, clean, free from dust, organic and deleterious matter. The sand filling under foundation shall be rammed with Mech. compactor. Sand material shall be approved by **Engineer-in-Charge**.

3.2.7 Moorum for filling, where ordered, shall be obtained from approved pits and quarries which contain siliceous material and natural mixture of clay. Moorum shall not contain any admixture of ordinary earth. Size of moorum shall vary from dust to 10 mm.

3.2.8 Hard-core shall be of broken stone of 90 mm to 10 mm size suitable for providing a dense and compact sub grade. Stones shall be sound, free from flakes, dust and other impurities. Hard core filling shall be spread and leveled in layers, 15 cm thick, watered and well compacted with ramming or with mechanical / hand compacts including hand packing wherever required.

3.2.9 If any selected fill material is required to be borrowed, **CONTRACTOR** shall make arrangements and procure such material from outside borrow pits. The material of source shall be subject to prior approval of **Engineer-in-Charge**. **CONTRACTOR** shall make necessary access roads to borrow areas and maintain the same, if such access roads do not exist, at no extra cost.

3.2.10 Plinth filling shall be carried out with approved material as described earlier, in layers not exceeding 150mm, watered and compacted with mechanical compaction machines. **Engineer-in-Charge** may however permit manual compaction by hand tampers in case he is satisfied that mechanical compaction is not possible. When filling reaches the finished level, the surface shall be flooded with water, unless otherwise directed, for at least 24 hours, allowed to dry and then the surface again compacted as specified above to avoid settlements at later stage. The finished level of the filling shall be trimmed to the level specified. Compacted surface shall have at least 95% of laboratory maximum dry density. A minimum of one test per 500 sq. meters of compacted area shall be done.

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3.2.11 Whenever the fill material (earth or soil) is purchased, **CONTRACTOR** shall get the approval of Engineer-in-Charge. The CONTRACTOR shall arrange to determine the following properties of the soil and shall get the approval of **Engineer-in-Charge**.

Clay content	:	15% to 20%
Laboratory dry density	:	Not less than 1600 kg/m^3
Plasticity Index	:	Not more than 20.

3.2.12 The fill shall be compacted using a vibrating compactor of not less than 1.5 tonne. The fill shall be thoroughly compacted in layers as directed but not more than 200 mm thick. Adequate water shall be used for compaction and the density after compaction shall be not less than maximum dry density obtained in test of BIS: 2720 Part-8. Compacted surface shall have at least 95% of laboratory maximum dry density. A minimum of one test per 500 sq. meters of compacted area shall be done.

3.2.13 The Gravel fill shall be non plastic granular material, well graded, strong, with maximum particle size of 50 mm, with not more than 15% passing a 4.75 mm BIS sieve, free of all debris, vegetable matter and chemical impurities.

3.2.14 All clods, lumps etc. shall be broken before compaction.

3.2.15 In case of grading/banking successive layers of filling shall not be placed, until the layer below has been thoroughly compacted to satisfy the requirements laid down in this specification.

Prior to rolling, the moisture content of material shall be brought to within +/-2% of the optimum moisture content as described in BIS 2720 Part-7. The moisture content shall preferably be on the wet side for potentially expansive soil.

After adjusting the moisture content as described, the layers shall be thoroughly compacted by means approved by Engineer-in-Charge, till the specified maximum laboratory dry density is obtained.

General, fill shall be placed in layers not exceeding 300 mm thickness and shall be thoroughly compacted to achieve a compaction of at least 90% of laboratory maximum dry density up to a depth of 600 mm below finished grade. Final fill of 600 mm thickness shall consist of preferably natural material in, as dug condition except that stones larger than 100 mm shall be removed. It shall be placed in layers not exceeding 150 mm thickness and compacted to achieve of at least 95% of laboratory maximum dry density. Each layer shall be tested in field for density and accepted by Engineer-in-Charge, subject to achieving the required density before laying the next layer. A minimum of one test per 500 sq meters for each layer shall be conducted.

If the layer fails to meet the required density, it shall be reworked or the material shall be replaced and method of construction altered as directed by Engineer-in-Charge to obtain the required density.

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The filling shall be finished in conformity with the alignment, levels, cross-section and dimensions as shown in the drawing.

Extra material shall be removed and disposed off as directed by the **Engineer-in-Charge.**

4.0 PLAIN AND REINFORCED CONCRETE WORK

This specifications deals with cement concrete, plain or reinforced, for general use, and covers the requirements for concrete materials, their storage, grading, mix design, strength & quality requirements, pouring at all levels, reinforcements, protection, curing, form work, finishing, painting, admixtures, inserts and other miscellaneous works.

4.1 MATERIALS

4.1.1 Cement: Any of the following cements may be used as required.

BIS - 269 Ordinary Portland cement, 33 grade

BIS - 8041 Rapid hardening Portland cement

BIS - 455 Portland slag cement

BIS - 8112 43 Grade ordinary Portland cement

BIS - 12330 Sulphate resistant ordinary Portland cement

BIS - 12269 53 Grade ordinary port land cement

BIS - 6909 Specifications for super Sulphate cement

4.1.2 Water: Water used for mixing and curing concrete and mortar shall conform to the requirements as laid down in BIS: 456. Sea water shall not be used for concrete work.

4.1.3 Aggregates: Coarse and fine aggregates for cement concrete plain and reinforced shall conform to the requirements of BIS 383 and / or BIS 515. Before using, the aggregates shall be tested as per BIS: 2386.

Coarse aggregate: Coarse aggregate for all cement concrete work shall be broken or crushed hard stone, black trap stone obtained from approved Quarries or gravel.

Sand: Fine aggregate for concrete work shall be coarse sand from approved sources. Grading of coarse sand shall be within grading zones I, II or III laid down in BIS: 383, table 4. If required the aggregates (both fine and coarse) shall have to be thoroughly washed and graded as per direction of **Engineer-in-Charge**.

4.2 MIXING

All cement concrete plain or reinforced shall be machine mixed. Mixing by hand may be employed where quantity of concrete involved is small, with the specific prior permission of the **Engineer-in-Charge**. 10% extra cement shall be added in case of hand mixing as stipulated in BIS-456.

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For large and medium project sites the concrete shall be sourced from ready- mixed concrete plants or from on site or off site batching and mixing plants (BIS 4926)

4.3 WATER CEMENT RATIO

Once a mix, including its water-cement ratio, has been determined and specified for use by the **Engineer-in-Charge**, that water cement ratio shall be maintained.

4.4 LAYING

Concreting shall be commenced only after the **Engineer-in-Charge** has inspected and passed the sub-base / base or the centering, shuttering and reinforcement. Concrete in slab beams, columns, footings etc. shall be laid gently in layers not exceeding 15 cm and shall be properly consolidated by means of approved mechanical vibrators.

4.5 CURING

a. After the concrete has begun to harden, it shall be protected with moist gunny bags, sand or any other material approved by the **Engineer-in-Charge** against quick drying. After 24 hours of laying concrete, the surface shall be cured by flooding with water or by covering with wet absorbent materials for 7 days as per the direction of **Engineer-in-Charge**.

b. Approved curing compounds may be used in lieu of moist curing with the permission of the **Engineer-in-Charge**. Such compounds shall be applied to all exposed surfaces of the concrete as soon as possible after the concrete has set. No extra payment shall be made for the same.

4.6 GRADES OF CONCRETE

4.6.1 Grades of cement concrete shall be as given below:

	Grade Specified	**Characteristic compressive strength at 28 days (N/mm^2)**
i.	M 7.5	7.5 (75 Kg/cm^2)
ii.	M 10	10 (100 Kg/cm^2)
iii.	M 15	15 (150 Kg/cm^2)
iv.	M 20	20 (200 Kg/cm^2)
v.	M 25	25 (250 Kg/cm^2)
vi.	M 30	30 (300 Kg/cm^2)

4.6.2 Grades lower than M 20 shall not be used in reinforced concrete.

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4.6.3 M 7.5 grades of concrete may be used for lean concrete bases & M 10 for simple foundation of masonry walls.

4.6.4 A sieve analysis test of aggregates shall be carried out as and when the source of supply is changed without extra charge not withstanding the mandatory test required to be carried out as per CPWD specification.

4.6.5 All test in support of mix design shall be maintained as a part of records of the contract. Test cubes for mix design shall be prepared by the CONTRACTOR under his own arrangements and at his costs, but under the supervision of the **Engineer-in-Charge**.

4.7 NOMINAL MIX CONCRETE

4.7.1 All concrete work (P.C.C / R.C.C.) shall be with nominal mix concrete unless specified otherwise. The proportions of materials used for concrete of grades M5, M 7.5, M10, M15 and M20 shall be as per following Table.

Proportions for Nominal Mix of Concrete

Grade of Concrete	Total Quantity of Dry Aggregate by Mass per 50 Kg of Cement (as sum of Fine and coarse aggregates), in Kg, Max.	Proportion of Fine Aggregate to coarse aggregate (by Mass)	Quantity of water per 50 Kg of cement Maximum in liters.
M 5	800	Generally 1:2 subject to an upper limit of 1 : 1.5 and a lower limit of 1 : 2.5	60
M 7.5	625	-do-	45
M 10	480	-do-	34
M 15	330	-do-	32
M 20	250	-do-	30

Notes:

1. The proportions of the fine aggregates should be adjusted from upper limit to lower limit progressively as the grading of the fine aggregates become finer and the maximum size of coarse aggregate becomes larger. Graded coarse aggregate as per BIS: 383 may be used.

2. This Table envisages batching by weight. Volume batching when done, the nominal mixes would roughly be 1:3:6, 1:2:4 and 1:1.5:3 for M10, M15 and M20 respectively.

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3. For under water concreting the quantity of coarse aggregate, either by volume or mass, shall be between1.5 to 2 times that of fine aggregates.

4.7.2 The cement content of the mix specified for any nominal mix shall be proportionately increased if the quantity of water in a mix has to be increased to overcome the difficulties of placement and compaction, so that water - cement ratio is not exceeded. In case of vibrated concrete, the limits specified, above may suitably be reduced to avoid segregation.

4.7.3 If the nominal mix concrete made in accordance with the proportion given for a particular grade does not yield the specified strength, such concrete shall be classified as belonging to appropriate lower grade. However, if the strength results of test are higher than those specified for the grade in the nominal mix of concrete it shall not be placed in a higher grade.

4.8 DESIGN MIX CONCRETE

4.8.1 Design mix shall be allowed for major works where it is contemplated to be used by installing weigh batch mixing plant as per BIS 4925. At the time of tendering, the **CONTRACTOR,** after taking into account the type of aggregates, plant and method of laying he intends to use, shall allow in his tender for the design mix i.e., aggregate/cement and water/cement ratios which he considers will achieve the strength requirements specified, and workability for concrete to be properly finished.

4.8.2 Before commencement of concreting, **CONTRACTOR** shall carry out preliminary tests for design mix on trial mixes proposed by him in design of mix to satisfy the **Engineer-in-Charge** that the characteristic strength is obtained. In this regard, CONTRACTOR may consult govt. approved/reputed institute to get design mix done as per BIS 10262 at his own cost. The concrete mix to be actually used shall be approved by the **Engineer-in-Charge**.

4.8.3 Notwithstanding the above, the following shall be the maximum combined weight of coarse and fine aggregate per 50 kg of cement.

	Grade of Concrete	Maximum weight of fine & coarse aggregates together per 50 kg of cement (for nominal mix only)
i.	M - 10	480 kg
ii.	M - 15	350 kg
iii.	M - 20	250 kg

4.8.4 The workability of concrete produced shall be adequate, so that the concrete can be properly placed and compacted. The slump shall be as per BIS 456.

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4.8.5 The minimum consumption of the cement irrespective of design mix shall not be less than the following:

M 7.5 (1:4:8)	170 kg/cu m
M 10 (1:3:6)	220 kg/cu m
M 15	300 kg/cu m
M 20	350 kg/cu m
M 25	400 kg/cu m

4.9 TESTING OF CONCRETE

4.9.1 Testing of concrete, sampling and acceptance criteria shall be in accordance with BIS 456.

4.9.2 A slump test shall be taken at each mixer at least once in every fifty batches mixed. Any batch for which a slump test is being made shall not be transferred to the place of laying until the slump test has been completed. Any batch which gives a slump in excess of that described at the time of preliminary tests shall be rejected and removed from the site.

4.9.3 At least six cubes shall be taken for every 30 cu. metres of concrete or part thereof deposited in the work on any day. Three cubes shall be tested for 28 days strength.

4.9.4 If a test for particular work does not meet the specified requirements, the **Engineer-in-Charge**, in his absolute discretion may accept the work at a correspondingly reduced rate provided the average strength at 28 days is not less than 85% of the specified strength.

4.9.5 If the results are poorer than 85% of the specified strength, the **Engineer-in-Charge** may order further testing of any kind as may be deemed necessary in his opinion, including load tests. The load tests shall be carried on the portion of the structure involving concrete represented by the unsatisfactory works test and such other adjoining elements of a building as the **Engineer-in-Charge** may decide. If the results of the load tests are not satisfactory, the CONTRACTOR shall at his own cost undertake remedial measures including dismantling and reconstruction according to the directions and to the satisfaction of the **Engineer-in-Charge**. If the load test is successful, the **Engineer-in-Charge** may exercise his judgment before accepting or rejecting the work and shall still have the power to apply a reduction in rate as herein-stated before, in case the work in question is accepted.

4.10 PROPORTIONING

Mixes of cement concrete shall be as ordered. Where the concrete is specified by grade, it shall be prepared by mixing cement, sand and coarse aggregate by weight as per mix design. In case the concrete is specified as volumetric mix, then dry volume batching shall be done, making proper allowances for dampness in

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aggregates and bulking in sand. Equivalent volume batching for concrete specified by grade may however be allowed by the **Engineer-in-Charge** at his discretion.

4.11 PRE CAST CONCRETE

The specifications for pre cast concrete will be similar as for the cast in situ concrete. All pre cast work shall be carried out in a yard made for the purpose. This yard shall be dry, properly leveled and having a hard and even surface. If the ground is to be used as a soft former of the units, shall be paved with concrete or masonry and provided with a layer of plaster (1:2 proportion) with smooth neat cement finish or a layer of MS sheeting. The casting shall be over suitable vibrating tables or by using form vibrators as per directions of **Engineer-in-Charge**.

The yard, lifting equipment, curing tank, finished material storage space etc. shall be designed such that the units are not lifted from the mould before 7 (seven) days of curing and can be removed for erection after 28 (Twenty Eight) days of curing. The moulds shall preferably be of steel or of timber lined with G.I.sheet metal. The yard shall preferably be fenced.

Lifting hooks, wherever necessary or as directed by **Engineer-in-Charge** shall be embedded in correct position of the units to facilitate erection, even though they may not be shown on the drgs. and shall be burnt off and finished after erection.

Pre cast concrete units, when ready shall be transported to site by suitable means approved by **Engineer-in-Charge**. Care shall be taken to ensure that no damage occurs during transportation. All adjustments, leveling and plumbing shall be done as per the instructions of the **Engineer-in-Charge**. The CONTRACTOR shall render all help with instruments, materials and staff to the **Engineer-in-Charge** for checking the proper erection of the pre cast units.

After erection and alignment the joints shall be filled with grout or concrete as directed by **Engineer-in-Charge**. If shuttering has to be used for supporting the pre cast unit they shall not be removed until the joints has attained sufficient strength and in no case before 14 (fourteen) days. The joint between pre cast roof planks shall be pointed with 1:2 (1 cement : 2 sand) mortar where called for in the drgs.

4.12 PROTECTION OF CONCRETE

All concrete shall be protected from damage by rain or by workmen, equipment, overload or any other causes. All edges, corners and projections of concrete members likely to be damaged, shall be protected by means of wooden cover fillets.

4.13 CONSTRUCTION JOINTS

Construction joints shall be made only where shown on the drawings or as approved by the **Engineer-in-Charge**. The procedure given in clause 13.4 of BIS: 456 shall be followed for general guidance.

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4.14 **SEPARATION JOINT**

Separation Joint shall be obtained by using an approved alkathene sheet struck on the surface against which concrete shall be placed. Adequate care should be taken to cause no damage to the sheet.

4.15 **DAMP PROOF COURSES**

Damp proof course shall consist of cement concrete of specified proportions and thickness. Surface of brick or stone masonry shall be leveled and prepared before laying the cement concrete.

4.16 **SAMPLING OF CONCRETE**

Sampling & strength Test of concrete, Acceptance criteria and Inspection & Testing of Structure : This shall be as per the requirements laid down in clause Nos: 14, 15 & 16 of BIS : 456.

5.0 STEEL REINFORCEMENT

5.1 Steel reinforcement shall comprise

i. Mild steel bars conforming to BIS : 432 Part-I.

ii. Cold twisted bars conforming to BIS: 1786

iii. CRS bars

iv. TMT bars

v. Hard drawn steel wire fabric conforming to BIS: 1566

5.2 All joints in reinforcement shall be lapped adequately to develop the full strength of the reinforcement as per provision of BIS: 456 or as per instruction of **Engineer-in-Charge**.

As and when required, welded laps shall be provided as specified by **Engineer-in-Charge.** Following procedure shall be followed for welding of Tor steel reinforcement bars.

1. Welding of Tor steel reinforcement bars shall be taken up only after specific approval by **Engineer-in-Charge**.

2. Lap welding with longitudinal beads shall only be adopted.

3. Welding shall be carried in accordance with BIS 2751 & 9417. Only qualified welders shall be permitted to carry out such welding.

4. For cold twisted reinforcement, welding operations shall be controlled to prevent a supply of large amount of heat, larger than can be disspated. The extreme non-twisted end portion shall be cut off before welding. Electrodes with rutile coating should be used.

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5. Welding procedure shall be approved by **Engineer-in-Charge** and tests shall be made to prove the soundness of the welded connection

6. Stripper at closer spacing shall be provided in the lap welded joints as directed by **Engineer-in-Charge**.

5.3 M.S. round bars shall be hooked at ends as specified. Ribbed Tor-Steel shall be bent at right angles at ends as indicated or directed.

6.0 FORM WORK

6.1 The shuttering or form work shall conform to the shape, lines and dimensions as shown on the drawings and be so constructed as to remain sufficiently rigid during placing and compacting of the concrete and shall be sufficiently tight to prevent loss of liquid from the concrete. The surface that becomes exposed on the removal of forms shall be examined by **Engineer-in-Charge** or his authorized representative before any defects are made good. Work that has sagged or bulged out, or contains honey combing, shall be rejected. All shuttering shall be plywood or steel shuttering.

6.2 The **CONTRACTOR** shall be responsible for sufficiency and adequacy of all form work. Centering and form work shall be designed & detailed in accordance with BIS 14687 and approved by the **Engineer-in-Charge**, before placing of reinforcement and concreting.

6.3 STRIPPING TIME

Forms shall not be struck until the concrete has reached a strength at least twice the stress to which the concrete may be subjected at the time of removal of form work. The strength referred to shall be that of concrete using the same cement and aggregates, with the same proportions and cured under conditions of temperature and moisture similar to those existing on the work. Where possible, the form work shall be left longer as it would assist the curing.

Note 1 - In normal circumstances and where ordinary Portland Cement is used, forms may generally be removed after the expiry of the following periods:

a.	Walls, columns and vertical faces of all structural members	24 to 48 hours as may be decided by the **Engineer-in-Charge**
b.	Slabs (props left under)	3 days
c.	Beam soffits (Props left under)	7 days
d.	Removal of props under slabs	
	1. Spanning up to 4.5 m	7 days
	2. Spanning over 4.5 m	14 days
e.	Removal of props under beams and arches :	
	1. Spanning up to 6 m	14 days

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2. Spanning over 6m 21 days

For other types of cements, the stripling time recommended for ordinary Portland Cement may be suitably modified.

Note 2 - The number of props left under, their sizes and disposition shall be such as to be able to safely carry the full dead load of the slab, beam or arch as the case may be together with any live load likely to occur during curing or further construction.

7.0 BRICK WORK

This specification covers the construction of brick masonry in foundations, arches, walls, etc. at all elevations. The provision of BIS: 2212 shall be complied with unless permitted otherwise.

7.1 Bricks

All bricks shall conform to minimum class 7.5 as designated in CPWD Specifications unless specified otherwise.

7.2 Mortar

7.2.1 Cement and water shall conform to the requirements laid down for cement concrete work.

7.2.2 Sand for masonry mortar shall be coarse sand conforming to BIS: 2116. Maximum quantities of clay, fine dust shall not be more than 5% by weight. Organic impurities shall not exceed the limits laid down in BIS: 2116.

7.2.3 Mix of mortar for building brick work shall be as specified in the item of work.

7.2.4 Mixing of mortar shall be done in a mechanical mixer. When quantity involved is small, hand mixing may be permitted by the **Engineer-in-Charge**. Any mortar remaining unused for more than 30 minutes after mixing shall be rejected.

7.3 Brick Masonry

Brick work shall be built in English bond, unless otherwise specified. The thickness of joints shall be 10 mm $\pm$ 3 mm. Thickness of joints shall be kept uniform. In case of foundations and manholes etc. Joints up to 15 mm may be accepted.

7.4 Half Brick Masonry

All courses shall be laid with stretchers. Reinforcement comprising 2 Nos.6 mm dia MS bars shall be provided over the top of the first course and thereafter at every third course.

7.5 Fixtures

All iron fixtures, pipe spouts, hold fasts of doors and windows, which are required to be built into the wall shall be embedded in cement concrete blocks 1:2:4 mix (1

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cement : 2 coarse sand : 4 graded stone aggregate 20 mm nominal size) of size indicated in the item.

7.6 Curing

Brick work shall be protected from rain by suitable covering when the mortar is green. Masonry work shall be kept constantly moist on all faces for a minimum period of seven days.

7.7 Cement Concrete Block

Cement concrete block shall be machined made in the proportion of such that mix shall not be leaner than one cement to Twelve combined aggregates (by volume) but having minimum strength of M 7.5. Combined aggregate shall be graded as near as possible to BIS : 383. The fineness modules of combined aggregate shall be between 3.6 and 4. The concrete block shall be properly cured as per BIS-456. The surface of conc. block shall have even face without any honeycomb and free from cracks.

7.7.1 Mortar

Cement and water shall confirm to the requirements laid down for cement concrete work.

7.7.2 Sand for concrete block masonry mortar's shall be coarse sand generally conforming to BIS: 2116. Maximum quantities of clay, fine dust, shall not be more than 5% by weight. Organic impurities shall not exceed the limits laid down in BIS: 2116.

7.7.3 Mix of mortar for building concrete block shall be as specified in the item of work.

7.7.4 Mixing of the mortar shall be done in a mechanical mixer. When quantity involved is small hand mixing may be permitted by **Engineer-in-Charge**. Any mortar remaining unused for more than 30 minutes after mixing shall be rejected.

7.8 Concrete Block Masonry

The thickness of joints shall be 10 mm +- 3mm. Thickness of joints shall be kept uniform. In case of foundation and manholes etc. joints up to 15 mm may be accepted.

7.9 Half Concrete Block

All courses shall be laid with stretchers. Reinforcement comprising 2 nos. 6 mm dia MS bars shall be provided over the top of the first course and thereafter at every fourth course.

7.10 Fixtures

All iron fixtures, pipes spouts, hold fasts of doors and windows which are required to be built into the wall shall be embedded in cement concrete blocks 1:2:4 mix (1 cement :2 coarse sand :4 graded stone aggregate. 20 mm nominal size) of size indicated in the item.

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7.11 Curing

Concrete block masonry shall be protected from rain by suitable covering when mortar is green. Masonry work shall be kept constantly moist on all faces for a minimum period of seven days.

8.0 WOOD WORK

All materials workmanship for wood work shall conform to BIS : 883, it shall be good quality well seasoned second class Teak / Sal wood as approved by **Engineer-in-Charge**. The wood work shall conform to BIS: 4021.

9.0 STRUCTURAL STEEL WORK

This specification covers the technical requirements for the preparation of shop drawings, supply, fabrication, protective coating, painting and erection of all structural steel rolled sections, built up sections, plates and miscellaneous steel required for the completion of the work.

9.1 Steel

All structural steel used in construction within the purview of this contract shall, comply with one of the following Bureau of Indian Standard Specifications, whichever, is appropriate or as specified.

BIS – 2062 Hot rolled sections and plates

BIS – 1079 Cold formed light gauge sections

BIS – 1161 Tubular sections

BIS – 4923 Hollow sections (rectangular or square)

9.2 Smithy Works

All smithy work shall be accurately made as shown on the drawings and shall be clean and sound. The metal shall not be burnt or injured in any way.

9.3 Fabrication

Fabrication of steel structure shall be carried out in conformity with the best modern practices and with due regard to speed with economy in fabrication and erection and shall conform to BIS-800. All members shall be so fabricated as to assemble the members accurately on site and erect them in correct positions. Before dispatch to site the components shall be assembled at shop and any defect found rectified. All members shall be free from kink, twist, buckle, bend, open joints etc. and shall be rectified before erecting in position. Failure in this respect will subject the defective members to rejection.

9.4 Fabrication Drawings

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9.4.1 Fabrication and erection drawings shall be prepared by the **CONTRACTOR** on the basis of design issued to the **CONTRACTOR** in stages. These drawings shall be prepared by the CONTRACTOR or by an agency approved by the **Engineer-in-Charge**.

9.4.2 Fabrication drawings shall be thoroughly checked, stamped "checked" and signed by the **CONTRACTOR'**s own responsible Engineer irrespective of the fact that such drawings are prepared by the **CONTRACTOR** or an approved agency, to ensure accuracy and correctness of the drawings. Unchecked or unsigned drawing shall not be submitted to **Engineer-in-Charge** for approval.

9.4.3 Fabrication drawings duly checked by the **CONTRACTOR** shall be submitted to the **Engineer-in-Charge** for checking & approval within 30 days from receipt of design drawings.

9.4.4 The approval accorded by **Engineer-in-Charge** on fabrication drawings shall not relieve the **CONTRACTOR** of the responsibility of fabricating and erecting safe and technically sound steel structures as per design drawings.

9.4.5 Fabrication drawings shall be drawn to a suitable scale large enough to convey the information clearly and shall include the following:

- Reference to design drawing number (along with revision number) based on which fabrication drawing has been prepared.
- Structural layout plans, elevations, & sections with distinct erections, & sections with distinct erection marking of all members.
- Framing plans, member sizes, orientations.
- Fabrication detail of each and every member.
- Details of Shop / field joints, connections and splices.
- Location, type and size of welds and bolts.
- Shape and size of edge preparation for welding.
- Bill of material including bolts for connections.

9.4.6 The **CONTRACTOR** shall however ensure accuracy of the following and shall be solely responsible for the same.

i. Provision for erection and erection clearance.

ii. Marking of members.

iii. Cut length of members.

iv. Matching of joints and holes.

v. Provision kept in the members for other interconnected members.

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vi. Bill of materials.

9.4.7 Connections, splices and other details where not shown on the design drawings shall be suitably designed and shown on the fabrication drawings based on good Engineering practice, developing full member strength.

9.4.8 The **CONTRACTOR** shall incorporate all the revisions in his fabrication drawings resulting from revision in design drawings during the course of execution of work at no extra cost.

9.4.9 The **CONTRACTOR** shall supply three (3) prints of each fabrication drawing submitted for checking to **Engineer-in-Charge**. After approval of fabrication drawings CONTRACTOR shall supply six (6) prints and two (2) reproducible of each approved fabrication drawing to **Engineer-in-Charge**. The rates quoted by the **CONTRACTOR** shall include the same.

9.5 Welding

Welding shall be adopted in most of the cases for fabrication of steel structure. Welding work shall be carried out as shown in relevant drawings as per BIS-816 or as required and approved by the **Engineer-in-Charge**. Welding of joints shall be so arranged that the resulting tensile and compressive stresses produced by each part of weld tend to balance each other.

The step back method of welding shall be adopted for continuous runs. Members which offer greater resistance to compression shall be welded first. The work shall be securely held in position by means of tack weld, clamps or jig before commencing of welding work so as to prevent relative movement due to distortion or other cause. All welds with blow holes, slag-intrusion and other defects must be removed from each run before another run is super imposed and also from the final run. Any defects in the work shall be rectified by the **CONTRACTOR** at his own expense. Bends, twists or distortion caused in any member due to faulty workmanship and method adopted during welding or in transit will be rejected and will have to be replaced / rectified by the **CONTRACTOR** at his own expense. According to the size of electrodes used, the **CONTRACTOR** is expected to adjust the current rating in the welding generators.

9.6 The **Engineer-in-Charge** reserves the right to have test done at any time for any welding and the cost of the test shall be borne by the **CONTRACTOR**.

9.7 Wherever continuous plates are used in built up member such as girders, columns, etc. the continuity of such plates shall be first ensured by full strength butt joints before welding such plates with the main member to form part of the built-up member.

9.8 All connection / joints made in shop shall wherever possible be welded connections and connections / joints made at site shall be bolted connections / site welded connections, continuous welding shall be done for all box members even if it is not required from design point of view.

9.9 Electrodes

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Electrodes used for welding shall comply with BIS-814 or BIS - 815 or any specification provided to the **CONTRACTOR** from time to time. No electrodes remaining in open containers for more than 72 hours shall be used.

9.10 No welder shall be employed to carry out welding in any position except those who are fully qualified to weld in that position as per BIS -7318, part-1 qualifying tests for metal arc welders. Welders employed shall be required both before commencing work and at intervals during the progress of work to make test pieces as laid down in BIS - 817 and 7318, part-1 for the purpose of grading of welders and according to the said grading, welders will be employed on jobs. Welders are to be got approved by **Engineer-in-Charge** before engaging on work.

9.11 MS Black/High Strength Bolts and Nuts

M.S.Black or high strength bolts, nuts and washers etc. shall be as per BIS-800, BIS-1363 and BIS-1367. Manufacturer's test certificate shall be made available to the **Engineer-in-Charge** or his representative, when called for. For bolted joints, shanks and threaded bolts are to be used to ensure that threaded length do not encroach within the thickness of connected members of dimension beyond the following limit:-

a. 1.5 mm for connected members of thickness below 12 mm and

b. 2.5 mm for connected member of thickness 12 mm and above and that adequate shearing and bearing values required as per design are achieved.

9.12 Every portion work shall have its erection mark or number stenciled on the member for guidance in erection and bears all necessary marks of erections as directed by the **Engineer-in-Charge**.

9.13 No part of the work is to be oiled, painted (except contact surfaces) packed, bundled, crated or dispatched until it has been finally inspected and approved by the **Engineer-in-Charge** or his authorized representative. The whole steel work before being dispatched from the **CONTRACTOR'**s shop shall be dry and after being thoroughly cleaned from dust, mills scale, rust etc., and shall be given two coats of primer and one coat of final paint as per painting specification attached in this enquiry. Unless otherwise specified, all surfaces inaccessible after welding shall be given two coats of primer and two coats of paints as per painting specification Annexure attached in this enquiry.

9.14 The **Engineer-in-Charge** or his authorized representative shall have free access at all reasonable time to all places where the work is being carried out, and shall be provided by the **CONTRACTOR** at his own expenses all necessary facilities for inspection during fabrication and erection. The **Engineer-in-Charge** or his authorized representative shall be at liberty to reject the work in whole or in part if the workmanship or materials do not conform to the terms of the specifications mentioned herein. The **CONTRACTOR** shall remove, replace or, alter any part of the work as ordered by the **Engineer-in-Charge** or his authorized representative.

9.15 Erection and Setting of Steel Structure

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The erection of steel work shall be in accordance with Bureau of Indian Standard Specifications Nos. BIS-800 and BIS - 816.

9.16 The **CONTRACTOR** shall be responsible for the suitability, safety and capabilities of all plant and equipment used for erection.

9.17 Prior to starting erection of fabricated structure, defects if any shall be rectified. The **CONTRACTOR** shall give to the **Engineer-in-Charge** not less than 24 hours notice of his intention to set out or give levels for any part of works, in order that arrangements may be made for checking. The **CONTRACTOR** shall provide all necessary arrangements and assistance which the **Engineer-in-Charge** may require for checking the setting out.

9.18 The **CONTRACTOR** shall erect the structural steel members in position, to dimension, and levels, as in relevant drawings and shall take care to see that component parts are not interchanged. Girders, stanchions etc., must rest fairly on their beds and will not be taken as erected until completely plumbed, aligned leveled, bolted or welded and strengthened, in every respect. The camber, if any, is to be maintained as shown in relevant drawings.

9.19 Particular care should be taken to ensure free expansion and contraction wherever provided in the relevant design / drawings or so directed on site.

9.20 While erecting, the holes in different component parts of structure should be made concentric with the use of drifts before any service bolts are fitted. No drifting shall be allowed except for bringing together several parts forming a member but the drifts must not be driven with such force as to disturb or damage the metal above the holes. Hammering of bolts to make holes concentric shall in no case be allowed. No nuts should be allowed to become loose and no unfilled bolt holes are to be left in any part of the structure unless otherwise specified in the relevant drawings. Welding should be adopted wherever specified in the drawings. Wooden rams or mallets shall be used in forcing members to position, in order to protect metal from injury or shocks, chipped edges shall be finished off smooth and all concave surface rounded off.

9.21 All erection tools and plants viz. derricks, cranes etc. will have to be provided by the **CONTRACTOR** as required in the erection work. All erection devices must be removed after the work is over, in such a way that no damage is done to the erected structures. Any damages, in this respect must be rectified by the **CONTRACTOR** at his own cost.

9.22 The maximum tolerance for line and level of the steel work shall be $\pm$ 3.0 mm on any part of the structure. The structure shall not be out of plumb more than 3.5 mm on each 10 M. Section of height and not more than 7.0 mm per 30 metre section. These tolerances shall apply to all parts of the structure unless mentioned in the drawings issued for erection purposes.

9.23 Match Marking & Stamping

i. All materials shall be match marked to facilitate erection.

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ii. All pieces shall be stamped on at least two sides with erection marks as per fabrication drawings to facilitate identification on receipt and assembly.

10.0 PAINTING ON STRUCTURAL STEEL

The following specification shall be used for painting of structural steel work.

10.1 SCOPE

This specification shall be used in non coastal area.

Surface Preparation

The surfaces to be painted shall be sand blasted to Sa - 2.5 as per Swedish Standard SIS 05-59-00. Air used for sand blasting must be dry and oil free. Sand used for sand blasting shall be good quality river sand suitable for achieving the required surface finish. For optimum results pressure of sand blasting gun should be maintained at around 7 kg/cm^2 and maximum height of profile should be kept around 50 microns. Sand blasted surfaces must be coated with primer within 4 hrs in dry climate. Moreover it is not advisable to carry out sand blasting when humidity exceeds 85% (RH).

10.1.1 Painting system to be used are indicated below:

a. Epoxy Painting:

Primer P 1-2 coats + finish paint FP1 (2 coats) where P1 is epoxy polyamide cured zinc chromate primer having DFT of 35 micron per coat and FP1 is epoxy polyamide cured finish paint having DFT (Dry Film Thickness) of 35 micron per coat.

b. For chlorinated rubber paint.

Primer P2 - 2 coats - finish paint FP2 - 2 coats. Where P2 is high chlorinated zinc phosphate primer having DFT of 50 microns per coat and FP2 is chlorinated rubber based paint having DFT of 50 microns per coat.

10.1.2 Equivalent product chart for approved paint manufactures for primer P1 and P2 finish paint FP1 and FP2 indicated above is enclosed.

10.1.3 All the surfaces must be sand blasted and 2 coats of primer plus 1 coat of finish paint applied in the shop before the same are shifted to site for erection. All the members must be suitably match marked for facilitating proper assembly.

After erection is over all surfaces shall be washed up as follows:

a. Washing with clean water (pressure 7 kg/cm^2) using suitable nozzles. During washing broom corn brushes shall be used to remove foreign matters.

b. Solvent washing if required to remove traces of oil grease etc.

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After washing the surface as indicated above, the surfaces shall be suitably touched up to the extent required so that all the damages to the premiered surfaces caused during erection are done up.

The surfaces affected by welding and / or gas cutting during erection shall also be suitably touched up. Before touch up is taken up surfaces shall be prepared by mechanical means such as grinding, power brushing etc. to achieve surface finish to ST-3.

After touch up work is over as indicated above, all the surfaces shall be given one coat of finish paint to the required specification.

10.1.4 The following points must be observed for painting work:

a. Primer and paint shall be compatible to each other and should be from the same manufacturer.

b. The recommendation of the paint manufacturer regarding mixing, matching and application must be followed meticulously.

c. Technical representative of paint manufacturer should be available at site as and when required by **Engineer-in-Charge** for their expert advice as well as to ensure that the painting work is executed as per the instruction of paint manufactures.

Paints and primers shall be supplied at site in original container with factory seal otherwise such paints and primers shall not be allowed to be used. Mode of application i.e. by spray, brush or roller shall be strictly as per recommendation of paint manufacturer.

Painting materials must be used before the expiry date indicated on the containers.

Number of coats and DFT per coat must be strictly followed as indicated above. If the desired DFT is not achieved for primer and finish paints in two coats (each), **CONTRACTOR** shall be required to apply extra coat (s) to achieve the desired DFT without any extra cost to **Engineer-in-Charge**.

Colour shade for each coat of primer and finish paint must be different to identify the coats without any ambiguity.

Shade for the final finish coat shall be decided by **Engineer-in-Charge** at site.

All painting materials must be accompanied by manufacturers test certificates. However, **Engineer-in-Charge** has any doubt regarding quality of materials, he shall have the right to direct **CONTRACTOR** to get the doubtful material tested or and provided (by **CONTRACTOR**) testing agencies for which no extra payment shall be made to the **CONTRACTOR** and the charges shall deemed to be covered in the unit rates quoted for fabrication and erection of structural work.

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DFT for paint shall be measured at least 20 points and mean DFT shall not vary by more than 10% than specified in DFT.

Instrument for measurement of DFT shall be arranged and provided by **CONTRACTOR** at his cost.

Thickness of each coat shall also be checked regularly to ensure uniformity in DFT.

10.1.5 Measurement

For purpose of payment, structural work so painted shall be measured and paid on MT basis. The weight for this item shall be taken from any of the following documents in the following order of priority:

i. Weights mentioned on the approved drawings.

ii. Weights paid to fabrication **CONTRACTOR** for structural fabrication work.

10.1.6 Sand blasting and painting works, being a specialized job must be carried out through the approved agencies only.

10.1.7 EQUIVALENT CHART FOR VARIOUS PAINT MANUFACTURERS

	ASIAN	**G & N**	**SHALIMAR**	**J & N**	**BERGER**	**BOMBAY**
P1	APCODUR - Epoxy Zinc Chrome Primer	AMERCOAT-71	EPIGARD-4 ZINC CHROMATE PRIMER	EPILAC ZINC CHROMATE PRIMER	EPILUX-4 ZINC CHROMATE PRIMER	PENTADUR PRIMER 1532
P2	ASIOCHLOR HB ZINC PHOSPHATE PRIMER	NEROLAC PHOSPHATE PRIMER	CHLOROKOTE ZINC PHOSPHATE PRIMER	JENSOLAC CR PRIMER	LINOSOL HB ZINC PHOSPHATE PRIMER	KANGAROO HB ZINC PHOSPHATE OR HEMPATEX PRIMER 1632
FP1	APCODUR CF 692	NEROLAC TWO COMP EPOXY	EPIGARD XL FINISH	EPILAC 974 ENAMEL	EPILUX-4 ENAMEL	PENTADUR ENAMEL 5534 GRAY
FP2	ASIOCHLOR CF 625	NEROLAC CR PAINT	CHLOROKOTE FINISH	JENSOLAC CHLORINATD. RUBR. PAINT	LINSOL CHLORINATED RUBR.PAINT	PENTACHLOR GP ENAMEL 5638

10.2 SCOPE

This specification shall be used for the painting of structural steel in coastal area in saline atmosphere.

10.2.1 SURFACE PREPARATION

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Surface preparation for all items to be painted shall be done by sand blasting to Sa 2.5 as per Swedish Specification SIS 05-59-00. Air used for sand blasting must be dry and oil free. Sand used for sand blasting must be of good quality river sand suitable for achieving required surface finish for optimum results. Pressure at sand blasting gun should be maintained at around 7 kg/cm2 and max. height of profile should be kept around 50 microns.

Sand blasted surfaces must be coated with primer within 2 hrs in dry climate. Moreover it is not advisable to carry out sand blasting when humidity exceeds 50% RH.

10.2.2 Painting systems to be used are as indicated below:-

a. FOR UNPAINTED SURFACES

i. P1-One coat of Ethyl silicate inorganic zinc primer having DFT of 70 microns per coat.

ii. IP1-One coat of Epoxy MIO having DFT of 70 microns per coat.

iii. FP-1 One coat of finish epoxy paint using two pack Polyamide cured epoxy having DFT of 40 microns per coat.

iv. FP-2 One coat of Aliphatic Acrylic Polyurethane paint having DFT of 40microns per coat.

10.2.3 The following points must be observed for painting work:-

a. Only the approved paints/primers as indicated in the equivalent product chart (attached herewith) are to be used.

b. All the surfaces must be sand blasted and one coat of primer including one coat of MIO are to be applied in the fabrication shop at project site before lifting the components for erection. After erection is over all the surfaces must be washed as indicated below:-

i. Wash with clean water (pressure approx. 7 kg/cm2) using suitable nozzles. During washing, broom corn brushes to be used to remove foreign matter, if any.

ii. Solvent washing if felt necessary to remove traces of oil, grease etc.

iii. After washing surfaces as indicated above, shall be suitably touched up to the extent required, so that all the damages to the primed surfaces caused during erection are taken care off.

c. Surfaces effected by welding and/or gas cutting or handling during erection shall also be suitably touched up after preparing the damaged surfaces by mechanical means such as grinding, power brushing etc. to achieve surface finish to ST-3.

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d. Application of ethyl silicate inorganic zinc primer must be under taken by spray method. Other application methods such as brush/roller application are not permitted.

e. Primers and paints for a particular system must be purchased from same manufacturer for compatibility.

f. Recommendation of the paint manufacturer regarding mixing, maturing, application (except as indicated specially in this specification) must be followed meticulously.

g. Technical representative of the paint manufacturers at site must be made available as and when required by PDIL for their expert advise as well as to ensure that painting work is executed as per instructions of paint manufacturer.

h. All paints, primers must be supplied to site in original containers with factory seal. Otherwise paints, primers shall not be allowed to used.

i. Mode of application for other primers and paints except ethyl silicate inorganic zinc primer shall be strictly as per recommendation of paint manufacturer.

j. All painting materials should be consumed within expiry date indicated by manufacturers on the containers.

k. Number of coat and DFT per coat must be strictly followed as indicated in the specification above and if the desired DFT is not achieved in the specified number of coat, **CONTRACTOR** shall be required to apply extra coat(s) to achieve desired DFT without any additional cost to PDIL/owner. It may be noted here that multi coat is not allowed for ethyl silicate inorganic zinc primer and therefore extreme care is to be taken for assuring desired DFT in single coat.

Unless it is not practical to do so, colour shades for primer, intermediate coat and finish paints must be different to identify each coat without any ambiguity.

l. All painting materials must be accompanied by manufacturers test certificate. However, if PDIL has any reasonable doubt regarding quality of the materials then, **CONTRACTOR** shall be required to get doubtful materials tested by PDIL approved testing agencies and nothing extra shall be paid for carrying out above testing and testing charges shall be deemed to be included in the rates quoted for painting work.

m. DFT for painting shall be measured at least 20 points and mean DFT shall not vary by more than 10% of the specified DFT.

Reliable and calibrated instrument for measurement of DFT shall be arranged and provided by **CONTRACTOR** at his cost at site.

n. Sand blasting, painting work being a specialized job must be carried out through approved agencies only. List of approved agencies is as indicated below:

10.2.4 EQUIVALENT CHART FOR VARIOUS PAINT MANUFACTURERS

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CODE	ITEM	DFT Per Coat(Microns)	ASIAN	G & N	SHALIMAR	J & N	BERGER	BOMBAY
P1	ETHYL SILICATE INORGANIC ZINC PRIMER	70	APCOSIL 601	DIMETCOTE9	TUFFKOTE ZILICATE	J&N INORGANIC ZINC SILICATE PRIMER	ZINC ANODE 304	HEAPEL'S GALVOSIL 1570
IP1	EPOXY MIO	70	APCODUR MIO	AMERCOT 385	EPIGUARD HB MIO	EPILAC HB MIO	EPILUX-4 HB MIO	PENTADUR HB-MIO 4567
FP1	TWO PACK POLYAMIDE CURED EPOXY	40	APCODUR CF 692	NEROLAC TWO COMP EPOXY	EPIGAURD XL	EPILAC 974	EPILUX-4 ENAMEL	PENTADUR ENAMEL 5534
FP2	ALILHATIC ACRYLIC POLYURETHANE PAINT	40	APCOTHANE 674	AMERCOAT 450 GL	SHALITHANE	JN 992 PU FINISH PAINT	BERGATHANE ENAMEL	PENTO-THANE 4513

11.0 MS GALVANIZED GRATINGS

MS Galvanized gratings shall be made out of M.S.flats and Tor steel round bars of approved pattern and thickness. All joints are welded together to form a perfect mesh.

The details of gratings shall be as per specification.

12.0 ALUMINIUM GRATING

12.1 Aluminium grating shall be made out of aluminium flats of approved pattern and thickness. All joints welded / reverted together to form a perfect mesh including necessary steel fasteners as required.

13.0 STEEL / ALUMINIUM DOORS, WINDOWS AND VENTILATORS

13.1 The Steel doors, windows, ventilators and sashes shall be of the size and type as shown on the drawings and/or of the approved make conforming to BIS-1361 and BIS-1038 Fixing and glazing shall be done as per BIS-1081 and as per manufacturers instructions. The putty of approved make such as special gold size or equivalent conforming to BIS-419 shall be used.

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13.2 Aluminium doors, windows and ventilators shall be manufactured from wrought aluminium and aluminium alloy extruded round tube and / or hollow rectangular / square sections conforming to BIS: 1285 & BIS : 6477 or equivalent as approved by **Engineer-in-Charge**.

14.0 NON-ASBESTOS HIGH IMPACT POLYPROPYLENE REINFORCED CEMENT CORRUGATED SHEETS FOR ROOFING AND CLADDING

All non asbestos high impact polypropylene reinforced cement 6mm thick corrugated sheets shall be of the specified approved quality and shall be in accordance with IS-14871 and fixing accessories such as J-bolts, L-bolts, roofs washers, etc. shall conform to BIS-730. Laying and fixing of sheets used as covering for roofs and wall shall conform to BIS-3007 part-I. Holes for receiving the fixing accessories in the crown of corrugation must be drilled and not punched and diameter should be 3 mm greater than the diameter of the bolts to be used. Bolts and screws should be 8 mm or more in dia. and the nuts of the hook bolts, crank bolts should bear a gal vanished iron limpet washers. The screw or bolts should be tightened sufficiently only to seat the bitumen washer over the corrugations so that the natural movement in the substructure of the roof may not damage sheeting. It is essential that the bolt holes are made water tight by the use of bitumen washers in conjunction with suitable G.I.washer. These form essential accessories to good fixing work. A cracked sheet should never be used.

15.0 FLOORING AND PAVING

15.1 Sub Base of floor

15.1.1 The area to be paved shall be divided into suitable panels. Form work shall be provided. The boarding / battens shall be fixed in position with their toe at proper level, giving slope where required. Alternatively base concrete may be deposited in the whole area at a stretch.

15.1.2 Before placing the base concrete the sub-base shall be properly wetted and rammed. The concrete of the specified mix shall then be deposited between the forms where provided, thoroughly tamped and the surface finished level with the top edge of the forms. The surface of base concrete shall be spreader uniformly. The surface shall be finished rough to provide adequate bond for the topping. Two or three hours after concrete has been laid the surface shall be brushed with wire brush to remove any scum or Latinate and swept clean so that coarse aggregate is exposed.

15.2 Cement Concrete Floor Finish

15.2.1 The surface of base concrete shall be thoroughly cleaned by scrubbing with coir or steel wire brush. Before laying the toping, the surface shall be soaked with water at least for 12 hours and surplus water mopped up immediately before the toping is laid.

15.2.2 The forms shall be fixed over the base concrete dividing into suitable panels. Where glass dividing strips are provided, thickness of glass dividing strips shall be 4 or as indicated. Before placing the concrete toping, neat cement slurry at the rate of 2 kg/sq.m shall be then thoroughly brushed into the base concrete just ahead of the

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finish. The topping shall then be laid, thoroughly compacted by using screed board/plate vibrator. The surface floated with a wooden float to a fair and even surface shall be left for some time till moisture disappears from it. Junctions with skirting / dado or wall surfaces shall be rounded off using cement mortar 1:2 curing shall be carried out for a minimum of 7 days.

16.0 PLASTERING

16.1 Sand for plastering : shall be 50% fine sand and 50% coarse sand from approved sources.

16.2 Preparation of surface shall be done as per CPWD specifications.

16.3 Cement mortar shall be of the mix as indicated in the items and shall be mixed as specified in the CPWD specifications.

16.4 Joints in walls etc. shall be raked to a depth of 12 mm, brushed clean with wire brushes dusted and thoroughly washed before starting the plaster work.

16.5 The surface shall be thoroughly washed with water cleaned and kept wet to saturation point before plastering is commenced.

16.6 Cement mortar as indicated, shall be firmly applied to the masonry walls in a uniform layer to the thickness specified and will be pressed into the joints. On concrete surfaces rendering shall be dashed to the roughened surface to ensure adequate bond. The surface shall be finished even and smooth. Hectoring wherever required shall be done as per directions of **Engineer-in-Charge.** Nothing extra shall be paid on this account.

16.7 All plaster work shall be cured for at least 7 days.

16.8 Integral water proofing compound shall be mixed with cement in the proportion recommended by the manufacturer. Care shall be taken to ensure that the water proofing material gets well and integrally mixed with cement. All other operations are the same as for general plaster work.

16.9 For sand face plaster undercoat of cement plaster 1:4 (1 cement : 4 sand) of thickness not less than 12 mm shall be applied similar to one coat plaster work. Before the under coat hardens the surface shall be scared to provide for the top coat. The top coat also of cement mortar 1:4 shall be applied to a thickness not less than 8 mm and brought to an even surface with a wooden float. The surface shall then be tapped gently with a wooden float lined with cork to retain a coarse surface texture, care being taken that the tapping is even and uniform.

17.0 WHITE & COLOUR WASHING AND CEMENT PAINTING

17.1 <u>White Washing</u>

17.1.1 Where white wash is indicated, 3 coats of white wash shall be applied. The surface shall present a smooth and uniform finish.

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17.1.2 White wash shall be prepared from lime slaked at site and mixed and stirred with 5 litres of water for one kg. of unsalted lime to make a thin cream. The cream shall be screened through a clean, coarse cloth and suitable adhesive such as DDL or equivalent as per manufacturer specification. About 1.3 kg of sodium chloride in hot water shall also be added for every 10 kg. of lime for making the coat hard and rule resistant. Indigo shall also be mixed @ 3 gm/Kg of lime. Each, coat shall be allowed to dry before next coat is applied. When dry, the wash should show no sign of cracking. One coat consists of application with brushes in horizontal stroke followed by vertical stroke.

17.2 Colour Washing

17.2.1 Where colour wash is indicated, one coat of white wash and two coats of colour of tints approved by the **Engineer-in-Charge** shall be applied. Dados and skirting shall not be white washed, colour washed or distempered or painted.

17.2.2 Only Colour stainer of approved brand not affected by lime, shall be added to colour wash. Indigo (Neel) shall, however, not be added in colour wash.

17.2.3 The colour wash shall be applied as described for white wash. After the surface has been prepared the first primary coat shall be of white wash. Minimum two coats of colour wash shall then be applied. The entire surface shall present a smooth and uniform finish of even tint or shade.

17.3 Distempering

17.3.1 Where distempering is indicated, two coats of distemper oil emulsion or dry distemper over a priming coat as specified in the item shall be applied. Each coat of distemper shall be approved by the **Engineer-in-Charge** before next coat is applied.

17.3.2 Distemper oil emulsion shall be as per BIS: 248 of approved brand and manufacture. The distemper shall be diluted with water or a prescribed thinner in the proportion of 4 parts of paste by weight to one part of cold water or in the proportion specified by the manufacturer, which shall be invariably followed.

17.3.3 The surface to be distempered shall be cleaned of dust, dirt, chalking and other foreign matter. All cracks, holes and surface defects shall be repaired with gypsum to give a smooth surface, and papered and wiped clean. The surface shall then be rubbed down again with sand paper and made smooth. The surface thus prepared shall be given a coat of alkali resistant, priming paint conforming to BIS: 109 or any other primer as specified by the manufacturer and allowed to dry at least for 48 hours.

17.3.4 Dry distemper shall be of approved make and shade conforming to BIS 427 and shall be prepared as per manufacturer's specification. The surface to be distempered shall be cleaned of dust, dirt, chalking and other foreign matter. All cracks, holes and surface defects shall be repaired with gypsum to give a smooth surface, and papered and wiped clean. The surface shall then be rubbed down again with sand paper and made smooth. The surface thus prepared shall be given a coat of alkali resistant,

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priming paint conforming to BIS: 109 or any other primer as specified by the manufacturer and allowed to dry at least for 48 hours.

17.3.5 After the primer coat has dried for at least 48 hours, the surface shall be lightly sand papered to make it smooth for receiving the distemper, taking care not to rub cut the priming coat and then dusted off. Prepared distemper shall then be applied with brushes in horizontal strokes followed immediately by vertical ones which together constitute one coat.

17.3.6 Subsequent coats shall be applied in the same way, with time intervals of at least 24 hours between consecutive coats.

17.3.7 A uniform finished surface without patches, brush marks, or distemper drops shall be obtained.

17.4 Cement Painting

17.4.1 Cement paint: Cement paint shall comply with BIS: 5410 specification for cement paint, of colour as required.

17.4.2 Where shown on drawings for external surfaces of sand faced plaster, or any other surface, two coats of cement paint shall be applied of tint and shade as approved by the **Engineer-in-Charge**.

17.4.3 The surfaces shall be prepared as specified for white washing. Before applying cement paint the surface shall be thoroughly wetted to control surface suction. The surface shall be moist but not dripping wet, when the paint is applied. Not less than 24 hours shall be allowed between the two coats. In hot weather the first coat shall be slightly moistened before applying the second coat.

17.4.4 On external plastered surfaces, sand faced or plain plastered and concrete surfaces, cement paint shall be vigorously scrubbed on to work the paint into the voids and provide a continuous paint film free from pin holes and other openings. Curing shall be done between the coats and for at least 2 days following the final coat.

18.0 GLAZING

18.1 Sheet glass glazing of doors, windows etc. shall be of selected quality glass conforming to BIS: 2835. Toughened splinter proof industrial safety glass shall confirm to BIS: 2553. No cracked chipped or disfigured glass shall be accepted Glass shall be in one piece for each pan.

18.2 Glazing shall be fixed with timber or steel / aluminium beading as called for. Glass shall be back puttied and fixed with beading for a water tight and rattle free installation. Sizes of timber/ steel / aluminium beading shall be as directed.

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SECTION-3.0

TECHNICAL SPECIFICATION

FOR

ELECTRICAL WORKS (SUPPLY & ERECTION)

FOR

RENOVATION OF ADMIN BUILDING & BUNGALOW (Type B: 09 nos; Type C:02 nos; Type D: 10 nos)

AT

HINDUSTAN URVARAK & RASAYAN LIMITED GORAKHPUR, UTTAR PRADESH

0	19.06.2018	07.06.2018	ISSUED FOR ENQUIRY	RKP	AP	SK
P	07.06.2018	07.06.2018	ISSUED FOR CLIENT'S REVIEW/COMMENTS	RKP	AP	SK
REV.	REV. DATE	EFF. DATE	PURPOSE	PREPD.	REVWD.	APPD.

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LIST OF ATTACHMENTS

ATTACHMENT NUMBER	DESCRIPTION
PC160-7711-0991	Schedule of Rates for Electrical Works (Supply & Erection) for Renovation of Admin Building & Bungalow, HURL, Gorakhpur
PC160-1201	Inventory/Point of Internal Electrification for Admin Building
PC160-1202	Inventory/Point of Internal Electrification for Admin Building
PC160-1203	Overall SLD
PC160-1204	Typical SLD Feeder Pillar Board
PC160-1205	Typical SLD Lighting Sub Distribution Board
PC160-1206	Typical SLD Sub power distribution board for AC
PC160-1207	Typical SLD Sub power distribution board for Switch socket
ES: 8080	Sheet Steel Distribution Boards
ES: 8160	Cables
PDS: E 451	Schematic Diagram Circuit Breaker Controlled Feeders
PDS: E 452	Schematic Diagram Auto Trip Alarm
PDS: E 453	Schematic Diagram Non Trip Alarm
PDS: E 461	Schematic Diagram Auto Control of Outdoor Lighting
PDS: E 603	Arrangement of connections of Earth Conductors
PDS: E 604	Typical Details of connections in Earth Pit
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PDS: E 611	GI / Al Accessories for Earth Pit
PDS: E 615	G.I. Earth Bus
PDS: E 617	Typical Arrangement for Neutral and Equipment Earthing

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SECTION – 1.0

GENERAL SPECIFICATION

1.0 SCOPE

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1.1 The scope covers technical requirement of Design, Engineering, Supply, Installation, Testing and Commissioning, delivery FOR site in well packed condition of the electrical equipments and accessories specified herein required for electrical works for renovation of Admin Building and Bungalow (Type B: 9 nos; Type C: 2 nos; Type D: 10 nos) for HURL, Gorakhpur, Uttar Pradesh

1.2 The scope shall include broadly include but not limited to supply, installation, testing & commissioning of following:

- Main Power Distribution Board (MPDB)
- LT cable
- Lighting Sub Distribution Board
- Single Phase Socket Distribution Board
- Sub Power Distribution Board for AC
- LED lighting fixtures
- Room switch board
- Earthing & Lightning protection system
- Junction Boxes
- Circuit/Point/exposed wiring to light points, power points & AC points
- Surface/Concealed Conduit wiring

1.3 Any other items not specified but required for the safe operation of the system are also included in vendor's scope of work.

1.4 For Admin building, Incoming power supply shall be provided at one point by owner. Further distribution to individual loads of building by providing MPDB, LSDB, SPDB-Socket, SPDB-AC etc. Refer overall SLD and typical SLDs for detailed understanding of the power distribution.

1.5 For individual bungalow Power shall be tapped from the nearest existing pole to individual Bungalow through cable & feeder pillar board and shall be terminated in the Meter Distribution Board, cable shall be laid underground in GI pipe/overhead as per direction of Engineer-in-charge. Further distribution to Pre-wired Lighting Distribution Board of individual Bungalow and to various electrical points shall also be in contractor's scope.

1.6 The scope of work shall also include digging of earth and refilling for directly buried cables in cable protection GI Pipes, earth strips, earth pits, civil works such as making earth pit inspection chambers with covers, grouting of equipment base plate, channels, supports and foundation bolts, chipping of concrete or in brick work for earth strips, pipes or other minor chipping for foundation preparation, if required, cutting holes in walls for sealing of cable entries and making good the same after installation of the equipment and levelling, and other minor similar jobs as per directions of Owner / Engineer-in-Charge.

1.7 Quantities indicated in the Schedule of Rates (SOR) are approximate and these may increase or decrease or some items may even be deleted at the time of actual execution. However, the value of total increase or decrease shall be limited to ± 25% of the contract value irrespective of the changes in quantity of individual items.

1.8 All civil work (like cutting, chipping, grouting, making opening in floor / wall etc. for equipment foundation and cabling work) pertaining to electrical equipment are in the scope of work of the contractor.

1.9 The contractor shall obtain the necessary clearance from local supply authority and electrical inspector of UP as applicable, for complete electrical installation. Wherever service connections

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are to be obtained from the local supply company, the contractor shall process the application and obtain the power supply. All necessary drawings, calculations, test certificates and record of site tests etc. as required by the Inspector shall be furnished. Any modification/rectification as required by Electrical Inspector shall be carried out free of cost by the contractor. All fees payable to the supply company and Electrical Inspector for such service connections shall be paid by the owner.

1.10 This specification shall be read in conjunction with all referred standards, associated drawings, specification sheets, PDS, Inventory of internal electrification of admin building & Bungalow and Schedule of Rates (SOR) for Electrical Supply & Erection Works for Renovation of Admin building & Building (Doc. No. PC160-7711-0991).

1.11 In case of any discrepancies between Technical Specification and SOR in respect of description of equipment / work, the details indicated in the SOR shall prevail.

1.12 This being a renovation job, Bidder must visit the site to understand the nature of job and collect the necessary details from site. Bidder shall also develop the layout based on the details provided and submit for approval during detail engg.

1.13 The contractor shall have valid “A” class licence. The contractor must have PF & ESI codes covering all persons hired by him for carrying out the job. He shall engage suitably skilled / licensed workmen of various categories for execution of work supervised by supervisors / engineer of appropriate qualification and experience to ensure suitable quality of work.

1.14 The contractor shall observe safety rules and take all necessary safety precautions to carry out the internal electrification work.

2.0 OPERATING REQUIREMENTS

2.1 All equipment and accessories shall be suitable for trouble free and continuous service at their rated capacity in the specified ambient and system conditions.

3.0 REFERENCE STANDARDS

3.1 All electrical equipment and installation shall comply with the requirements laid down in the latest issue of relevant Indian Standard Specifications and statutory acts / rules / regulations. In the absence of IS for any particular equipment or in case of imported equipment, relevant IEC Standards shall be applicable. All Specifications, publications mean the latest edition.

3.2 The equipment and installation shall also comply with the provisions of latest issue of Indian Electricity Rules. Contractor shall obtain approvals of Statutory Authorities for equipment and complete installation and shall make, wherever necessary, suitable modification in the equipment, installation to comply with the above.

3.3 Wherever any requirement, laid down in this standard, differs from that in Indian Standard Specification, the requirement specified herein shall prevail.

4.0 SERVICE CONDITIONS

The equipment shall be designed for the following site conditions: -

- Maximum ambient temperature - 47 ^{0}C
- Minimum ambient temperature - 1.7 ^{0}C
- Design reference temperature - 50 ^{0}C
- Relative humidity - 100%

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- Altitude above sea level - <1000 mtr

5.0 INSTRUCTION TO THE BIDDER

5.1 This specification covers complete electrifications of Admin building & Bungalow, which shall include LT cables & wires, LSDB's, FPB, SPDB's for 16A switch socket, SPDB' for AC, Meter distribution board. Room switch boards, surface/recess conduits, MCB boxes, LED lighting fixtures, wall & ceiling Fan, 6A & 16A switch socket etc as specified in technical specification, SOR, and attachments enclosed with it.

5.2 Complete work shall be carried out conforming to the provisions of Indian Electricity Act and relevant Indian standard Specifications (ISS). Wherever these regulations are supplemented by the State Electricity Dept., Electricity Undertakings / Boards, the installation shall also comply with these requirements. Wherever the specifications given in this NIT differs from those of the statutory regulations, these specifications shall be followed.

5.3 Bidder shall submit various Layout drawings as per Annexure-I 'Drawings and Documents Schedule' for owner's approval before proceeding with the installation works. Approval of drawings / documents does not relieve the contractor of his responsibilities to meet the intents of specifications. Cutting chases / groove, wherever required, and making good is deemed to be included in the contractor's quoted rates.

5.4 Location Main Power Distribution Board, Feeder Pillar Board, Meter Distribution Boards, Lighting Sub Distribution Boards, switch boards, light fittings, cable routes, conduit routes, earth pits etc. shall be marked at site by the contractor and approval of Engineer-in-charge shall be obtained before proceeding with the installation work.

5.5 On completion of works, wiring diagram for complete installation and various Layout drawings as per Drawings and Documents Schedule shall be prepared by the contractor and 4 copies of the same shall be supplied to the owner (M/s HURL) for their record.

5.6 Rated Power, Voltage and frequency of supply of current consuming devices and materials used in installation shall be suitable for the power and frequency of the supply to which these are to be connected.

5.7 Power wiring shall be kept separate and distinct from light wiring, from the level of circuits, i.e., beyond the branch distribution boards. Conduits for light/power wiring shall be separate.

5.8 Loads of complete building & bungalow are distributed in such a way that balancing of 3-ph circuit shall be done.

5.9 All circuits shall be indicated and numbered in wiring diagram and all points shall be given the same number as the circuit to switch they are electrically connected. Distributions boards shall also be marked to indicate the circuit number controlled by them.

5.10 "Loop in" system of wiring shall invariably be followed throughout the installation. Where it is absolutely necessary, junction boxes of approved make may be used as permitted by Engineer-in-charge.

5.11 In wiring, no joints in wiring will be permitted anywhere, except in switch box or point outlets, where jointing of wires will be allowed with use of suitable connector. Soldered or taped joints are not permitted for jointing under any circumstances.

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5.12 The wiring throughout the installation shall be such that there is no break in the neutral wire except in the form of linked switchgear.

5.13 Surface wiring, wherever applicable shall run as far as possible along the walls and ceiling, so as to be easily accessible for inspection.

5.14 In recessed conduit system, routes of conduit will be planned, so that various inspection boxes provided don't present a shabby look. Such boxes can be provided 5 mm above plaster level, and they can be covered with plaster of paris with marking of junction boxes.

5.15 Installation of conduits for wiring generally will not be taken in floor slabs.

5.16 Socket outlets along with switch shall be modular type for either 6A 3 pin or 16/6 Amp 6 pin configuration. The third pin shall be connected to earth through protective (loop earthing) conductor. 2 pin or 5 pin socket outlets will not be provided.

5.17 Sockets for the power outlets of rating above 1KW like for window/split AC etc, shall be of industrial type with associated plug top and controlling MCB.

6.0 POWER SUPPLY DISTRIBUTION

6.1 For Admin building, Incoming power supply shall be provided at one point by owner. Further distribution to individual loads of building by providing MPDB, LSDB, SPDB-Socket, SPDB-AC etc. Refer overall SLD and typical SLDs for detailed understanding of the power distribution.

6.2 For individual bungalow Power shall be tapped from the nearest existing pole to individual Bungalow through cable & feeder pillar board and shall be terminated in the Meter Distribution Board, cable shall be laid underground in GI pipe/overhead as per direction of Engineer-in-charge. Further distribution to Pre-wired Lighting Distribution Board of individual Bungalow and to various electrical points shall also be in contractor's scope

7.0 SYSTEM OF WIRING

7.1 Wiring shall be FRLS PVC insulated (Sheathed /Unsheathed) stranded copper conductor cable in approved PVC conduit wiring as per approved drawings. Wiring is to be terminated in sunken cast iron or pressed steel terminal boxes for mounting modular type fittings like switches, sockets and regulators, etc. complete with modular base, cover plate etc. Cable for lighting and power circuit shall run separately.

8.0 POINT WIRING

8.1 Installation is to be carried out on point wiring basis, the supply of following shall be deemed to be included in wiring works.

a) Conduit/channel as the case may be, accessories for the same and wiring cables between the switch box and the point outlet, loop protective earthing of each fan/light fixture.

b) 650/1100V FRLS PVC insulated copper conductor single core lighting wires of size 1.5/2.5/4/6 sq. mm as specified for conduit wiring, and PVC insulated 1.5 copper conductor earth wire.

c) All fixing accessories such as clips, screws, Phil plug, rawl plug etc. as required.

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d) GI or PVC switch boxes for control switches, regulators, sockets etc, recessed or surface type, and phenolic laminated sheet covers over the same.

e) Outlet boxes, junction boxes, pull boxes etc. provided with switchboards for loose wires/ conduit terminations.

f) Control switch or MCB, as specified.

g) PVC concealed conduit as specified with all relevant accessories and junction / inspection boxes.

h) Ceiling rose or connector (in case of ceiling / exhaust fan points).

i) Connections to ceiling rose, connector, socket outlet, lamp holder, switch etc.

j) Bushed conduit or porcelain tubing where wiring cables pass through wall etc.

k) Back plate (in case of suspended light fixtures).

l) Wiring of each lighting fitting / receptacle unit / ceiling fan / bell point / exhaust fan, etc. shall be considered as one point.

9.0 CONCEALED CONDUIT WIRING

9.1 Supply, routing and laying of PVC conduit of minimum size 20mm in walls/ceiling, from lighting panels up to fittings, receptacles/ inspection/ junction boxes etc. shall be in the contractor's scope.

9.2 The Contractor shall closely coordinate his work with that of the Civil Contractor. The contractor shall prepare detailed shop drawing and submit for the approval to the owner well before commencing the work. The shop drawings shall show setting out details for all components such as conduits and cable routes indicating the number and size of wires in each section of conduit.

9.3 The layout of conduits shall be such that any condensation or sweating inside the conduit is drained out. Suitable precaution shall be taken to prevent entry of insects inside the conduit. No cable or wire shall be installed until the inside of conduit has been cleaned.

9.4 Suitable junction / inspection boxes according to requirements shall be provided to permit periodical inspection and to facilitate replacement of wires, when required. The boxes shall be mounted flush with the wall or ceiling. Junction boxes with minimum 75 mm depth shall be used in roof slabs and depth of boxes in other places shall be as per IS: 2667.

9.5 Wherever a straight run of conduit exceeds 6 mts. additional pull boxes or junction box shall be provided. However, the entire assembly shall be so assembled in order to facilitate renewal wiring etc. in the future. Pull boxes shall not be located in a conspicuous manner. Number and location of pull boxes shall be clearly indicated on shop drawings and shall be got approved by the owner / Engineer-in-charge before commencing the work.

9.6 The chases in the wall shall be neatly made and with ample dimensions to permit the conduit to be fixed in the manner desired.

9.7 All the cuttings and chasings in the brick work / RCC work / Block work shall be carried out using electrically operated Hilti or Fishcher make casing tool. Further all the drillings and

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cuttings in the RCC work shall be carried out using core cutting machine. The rate shall include all these and no separate rates towards the same shall be paid to the contractor.

9.8 Fixing of standard bends of elbows shall be avoided as far as practicable and all curves maintained by bending the conduit pipe itself with a long radius which will permit easy drawing in of conductors. All threaded joints of conduit pipes shall be treated with some approved preservative compound to secure protection against rust. Open conduit ends shall be properly protected to prevent the ingress of dirt and rubbish.

9.9 Provisions shall be made at expansion joints, where they occur in the building structure. PVC pipe with coupling to be installed to prevent damage to structure / conduits and finishes. Continuity through all such joints shall be maintained.

9.10 All conduits shall be kept clear of other services, except where intentionally earthed or bonded. Conduits shall be fixed to prevent contact with same at the following minimum spacing.
a) 150 mm away from hot water services.
b) 50 mm away from all other services.

9.11 Where desktop to be installed, group of 3 nos 6A plug points to be provided.

10.0 CONDUIT CAPACITY

10.1 Maximum number of PVC insulated cables conforming to IS: 694 that can be drawn in one conduit shall be as follows:

Nominal Cross Sectional Area of Conductor in sq. mm	Size of Conduit							
	20 mm		25 mm		32 mm		38 mm	
	S	B	S	B	S	B	S	B
1.5	5	4	10	8	18	12	-	-
2.5	5	3	8	6	12	10	-	-
4	3	2	6	3	10	8	-	-
6	2	-	5	4	8	7	-	-
10	2	-	4	3	6	5	8	6

Note:

1. The above table shows the maximum capacity of conduits for a simultaneous drawing of cables.

2. The columns headed ‘S’ applies to runs of conduit which have distance not exceeding 4.25 m between draw in boxes and which do not deflect from the straight by an angle of more than 15°. The columns headed ‘B’ apply to runs of conduit which deflect from the straight by an angle of more than 15°.

3. Conduit sizes are the nominal external diameters.

11.0 MATERIALS

11.1 The cable shall be of XLPE insulated and of approved make / grade ISI marked. All materials for fittings / accessories, cable etc. to be incorporated in this work shall strictly comply with latest appropriate Indian Standards. If Indian standards have not been issued relevant current

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British Standards may be used. Aluminium link clips of width 6 mm to 8 mm shall be acceptable without any price adjustment.

11.2 The rates for point wiring (power / light) are with the provision of stranded copper conductor of solid drawn copper conductor.

12.0 CONNECTORS

12.1 Connectors of appropriate rating shall be provided inside the box for fan and utility fittings. The wiring shall be done in such a way that wires from connectors to the fan are not visible. In situations where ceiling rose is proposed for fan and tube light fittings, the connector need not be provided.

13.0 LIGHTING WIRES

13.1 The wires for wiring in lighting system shall be 650 / 1100 V, PVC insulated, unarmoured with stranded copper conductors, unless otherwise specified. The wires shall conform to IS: 694.

13.2 The minimum area of conductors shall be 1.5 sq. mm for light point/fan point/exhaust fan point/call bell point and 4 sq. mm for light/power plug.

13.3 The PVC insulation shall be coloured red, yellow, blue for R, Y, B phase and black for neutral.

14.0 EQUIPMENT SPECIFICATIONS

14.1 415V MAIN POWER DISTRIBUTION BOARD (MPDB)

14.1.1 Distribution boards shall conform to the specification sheet, feeder details**,** Engineering standard for sheet steel distribution board (ES: 8080), SLD and specifications mentioned herein.

14.1.2 The required details of the MPDB, such as feeder/circuit rating, instruments and meters, protections, reference schematic drawings etc. are indicated in the feeder details. Numbers and ratings of feeders, indicated in the feeder details, are tentative and may increase or decrease. Actual numbers and ratings of the feeders will be indicated at the time of order/drawing approval.

14.1.3 Rated short circuit breaking capacity for 415V MPDB shall be minimum 50 KA for 1 sec.

14.1.4 The incoming circuit breaker feeders shall be in single tier formation.

14.1.5 ACB shall be provided with electrically draw out features.

14.1.6 The main bus bars shall have heat shrinkable insulated sleeves suitable for rated voltage and shall be made of high conductivity aluminium alloy. At joints of these bus bars removable shrouds shall be provided.

14.1.7 Bus bars shall be of uniform cross section and supported on non-hydroscopic FRP insulators with adequate clearances and creepage distance to prevent flash over due to effect of dust/moisture.

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14.1.8 A continuous earth bus shall be provided at the bottom in the switchboard for grounding.

14.1.9 Busbar clearances shall conform to relevant Indian Standard/IEC for equipment voltages up to and including 500V AC.

14.1.10 The draw out modules shall be standardized and it shall be possible to interchange any module with a module of same size. The components to control the equipment like switch, starter, fuse, auxiliary relay etc. shall be wired as a unit on the individual module. Safety shutter shall be provided to prevent direct access to live parts when the chassis is removed.

14.1.11 The entire draw out construction should be designed for safe operation during placement or removal of chassis. An earthing arrangement shall be provided which will make contact first before the power contacts are made and break last.

14.1.12 The door shall be interlocked so that it cannot be opened unless the isolating switch on that module is OFF. However, it shall be provided with interlock defeat mechanism for intentional opening when on line for testing and inspection purpose.

14.1.13 Control switches for breaker control shall be provided in each breaker cubicle. Circuit breaker shall be interlocked to prevent withdrawal of a closed breaker or insertion of a closed breaker. Each breaker shall be provided with anti pumping device.

14.1.14 Provisions shall be made to manually close/trip circuit breakers on loss of control voltage.

14.1.15 The switchboards shall be suitable for extension at both the ends.

14.1.16 There shall be three positions for Breaker/Contactor trolley: - Service, Test and Isolate. In service position, the power connections shall be made; but in test and isolate mode, the power connection of bus bars shall be automatically removed.

14.1.17 Suitable shutter arrangement shall be provided to protect the person from accidental contact with live bus in trolley chamber.

14.1.18 FRP supports shall be used for bus bars with adequate clearances and creepage distance to prevent flash over due to effect of dust moisture.

14.1.19 Protective relays for incoming and outgoing feeders shall be microprocessor based numerical type.

14.1.20 Every enclosure door that provides access to live parts operating at 240 V AC and above shall be mechanically interlocked with a circuit interrupting device on the supply side such that when the door is open, the equipment is de-energised.

14.1.21 The design, manufacture and testing of MPDB shall be in conformity with all applicable Indian Standards, Codes, Regulatory requirements and details indicated in the above SS/ES/FD.

14.1.22 Main power distribution board shall be totally type tested panel as per IEC 61439.

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14.1.23 The required details of the MPDB, such as feeder/circuit rating, instruments and meters, protections, reference schematic drawings etc. are indicated in the feeder details. Numbers and ratings of feeders, indicated in the feeder details, are tentative and may increase or decrease. Actual numbers and ratings of the feeders will be indicated at the time of order/drawing approval.

14.1.24 Technical Particulars shall be filled by the bidder and submitted for Approval after order in line with ITB / P.O. requirement before commencement of manufacturing.

14.1.25 The make of components to be used in the MPDB shall be as specified in this specification. The make of the components, not specified, shall be indicated by the bidder and the same shall be subject to HURL/PDIL approval.

14.1.26 Meters as indicated in the feeder details for each feeder shall be provided. However, whereas ammeter and voltmeter shall be provided separately, all other meters shall be part of the multifunction meter.

14.1.27 Power for space heater bus shall be tapped from the main bus of the MPDB through suitably rated double pole MCB instead of the provision specified at clause no. 5.17.1 of ES: 8060.

14.1.28 Suitable DC power pack of required capacity of minimum 30min backup to be provided for closing, tripping and indication of circuit breaker feeder. Spare power pack with inside and outside isolation shall be provided. DC voltage shall be 220V/110V DC and AC auxiliary supply voltage shall be 240V AC.

14.1.29 Various schematic diagrams attached are suggestive. Vendor shall consider all other components/wiring as required for proper and safe operation of the scheme. Where no scheme is attached for any type of feeder, vendor shall develop the scheme as per his own standard which shall be subject to owner's approval.

14.1.30 The switch boards shall be complete with terminal blocks, rolled aluminium heavy duty double compression type cable glands and crimping lugs suitable for the cable types and sizes indicated in feeder details. The number and sizes of cables may change at the time of drawing approval and the same shall be provided as required without any cost/time implications.

14.1.31 Removable gland plates shall be of 6 mm minimum thickness for incomers and 3 mm thickness elsewhere.

14.1.32 The offered switchboard shall be suitable for extension in either direction, for this ends of bus bars shall be suitably drilled and panels at extreme end shall have openings, which shall be covered with plates screwed to the panel.

14.1.33 The current rating of the neutral shall be half that of the phase bus bars. Removable neutral links shall be provided on feeders to permit isolation of the neutral bus bar.

14.1.34 Control transformer shall be provided for each bus section of the MPDB having contactor control feeders and each transformer shall be sized for the entire switchboard. Switchboard

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having two bus sections and coupled by bus tie shall have manual changeover switch for the control transformers. The control transformer shall have at least 10% spare capacity.

14.1.35 The hot spot temperature of bus bars, including joints, at design temperature shall not exceed 95^0C under normal operating conditions. However, for silver plated joints the allowable maximum temperature shall be 115^0C.

14.1.36 The current rating as specified in specification sheets for switchboard its components are in panel rating. The vendor shall apply suitable de rating to arrive the nominal rating.

14.1.37 All bus bars shall be insulated with PVC heat shrinkable sleeves of 1100V grade. Red, yellow and blue colour shall be used for phase bus bars and black colour shall be used for neutral bus bars.

14.1.38 Minimum clearance between live parts, between live parts/neutral to earth shall be 19mm.

14.1.39 Adequate means shall be provided to prevent shorting of power and/ or control terminals due to accidental dropping of maintenance tools etc.

14.1.40 All identical equipments and corresponding parts shall be fully interchangeable.

14.1.41 Metal sheets shall be provided between two adjacent vertical panels running up to the full useful height of the switchboard.

14.1.42 All doors and movable parts shall be earthed using flexible copper connections, to the fixed frame of the switchboard. Provision shall be made to connect the earthing bus bar to the plant earthing grid at two ends. Minimum 4 nos, 10mm dia bolts with nuts shall be provided on the earth bus for termination of fourth core of cable per vertical panel.

14.1.43 Nameplates for feeder compartments shall be in two parts, one part shall have necessary details pertaining to the compartments number of vertical panel of the switchboard. The other parts shall be removable and shall contain all details regarding the feeder numbers for drives/equipment controlled by the particular module as per approved drgs, also Danger name plate shall be provided at the front and rear of each panel.

14.1.44 The incoming / outgoing cable termination shall be staggered for each circuit and barriers of sheet steel or insulating material shall be provided between terminations of two circuits such that maintenance on one circuit could be carried out while the other circuit is live. Suitable clamping arrangements shall be provided for cables and cable termination. Terminal blocks shall not be used for supporting the cables.

14.1.45 All terminals except wiping/sliding type control terminals shall be shrouded with plastic covers to prevent accidental contact.

14.1.46 The earth connection shall make before the main power / control contacts make and break after the power /control contacts are disconnected. Earthing connection through a plug and socket connection shall not be acceptable. Also the earth connections must remain connected when breaker connected in ‘Test’ position.

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14.1.47 Sheet steel barrier shall be provided between individual compartments and cable alley. This barrier shall be provided with opening for power and control connections and it shall be possible to safely carryout maintenance work on cable connections to any one circuit in the cable alley with the bus bars and the adjacent circuits live. Maintenance and connection of cables to any modules shall be possible without having to takeout the modules from its position from the panel.

14.1.48 Wherever any requirement, laid down in this specification/specification sheet/feeder details, differs from that in Engineering Standard (ES:8060), the requirements specified in this specification/specification sheet/feeder details shall prevail.

14.2 Cables

14.2.1 Cables shall conform to Engineering Standard ES-8160 and enclosed Specification Sheets.

14.2.2 All LT power cables shall be with stranded aluminium / copper conductor with XLPE insulation, PVC inner sheathed, armoured, PVC outer sheathed FRLS type and construction as per IS: 7098 (Part 1) and as specified in the specification Sheet (attached in this specification).

14.2.3 All control cables shall be stranded copper conductor with XLPE insulation, PVC inner sheathed, armoured, PVC outer sheathed FRLS type and construction as per IS: 7098 (Part 1) and as specified in the specification Sheet (attached in this specification).

14.2.4 All control cables cores shall be identified with numerical core numbers printed on core instead of colours.

14.2.5 All cables shall be armoured and shall have extruded inner and outer sheath. Cables shall be in continuous lengths without any joints.

14.2.6 Preferred drum length shall be indicated by bidder which shall be subject to approval by owner/PDIL. Bidder shall indicate maximum drum length for each size and type of cables.

14.2.7 Various sizes of cables and their quantities shall be as indicated in the SOR. The quantities indicated are tentative and may increase or decrease. Some sizes may be even deleted. Exact requirement shall be indicated at the time of order. Bidder shall confirm that there shall be no variation of unit rate on this account.

14.2.8 Technical Particulars shall be filled by bidder and submitted for approval after order in line with PO requirement before commencement of manufacturing. Separate sheet shall be furnished for different grade cables.

14.2.9 The cut ends of cable shall be sealed by means of non-hygroscopic sealing material.

14.2.10 Following information shall be embossed on outer sheath throughout the length of cable at regular interval:

i) Cable size & no of cores

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ii) Voltage grade

iii) Type of insulation

iv) Year of Manufacture

v) Name of Manufacture

vi) Running meter

14.3 **Lighting Sub Distribution Board (LSDB)/ Single Phase Socket Sub Distribution Board (SPDB-Soc.)/ Sub Power Distribution Board for Air conditioners (SPDB-AC)**

14.3.1 Power to Lighting Sub Distribution Board (LSDB), Single Phase Socket Sub Distribution Board (SPDB-Soc) and Sub Power Distribution Board for AC (SPDB-AC) shall be provided from Main Power Distribution Board (MPDB).

14.3.2 LSDB shall be provided to supply power to the lighting fixtures, SPDB-Soc shall be provided to supply power to 16A switch sockets and SPDB-AC shall be provided to supply power to Air-Conditioner.

14.3.3 The design and specification of the LSDB/SPDB-Soc/SPDB-AC shall conform to the requirements laid down in the specification sheet. LSDB/SPDB-Soc/SPDB-AC shall be fabricated out of 2.5 mm thick cold rolled sheet steel.

14.3.4 LSDB/SPDB-Soc/SPDB-AC shall be of dust, vermin and weatherproof construction fabricated out of 2mm thick CRCA conforming to IP55. The enclosure shall be suitable for mounting on wall. 4nos. holes suitable for 12mm bolts shall be provided outside the enclosure for fixing the LSDB/SPDB-Soc/SPDB-AC on wall.

14.3.5 The miniature circuit breakers shall be so mounted inside the enclosure that their operating knobs project outside for easy operation. The cut-out for the knobs on the enclosure shall be lined with gasket for dust proofness. For further protection against ingress of dust, the portion where the knobs have protruded out shall be provided with another external front cover, internally hinged at the top, gravity operated and with a knurled knob at the bottom. The external cover shall be flushed with the main cover. Continuous neoprene gasket shall be provided to make the board completely dust and weather proof.

14.3.6 All external hard ware of diameter less than 8mm shall be of stainless steel and those of diameter 8mm and above shall be of mild steel cadmium plated or zinc passivated.

14.3.7 The LSDB shall have top entry arrangement for outgoing cables and bottom entry for incoming cable provided with double compression type rolled aluminium cable glands suitable for 1.1 KV XLPE-A-FRLS PVC outer-sheathed cables. FPB/SPDB-Socket/ SPDB-AC shall have bottom entry arrangement for cables provided with double compression type rolled aluminium cable glands suitable for 1.1 KV XLPE-A-FRLS PVC cables.

14.3.8 The internal wiring shall be carried out by means of single core XLPE/PVC insulated 2.5 sq.mm stranded copper conductor cables.

14.3.9 Individual earth terminals shall be provided for the earth conductor of the outgoing cables beside the phase and neutral terminals.

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14.3.10 Suitable label inscription consisting of black Perspex with engraving for the board and circuit nos. of all outgoing feeders shall be provided. The label inscription of the board shall contain description and code no. as indicated in specification sheet. The circuit nos. of outgoing feeders shall be serially indicated as 1L, 2L..... 17L, 18L.

14.3.11 The LSDB's/SPDB-Soc/SPDB-AC shall be provided with two external earthing terminals.

14.3.12 The board shall be complete with terminal block, cable glands, cable lugs and other accessories as required.

14.3.13 Three phase and neutral bus bar system of adequate size shall be provided to which all outgoing and incoming MCBs shall be connected.

14.3.14 The board shall be complete with terminal block, cable glands, cable lugs and other accessories as required.

14.4 PRE WIRED LIGHTING DISTRIBUTION BOARDS FOR BUNGALOW

14.4.1 Pre-wired distribution boards shall be concealed single door housed in purpose made metal cases conforming to relevant Indian standards. The sub-distribution boards shall not be mounted at a height exceeding 180 cm from finished level.

14.4.2 Pre-wired distribution Boards shall be phase segregation type equipped with rigidity fixed Miniature Circuit Breakers (MCB) complying with specific number of relevant code in the phase leads with overload and short circuit protection. The (MCB) shall have adequately sized terminals for the outgoing leads. Pre-wired distribution boards shall have adequately sized terminals or clamps for the incoming conductors. Pre-wired distribution boards shall have an earth bus bar with the necessary number of terminals for connecting the earth continuity conductors associated with the various circuits supplied from the board.

14.4.3 Each Pre-wired distribution board shall have a circuit pasted or otherwise permanently fixed inside the cover stating the designation and details of the circuits controlled, and rating of miniature breakers. Non-flammable insulating barriers shall be provided between poles and phases and all live parts protected with non-flammable insulating shields to prevent accidental contact while operating the miniature breaker.

14.5 LIGHT FITTINGS

14.5.1 All lighting fixtures shall be LED type.

14.5.2 The fixtures shall be complete with all accessories including the driver, lamps and all accessories. The lighting fixtures shall also conform to the specification sheet (attached in this specification).

14.5.3 The fixtures shall be provided with cable glands and a terminal block suitable for termination of copper conductor up to 2.5 sq. mm size.

14.5.4 The fixture shall be so designed that it shall be possible to maintain or replace different accessories without difficulty, including replacement of lamps

14.5.5 Following type of light fittings shall be used:

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a) High quality LED tube batten complete with single 20W tube (T5) eco friendly, having ≥ 2000 lumen output, CCT-6500K, IP-20, luminous efficacy ≥ 100 lm/watt, CRI>80, life ≥ 40000 burning hours, PF>0.95 and THD<10%, no UV radiation etc.

b) High quality LED tube batten complete with two 20W tube (T5) eco friendly, having ≥ 2000 lumen output, CCT-6500K, IP-20, luminous efficacy ≥ 100 lm/watt, CRI>80, life ≥ 40000 burning hours, PF>0.95 and THD<10%, no UV radiation etc.

c) High quality LED fluorescent tube batten complete with single 9W tube (T5) eco friendly, having ≥ 900 lumen output, CCT-6500K, IP-20, luminous efficacy ≥ 100 lm/watt, CRI>80, life ≥ 40000 burning hours, PF>0.95 and THD<10%, no UV radiation etc.

d) Bulk head lighting fixtures complete with bracket, 9W LED bulb eco friendly, having ≥ 900 lumen output, CCT-6500K, luminous efficacy ≥ 100 lm/watt, CRI>80, life ≥ 40000 burning hours, PF>0.95 and THD<10%, no UV radiation etc. suitable for outdoor installation.

Also refer other type lighting fixture from SOR attached.

14.6 CEILING FANS

14.6.1 Ceiling fans shall be of 1200 mm/600mm sweep suitable for operating on 240V, 1 phase, 50Hz supply and shall be complete with standard mounting accessories such as suspension rods, top and bottom caps etc. The fans shall be of approved shade and supplied with appropriate electronic speed regulators (modular type). The ceiling fans shall conform to relevant Indian standards.

14.6.2 The minimum distance between fan blades and the ceiling should be about 0.3 meters.

14.6.3 Energy efficient fans with minimum BEE 5 star rating shall be used.

14.7 CEILING ROSES

14.7.1 Ceiling rose shall be of bakelite and shall comply with IS-371 specification for ceiling roses having two or three terminal plates and of outside diameter not less than 63.5 mm. The flexible cord shall be fixed to ceiling rose in such a way that no weight is carried by the clamping screws. The flexible cord shall be of 23 / 0076 dia. cord with copper conductor.

14.8 EXHAUST FANS

14.8.1 The exhaust fans shall be of 300mm sweep, domestic type, suitable for operating on 240V, 1 phase, 50 Hz supply and shall be complete with self opening louvers and standard mounting accessories such as frame etc.

14.8.2 Exhaust fans shall be fixed in wall by providing, a circular opening to suit the size of the frame, which shall be fixed by means of rag bolts embedded in the wall. The hole shall be neatly plastered to the original finish of the wall. The exhaust fan shall be connected to the exhaust fan point, which shall be wired as near to the opening as possible, by means of a flexible cord.

15.0 MOULDED CASE CIRCUIT BREAKERS (MCCB)

15.1.1 MCCBs shall be provided with spring assisted quick make/ break, trip free mechanism.

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15.1.2 MCCB shall be suitable for remote tripping operation and the tripping device shall be suitable for the specified control supply voltage.

15.1.3 MCCBs shall be provided a tripping device with inverse time characteristic for over load protection and instantaneous characteristics for short circuit protection and MCCB rated above 125A shall preferably have adjustable settings.

15.1.4 ON and OFF position of the operating handle of MCCB shall be displayed and the operating handle shall be mounted on the door of the compartment housing MCCB.

15.1.5 Each MCCB shall be provided with minimum 1 NO + 1 NC auxiliary contact and 1NO contact for tripping indication/alarm for owners use.

16.0 MINIATURE CIRCUIT BREAKERS (MCB)

16.1.1 MCBs shall have silver tungsten contact rewirable connections suitable for flush and surface mounting and shall be suitable for mounting on Din-Rail. MCB and distribution boards shall be as per approved make of list.

16.1.2 All MCBs shall be ISI marked.

16.1.3 All wiring connections required to be made with MCBs shall be carried out by providing necessary thimbles / lugs duly crimped.

16.1.4 MCBs shall be hand operated, air break, quick make, quick break type conforming to applicable standards.

a) The MCB shall be provided with overload / short-circuit protective device for protection under overload and short circuit conditions. The switch action shall be trip free to inhibit closing under fault conditions. All brass parts shall be electroplated and all steel parts cadmium plated and all contacts silver plated. The minimum breaking capacity of MCBs shall be 10 KA r.m.s at 415V / 220V AC.

b) Miniature circuit breakers shall be SP/DP/TP or 4P and of the current rating all as specified elsewhere or approved. Each miniature circuit breaker shall be provided with spring-washer at each cable termination. All MCBs shall be in accordance with the relevant standards.

c) The instantaneous magnetic tripping of the MCBs shall be in accordance with the latest edition of the I.E. Regulations. The magnetic tripping of miniature circuit breaker supplying socket outlets shall be 2.7 to 4 times their rated current. The magnetic tripping of the miniature circuit breakers supplying lighting circuits shall be 7 to 10 times their rated current.

17.0 CAST IRON / MILD STEEL BOXES

17.1 The boxes having various fittings such as switches, sockets, fan regulators etc. shall be of cast iron / MS of required size and flush mounting type (Refer clause 6.52 of IS-782). Average thickness of cast iron boxes should not be less than 2.5 mm and that of MS boxes not less than 2 mm thick. The cast iron / MS boxes shall be embedded in the wall and need not be fixed to wooden plugs. The contractor may at his discretion provide galvanized screws without any extra cost.

18.0 ROOM SWITCH BOARD

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Room Lighting Switch Board comprising of flush mounting Sheet Steel concealed metal box with Anchor (Roma) make inner plate, cover plate (white), modular switch/ socket/ switch cum electronic fan regulator with necessary hardware as specified in specification and SOR.

19.0 EARTHING & LIGHTNING PROTECTION

19.1 Complete earthing installation shall be done as per IS: 3043 and lightning protection shall be as per IS/IEC 62305 along with its latest amendments.

19.2 Earthing & lightning protection shall also conform with the requirements of National building code.

19.3 Separate Earthing rings/grid for Earthing & Lightning protection shall be provided around the Admin building. Minimum size of main grid shall be 50mmX6mm.

19.4 Earthing grid/ring shall comprise of buried GI earth strips and GI pipes/electrodes. All these earth electrodes shall be inter-connected.

19.5 Individual electrical equipment shall be earthed by GI strip. Earth buses shall be provided for earthing groups of electrical/non-electrical equipment to earthing grid/rings.

19.6 All equipment rated above 250V shall have two external earth connections and those rated up to 250V shall have one external earth connection.

19.7 All GI conductors shall meet the galvanizing requirement as per IS.

19.8 Surplus soil shall be carried away to distance exceeding 50 m and the site left clean and tidy.

19.9 Pipes carrying gas / water etc. shall not be used as means of earthing on installation.

20.0 TERMINAL BOXES

20.1 In concealed conduit wiring, the terminal point for power / light socket outlets, switching etc. shall terminate in recessed cast iron or galvanized mild steel boxes fitted flush with wall surface. All terminal boxes shall be properly earthed and connected to earth dolly.

21.0 MODULAR TYPE SWITCHES / SOCKETS

21.1 Modular type switches and modular type sockets shall be ISI marked and shall be approved.

22.0 MOUNTING STRUCTURES

Switch sockets, cable trays, Distribution Boards etc shall be mounted / supported on suitable structure fabricated out of standard sections of mild steel, i.e. channels, angels, flats etc conforming to IS: 266.

23.0 TESTS & INSPECTION

23.1 All equipment shall be routine tested as per relevant standards in presence of owner representative at manufacturer's works before despatch. In addition, the equipment shall be inspected at site for final acceptance.

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23.2 Electrical installation work shall be subjected to inspection by owner/ his authorised representative, statutory bodies like Electrical Inspector. The contractor shall carry out without extra cost to owner rectifications / modifications desired by the above authorities to make the installation conforming to I.E. Rules etc.

23.3 The owner may reject any portion of the work considered defective or of poor workmanship and the contractor shall make good these defects without extra cost to owner.

23.4 Guarantee / Warrantee Certificate for all electrical equipments / appliances / components shall be handed over to the owner / Engineer-in-charge.

23.5 The following tests as specified in IS-732, code of practice for electric wiring and fittings in building shall be complied with before the complete installation is taken over. The contractor shall carry out the tests in the presence of Engineer-in-charge. Electrical wiring test sheet shall be signed both by the contractor's representative and the Engineer-in-charge. All testing equipment shall be arranged by contractor without any extra cost.

a) Insulation resistance shall be measured by 500 volts megger. The insulation resistance in mega ohm of the installation shall not be less than 50 divided by the number of points on the circuit and the resistance of the whole installation shall not exceed one ohm and resistance including earth mass as 5 ohm.

b) Testing Polarity of Switches
A test shall be made to verify that all non linked single pole switches have been fitted in the same conductor throughout and that such conductor has been connected to another or phase conductor or to the non-earthed conductor of the supply.

24.0 ERECTION, TESTING & COMMISSIONING

24.1 The contractor shall undertake erection of all equipment in accordance with good engineering practices in conformity with statutory regulations and Code of Practice and to the entire satisfaction of the owner.

24.2 Contractor shall prepare SLD of the entire distribution system and Power/ Lighting Distribution Boards, various layout drawings (e.g. point layout, conduit layout etc.) and submit to the owner for approval. Contractor shall also supply 'as built drawings' for complete installation.

24.3 The contractor shall arrange all the necessary erection tools, tackles, testing and measuring instruments and shall supply erection materials and consumables.

24.4 The contractor shall clear the site after commissioning of the equipments / system and obtain the Site Clearance Certificate from owner's Engineer-in-charge.

25.0 MAKE OF COMPONENTS

25.1 Make of equipment / components shall be as per Annexure-II. Make of equipment / components not indicated shall be subject to owner's approval.

26.0 PAINTING

26.1 The equipment surface to be painted shall be pre-treated to remove all dust, scale and foreign adhering matter by suitable treatment.

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26.2 All metal surfaces shall be painted with two coats of suitable anti-rust paint followed by two coats of anticorrosive epoxy paints.

26.3 All paints shall be carefully selected to withstand tropical heat and extremes of weather. The paint shall not scale off, crinkle or be removed by abrasion due to normal handling.

26.4 Unless otherwise specified, the finishing shade shall be light gray having No.631 as per IS-5.

27.0 DRAWINGS AND DOCUMENTS

27.1 The bidder shall supply the drawings and documents as per Annexure-I 'Drawings & Documents Schedule'.

27.2 All drawings and documents shall have the following descriptions written boldly:

- Name of Client.
- Name of Consultant i.e. PDIL.
- Enquiry / Order Number with Project/Plant name.
- Equipment Code No. and Description.

27.3 The Contractor shall be responsible for preparation and submission of two sets of drawings viz.

(1) "AS BUILT" (2) Material Reconciliation and Deviation Statement

27.4 The vendor shall furnish a Bill of Materials covered in their offer. However, this shall be treated for information only and shall not absolve them from his obligation to supply the required items and quantities for making the plant complete as per intent of the specification.

27.5 Drawings and documents shall be submitted as per Annexure-I

28.0 CO-ORDINATION WITH OTHERS

28.1 The contractor shall co-ordinate with owner's other contractors / agencies as required.

29.0 HANDING OVER TO OWNER

29.1 The contractor shall hand over the complete installation as a whole. Minor works not specified or mentioned in the scope or SOR but required to complete the job as a whole will have to be done by the contractor without extra cost. Any equipment / installation shall not be deemed as handed over to Owner until the same is complete in all respect and is accepted in writing by the Owner / Engineer-in-charge.

30.0 SPARE PARTS

30.1 Commissioning spares as required shall be supplied without any extra cost to the owner.

30.2 Item wise unit prices of spares as indicated in SOR for two years of operation and maintenance along with recommended quantity shall be quoted.

30.3 All spare parts shall be identical to the parts used in the offered electrical equipment.

31.0 SCHEDULE

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31.1 Bidder shall furnish bar chart for complete scope of their works.

32.0 DEVIATIONS

32.1 Clause-wise deviations, if any, from this specification shall be clearly indicated in the offer with reasoning.

ANNEXURE-I
DRAWINGS AND DOCUMENTS SCHEDULE

Sl. No.	Description	With bid Y/N	Delivery Time in Weeks from placement of letter of Intent (LOI)		
			For approval	For Information	Final / Approved / As built
1.	Specification Sheets, duly completed	N	4	--	8
2.	Technical Particulars, duly filled in	N	4	--	8
3.	SLD	N	4	--	8
4.	Feeder Details of Switchboards	N	4	--	8

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5.	Calculation for Bus-bar sizing for Switchboards.	N	4	--	8
6.	Power Layout / Cable route Layout (as built)	N	--	4	8
7.	Conduit Layout	N	--	4	8
8.	Point Layout	N	--	4	8
9.	Earthing & Lightning protection Layout	N	--	4	8
10.	Lighting Layout	N	--	4	8
11.	Dimensional & GA drawing for complete 415V MPDB,LSDB,SPDB etc.	N	4	--	8
12.	Schematic / wiring and terminal arrangement Diagram for 415V MPDB, LSDB, SPDB etc.	N	4	--	8
13.	Foundation Drawings of 415V MPDB etc.	N	4	--	8
14.	Cable schedule	N	--	4	8
15.	Bill of Materials (as built)	N	--	4	8
16.	Installation, Operation & Maintenance Manual	N	--	4	8
17.	Illustrative and Descriptive Literature/ Catalogue	Y	--	4	8
18.	Catalogue of brought out items	Y	--	4	8
19.	List of spares with identification marks	Y	4	--	8
20.	Type Test Certificates of similar equipment a) Circuit Breaker b) MCCB's c) MCB d) Hose proof fixtures e) Cables	N	--	--	8
21.	Routine Test Certificates	N	--	--	8
22.	Guarantee/Warrantee Certificates	N	--	--	8

Note:

1. 4 hard copies & 1 soft copy shall be supplied with bid.

2. 4 hard copies & 1 soft copy shall be supplied for approval after order within 2 weeks from the date of LOI.

3. 8 hard copies & 2 soft copies in CD/Pen Drive shall be submitted as final documents. These shall be made in sets and supplied in fine plastic coated folder.

Y – Yes, N – No

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ANNEXURE-II
MAKE OF EQUIPMENTS / COMPONENTS

Sl. No.	ITEM	MAKE
1.	LV Switchboard	Alstom Limited (Areva T&D)
		C&S Electric Ltd.
		Elecmech Corporation
		GE Power Controls India Pvt. Ltd.
		Intrelec
		Larsen & Toubro Ltd. (El. Products Divn.)
		Siemens Ltd.
2.	Medium Voltage ACB	GE Power Controls India Pvt. Ltd.
		Larsen & Toubro Ltd. (El. Products Divn.)
		Siemens Ltd.
3.	MV Current Transformer	Alstom Limited (Areva T&D)

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Sl. No.	ITEM	MAKE
		Indcoil Transformers Pvt. Ltd.
		Kappa Electricals
		Mehru Electricals (Formerly Automatic Electric Ltd.)
		Perfect Sales Corporation
		Siemens Ltd.
4.	MV Potential Transformer	Alstom Limited (Areva T&D)
		Indcoil Transformers Pvt. Ltd.
		Kalpa Electrical Pvt. Ltd.
		Kappa Electricals
		Larsen & Toubro Ltd. (El. Products Divn.)
		Mehru Electricals (Formerly Automatic Electric Ltd.)
		Perfect Sales Corporation
		Siemens Ltd.
5.	Low Voltage Industrial Switches / Isolators	Asea Brown Boveri Ltd.
		GE Power Controls India Pvt. Ltd.
		Havells India Ltd.
		Kaycee Industries Ltd.
		Larsen & Toubro Ltd. (El. Products Divn.)
		Siemens Ltd.
6.	MCB	Adhunik Switchgears (P) Ltd.
		Havell's India Limited
		HPL Electric & Power Pvt. Ltd.
		Indiana Current Control Ltd.
		Indo Asian Fusegear Ltd.
		Legrand India Ltd.
		S & S Power Switchgear Ltd.
		Standard Electricals Ltd.
7.	Microprocessor / Numerical Relays	Alstom Limited (Areva T&D)
		Asea Brown Boveri Ltd.
		Easun Reyrolle Limited
		Larsen & Toubro Ltd. (El. Products Divn.)
		Siemens Ltd.
8.	Meters	Alstom Limited (Areva T&D)
		Hotline Switchgear & Controls
		IMP Power Ltd.
		Jaipur Metals & Electrical Ltd.
		M.B. Control & Systems Pvt. Ltd. (Only for Multifunctional Meter)
		Meco Instruments
		Mehru Electricals (Formerly Automatic Electric Limited)
		Prok Devices Private Limited
		Rishabh Instruments Pvt. Ltd.
		Seahorse Industries Ltd.
9.	Wall Mounting Type Distribution Board	Controls & Switchgear Co. Ltd.
		Elecmech Corporation

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Sl. No.	ITEM	MAKE
		Globe Electrical Industries
		Havells India Ltd.
		Indo Asian Fusegear Ltd.
		Intrelec
		Legrand India Ltd.
		Standard Electricals Limited
10.	Floor Mounting Type Distribution Board	Elecmech Corporation
		Intrelec
		Controls & Switchgear Co. Ltd.
		Globe Electrical Industries
		Hi-Tech Engineers
		Intrelec
		Jakson Engineers Ltd
		Larsen & Toubro Ltd. (El. Products Divn)
		Universal Industrial Products
		Siemens Ltd
		GE Power Controls India Pvt. Ltd
11.	MCCB	Crompton Greaves Ltd
		GE power controls india pvt. Ltd.
		Havells india ltd.
		Larsen & Toubro ltd.(El. Products Divn)
		Siemens Ltd.
		Standard Electricals Limited
12.	MV ELCB/RCCB	GE Power Controls India Pvt. Ltd.
		Havells India Ltd.
		Indo Asian Fusegear Ltd.
		Legrand India Ltd.
		S&S Power Switchgear Ltd.
		Siemens Ltd.
		Standard Electricals Limited
13.	Fuse	Larsen & Toubro Ltd. (El. Products Divn.)
		Siemens Ltd.
		Alstom Power
		Havells India Ltd.
14.	Contactor	Larsen & Toubro Ltd. (El. Products Divn.)
		Siemens Ltd.
15.	Timers	ABB India Limited
		Alstom Power
		Alstom Limited (Areva T&D)
		Bhartia Cutler Hammer

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Sl. No.	ITEM	MAKE
		Siemens Ltd.
16.	Control Transformer	AEP
		Alstom Power
		Indcoil
		Kappa Electricals
		Larsen & Toubro Ltd. (El. Products Divn.)
		Siemens Ltd.
17.	Push Buttons	Alstom Power
		Larsen & Toubro Ltd. (El. Products Divn.)
		Siemens Ltd.
		Tecnik
		Tulsi
18.	Control Switches	Alstom Power
		Kaycee
		Larsen & Toubro Ltd. (El. Products Divn.)
		Siemens Ltd.
19.	Signal Lamps	Alstom Power
		Binoy
		Larsen & Toubro Ltd. (El. Products Divn.)
		Siemens Ltd.
		Tulsi
20.	Terminal Blocks	Connectwell
		Elmex
		Larsen & Toubro Ltd. (El. Products Divn.)
		Siemens Ltd.
21.	LT Power Cable	Ravin Cables Ltd.
		KEC International Ltd. (Formerly RPG Cables Limited)
		KEI Industries Ltd.
		NICCO Corporation Ltd.
		Torrent Cables Ltd.
		Universal Cables Ltd.
		APAR Industries Ltd. (Unit: Uniflex cable)
22.	Control Cable	Ravin Cables Ltd.
		KEC International Ltd. (Formerly RPG Cables Limited)
		KEI Industries Ltd.
		NICCO Corporation Ltd.
		Torrent Cables Ltd.
		Universal Cables Ltd.

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Sl. No.	ITEM	MAKE
		APAR Industries Ltd. (Unit: Uniflex cable)
23.	Earthing Cable	Finolex Cables Ltd.
		NETCO cable Industries (Pvt.) Ltd.
		KEI Industries Ltd.
		NICCO Corporation Ltd.
		TC Communication Pvt.Ltd.
		Universal Cables Ltd.
24.	Copper Wires-650/1100 Volts (Flexible Cable)	Anchor Electricals Pvt. Ltd.
		Finolex Cables Ltd.
		Havells India Ltd.
		NICCO Corporation Ltd.
		Plaza Cable Industries Ltd.
		Polycab Wires & Cables
		TC Communication Pvt. Ltd.
25.	Telephone Wire & TV Cables	Cord Cable Industries Ltd.
		Delton Cables Ltd.
		Finolex Cables Ltd.
		NICCO corporation Ltd
		RPG Telecom Ltd.
		TC Communication Pvt. Ltd.
26.	Industrial Cable Gland	Baliga Lighting Equipments Limited
		Comet Brass Products
		Comet Industries
		Dowell's Electricals
		Electromac Industries
		FCG Flameproof Control Gears Pvt. Ltd.
		Gland-Mech. Industries
		Power Engg. Co.
		Quality & Precision Indl. Equipment
		S J Metal Industries (Jainson)
27.	Cable Lugs	Dowell's Electricals
		Forward Engg. Industries
		KSE Electrical Pvt. Ltd.
		Power Engg. Co.
		S J Metal Industries (Jainson)
		Usha Martin Industries Ltd. (Ismal Divn.)
28.	PVC Conduit Pipes	A.K.G.
		Finolex Industries Ltd.
		Kalinga Cables & Conduit Co.
		Plaza Cable Industries Ltd.
		Polypack
		Prakash Industries Ltd.

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Sl. No.	ITEM	MAKE
29.	Ceiling Fan	Bajaj Electrical Ltd.
		Crompton Greaves Ltd.
		Usha
30.	Exhaust Fan	Bajaj Electrical Ltd.
		Crompton Greaves Ltd.
		Havells India Ltd
31.	Modular Switch/Socket	Anchor Electricals Pvt. Ltd.
		Crabtree
		SSK
		Clipsal
32.	Lighting Fittings & Accessories / LED Lamp	Bajaj Electrical Ltd.
		Crompton Greaves Ltd.
		Havells India Ltd.
		Keselec Schreder Private Ltd.
		Philips India Ltd.
		Surya Roshni Ltd.
		Wipro Lighting
33.	Electric Call Bell	Anchor Electricals Pvt. Ltd.
		MDS
		Kinjal
34.	Earthing & Lighting Protection Material	Anand Electric Trading Co.
		Bharti Exports
		Controls & Switchgear Co. Ltd.
		Indmark Formtech Pvt. Ltd.
		Jamna Metal Company
		Jayant Metal Mfg Co.
		Mahavir Industrial Corporation
		Metalite Industries
		Metropolitan Industries
		Premier Power Products (Calcutta) Pvt. Ltd.
		Rukmini Electricals & Components Pvt. Ltd.
		Sadhana Engineering Corporation
		Sai Galvanisers & Fabricators Pvt. Ltd.
		Stealite Engg. Co.
35.	GI Pipes	Bharti Exports
		Indian Tube Co. (Tata Div. Of Tubes & Pipes)
		Jindal Pipes Ltd.
		Meghjyot Enterprises
		Rukmini Electricals & Components Pvt. Ltd.
		Steelcraft

NOTE: Items not covered above shall be subject to Owner/ Consultant's approval.

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SPECIFICATION SHEET
415V MAIN POWER DISTRIBUTION BOARD (MPDB)

CLIENT: M/s HURL, Gorakhpur		**PROJECT:** Renovation of Admin Building & Bungalow			**PLANT:**
ISSUED FOR: PROPOSAL ☐	ENQUIRY ☒	ORDER ☐	FINAL ☐		
GENERAL		**AMBIENT CONDITION**			
Ref. Stds. : IS & IEC		Temp. Max./Min./Design Ref.: 47 / 1.7 / 50°C			
Encl. Docs. :		Relative Humidity 100 %	Alt. above sea : <1000 M		
Vendor :		**Atmospheric Pollution**	Dusts : UREA		
Vendor Ref. No. :			Vapours : AMMONIA		
		Location	Indoor ☒	Outdoor ☐	
			Gr. Floor ☒	1st floor ☐	
Addl. Scope :	Incoming Bus Duct ☐		Tie Bus Duct ☐		
	Erection & Comm. ☒		Supervision of Erection Comm. ☐		
TESTS: Routine ☒	Type ☐	Others ☐			

BASIC DATA		
TAG NO.	Item No.	
	Description	MAIN POWER DISTRIBUTION BOARD (MPDB)
	Code No.	--
REFERENCE DRAWINGS	Single Line Diagram	Drg. No. PC160-1203
	Feeder Details	Enclosed
	Auto Trip Alarm Scheme	Refer attached PDS

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	Non Trip Alarm Scheme		
	Trip Circuit Supervision Scheme		
	Auto C/O Scheme		
	P.T. Bus Arrangement		
SYSTEM DETAILS	Nominal Voltage with Variation		415V ± 10%
	Rated Frequency with Variation		50Hz ± 5%
	Combined V & F Variation		± 10%
	No. of Phases & Wires		3 Ph & 4W
	Insulation Level		2.5 KV
	Fault Level		36 MVA
	Earthing Mode		Solidly Earthed
BUS BARS	**Rating**	Continuous	1000 A
		Short Time for 1 sec.	50 KA
	Bare / Insulated		Insulated
	Type of Insulation		Heat Shrinkable PVC sleeved
EXECUTION	**Breaker Feeders**	I/C: ST / DT	ST
		Others: ST / DT	DT
	Other Feeders	Single front / Double front	Double Front
		Fixed / Drawout	Drawout
	Cable Entry : Top / Bottom		Bottom
	Bus Duct Entry : Top / Bottom		--
	Accessibility : Front / Back		Front / Back
CONTROL SUPPLY	**Breaker Feeders**	Closing & Indication	220V/110V DC **
		Tripping	220V/110V DC **
	Contactors		240V AC
	Space Heater		240V AC
MISC. DATA	**Painting**	Type	Epoxy
		Shade	631 of IS: 5
	Period for which Spares required		2 Years

ST- SINGLE TIER
DT- DOUBLE TIER

** NOTE: 220V/110V DC Power required for closing, tripping and indication of circuit breaker feeder shall be provided by the vendor through in-built power pack in the feeders having battery back-up of 60 minutes.

FEEDER DETAILS
(BREAKER CONTROLLED FEEDERS)

CLIENT: M/s HURL, Gorakhpur **PROJECT:** Renovation of Admin Building & Bungalow **PLANT:**

ISSUED FOR: PROPOSAL ☐ ENQUIRY ☒ ORDER ☐ FINAL ☐

SWITCH BOARD DESCRIPTION: 415V MAIN POWER DISTRIBUTION BOARD **CODE NO.:**

GENERAL	Feeder No.	1
	Feeder Description	Incomer
	Eqpt. Code No.	--
	Load in KW / Amp	-- / 1250A
	Ref. Scheme Drgs.	--
C. B.	Rating	1250 A (ACB)
	Operating Mechanism	MWS
CURRENT TRF.	Metering	3-1250/1 A
	Protection	3-1250/1 A
	O/C & E/F / Combined Motor Protn.	Yes / --
	Restricted Earth Fault Protn.	Yes
	Stand By Earth Fault Protn.	Yes
V. T.	Ratio	415/√3/110/√3
	Connection : Bus / Feeder	Yes / Yes
METERS	Ammeter	Yes (0-1250A)
	Voltmeter	Yes (0-500V)
	KWH/KW	Yes / Yes

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	PF Meter		Yes
	Frequency Meter		Yes
PROTECTIVE RELAY	Combined Motor Protn.		--
	Over current	IDMTL	Yes
		High Set Inst.	--
	Earth Fault	Res. IDMTL	Yes
		Inst.	--
		Restricted	--
		Stand by	Yes
	Under Voltage with Timer		Yes
	PT Fuse Failure		Yes
	Stalling / Single Phasing		--
AUX. RELAY	**Tripping Relay**	Elect. Fault	Yes
		Process Fault	--
	Trip Circuit Supervision		Yes
	Buchholz Alarm / Trip		Yes
	WTI / OTI Alarm		Yes / Yes
	Low Oil Level Alarm		Yes
	Alarm / Alarm Cancellation		Yes / Yes
	Others as required		Yes
CONTROL SWITCH	Trip-Neutral-Close / OFF-AUTO-ON		Yes / --
	Auto-Manual / Local-Remote		-- / Yes
	ASS / VSS		Yes / Yes
	Local-Remote-Auto		--
PUSH BUTTON	Emg. Trip (T) / Test (Te)		-- / Yes
	Alarm Accept (AC) / Reset I		Yes / Yes
	Defeat Interlock or Momentary Paralleling		Yes
	Emgy. Trip of CB		--
SIGNAL LAMPS	ON(R) / OFF(G)		Yes / Yes
	Non Trip (B) / Auto Trip (A)		-- / Yes
	Trip Ckt. Healthy (W)		Yes
	Panel Space Heater ON		Yes
	Ready for Service / Test		Yes / Yes
AUX. EQPT.	Limit Switch: Service / Test		Yes / Yes
	MCB for Motor Space Heater		--
	Others as required		Yes
CABLING DATA	Power Cable: 1.1KV, XLPE-A-FRLS PVC		Later
	Space Heater:1.1KV, XLPE-A-FRLS PVC		--
	Control Cable: 1.1KV, XLPE-A-FRLS PVC		1-5x2.5 mm^2 (Cu), 1-3x2.5 mm^2 (Cu), 1-19x2.5 mm^2 (Cu)

FEEDER DETAILS
415V MAIN POWER DISTRIBUTION BOARD (MPDB)

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CLIENT: M/s HURL, Gorakhpur **PROJECT:** Renovation of Admin Building & Bungalow **PLANT:**

ISSUED FOR: PROPOSAL ☐ ENQUIRY ☒ ORDER ☐ FINAL ☐

SWITCH BOARD DESCRIPTION: 415V MAIN POWER DISTRIBUTION BOARD (MPDB) **CODE NO.:**

Feeder No.	Feeder Description and Code No.	Rating		Ref. Scheme Drg.	Fdr. Type	Power Cable Size (mm^2)	Remarks
		KW	Amp.				
1	Incomer-1	--	1250A	--	Transformer Feeder	Later	
2	Incomer-2 for future use	--	1250A	--	DG Incomer Feeder (for future)	----	
3	PDB for AC	--	150A	--	-do-	1R-3.5CX120 mm^2 (Al)	
4	PDB for AC	--	150A	--	-do-	1R-3.5CX120 mm^2 (Al)	
5	PDB for AC	--	150A	--	-do-	1R-3.5CX120 mm^2 (Al)	
6	PDB for AC	--	150A	--	-do-	1R-3.5CX120 mm^2 (Al)	
7	LSDB-1	--	63A	--	-do-	1R-3.5CX50 mm^2 (Al)	
8	LSDB-2	--	63A	--	-do-	1R-3.5CX50 mm^2 (Al)	
9	LSDB-3	--	63A	--	-do-	1R-3.5CX50 mm^2 (Al)	
10	LSDB-4	--	63A	--	-do-	1R-3.5CX50 mm^2 (Al)	
11	16A Sw-Soc PDB-1	--	63A	--	-do-	1R-3.5CX50 mm^2 (Al)	
12	16A Sw-Soc PDB-1	--	63A	--	-do-	1R-3.5CX50 mm^2 (Al)	
13	16A Sw-Soc PDB-1	--	63A	--	-do-	1R-3.5CX50 mm^2 (Al)	
14	16A Sw-Soc PDB-1	--	63A	--	-do-	1R-3.5CX50 mm^2 (Al)	
15	Spare	--	150A	--	-do-	LATER	
16	Spare	--	63A	--	-do-	LATER	
17	Spare	--	63A	--	-do-	LATER	
18	Spare	--	63A	--	-do-	LATER	
19	Photo cell with 63A contactor for outdoor bus	--	63A	--			
20	LSDB-5	--	63A	--	-do-	1R-3.5CX50 mm^2 (Al)	

GF – Ground Floor,
FF – First Floor

Note: Final cable size shall be indicated at the time of drawing approval.

TECHNICAL PARTICULARS
415V MAIN POWER DISTRIBUTION BOARD (MPDB)

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CLIENT: M/s HURL, Gorakhpur	**PROJECT:** Renovation of Admin Building & Bungalow	**PLANT:**
ISSUED FOR: PROPOSAL ☐	ENQUIRY ☒	ORDER ☐ FINAL ☐
GENERAL		
Manufacturer's Type		
Ref. Standards		
Rated Operational Voltage with ± %		
Rated Insulation Voltage		
Rated Voltage of Aux. Circuits with ± %		
Rated Current		
Short Circuit Rating		
Degree of Protection of Enclosure		
Service Conditions : Indoor / Outdoor		
DRAWOUT FACILITIES	Circuit Breakers	
	P.Ts.	
	Motor Starters	
	Protective Relays	
	Meters	
SINGLE FRONT / DOUBLE FRONT	C.B. Feeders	
	Other Feeders	
Cable Entry :	Top / Bottom	
Accessibility :	Front / Back	
MAXIMUM NOS. OF FEEDERS IN ONE PANEL	Circuit Breakers	
	Motor Starters	
	Switch Fuse	
SHEET STEEL TYPE & THICKNESS	Load Bearing member	
	Non Load Bearing member	
	Base Channel	
Material of Gaskets		
Material of External Hardware		
Operating Height : Max. / Min.		
Space Heater Rating of each Panel		
PAINTING	Method of Pre-treatment	
	Type	
	Thickness of Paint	
	Finishing Shade	
Dimensions : L X B X H / Dim. Drg. Ref. No.		
Shipping Dimensions of Largest Package		
Weight : Static / Dynamic		
BUS - BARS		
Material		
SIZE	HBB : Phase / Neutral	
	VBB : Phase / Neutral	
	Ground	
	Supporting Calculations Attached	
MINIMUM CLEARANCE	Between Phases	
	Between Phase & Earth	
Minimum Creepage Distance		
Current Rating : Continuous / Short Time		
Temp. Rise for : Cont. Load / Short Time Current		
SUPPORT	Material	
	BIL	
	Arrangement :Separate/Common	
Material of Bus-bar Insulation		
Shrouding Material for Joints		
No. & Type of Bolts		
CIRCUIT BREAKERS		
Make		

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Maker's Type		
Ref. Standards		
Type of Circuit Breaker		
Short Circuit Category		
Maximum Operating Voltage		
No. of Poles		
CURRENT RATING	Continuous	
	1 second RMS	
	Momentary (kA Peak)	
BREAKING CURRENT	Symmetrical KA	
	Asymmetrical KA	
	Sym. MVA at Rated Voltage	
Making Current (Peak)		
INSULATION LEVEL	1 Min. PF withstand Voltage	
	Impulse withstand Voltage	
No. of Breaks per Pole		
TYPE AND MATERIAL OF	Main Contacts	
	Arcing Contacts	
Contact Pressure		
Type of Closing Mechanism		
Type of Tripping Mechanism		
Type of Arc Control Device		
Arc Pumping Features with Details		
Trip Free Features with Details		
Total Closing Time		
Interrupting Time at 10%, 50%, 100% of rated Interrupting Capacity	Total	
	Arcing Time	
SPRING CHARGING MOTOR	Rating	
	Voltage	
	Insulation	
	Duty	
Spring Charging Time		
CONTROL VOLTAGE WITH RANGE	Closing	
	Tripping	
	Alarm and Indication	
POWER/ CURRENT REQUIRED FOR	Closing	
	Tripping	
AUXILIARY CONTACTS	No. of Spare Contacts : NO / NC	
	Contact Rating : AC / DC	
	Convertible : Yes / No	
Net Weight of Breaker		
Type Testing Authority & Test Report Ref. No.		
CURRENT TRANSFORMERS		
Make / Maker's Type		
Ref. Standard		
Type of Primary Winding		
Ratio		
Rated Burden		
Accuracy Class		
ALF / ISF		
Insulation Class & Material		
Ref. Magnetisation Curve No.		
POTENTIAL TRANSFORMERS		
Make / Maker's Type		
Ref. Standard		
Winding Connection		
Ratio		

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Rated Burden		
Accuracy Class		
Insulation Class & Material		
SWITCHES		
Make / Maker's Type		
Ref. Standard		
Type of Switch		
Rated Operational Voltage		
Utilisation Category		
Rated Operational Current		
Short Time Withstand Current		
No. of Poles / Break		
Type Test Certificate Ref. No.		
FUSES		
Make / Maker's Type		
Ref. Standard		
Type of HRC Fuse		
Rated Voltage / Current		
Category of Duty		
Prospective Breaking Current		
CURRENT TIME CURVE SHOWING PRE-ARCING AND TOTAL I^2T VALUES	Ref. No.	
	Attached	
CONTACTORS		
Make / Maker's Type		
Ref. Standard		
Rated Operational Voltage		
Utilisation Category		
Rated Duty		
Rated Thermal Current		
OPERATING VOLTAGE OF COIL	Pick up Max./Min.	
	Drop off Max./Min.	
Coil Consumption Pick up / Hold on		
RELAYS		
Make / Maker's Type		
Ref. Standard		
Operating Principle		
Setting Range		
Type of Mounting		
Burden		
Reset : Hand or Self		
Flag Indication Type		
Ref. Characteristic Curve Type		
Ref. Descriptive catalogue		
INSTRUMENTS AND METERS		
Make / Maker's Type		
Ref. Standard		
Operating Principle		
Scale Range		
Accuracy		
Size		
Type of Mounting		
CONTROL SWITCHES		
Make / Maker's Type		
Ref. Standard		
Contact Rating		
Utilisation Category		
PUSH BUTTONS		
Make / Maker's Type		

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Ref. Standard	
Contact Rating	
Utilisation Category	
SIGNAL LAMPS	
Make / Maker's Type	
Ref. Standard	
Rated Voltage / Watts	
Type of Lamp Holder	
Type of Globe	
MINIATURE CIRCUIT BREAKER	
Make / Maker's Type :	
Ref. Standards	
Rated Current	
Breaking Capacity	
MOULDED CASE CIRCUIT BREAKERS	
Make / Maker's Type	
Ref. Standard	
Current Rating	
Breaking Capacity	
Setting Range of Thermal Release	
Setting Range of Magnetic Release	
CABLE GLANDS	
Material	
Type	
TERMINAL BLOCKS	
Make	
Type	
Current Rating	

NOTE:
- Completely filled in Technical Particulars Sheet shall be furnished along with the bid and for owner/consultant approval before commencement of manufacturing in line with NIT/PO.
- Inter-tripping of primary and secondary of transformer shall be provided for all faults through lockout relays.

SPECIFICATION SHEET
LIGHTING SUB DISTRIBUTION BOARD

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CLIENT: M/s HURL, Gorakhpur		**PROJECT:** Renovation of Admin Building & Bungalow		**PLANT:**
ISSUED FOR: PROPOSAL ☐	ENQUIRY ☒	ORDER ☐	FINAL ☐	
GENERAL		**AMBIENT CONDITION**		
Ref. Stds. : IS/IEC		Temp. Max./Min./Design Ref.: 47 / 1.7 / 50°C		
Encl. Docs. :		Relative Humidity: 100%; Alt. above sea : <1000 M		
Vendor :		Atmospheric Pollution	Dusts : Urea	
Vendor Ref. No. :			Vapour : Ammonia	
SYSTEM DETAILS		Area	Safe ☒	Hazardous ☐
Nominal Voltage with ± % : 415V ± 10%,		Hazardous Area Class	Zone :	Encl. Gr. :
Rated Frequency with ± % : 50 Hz ± 5%,			Temp. Class :	
Combined V & F Variation : ± 10%,		Location	Indoor ☒	Outdoor ☐
No. of Phases & Wires : 3-Phase, 4-wire				
TESTS TO BE WITNESSED: Routine ☒		Type ☐	Others ☐	

BASIC DATA		
Item No. :		
Quantity :		AS PER ATTACHED SOR
Description :		AS PER ATTACHED SLDs
Code No.		
Incoming & Outgoing feeders		AS PER ATTACHED SLDs
Degree of Protection :		IP55
Addl. Degree of Protection :		--
Cable Type & Size	Incoming (Al)	AS PER ATTACHED SLDs / TS / SOR
	Outgoing (Cu)	AS PER ATTACHED SLDs / TS / SOR
Painting Type & Shade :		Epoxy based, 631of IS:5
Period for which Spares required :		2 years

MAKE OF COMPONENTS	
SWITCH	: Refer Make of Electrical Items
M.C.B.	: -do-
CABLE GLANDS	: -do-
TERMINAL BLOCKS	: -do-

TECHNICAL PARTICULARS			
General	Item No. :		
	Make & Maker's Type		
	Material & Thickness of Enclosure		
	Gasketing Material		
	COVER TYPE	Internal :	
		External :	
	PAINTING	Pre treatment	
		Shade	
	Material of Ext. Hardware < 8mm / > 8mm		
	Dimensional Drawing Reference No. :		
	Weight :		
M.C.B.	Make & Maker's Type		
	Reference Standards		
	Category of Duty :		
	Rated Current :		
	No. of Poles :		
	Type of Neutral :		
Terminal Block	Make & Type		
	Rated Current		
Cable Gland	Type :		
	Material :		

NOTE: Completely filled in Technical Particulars Sheet shall be furnished along with the bid and for owner/consultant approval before commencement of manufacturing.

SPECIFICATION SHEET
LT POWER & CONTROL CABLES

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CLIENT: M/s HURL, Gorakhpur **PROJECT:** Renovation of Admin Building & Bungalow **PLANT:**

ISSUED FOR: PROPOSAL ☐ ENQUIRY ☒ ORDER ☐ FINAL ☐

GENERAL	**AMBIENT CONDITION**	
Encl. Docs. :	Temp. Max./Min./Design Ref.: 47/ 1.7 / 50°C	
Vendor :	Relative Humidity: 100 %	Alt. above Sea Level < 1000M
Vendor Ref. No. :	**Atmospheric Pollution** Dusts : Urea	
	Vapours : Ammonia	

TESTS TO BE WITNESSED: Routine ☒ Type ☐ Acceptance ☒ Others ☐

Type Tests Certificate of Similar Cable : Required ☒ Not required ☐

BASIC DATA

Item No.		1-3	4	
Ref. Stds.		IS:7098 (PART-1)	IS:7098 (PART-1)	
Voltage Grade		1.1 KV POWER CABLE	1.1 KV EARTHING CABLE	
System Earthing		NEUTRAL SOLIDLY EARTHED	NEUTRAL SOLIDLY EARTHED	
Type of Cable		POWER	EARTHING	
CONDUCTOR	ALUMINIUM/ COPPER	ALUMINIUM / COPPER	ALUMINIUM	
	STRANDED	STRANDED	STRANDED	
Insulation Type		XLPE EXTRUDED	XLPE EXTRUDED	
Inner Sheath Type		EXTRUDED PVC (ST2)	--	
CONDUCTOR SCREEN	Required	--	--	
	Not Required	--	--	
Material of Conductor Screen		--	--	
ARMOURING	Required	--	--	
	Material	--	--	
	No. of Layer	--	--	
Outer Sheath Type		EXTRUDED FRLS PVC TYPE-ST2	EXTRUDED FRLS PVC TYPE-ST2	
Special Requirements		--	--	
Drum Material		WOOD	WOOD	

BILL OF QUANTITY

Item No.	No. of Core & Cross-Sectional Area in Sq. mm.	Qty. in M.	Preferred Drum Length	Remarks
1.1 KV XLPE insulated, armoured, FRLS PVC outer sheathed, Power Cables of following sizes:-				
1.	3.5CX240 sq. mm (Al)	Refer SOR		
2.	3.5CX120 sq. mm (Al)			
3.	3.5CX50 sq. mm (Al)			
Single Core 1.1 KV XLPE insulated, unarmoured FRLS PVC outer sheathed cable for earthing of following sizes:-				
4.	1CX25 sq. mm (Al)		LATER	

TECHNICAL PARTICULARS

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CABLES

CLIENT: M/s HURL, Gorakhpur	**PROJECT:** Renovation of Admin Building & Bungalow	**PLANT:**
ISSUED FOR: PROPOSAL ☐	ENQUIRY ☒	ORDER ☐ FINAL ☐

GENERAL		
Make		
Ref. Standard		
Item No.		
Voltage Grade		
Suitable For Earthed / Unearthed System		
No. of Cores & Size of Conductor		
CONSTRUCTIONAL DETAILS		
CONDUCTOR	Material	
	Construction	
	No. & Dia of wires per Core	
CONDUCTOR SCREEN	Material	
	Thickness	
INSULATION	Material	
	Thickness	
	Core Identification Method	
INSULATION SCREEN	Material	
	Thickness	
INNER SHEATH	Type & Material	
	Thickness	
ARMOURING	Type & Material	
	Dia of Wire / Strip Thickness	
OUTER SHEATH	Material	
	Thickness	
ELECTRICAL DATA		
CONTINUOUS CURRENT RATING WHEN LAID IN	Ground At 30^0 C	
	Air At 40^0 C	
Short Circuit Current For 1 sec.		
CONDUCTOR TEMP.	Continuous	
	Short Time	
Resistance At Operating Temp. (Ohm / KM)		
Reactance At 50 C/S (Ohm/KM)		
Capacitance (F/Km)		
Insulation Resistance		
Polarisation Index		
DERATING FACTOR CHART ATTACHED FOR	Temperature	
	Grouping	
	Exposure to Sun	
MECHANICAL DATA		
DIAMETER WITH TOLERANCE	Over Inner Sheath	
	Over Armour	
	Overall	
Weight Of Cables Per KM		
Minimum Bending Radius		
Maximum Pulling Tension		
Standard Drum Length		
Tolerance On Drum Length		

Notes: Completely filled in Technical Particulars Sheet shall be furnished separately for each type & size of cable and shall be submitted with the bid and for owner/consultant approval before commencement of manufacturing in line with NIT/PO.

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SPECIFICATION SHEET
LIGHTING FIXTURES AND ACCESSORIES

CLIENT: M/s HURL, Gorakhpur **PROJECT:** Renovation of Admin Building & Bungalow **PLANT:**

ISSUED FOR: PROPOSAL ☐ ENQUIRY ☒ ORDER ☐ FINAL ☐

GENERAL		**AMBIENT CONDITION**	
Ref. Stds. : IS / IEC		Temp.- Max / Min / Design ref.: 47 / 1.7 / 50°C	
Encl. Docs. :		Max Relative Humidity: ≤ 100% Alt. above sea : <1000 M	
Vendor :		Atmospheric	Dusts : Urea
Vendor Ref. No. :		Pollution	Vapour : Ammonia
SYSTEM DETAILS		Area	Safe : ☒ Hazardous : ☐
Nominal Voltage : 240V ± 10%		Haz. Area class	Zone Encl. Gr. :
Rated Frequency: 50Hz ± 5%			Temp. Class :
Combined V & F variation : ± 10%		Location: Indoor ☒	Outdoor ☒

TESTS TO BE WITNESSED : Routine ☒ Acceptance ☐ Type ☐ Others ☐

BASIC DATA

Item no.		1-4	
Degree of Protection		IP-20	
Addl. Deg9ree of Protection		--	
Material of Housing		CRCA sheet steel	
CONTROL GEAR	Separate	--	
	Integral	Yes	
Cable Type & Size		3 x 2.5 mm^2 (Cu)	
Looping facility		Yes	
CABLE GLANDS	Required	Yes	
	Type	Rolled Al	
MOUNTING BRACKET	Required	Yes	
	Not Required	--	
PAINTING	Type	Epoxy	
	Shade	631 as per IS: 5	
LOCATION	Indoor	--	
	Outdoor	Yes	
SAMPLE	Required	--	
	Not Required	Not Required	
Period for which Spares Required		2 years	

BILL OF QUANTITY

Item No.	Lamp Type & Wattage	Description of Fixtures	Qty.	Remarks
1.	2X20W/1X20W LED lamp	Ceiling/wall mounted Industrial	As per SOR	
2.	1X9W LED lamp	Ceiling/wall mounted Industrial		
3.	9W LED Bulb	Bulk Head		
4.	90W LED Bulb	Flood lighting fixture		

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SECTION – 2.0

ERECTION, TESTING & COMMISIONING SPECIFICATION

1. SCOPE OF WORK

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1.1 The scope of work shall include storage, handling, transportation, unpacking, checking, reporting of damages / defects, assembling, erection, installation, including fabrication, alignment, levelling, grouting, welding, bolting, painting (wherever specified), etc., testing and commissioning of various electrical equipment supplied by the contractor, earthing system, fabrication & installation of steel structural etc. as per drawings & documents, specifications, standards & codes, prevalent rules & regulations and best engineering practices.

1.2 The scope shall also include obtaining approval from statutory authorities, as required.

2. SCOPE OF ERECTION

2.1 The scope comprises of erection / installation, testing and commissioning of electrical equipment / items as indicated in SOR.

2.2 Laying of cables in excavated / RCC trenches and on cable trays as required.

2.3 Supply of single/double compression aluminium cable glands and crimping type tinned copper cable lugs, shall be provided by the electrical contractor. Normally, equipment shall be received at site with cable lugs and glands. Where these are short supplied or wrongly supplied by the equipment supplier, these shall be provided by the electrical contractor for which unit rates shall be quoted.

2.4 Excavation and back filling of cable trenches/direct buried cables.

2.5 Termination of power, control and lighting cables.

2.6 Fabrication with supply of MS material, consumable and hardware of frames, supports, cable racks etc. as required.

2.7 Supply, laying & connection of the complete earthing system including supply of GI earth electrode as per sketch given, GI earthing strips, flexible earthing conductors etc.

2.8 Civil works such as digging of earth and refilling for directly buried cables, earth strips, cable protection pipes, earth electrode pits, ground mounted lighting pole foundations, civil works such as making earth pit inspection chambers with covers, grouting of base plate, channels, supports and foundation bolts, including chipping of concrete or in brick work for earth strips, pipes and other minor chipping for foundation preparation, if required, cutting holes in walls for racks, risers, light fitting brackets, sealing of cable entries and making good the same after installation of the equipment and levelling and other minor similar jobs shall be in contractor's scope.

2.9 Straight - through jointing of cables (wherever required)

2.10 Making / providing canopies / rain hoods.

2.11 All hardware required for successful commissioning, whether specifically mentioned or not in the specification.

2.12 Concrete foundations for pedestals, lighting poles, grouting of equipments etc., including supply of grouting materials.

2.13 Removal of materials / scraps to the scrap yard and stores etc. as per instructions of Owner / Consultant.

2.14 Supply and installation of any other item not specifically mentioned but found necessary by the engineer-in-charge for satisfactory completion of job.

2.15 All letter writing on switchboards, transformer, danger boards, sign etc shall be done by the contractor.

2.16 Any work not included in this tender but may be required, as decided by engineer-in-chief, such as site modification of panel wiring, mounting of additional equipment etc. for which extra payment shall be made as per the man-day-rates to be quoted for various categories of workmen.

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2.17 "AS BUILT" drawings with all site modifications shall be prepared by making the changes on owner's drawings.

2.18 All major civil engineering works pertaining to electrical equipment as per Technical Specification of Civil enclosed elsewhere in the tender.

3. CODES AND STANDARDS

3.1 The design, manufacture, testing, installation of the equipment shall comply with the latest issue of all relevant Indian Standards and codes of practices and all applicable Statutory Acts & Regulations.

3.2 The contractor shall have valid "A" class licence. The contractor must have PF & ESI codes covering all persons hired by him for carrying out the job. He shall engage suitably skilled / licensed workmen of various categories for execution of work supervised by supervisors / engineer of appropriate qualification and experience to ensure suitable quality of work.

3.3 The contractor shall observe safety rules and take all necessary safety precautions to carry out the internal electrification work.

4. GENERAL PROCEDURE FOR ERECTION

4.1 The general procedure governing "Transfer of equipment and materials to Contractor", erection and final acceptance of owner / consultant are given below:

4.1.1 Storage of equipment at site

a. All equipment and materials shall be properly stored by the contractor at site in the designated storage area provided by the owner. Contractor shall arrange to draw the necessary equipment / materials in the sequence required for erection and transport the same from contractor's store to erection point.

b. The contractor shall keep proper record of the materials supplied by him / owner.

c. The contractor shall ensure that all the materials drawn / supplied by him are stored indoor / under shade. However, if a package is temporarily stocked outdoor due to unavoidable reasons, this shall be ensured that the storage area is dry, hard and well-drained.

d. Goods must not be placed directly on the floor / ground but shall be kept on blocks, 60 mm to 120 mm above the floor level such that the bottom is well ventilated.

e. In case of outdoor storage, the contractor at his own cost shall provide waterproof PVC sheets/ tarpaulin to cover all goods so as to protect them from rain etc. These sheets / tarpaulin shall be removed for inspection once in a week and if found moist or mouldy, shall be dried in direct sunlight.

f. In addition to the above, the equipment manufacturer's storage instructions, if any, shall be strictly followed.

4.1.2 Contractor's inspection at site

a. On receipt of any material (supplied by the contactor) at site, contractor shall fully unpack and inspect all equipment received for completeness, signs of damages, defect etc. in the presence for owner's representative. Any damage / short supply detected shall be recorded immediately. The contractor shall be required to make good / replace / repair the defective / damaged items at no extra cost to the owner.

4.1.3 Handling and cleaning

a. The contractor shall be responsible for proper handling and cleaning of all materials / equipment drawn / supplied by him until owner / consultant finally accepts the erected equipment.

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b. Equipment shall be handled with care by experienced riggers under guidance of competent supervisors and as per rigging marks given on cases. Dragging on floor shall be avoided and crane / suitable rollers shall be used for moving the equipment at any times.

c. The contractor shall be fully responsible for the safe keeping of equipment issued to him till these are erected, tested, commissioned by him and accepted by owner / consultant.

4.1.4 Transportation

This involves transportation of various electrical equipments / materials from contractor's store to erection site. When transporting the equipment, it shall be loaded on suitable trailer / trucks as per capacity and size of equipment, and shall be properly supported on the trailers / trucks by means of ropes / stoppers to avoid damage or tilting due to heavy jerks and vibration. Precautions, if any, displayed on equipment shall be strictly observed.

4.1.5 Erection Requirements

a. All work shall be carried out as per drawings supplied. Placing on foundation, aligning, grouting, connecting, fixing danger notice plate / board on equipment as specified, meggering, labelling and painting shall form part of erection requirements.

b. Fixing of supporting frames / pedestals, grouting, cutting and dressing holes in walls / ceiling and any other minor civil work necessary for installation and levelling of electrical equipment are included in electrical erection scope.

c. The scope of erection also includes cable dressing / clamping / minor rerouting, minor relocation of fittings, internal cleaning of equipment, overhauling and minor repairs.

d. Fabrication of clamps from the materials specified and clamping of cables on racks, trays etc. fixing of single core cables in tri-foil formation in aluminium clamps, earthing of cable armour and lead sheath, wherever necessary (and as per the details given by Consultant) fall under erection scope of work.

e. Marking of cables by fixing / grouting the cable marks / number tags at every 25 metres along entire route of cables are included in the scope of work. The tags shall be made of Aluminium Strips.

f. The contractor shall without any extra cost, touch up with paint all electrical equipment which are damaged / scratched during handling, erection or repair. The paint used shall match exactly the painted surface of the equipment on which touch-up is done, and shall be epoxy based.

g. The descriptions given above are only to give a preliminary idea about the scope of work and they do not limit the entire scope to these descriptions only. Hence all other parts of the tender document shall be read in conjunction with the referred standards, associated drawings, specification sheets and schedule of materials & services to assess actual scope of work.

h. The contractor shall undertake erection of all equipment specified herein in accordance with good engineering practices in conformity with statutory regulations and Code of Practice and to the entire satisfaction of the purchaser / owner.

i. The contractor shall arrange all the necessary erection tools, tackles, testing and measuring instruments and shall supply all erection materials as required.

4.1.6 Erection Supervision by OEM Suppliers

a. For guiding / supervising erection of sophisticated equipment, services of main equipment supplier's engineer may be made available free of cost by the contractor for the electrical equipment. However, this will neither absolve the contractor from his responsibility nor his obligation to provide his own supervisors or technical personnel.

- Switchboard
- Transformer

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b. The contractor shall have to comply with all the directions of Engineer-in-Charge, drawings etc. issued to him within the scope of his contract by supplier's engineer.

5. SPECIFICATION FOR ELECTRICAL ERECTION

5.1 General

5.1.1 These specifications lay down the erection procedures to be followed for each type of equipment, over and above the general "Erection Requirements".

5.1.2 The contractor shall also follow manufacturer's instructions and any other instructions of consultant / Principal / Statutory bodies during erection.

5.1.3 Suggestive Erection Drawings shall be supplied to the successful bidder for Lighting, Earthing, Cable Tray Routing, etc. These drawings may be suitably modified, if required, to suit site requirement with the approval of owner / consultant.

5.1.4 As-Built Drawings shall be prepared by the bidder and supplied to owner/ consultant.

5.2 Switch Boards

5.2.1 Handling

a. As far as possible lifting of switchboards shall be done by making use of eyebolts provided. It shall be ensured that before lifting, all eyebolts are fully tightened and that panel supports, nuts and bolts are intact and tight.

b. If lifting arrangement is not provided/ not feasible and final positioning by sliding is unavoidable, packing base shall be retained as long as possible and rolled on suitable pipes. Dragging of panel directly on floor by crowbars shall be avoided.

c. Maximum care shall be taken to avoid any damage to insulator, bushings, meters and protective equipment.

5.2.2 Erection

a. Check the foundation according to the drawings. Ensure that all pockets have been rightly made. Fix the datum level, and level the foundation by chipping in such a way that the prescribed point of cubicle base plate is flushed with finished floor.

b. Check the individual cubicle for any deformity and ensure that all faces are straight. Any dent on sheet steel frame shall be rectified before placing on foundation.

c. Wherever separate base frames are supplied, level the foundations in both directions (lateral and transverse) and ensure that these have been correctly levelled throughout. In case of runner rails, check the rails for level in both the directions and ensure that they are parallel to each other. Wherever base frame is fixed to cubicle, place the cubicle on foundation ensuring that holding down bolts are directly over the foundation pockets.

d. Obtain correct level of panel with respect to floor/ existing bus-bar by putting shims below base frame, shims are to be supplied by the contractor. Measure the level of each frame with reference to datum and ensure that level difference between the two ends of the switchboard base frame is within ± 2 mm.

e. Cubicle shall be so adjusted that front face of all the panels are in one plane, all sides are plumb and corresponding horizontals on all panel faces (e.g. minimum lines, door edges, inter cubicle joints) line up in the same horizontal line (s). Match the cubicles and adjust properly. Provide gasket between edges, if required; so that no inter-panel gaps are seen.

f. Bolt adjacent cubicles and base frame together by drilling new holes, wherever necessary to match holes.

g. Grout the foundation bolts with mortar, run grouting mixture under base of the cubicle frame, ram to ensure solidity. After grout has set properly, tighten the foundation bolts.

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5.2.3 Bus Connections and Installation of Loose items

a. Fix bus bar links and inter panel bus-bar connections with coupling bolts / supporting insulators. Clean the contact surface of bus bars and links and smear with contact grease before bolting.

b. Wherever recommended, fix shroud on the joints and fill compound, or compound may be put on joint to form smooth homogenous & spherical shaped mass and then wrapped with tape. Simple taping of joints may also be done. Recommendation of manufacturer/ consultant/ Principal shall be followed in this respect.

c. In case of misalignment of bus bars, adjustments may be necessary. The connecting pieces may have to be re-drilled or re-fabricated.

d. Check tightness of bus bars bolts connections with torque wrench. Follow vendor's recommendations in this regard.

e. Install all loose relays, instruments, cable boxes, metering and protective CTs, PTs etc. Before fixing the relays, make sure that they are cleaned and all packing materials have been removed from them and proper operation. Clean the contacts.

f. Connect all inter-panel bus wiring. Connections of relays and instruments shall be done as per drawings. Check the wiring according to wiring diagram.

g. Connect all earthing bus bar between the cubicles and it shall be connected at two points by Al / GI strip or cable to the main earthing ring. Fix all glands for incoming and outgoing and control cable connections on the holes provided for the purpose, as per drawings.

h. Drill holes for fixing cable glands/ cable boxes as per drawings, if such holes are not provided. All spare holes, gaps etc. shall be blanked as per instructions of Principal / Consultant.

5.2.4 Cleaning

After erection is complete all cubicles, switches, starters, CTs, PT Chambers, Bus bar Chambers etc. should be cleaned by blowing air (preferably hot air). Surface of the insulation shall be cleaned with cloth soaked in CTC / Benzene.

5.2.5 Circuit breakers installation (Air Circuit Breaker)

a. Clean the contacts properly with cloth soaked in CTC / Benzene etc. Clean and lubricate the operating mechanism, check and rectify the main insolating contacts and bushings and also secondary contact for any damage/ misalignment. Check the locking mechanism.

b. Manually close and trip the breaker several times and check contact alignment and pressure. Adjustment, if required, shall be done according to the manufacturer's instruction. The arc chute if despatched separately should be fixed properly, only after checking of contact alignment etc. After fixing the Arc Chute, operate manually the breaker and check the contacts make properly. Measure contact resistance with conductor. Check the operation of OFF-ON indicator.

5.3 Cable Installation

5.3.1 General

a. All fabrication, cutting, laying, spacing, fixing etc. of cables, trays, supports, hangers etc. shall be as per drawings and instructions of Owner / Engineer-in-Charge.

b. The contractor shall keep accurate record of cable drums, the drum nos. and actual length of cable taken out of each drum. Each cable length shall be cut from a specific drum as per approved schedule of cable. Lengths of cable runs shown in the cable schedule are calculated lengths only, hence the actual lengths shall be measured at site before laying and cutting the

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cable. The contractor shall take extreme care to adjust cable runs from drums so that joints in the cable are avoided and wastage reduced to minimum.

c. For purpose of measurement of cable run for payment the length of cable between and terminations only shall be considered.

5.3.2 Laying

a. The cable drums should be properly mounted on jack / cable wheel. Make sure that the spindle is suitable for carrying weight of the drum without bending. Check that spindle is laying horizontal on the bearing so as to prevent the drum creeping to one side or to the other while rotating.

b. Unroll the cables from the drum in correct direction. Rotate drum only as per arrow mark given in the cable drum. Ensure that the end protection box attached to the flange of the drum is removed and securing rope cut to allow cable and move freely. Rotate the cable drum and simultaneously pull cable steadily and with even pulls and not with unnecessary jerk or strain. In no case the cable shall be allowed to twist or kink since this is likely to spring the armour and fracture the insulation and outer serving of the cable.

c. Do not drag the cable on floor or hard surface. Use only wooden / steel cable rollers for this purpose.

d. Cable should not be bent sharply to a small radius. The cable bending radius shall be as large as possible and will not be less than 15 times the outside diameter for XLPE cables and 12 times for PVC cables. At joint termination the individual core of cable shall not be bent with bending radius of less than 15 times the diameter over the insulation.

e. Where cables are laid on the MS racks, trays etc. ensure that trays / racks / supports are fixed properly in an approved manner or according to the drawings. Check from drawings that for horizontal runs of cable, bracket, risers, supports, angles are grouted or fixed in formation as required.

f. In sub-station where large no. of cables rise to panels/ switchboards, it shall be ensured that these risers do not interfere with cables on racks and rising cables do not interfere with cables on racks and rising cables do not cross the other cables in horizontal runs. Risers are to be properly supported so that weight of cable does not fall on terminations. All cable crossings shall be avoided.

g. Cable laid in trenches should be sealed at the entry to hazardous area / non-hazardous area as per direction of owner / engineer-in-charge.

h. Openings in substation basement and floors for entry of cables shall be sealed after the cables are laid.

i. Cables shall be clamped by taking care to be taken to space clamps at such intervals as to prevent buckling of cables.

j. The laying of the cable on the racks shall be done in an approved manner and according to the drawings supplied.

k. Where cables are laid in cable slits, the slits after laying of cables shall be filled with sand & lean cement mixture and plastered so that surface flushes with top of slit.

5.3.3 Directly Buried Cables

a. Laying of under ground directly buried cables shall include excavation of earth along the cable route, laying of Hume / GI pipes for road crossing, back filling, ramming, removing of extra earth including supply of bricks, sand etc. as per drawing and instruction of Owner / Engineer-in-Charge.

b. Broken bricks shall not be use for brick working. Only Class-I bricks shall be used.

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c. If new cables are laid to cross existing cables, the new cable shall be laid under existing cables at depth of not less than 300 mm from the existing cable. It shall be ensured that the approach of new cable to the crossing is uniform and gradually sloped.

d. Where cables are directly laid into ground, trenches should be dug up to such a depth as to ensure that the depth of the top of the entire cable below the ground level is min. 750 mm for medium and low voltage cables, and min.1050 mm for high voltage cables. Before laying of cables at these trenches, bottom of the trench should be properly levelled up and all odd and sharp materials removed. Trench bottom then should be bedded with a 75 mm thick layer of sand. Approval of Owner / Engineer-in-Charge shall be taken for preparation of this bed before laying of cables. Cables shall be laid in the trenches in straight runs. Care shall be taken so that any kinds or bends are not formed. After laying of the cables, bricks shall be placed length wise on both the sides of the cables along the entire length to form trough.

e. Fill up space between bricks with sand up to height of the bricks. Then place bricks closely width wise on top of the sand layer throughout the length. Fill up loose earth in trench, ram properly to compact, remove extra earth from site. Broken bricks shall not be use for brick working. Only Class-I bricks shall be used.

f. If new cables are laid to cross existing cables, the new cable shall be laid under existing cables at depth of not less than 200 mm from the existing cable. It shall be ensured that the approach of new cable to the crossing is uniform and gradually sloped.

g. Fix cable markers at interval not exceeding 30 Mtrs. In straight portion, at bends in cable route apart and at joints on the entire cable route length of the cables. The cable markers shall be made of pre-cast concrete blocks of 300 mm x 350 mm x 350 mm size with markings of “HT CABLE”, “LT CABLE”, “Depth of Cable”, “Arrow Marks” etc. inscribed. These shall be supplied by the contractor at no extra cost and fixed as per directions of the Owner / Engineer-in-Charge. The top of the above concrete slabs shall have a smooth finish with cement only.

h. Laying of cables under road crossings etc. shall be done in pipes, and pipe ends shall be sealed with bitumen compound and sand as required after cables are laid. Backfilled soil shall be rammed thoroughly to prevent road surface cracking due to settlement of loose soil.

5.3.4 Laying in Readymade Trenches

a. RCC slabs / chequered plates lifted from trenches for laying cables shall be put back in position at close of work every day to avoid accident & damage to cables in the trench.

b. When cables pass through pipes, pipe ends shall be sealed with bitumen compound and sand as required.

c. Protection pipes shall be provided, whenever cables enter from the floor, trench etc. in the equipment and sealing in and around these pipes shall be done.

5.4 Cable Jointing and Termination

5.4.1 General

The scope of work shall include but not limited to the followings:

a. Soldering / crimping of sockets / ferrules and connections at all joints/ terminations as per specifications. Sockets shall be provided at all terminations except where pressure clamp type terminals are provided.

b. Glanding of cable and fixing of cable boxes.

5.4.2 Specifications

a. All LT XLPE power and control cables shall be terminated through compression type gland.

b. In case of LT XLPE cables, armours shall be suitably earthed in compression type glands.

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c. All lighting and control cables shall be provided with crimped Al / Cu Sockets before termination in junction boxes.

5.4.3 Crimping

a. For all power cables, crimping type Al lugs for Al cables and tinned Cu lugs for Cu cables shall be provided. These lugs shall be crimped on the cable conductors by means of special hand/ hydraulic crimping tools. Before crimping the socket inhibiting grease shall be smeared over the conductor. Conductor shall be shaped properly before sliding the socket over it. Crimping shall be done in an approved manner.

b. All the control cables, which shall be of copper conductor, shall be terminated without any additional lugs in screwed type terminals provided in various equipments.

c. Bimetallic washer shall be used at copper to aluminium connection.

5.4.4 Jointing

a. The jointing shall be done in an approved manner. Care shall be taken not to damage the insulation when opening the cable for jointing.

b. Before commencing soldering of the socket, conductor shall be thoroughly cleaned and insulation protected. The ferrules shall be thoroughly cleaned. Ferrule and each strand of the cable shall be thoroughly sweated with solder to tin them and fill the conductor gaps to remove all air pockets. Soldering materials of approved quality as per ISS practice shall be used. Taping of the conductors shall be done in an approved manner after crimping / soldering.

c. Filling up compound and sealing the cable box shall never be done in one operation. After the first pouring of compound, it should be topped up again with compound and then sealed.

5.4.5 Straight Through Joints

a. Jointing of XLPE & XLPE cables shall be done with extreme care and manufacturer's instructions shall be strictly followed. Soldering of sockets shall also be done with extreme care as indicated above.

Earth continuity wire shall be plumbed and / or clamped. Compound shall be filled according to the instructions of manufacturers of terminating kit / cable. Joints made inside trench or on rack shall be properly supported. Wherever joints are made inside ground, brick masonry work shall be done around the joint box and filled with sand, and there after covered with earth at no extra cost.

b. A tent shall be used in all circumstances where jointing work is being done outdoor, for protection against rain and to prevent dust from being blown in to exposed joints and jointing materials. Extreme care shall be taken to maintain proper phase sequence while terminating at equipment ends. Records of connection details shall be maintained. Conductors shall be shaped properly while terminating and no sharp bends shall be given. Where numbers of cables are to be connected in parallel, proper tests shall be done before connection, so that no cross connection shall be made. No phase crossings shall be allowed for making the connections.

c. Cables shall be supported adequately at the entry to cable box / equipment so that load of cable does not come on cable glands.

d. All cables shall be meggered (checked for insulation resistance) before and after jointing and insulation values recorded.

e. While terminating at equipment end, each core shall be properly tagged with numbering ferrules as per nomenclature given in the drawings. Wires should be dressed and clamped neatly, bolting shall be done properly.

5.4.6 Earthing **& Lightning**

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5.4.6.1 General

a. Painting of all earth strip joints with anti-corrosive paints shall be carried out as per details given in drawings and instruction of Owner / Engineer-in-Charge.

b. All electrical equipment rated 415 V and above shall be connected to earth bus by two separate and distinct earth connections. All equipment rated 240 V and below shall be earthed with single earth conductor.

5.4.6.2 Specifications

a. Types and sizes of earthing conductors shall be as indicated in the SOR attached. All earthing installations shall conform to IS-3043 / National building code 2016 / IS / IEC : 62305

b. Underground conductors shall run at a depth of 600 mm below ground level. Where these conductors run along with cables, they shall be laid at the same depth as cables. Where conductors run on wall, ceilings, they shall be laid on clamps or brackets made out of Al/GI strips.

c. Wherever, earthing conductor is passing through floor, walls etc. the conductor shall be taken through PVC / GI pipes.

d. All paints, enamel etc. shall be removed from point of contact before making connections.

e. Connections between G.I. strips shall be done by welding. For connecting Al conductor / G.I. wire, Al socket shall be crimped on the conductor / wire. At the equipment end, connections shall be done by bolting.

f. Connection between Al & GI shall be done by bolting. Graphite grease shall be applied on contact surfaces.

g. Epoxy resin paint or bitumen shall be applied on welded or bolted joints to prevent corrosion and taping done as indicated in the drawing. Connections between Al wires shall be done by crimping back to back Al ferrule.

h. Earth electrodes - Earth electrodes shall be provided as per drawings / specification. Work includes excavation of earth, installation of electrodes and test links etc., supply and filling of charcoal and common salt, back filling of earth and removal of extra earth as specified earlier. It also includes making brick wall around the electrode and cover as per drawings / specifications. The testing links shall be grouted on brick wall and connections with earth electrode and conductors shall be made. Distance between two electrodes shall not be less than 10 meters and may be located 4 M away from building foundation.

i. Earth pits for equipment earthing, neutral earthing and lightning protection shall be separate. However, these pits shall be inter-connected.

5.4.7 **Building Lighting**

5.4.7.1 The electrical installation covered by this specification shall conform to relevant Indian Standards & codes of practices.

5.4.7.2 Erection of light fittings, plug sockets etc.

Fabrication of supports for lighting fittings, sockets, junction boxes / Air condition points / TV points shall be done as per the best practice / relevant drawings / instructions given by the owner / engineer-in-charge. These shall be grouted to walls, ceiling or welded to insert plates, steel structures etc. Insert plates on ceilings shall normally be provided. However, if required, the contractor shall weld such supports to the reinforcement rods after exposing by chipping off concrete at no extra cost. Installation of lighting fittings includes control boxes, where supplied separately and shall be done as per drawings. Before installation, checking of internal parts, assembly of accessories shall be done as per manufacturer's instruction.

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5.4.7.3 The explosion-proof fittings shall be earthed through third core of the cable used for wiring. The third pin and body of 16 amps shall be earthed similarly.

5.4.7.4 Installation of explosion proof equipment shall be done strictly following manufacturer's instruction or relevant Standards. Cable termination shall be done as per relevant drawings. No drilling of holes or any change in construction of equipment or part thereof shall be done.

5.4.7.5 Wiring for normal AC supply light points and plugs shall be taken on the same brackets but wiring for emergency DC supply lights shall be taken separately. Drawings for lighting layout give only tentative location of fittings and wiring route shall be decided in consultation with owner / engineer-in-charge. Wiring shall follow shortest possible route and no. of circuit shall be bunched together to the extent possible in the same route.

5.4.7.6 Cable for wiring light points and socket outlets shall normally be laid along wall, ceilings, structures, on suitable brackets made out of M.S. / Al sheets or strips. Connections to the points with fluorescent fixtures in one circuit shall be taken through junction boxes. Junction boxes shall be suitably located for branching off from the circuit to the individual point. Wherever indicated, cables may be laid directly on walls, ceilings etc. by clamping on saddles.

5.4.7.7 Wherever indicated, the wire can be drawn through PVC bushings provided in the fittings. Relevant drawings may also be referred to.

5.4.7.8 Lamps shall be installed after installation of fittings and wirings.

5.4.7.9 All light fittings and corresponding control switches shall be numbered in a permanent way as instructed by owner / engineer-in-charge.

5.5 ERECTION OF STRUCTURES

5.5.1 Specification

The fabrication work shall be done as per drawings / specifications / sketches in an approved manner and to the entire satisfaction of owner / engineer-in-charge. The contractor shall take adequate measures to avoid wastage. Scrap quantity shall not exceed 2% of total quantity used for erection.

5.5.2 Erection of racks, risers, supports etc.

a. Erection of racks and risers for cable supports shall be done along the cable routes as indicated in the drawings. The contractor before erection shall check the route for any obstruction like process pipe lines, structures, equipment etc. In case of obstructions, the matter shall be brought to the notice of owner / engineer-in-charge in writing and racks shall be re-routed as per his instructions.

b. As and where indicated in the drawings, supports for racks, risers etc. shall be welded on the steel structure, such as MS beams, pipe trestles, insert plates provided in the RCC column etc. for erection of racks.

c. Wherever indicated, supports for racks, risers, shall be grouted on walls. The racks, risers etc. shall be installed on such supports and those properly welded.

d. Opening on walls / floors shall be provided where racks / risers are crossing floors/ walls.

e. Heavy channels, risers may also be grouted on the floors in addition to supports provided from walls, ceilings, steel structures etc.

f. As indicated in the drawings, racks and risers shall be erected either in single tier/ multi tier formation.

5.5.3 Erection of supports in trench

a. Supports and Hangers shall be grouted with rag bolts on the walls of readymade concrete trench.

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b. In existing trench wall, contractor may be required to provide pockets for grouting cable supports at some points. This shall be done without any extra cost to the owner.

c. In case of requirement of insert plates for support of cable rack, the contractor shall weld such plates to the reinforcement MS rods. This shall be done by chipping the concrete for exposing the reinforcement MS rods and thereafter welding the plates and making good the concrete chipping by plastering.

5.5.4 The pipes will have to be bent (wherever required) and fixed / embedded in floor, wall and ground for laying the cables. Neoprene bushes shall have to be fixed at the end of such pipes.

5.5.5 GI trays of different sizes shall be cut in size and fixed on racks and risers. Fixing of trays shall only be done after erection / welding / painting of the supports as required.

5.5.6 Erection of support frames for miscellaneous equipments, base channels for transformers and switchboards etc. shall be carried out at no extra cost.

5.5.7 Dismantling of steel fabrication and re-erecting as required by owner / engineer-in-charge shall have to be carried out by the contractor.

5.5.8 Dismantling of cable racks and re-erecting as required by owner / engineer in charge shall be carried out by the contractor.

5.6 GENERAL PROCEDURE FOR TESTING & COMMISSIONING

5.6.1 Before proceeding with the work, contractor shall fully inspect all installed Electrical Equipment for completeness, signs of damages, defects etc. and record all discrepancies noticed. The contractor shall be required to make good / repair / replace the damaged components at no extra cost.

5.6.2 Testing and Commissioning Requirements

a. All works shall be carried out in accordance with the drawings, supplier's instructions / manuals for equipment and as per relevant ISS & Code of Practices.

b. Before conducting test on any equipment, the contractor shall obtain permission from owner / engineer-in-charge and all tests shall be conducted in their presence.

c. Results of each test shall be recorded by the contractor immediately after the test on approved performa and counter signed by the owner's authorised representative. The test results shall be furnished in four copies in the form of 'Test Certificates'. Performa for some of the items are given in Appendix-1.

d. Copies of the record shall be handed over to owner / engineer-in-charge.

e. The Contractor shall commission all electrical equipment and carry out all pre-commissioning / commissioning tests inclusive of no-load and on-load tests on motors, and shall be responsible for final adjustments of relays, motors, instruments, starters, breakers etc. as per operational data supplied and as per directions of Engineer-in-Charge.

f. All terminals, cable joints, earth terminals which are opened for testing purposes shall be re-terminated and re-insulated by the Contractor to restore their original state.

g. Painting

The contractor shall without any extra cost, touch up with paint all electrical equipment which are damaged / scratched during testing and commissioning work. The paint used shall match exactly painted surface of the equipment on which touch up is done.

5.6.3 Cleaning and Regular Maintenance.

Till the commissioned equipment is finally accepted by owner / engineer-in-charge, Contractor shall be responsible for regular cleaning and maintenance of all electrical equipment. The maintenance job is to be done in consultation with or on advice from the Owner/ Consultant.

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5.7 TESTING & COMMISSIONING SPECIFICATIONS

5.7.1 These specifications lay down the testing and commissioning procedures to be followed for each type of equipment, over and above the general requirements laid down in specifications for erection.

Manufacturer's instructions and any other instructions of owner / engineer-in-charge / statutory bodies shall also be followed by the contractor during testing and commissioning.

The contractor shall maintain and furnish the records of all equipments i.e. HT Panels, Transformer, LT panels, CT, PT, relay etc. including any special test as per manufacturer's manual.

5.7.2 Switch Boards

5.7.2.1 General Checks

a. Check all auxiliary contacts of breakers for proper make / break operation.

b. If necessary, make minor adjustments to circuit breakers mechanism, auxiliary contacts etc. for proper operation of circuit breakers. Proper greasing and lubrication or mechanism shall also be done before final commissioning.

c. Check for termination of control circuit wiring as per drawing and ensure that the terminals at equipment and panel are mechanically sound.

d. Ensure proper operation of all test operation switches and push button.

e. Check wiring of all space heaters, indication lamps bells, buzzers etc.

5.7.2.2 Insulation resistance test

a. Measure the insulation resistance of main bus-bars (Phase to phase & Phase to earth) and circuit breaker with 1000 V Megger (IR values shall generally be not less than 100 MΩ for 11 KV, 50 MΩ for 3.3 KV, 10 MΩ for 415 V).

b. Control wiring shall be tested with 500 V Megger (IR values shall not be less than 2 MΩ).

5.7.2.3 High Voltage Test

The test shall be conducted contacted on switch Gear rated 3.3 KV and above. Test shall be as per relevant Indian Standard. However, for AC high voltage test the value shall be twice the working voltage of the switchgear plus 1000V. This voltage shall be maintained for 1 minute. Each phase shall be tested in turn with remaining phases earthed. After high voltage test, a further megger test shall be made to make sure that insulation resistance to earth has not altered appreciably. The reading of second megger test should be consistent with that of the first. (AC test voltage for 1 min. duration shall be 24KV for 11 KV panel and 8 KV for 3.3 KV panel).

5.7.2.4 Testing of Current Transformer

a. Insulation resistance to earth of secondary winding shall be tested with 500 V megger (remove earth connection before test).

b. Check the polarity of C.T:- Connect zero centre voltmeter in the secondary winding, connect 6 V battery with switch in the primary, close the switch and from the kick of the voltmeter, ascertain the polarity.

5.7.2.5 Testing of P.T. Insulation

Testing of H.T. & LT side of P.T. shall be done with 1000 Volts and 500 Volts megger respectively (the value shall not be less than 100 MΩ and 2 MΩ respectively).

5.7.2.6 Testing of Relays

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a. Checking of wiring shall be done according to Manufacturer's drawings. Check relay continuity at all taps and also ensure plug bridge contact satisfactory.

b. Secondary injection test

Use secondary injection test set incorporating timer. Testing of all protective relays such as but not limited to over current, earth fault, differential, motor protection, under voltage relays etc. shall be done as per the procedure set by the manufacturers of the relays. All time delay relays shall be tested to verify their characteristics for IDMT and instantaneous relay pick up and drop off values shall be noted at various taps. Relays shall be tested at all taps. Errors shall be calculated and compared with permissible limits specified by manufacturers. Adjustment, such as in establishing circuit, shall be done as recommended by manufacturer. After testing, relays shall be set at values given by Consultant.

c. Timer relay shall be tested and calibrated and set properly.

d. All auxiliary relays shall be tested for proper operation.

5.7.2.7 Testing of Instruments

All indicating and recording instruments like Ammeter, Voltage meter, KWh meter etc. shall be calibrated. Zero error of each instrument shall be corrected.

5.7.2.8 Operational Test

Conduct the following operational tests after putting the circuit breaker at test and service position. Check that the fuses of proper rating are put in control circuit as per wiring diagram.

a. Close and trip the circuit breaker several times with power or manually. In case of motor operated spring charged closing mechanism, check the operation of charging motor. Ensure that it cuts in/ off properly.

b. Check the indication scheme ON, OFF, trip circuit healthy, auto-trip etc.

c. Trip the breaker by operating the protective relays (operate contact manually).

d. Check the trip free feature

e. Check the anti-pumping feature

f. Check operation of voltage selector relay scheme for supply.

g. Check annunciation scheme for AC/DC power supply failure.

h. Each motor starter shall be tested for correct operation. All operational tests to verify sequence of operation, inter-locking, alarm indication schemes (by simulating the connection) shall be done.

i. Bi-metallic type thermal over load relay shall be tested at different settings. Current shall be injected through the thermal elements (three elements can be connected in series) at twice and thrice the set value and tripping time shall be noted. The values shall be compared with the data supplied by manufacturer.

j. Single phase prevention relays shall be tested for proper operation.

k. Check that fuses of specified ratings are put in various outlets.

5.7.3 **Cables**

a. All HT & LT cables shall be tested for insulation resistance with 1000V megger after termination.

For 11 KV---With 5000V Megger (Motorised)

For 1.1 KV-- With 1000V Megger

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IR shall be measured between phases and between phase & earth. The voltage shall be applied for 1 minute.

b. All HT cables shall be tested for high voltage as per IS: 1255 after making all termination and joints followed by IR test.

5.7.4 Lighting

Before energising any lighting circuit, the IR values (phase to phase and phase to earth) shall be recorded for entire wiring installation. The testing shall be done with 500 V megger. After switching on the power supply, load of each circuit shall be measured.

5.7.5 Earthing

- Measurement of earth resistance of each earth pit
- Checking earth grids for size, continuity and connections
- Checking size and continuity of earth connections from grid to each equipment
- Measurement of connections to earth at equipment which are likely to have highest earth resistance
- Measurement of earth loop impedance for checking the operation of protective devices in case of earth fault.
- The continuity of earthing and resistance of each earth pit and grid shall be measured with earth megger.

5.7.6 Miscellaneous Equipment

Under this are included, exhaust fans, blowers, limit switches, vibrators, electro-magnets, air pressurisation unit etc. The following tests shall be conducted.

a. Measurement of insulation resistance

b. Check up the direction of rotation.

c. Operational test

5.8 DOCUMENTATION

5.8.1 For the purpose of completion certificate, the following documents will be deemed to form completion document:

a. The technical documents according to which the work was carried out.

b. Final check-list and completion report.

5.8.2 Three sets of construction drawings showing therein the modifications and correction made during the course of execution signed by Owner / Engineer-in-charge.

5.8.3 Test certificates for the materials purchased by Contractor.

5.8.4 Material appropriation statement for the materials issued by Owner for the works and list of surplus materials returned to Owner's stores duly supported by necessary documents.

5.8.5 No claim certificate by the Contractor certifying that the entire work done by him under the contract has been measured & accepted for the final bill to his satisfaction and that he will have no claim(s) concerning any work(s) or part thereof performed by him under the Contract, to Owner except otherwise indicated in the final bill.

5.8.6 The completion certification shall be issued by Owner within 30 days of the Contractor furnishing documents listed in this clause jointly certified by Owner / Engineer-in-charge and Contractor's Site Engineer.

5.9 HANDING OVER TO OWNER

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5.9.1 The contractor shall hand over the complete installation as a whole. Minor works not specified or mentioned in the scope or SOR but required to complete the job as a whole will have to be done by the contractor without extra cost. Any equipment / installation shall not be deemed as handed over to Owner until the same is complete in all respect and is accepted in writing by the Owner / Engineer-in-charge.

5.9.2 The final acceptance of the work shall be after the demonstration of guarantees by the Contractor. Owner shall issue the final acceptance / taking over certificate upon fulfilment of the guarantees.

5.10 OBLIGATIONS & RESPONSIBILITIES OF CONTRACTOR

The contractor's obligations and responsibilities shall include but not limited to the following:

5.10.1 To deploy skilled, semi skilled and unskilled personnel in requisite numbers and as per scheduled programme so as to complete the WORK as per overall project schedule.

5.10.2 To deploy suitably qualified supervisors and engineers in requisite numbers to assure execution of good quality job as per best engineering practices and to the full satisfaction of Owner / Consultants.

5.10.3 Safety supervisor shall be deployed at site that monitors safety aspect during the site construction work. Contractor to note that all workers shall use PPE (helmet, safety shoes, hand gloves, goggles, double lanyard safety belt etc. and they shall be medically tested before putting into the job.

5.10.4 To prepare detailed planning and execution schedule considering the availability of fronts and materials. This shall be reviewed by Owner / Engineer-in-charge and Contractor shall be required to keep updating the same (as per the instructions of Owner / Engineer-in-charge) to take care of any changes in the availability of fronts and materials and to complete all jobs as per the overall project schedule. Owner / Engineer-in-charge shall in no way be held responsible for such changes.

5.10.5 To check for quantity compliance between bill of materials and drawings for cable, structural, earthing materials etc. and intimate Owner / Engineer-in-charge sufficiently in advance regarding discrepancies, if any.

5.10.6 To prepare & submit lighting layout, conduit layout, earthing/lightning protection layout drawings of the admin building & Bungalow for HURL/PDIL review/approval before starting of erection work at site.

5.10.7 To arrange all required tools and tackles, consumables, instruments, erection materials & machineries etc. for handling erection, testing & commissioning of complete electrical installation.

5.10.8 To arrange and supply storage tanks for drinking water so as to avoid any inconvenience that may be caused due to interruption in water supply at times.

5.10.9 To provide proper storage and security arrangements for his tools, tackles, equipments, materials etc. as well as equipment and materials issued by Owner / Engineer-in-charge to Contractor. Owner / Engineer-in-charge shall not be responsible for any loss or damage to items in the custody of Contractor at site for any reason whatsoever.

5.10.10 Completion of all repairs arising out of defective work done by Contractor, Owner / Engineer-in-charge may at his discretion require the Contractor to rectify certain defects in materials caused due to bad workmanship of supplier and / or during transportation. For such work of course, the payment modalities shall be settled by mutual agreement before starting such rectification jobs.

5.10.11 To maintain all the records for men, materials and execution of job as required by law as well as Owner / Engineer-in-charge.

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5.10.12 To get his work inspected by Owner / Engineer-in-charge and get approved from statutory agencies such as but not limited to Electrical Inspector, Factory Inspector etc.

5.10.13 All co-ordination with Statutory Authorities shall be contractor's responsibility. Only statutory fee required for approval shall be paid by the owner.

5.10.14 To make arrangements for services such as transport, medical, lighting, canteen etc. for working round the clock.

5.10.15 In addition to safety regulations indicated in this enquiry, Owner / Engineer-in-charge may issue certain safety directives, which shall have to be followed meticulously without any reservation.

5.10.16 To undertake and execute work and supply as per scope of work, scope of supply and follow Technical Conditions including specification for electrical erection, specification for electrical testing and commissioning and as per schedule of rates

5.10.17 Reconciliation of all materials issued by owner / supplied by contractor.

5.10.18 Handing over of the completed works to owner / engineer-in-charge as per procedure laid down by Consultant.

5.10.19 To submit documentation forming part of request for issue of completion certificate.

5.10.20 Clearing the site after cleaning the areas where the Contractor executed the job, stored the materials and built his office, fabrication shop etc.

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ADMIN BUILDING, HURL, GORAKHPUR												PC-160-1201			0
INVENTORY / POINT OF INTERNAL ELECTRIFICATION FOR ADMIN BUILDING GROUND FLOOR												DOCUMENT NUMBER			REV.
												SHEET 1 OF 2			
Sl. No.	Description	Point wiring	2X20 W FLT (LED)	2X20 W FLT (LED) Decorative Type	1X20 W FLT (LED)	ceiling Fan (1200 mm sweep)	Heavy duty Exhaust Fan (300 mm sweep)	16A sw. soc. with piano sw. (Modular Type)	6A sw. soc. with piano sw. (Modular Type)	32A MCB & Socket for 1.5 Ton AC Point	T.V. Soc.	2-way switch (6A)	18 way LSDB	12 way SPDB	21 way PDB FOR AC
1.	Room-1	16	12			4		4	6	6	1				
2.	Room-2	5			2	1	2	2	2	1					
3.	Room-3	5	2			1	2	1	2	1	1				
4.	Room-4	6	4			2		2	4	2					
5.	Room-5	6	4			2		2	4	2					
6.	Room-6	3	2			1		2	2	1					
7.	Room-7	10		5		3	2	2	4	2	1				
8.	Room-8	8		5		3		4	4	2	1				
9.	Room-9	18		12		6		6	10	6	1				
10.	Room-10	8		5		3		2	4	2	1				
11.	Room-11	3			3	0		2	2	2					
12.	Room-12	5			3	0	2	2	2	2					
13.	Room-13	6	3			1	2	2	2	2					
14	Staircase	8			8							4			
15	Corridor	34			34										
	Quantity	**141**	**27**	**27**	**50**	**27**	**10**	**33**	**48**	**31**	**6**	**4**	**0**	**0**	**0**

ADMIN BUILDING, HURL, GORAKHPUR													PC-160-1201			0
INVENTORY / POINT OF INTERNAL ELECTRIFICATION FOR ADMIN BUILDING FIRST FLOOR													DOCUMENT NUMBER			REV.
													SHEET 2 OF 2			
Sl. No.	Description	Point wiring	2X20 W FLT (LED)	2X20 W FLT (LED) Decorative Type	1X20 W FLT (LED)	90W outdoor light with LED lamp	ceiling Fan (1200 mm sweep)	Heavy duty Exhaust Fan (300 mm sweep)	16A sw. soc. with piano sw. (Modular Type)	6A sw. soc. with piano sw. (Modular Type)	32A MCB & Socket for AC Point	T.V. Soc.	2-way switch (6A)	18 way LSDB	12 way SPDB	21 way ACDB
1.	Room-1	16	6				10		4	6	10					
2.	Room-2	10	8				2		2	4	2					
3.	Room-3	14	12				2		2	2	2					
4.	Room-4	11	10				1		1	2	1					
5.	Room-5	7	2		2		1	2	1	2						
6.	Room-6	7	2		2		1	2	1	2						
7	Staircase	4			4								2			
8	Corridor	10			10											
9	Periphery area	8				8										
	Quantity	**87**	**40**	**0**	**18**	**8**	**17**	**4**	**11**	**18**	**15**	**0**	**2**	**0**	**0**	**0**

EXECUTIVE BUNGLOW HURL, GORAKHPUR															PC-160-1202		
INVENTORY / POINT OF INTERNAL ELECTRIFICATION FOR EXECUTIVE BUNGALOW															DOCUMENT NUMBER		
(NO. OF FLATS = 9 TYPE B)																	
Sl. No.	Description	Point Wiring	1x20W (LED TUBE LIGHT)	9 W FLT (LED)	Bulk head Lighting Fixture with 9W LED Bulb	Ceiling Fan With Regulator (1200 mm sweep)	Ceiling Fan With Regulator (600 mm sweep)	Heavy duty Exhaust Fan (300 mm sweep)	Call Bell	16A sw. soc. with piano sw. (Modular Type)	32A MCB & Socket with Top for AC Point	6A sw. soc. with piano sw. (Modular Type)	T.V. Soc.	Room Lighting Board	16 way SPN Main DB.	Energy Meter	2-way switch (6A)
1.	Entrance Lobby (Veranda)	3	0	1			1		1	1		1		1	1	1	
2.	Drawing Room	4	2			2				2	1	3	1	1			
3.	Dining Room	3	2			1				2	1	3	1	1			
4.	Bedroom-1	4	2			2				2	1	3	1	1			
5.	Bedroom-2	4	2			2				2	1	3	1	1			
6.	Bedroom-3	4	2			2				2	1	3	1	1			
7.	Kitchen & Pantry	4		2			1	1		2		4		1			
8.	Store	2		1		1				1		1		1			
9.	Passage (Veranda)	3	0	2			1			1		1		1			
10.	Toilet-1	2		1				1		1		1		1			
11.	Toilet-2	2		1				1		1		1		1			
12.	Staircase	2		2								1		1			2

13.	Perifery of Flat	4			4									1			
14.	Servant Room	2	1			1				1	1	1		1			
15.	Servant room Toilet	2		1				1		1		1		1			
16.	Servant room kitchen	3		1			1	1		1		1		1			
17.	Servant room Bathroom	2		1				1		1		1		1			
18.	Garage	1	1							1				1			
19.	Entrance	1			1												
	Qty. per Flat	**52**	**12**	**13**	**5**	**11**	**4**	**6**	**1**	**22**	**6**	**29**	**5**	**11**	**1**	**1**	**2**
	Total Qty. for 9 No. Flats	**468**	**108**	**117**	**45**	**99**	**36**	**54**	**9**	**198**	**54**	**261**	**45**	**99**	**9**	**9**	**18**

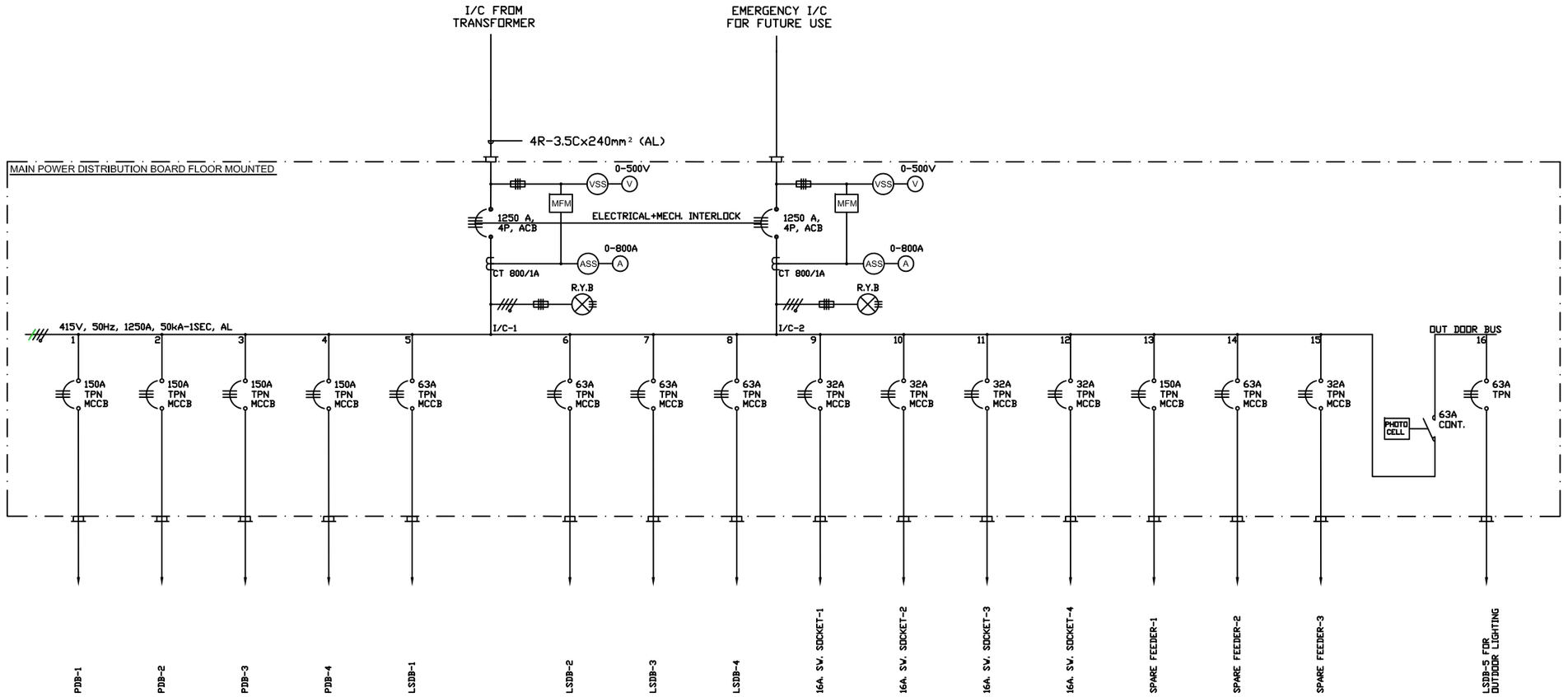
EXECUTIVE BUNGLOW HURL, GORAKHPUR															PC-160-1202		
INVENTORY / POINT OF INTERNAL ELECTRIFICATION FOR EXECUTIVE BUNGALOW															DOCUMENT NUMBER		
(NO. OF FLATS =2 TYPE C)																	
Sl. No.	Description	Point Wiring	1x20W (LED TUBE LIGHT)	9 W FLT (LED)	Bulk head Lighting Fixture with 9W LED Bulb	Ceiling Fan With Regulator (1200 mm sweep)	Ceiling Fan With Regulator (600 mm sweep)	Heavy duty Exhaust Fan (300 mm sweep)	Call Bell	16A sw. soc. with piano sw. (Modular Type)	32A MCB & Socket with Top for AC Point	6A sw. soc. with piano sw. (Modular Type)	T.V. Soc.	Room Lighting Board	16 way SPN Main DB.	Energy Meter	2-way switch (6A)
1.	Entrance Lobby (Veranda)	3	0	1			1		1	1		1		1	1	1	
2.	Drawing Room	4	2			2				2	1	3	1	1			
3.	Dining Room	3	2			1				2	1	3	1	1			
4.	Bedroom-1	4	2			2				2	1	3	1	1			
5.	Bedroom-2	4	2			2				2	1	3	1	1			
6.	Bedroom-3	4	2			2				2	1	3	1	1			
7.	Kitchen & Pantry	4		2			1	1		2		4		1			
8.	Store	2		1		1				1		1		1			
9.	Passage (Veranda)	3	0	2			1			1		1		1			
10.	Toilet-1	2		1				1		1		1		1			
11.	Toilet-2	2		1				1		1		1		1			
12.	Staircase	2		2								1		1			2

13.	Perifery of Flat	4			4								1				
18.	Garage	1	1							1			1				
19.	Entrance	1			1												
	Qty. per Flat	**43**	**11**	**10**	**5**	**10**	**3**	**3**	**1**	**18**	**5**	**25**	**5**	**11**	**1**	**1**	**2**
	Total Qty. for 2 No. Flats	**86**	**22**	**20**	**10**	**20**	**6**	**6**	**2**	**36**	**10**	**50**	**10**	**22**	**2**	**2**	**4**

EXECUTIVE BUNGLOW HURL, GORAKHPUR															PC-160-1202		
INVENTORY / POINT OF INTERNAL ELECTRIFICATION FOR EXECUTIVE BUNGALOW															DOCUMENT NUMBER		
(NO. OF FLATS = 10, TYPE D)																	
Sl. No.	Description	Point Wiring	1x20W (LED TUBE LIGHT)	9 W FLT (LED)	Bulk head Lighting Fixture with 9W LED Bulb	Ceiling Fan With Regulator (1200 mm sweep)	Ceiling Fan (600 mm sweep)	Heavy duty Exhaust Fan (300 mm sweep)	Call Bell	16A sw. soc. with piano sw. (Modular Type)	32A MCB & Socket for AC Point	6A sw. soc. with piano sw. (Modular Type)	T.V. Soc.	Room Lighting Board	16 way SPN Main DB.	Energy Meter	2-way switch (6A)
1	Entrance Lobby (Veranda)	2	1				1			1		1		1	1	1	
2	Drawing Room	3	2			1				2	1	4	1	1			
3	Bedroom-1	3	2			1				1	1	2	1	1			
3	Bedroom-2	4	2			2				1	1	2	1	1			
4	Kitchen & Pantry	3	1				1	1		2		6		1			
5	Passage (Entry)	1	0		1					1		1		1			
6	Toilet-1	2			1			1		1		1		1			
7	Bath Room	2			1			1		1		1		1			
8	Perifery of Flat	4			4									1			
9	Entrance Gate	2			1				1					1			
	Qty. per Flat	**24**	**7**	**0**	**8**	**4**	**1**	**3**	**1**	**9**	**3**	**17**	**3**	**11**	**1**	**1**	**1**
	Total Qty. for 10 No. Flats	**240**	**70**	**0**	**80**	**40**	**10**	**30**	**10**	**90**	**30**	**170**	**30**	**110**	**10**	**10**	**10**

GENERAL NOTES:

1. BUSBAR MATERIAL - AL.
2. SYSTEM VOLTAGE - 415V, 3 ϕ N, 50HZ
3. RATED SHORT CIRCUIT WITHSTAND - 50KA, 1 SEC
4. DEGREE OF PROTECTION (IEC 60529) - IP:55
5. PAINT SHADE - 631 OF IS:5.
6. CABLE ENTRY : INCOMER - BOTTOM
   OUTGOING - BOTTOM



LEGEND:-

- FUSE
- INDICATING LAMP
- CABLE GLAND
- MCCB
- ACB
- CT (CURRENT TRANSFORMER)
- MFM — MULTI FUNCTION METER
- CONTACTOR

ISO-A3

FOR TENDER PURPOSE

REV.	DATE	DESCRIPTION	PPD.	CKD.	APPD.
P	06.06.18	ISSUED FOR ENQUIRY	SS	RKP	SK

CLIENT:–
HINDUSTAN URVARAK & RASAYAN LIMITED, GORAKHPUR

PROJECT:–
PRE PROJECT ACTIVITIES (RENOVATION OF ADMIN BUILDING) FOR AMMONIA UREA FERTILIZER PROJECT

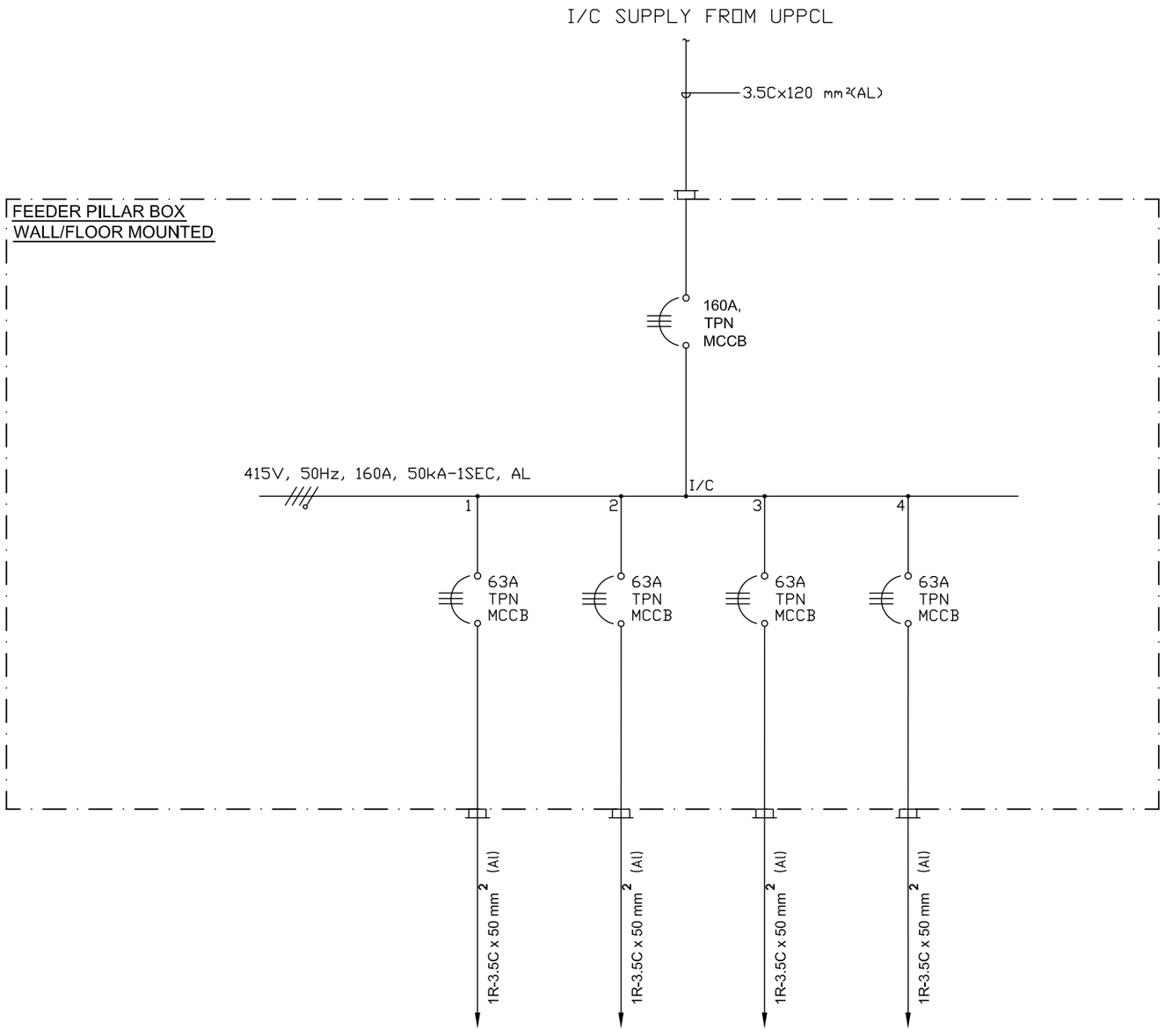
TITLE:– SINGLE LINE DIAGRAM AUX. SERVICE DISTRIBUTION BOARD (ADMIN BUILDING)

REV. P
SHEET 1 OF 1
SCALE: N.T.S.
DRG. NO.– PC160–1203
FILE:

पी डी आई एल
PDIL
प्रोजेक्ट्स एंड डेवलपमेंट इंडिया लिमिटेड नोएडा
PROJECTS & DEVELOPMENT INDIA LTD.–NOIDA

GENERAL NOTES:

1. BUSBAR MATERIAL - AL.
2. SYSTEM VOLTAGE - 415V, 3ϕ N, 50HZ
3. RATED SHORT CIRCUIT WITHSTAND - 50KA, 1 SEC
4. DEGREE OF PROTECTION (IEC 60529) - IP:55
5. PAINT SHADE - 631 OF IS:5.
6. CABLE ENTRY : INCOMER - BOTTOM
   OUTGOING - BOTTOM



LEGEND:-

MCCB

CABLE GLAND

FOR TENDER PURPOSE

REV.	DATE	DESCRIPTION	PPD.	CKD.	APPD.
P	06.06.18	ISSUED FOR CLIENT'S REVIEW/COMMENT	SS	RKP	SK

CLIENT:– HINDUSTAN URVARAK & RASAYAN LIMITED, GORAKHPUR

REV. P

SHEET 1 OF 1

SCALE: N.T.S.

PROJECT:– EARLY WORKS FOR AMMONIA UREA FERTILIZER PROJECT

DRG. NO.– PC160–1204

TITLE:– TYPICAL SINGLE LINE DIAGRAM FEEDER PILLAR BOX (FOR BUNGALOW)

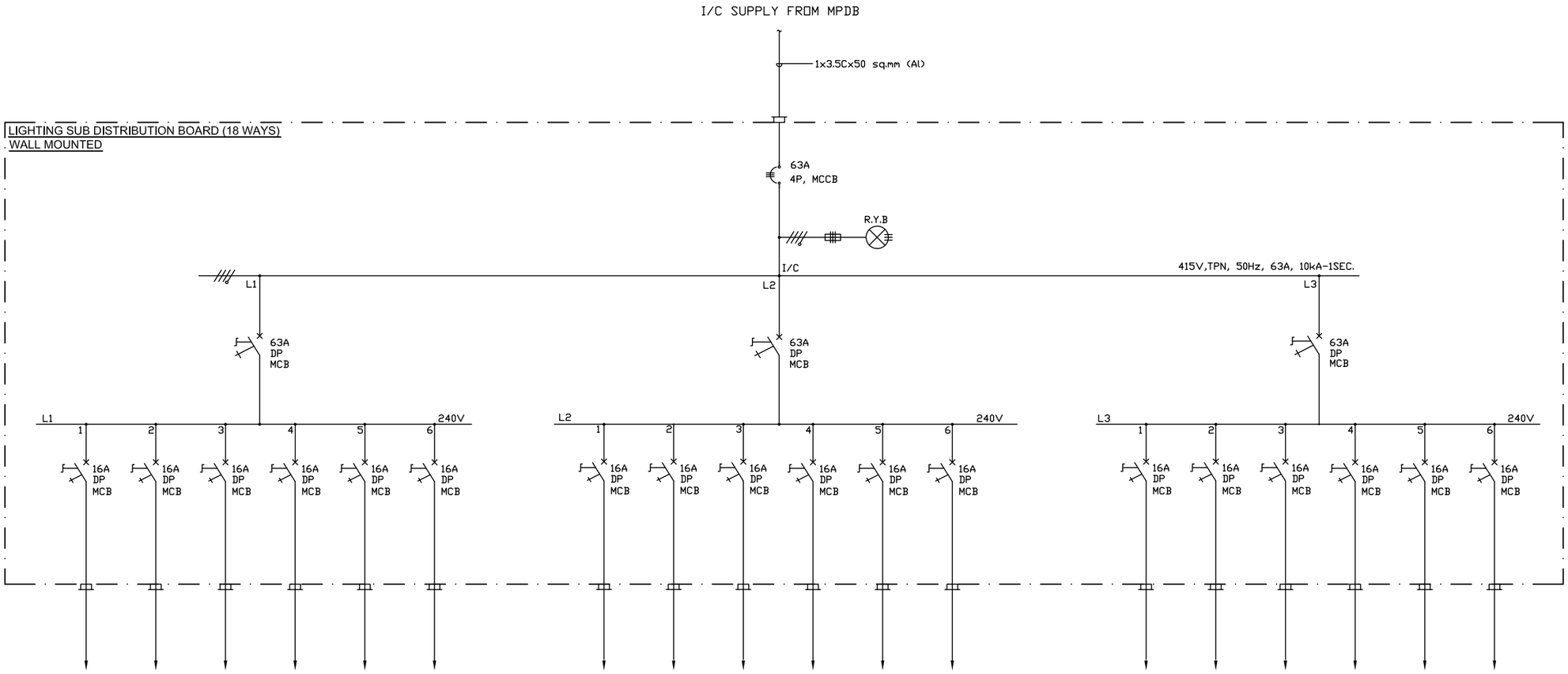
FILE:

प्रोजेक्ट्स एंड डेवलपमेंट इंडिया लिमिटेड नोएडा
PROJECTS & DEVELOPMENT INDIA LTD.–NOIDA

ISO–A3

GENERAL NOTES:

1. BUSBAR MATERIAL - AL.
2. SYSTEM VOLTAGE - 415V, 3ϕ N, 50HZ
3. RATED SHORT CIRCUIT WITHSTAND - 10KA, 1 SEC
4. DEGREE OF PROTECTION (IEC 60529) - IP:55
5. PAINT SHADE - 631 OF IS:5.
6. CABLE ENTRY : INCOMER - BOTTOM
   OUTGOING - BOTTOM



LEGEND:-

- FUSE
- INDICATING LAMP
- MCB/MCCB WITH THERMAL ELECTROMAGNETIC PROTECTION
- CABLE GLAND
- MCCB

FOR TENDER PURPOSE

ISO-A3

REV.	DATE	DESCRIPTION	PPD.	CKD.	APPD.
P	06.06.18	ISSUED FOR CLIENT'S REVIEW/COMMENT	SS	RKP	SK

HURL

CLIENT:- HINDUSTAN URVARAK & RASAYAN LIMITED, GORAKHPUR

REV. P | SHEET 1 OF 1 | SCALE: N.T.S.

PROJECT:- EARLY WORKS FOR AMMONIA UREA FERTILIZER PROJECT

DRG. NO.- PC160-1205

TITLE:- TYPICAL SINGLE LINE DIAGRAM LIGHTING SUB DISTRIBUTION BOARD (FOR ADMIN BUILDING)

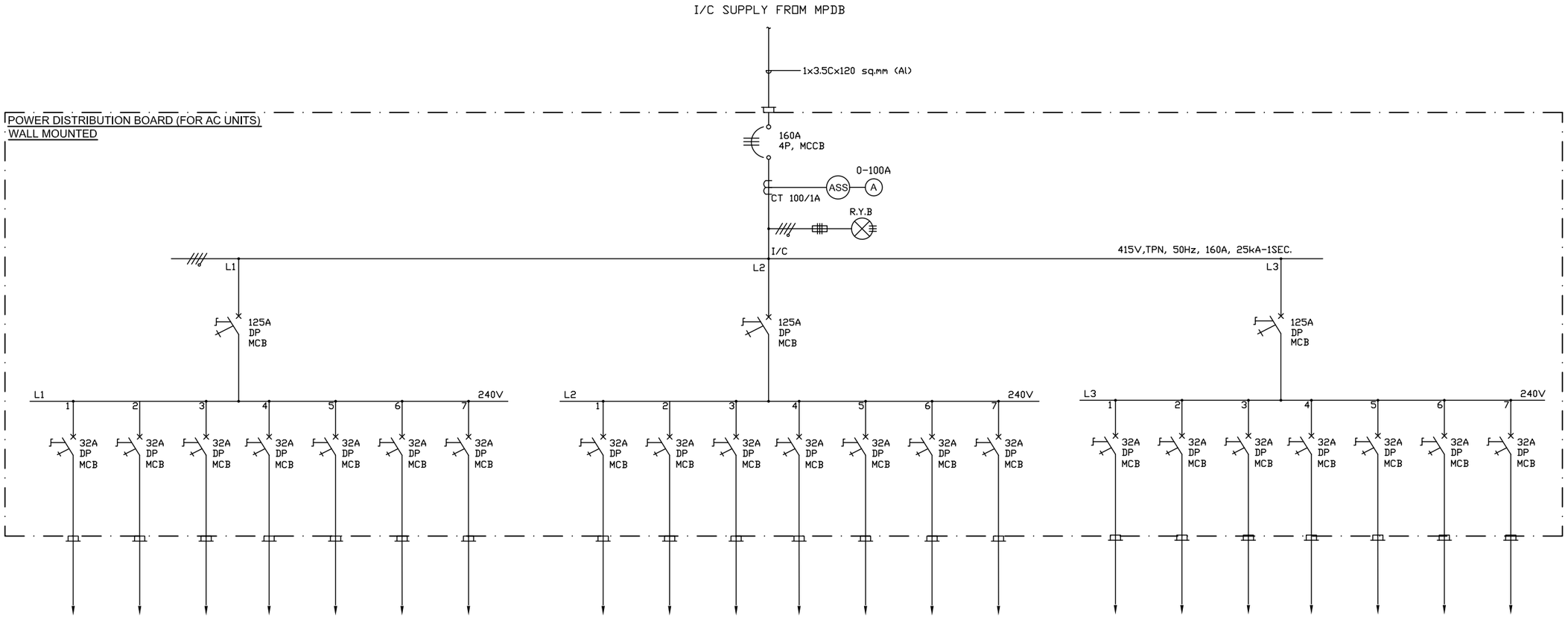
FILE:

PDIL

प्रोजेक्ट्स एंड डेवलपमेंट इंडिया लिमिटेड नोएडा
PROJECTS & DEVELOPMENT INDIA LTD.-NOIDA

GENERAL NOTES:

1. BUSBAR MATERIAL - AL.
2. SYSTEM VOLTAGE - 415V, 3ϕ N, 50HZ
3. RATED SHORT CIRCUIT WITHSTAND - 25KA, 1 SEC
4. DEGREE OF PROTECTION (IEC 60529) - IP:55
5. PAINT SHADE - 631 OF IS:5.
6. CABLE ENTRY : INCOMER - BOTTOM
   OUTGOING - BOTTOM



LEGEND:-

- FUSE
- INDICATING LAMP
- MCB WITH THERMAL ELECTROMAGNETIC PROTECTION
- MCCB
- CABLE GLAND
- CT (CURRENT TRANSFORMER)

FOR TENDER PURPOSE

REV.	DATE	DESCRIPTION	PPD.	CKD.	APPD.
P	06.06.18	ISSUED FOR CLIENT'S REVIEW/COMMENT	SS	RKP	SK

CLIENT:- HINDUSTAN URVARAK & RASAYAN LIMITED, GORAKHPUR

REV. P

SHEET 1 OF 1

SCALE: N.T.S.

PROJECT:- EARLY WORKS FOR AMMONIA UREA FERTILIZER PROJECT

DRG. NO.- PC160-1206

TITLE:- TYPICAL SINGLE LINE DIAGRAM SUB POWER DISTRIBUTION BOARD FOR AC UNITS (FOR ADMIN BUILDING)

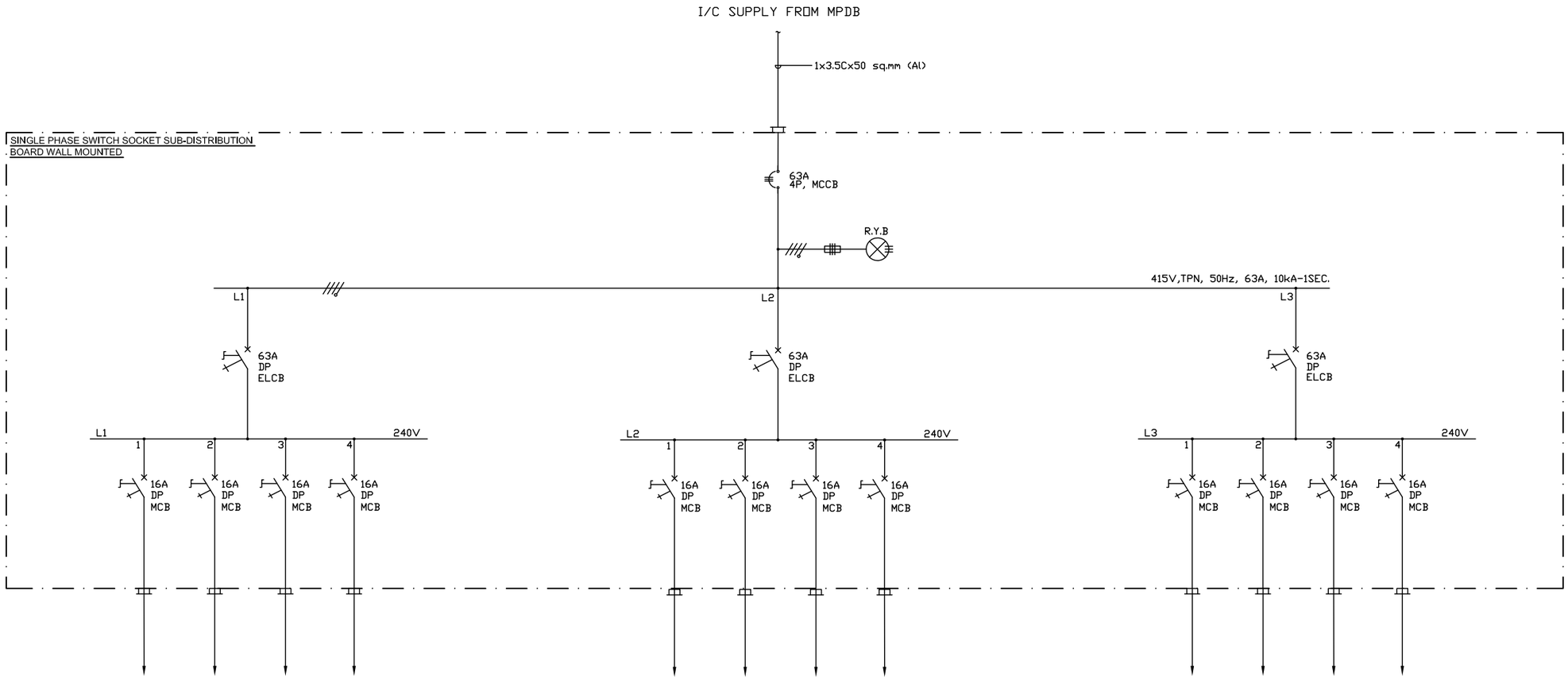
FILE:

प्रोजेक्ट्स एंड डेवलपमेंट इंडिया लिमिटेड नोएडा
PROJECTS & DEVELOPMENT INDIA LTD.-NOIDA

ISO-A3

GENERAL NOTES:

1. BUSBAR MATERIAL - Al
2. SYSTEM VOLTAGE - 415V, 3ϕ N, 50HZ
3. RATED SHORTCIRCUIT WITHSTAND - 10KA, 1 SEC
4. DEGREE OF PROTECTION (IEC 60529) - IP55
5. PAINT SHADE - RAL 7032.
6. CABLE ENTRY : INCOMER - BOTTOM
   OUTGOING - BOTTOM



LEGEND:

- FUSE
- INDICATING LAMP
- MCB/ELCB WITH THERMAL ELECTROMAGNETIC PROTECTION
- SWITCH FUSE UNIT
- CABLE GLAND
- MCCB

FOR TENDER PURPOSE

REV.	DATE	DESCRIPTION	PPD.	CKD.	APPD.
P	06.06.18	ISSUED FOR CLIENT'S REVIEW/COMMENT	SS	RKP	SK

CLIENT:– HINDUSTAN URVARAK & RASAYAN LIMITED, GORAKHPUR

REV. P

SHEET 1 OF 1

SCALE: N.T.S.

PROJECT:– EARLY WORKS FOR AMMONIA UREA FERTILIZER PROJECT

DRG. NO.– PC160–1207

TITLE:– TYPICAL SINGLE LINE DIAGRAM SINGLE PHASE SWITCH DISTRIBUTION BOARD 12WAYS (FOR ADMIN BUILDING)

FILE:

प्रोजेक्ट्स एंड डेवलपमेंट इंडिया लिमिटेड नोएडा
PROJECTS & DEVELOPMENT INDIA LTD.–NOIDA

ISO–A3

ENGINEERING STANDARD

SHEET STEEL DISTRIBUTION BOARDS

REV	REV DATE	EFF DATE	PURPOSE	PREPD	REVWD	APPD
2	20.01.07	01.02.07	ISSUED FOR IMPLEMENTATION	AV	BKC / SC	BB
1	16.01.06	30.01.06	ISSUED FOR IMPLEMENTATION	AV	BKC	BB
0	OCT. '97	--	ISSUED FOR IMPLEMENTATION	RNS/JKT/SC	JKT	HSW

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1.0 SCOPE

1.1 This standard covers the technical requirements of design, manufacture, testing at works and delivery in well-packed condition of Sheet Steel Distribution Boards.

1.2 This standard shall be read in conjunction with relevant Specification Sheets and Feeder details.

2.0 STANDARDS TO BE FOLLOWED

2.1 The design, manufacture and testing of the equipment shall comply with the latest issue of the following Indian Standards, unless otherwise specified. Equipment complying with equivalent IEC standards shall also be acceptable.

IS: 8623	-	Specification for low voltage switchgear and control gear assemblies.
IS: 13947	-	Specification for Low-voltage Switchgear and Control gear
IS: 5578	-	Guide for marking of insulated conductors.
IS: 11353	-	Guide for uniform system of marking and identification of conductors and apparatus terminals.
IS: 10118	-	Code of practice for selection, installation and maintenance of switchgear and control gear.

Various components housed in the distribution board shall conform to the Indian Standard Specification as mentioned against the component details.

2.2 The design and operational features of the equipment offered shall also comply with the provisions of the latest issue of the Indian Electricity Rules and other Statutory Acts and Regulations. The supplier shall, wherever necessary, make suitable modifications in the equipment to comply with the above.

2.3 Wherever any requirement, laid down in this standard, differs from that in Indian Standard Specification the requirement specified herein shall prevail.

3.0 SERVICE CONDITIONS

3.1 Ambient Conditions

These shall be as indicated in Specification Sheet.

3.2 System Details

These shall be as indicated in Specification Sheet.

4.0 OPERATING REQUIREMENTS

The distribution board shall be suitable for operating at the specified rating continuously with the specified voltage and frequency variations under the

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ambient conditions indicated in Specification Sheet, without exceeding the permissible temperature rise and without any detrimental effect on any part.

5.0 DESIGN AND CONSTRUCTIONAL FEATURES

5.1 General

5.1.1 The distribution board shall consist of an assembly of a series of floor mounting, identical, metal clad, dead front type panels of unitized design. The panels shall be placed side by side to form a compact assembly and shall be extensible on either side.

5.1.2 The complete assembly shall be dust, damp and vermin proof having minimum degree of protection equivalent to IP-52 as per IS: 13947.

5.1.3 The frame work of the cubicles shall be of bolted/welded construction. The minimum thickness of steel shall be 2 mm for load bearing members, 1.6 mm for non-load bearing members and 3 mm for base channel. The doors and covers shall be fabricated from cold rolled sheet steel. Suitable reinforcement, wherever necessary, shall be provided.

5.1.4 The door hinges shall be concealed type.

5.1.5 All external hardware shall be cadmium plated/zinc passivated. The hardware for fixing the removable parts shall be provided with retaining devices.

5.1.6 The doors and the removable covers shall be provided with non-deteriorating neoprene gaskets. Gaskets without any discontinuity shall be preferred. Gaskets shall be held in position in groove of shaped sheet steel work or these shall be of U type. Adhesive cement, if used, shall be of good quality so that the gaskets do not come off during service.

5.1.7 All the components shall be accessible for inspection and maintenance without the necessity for removal of the adjacent ones. In case of single front design all components shall be accessible from the front for maintenance and back opening doors/ openable covers for maintenance shall not be acceptable.

5.1.8 The layout of the components inside a module shall be liberal to facilitate maintenance and the interconnection of wiring between the components shall not be subjected to any undue stress at the bends.

5.1.9 Mounting height of components requiring operation and observation shall not be lower than 300 mm and higher than 1800 mm.

5.1.10 Inter panel barriers shall be provided.

5.1.11 Adequate arrangement for earthing shall be provided to safeguard the operator or other personnel from electric hazards under all conditions of operation.

5.2 Panel Arrangement

5.2.1 The distribution board shall be drawout / non-drawout type in single front/double front configuration as specified in Specification Sheet.

5.2.2 Each Panel shall have its horizontal bus-bar chamber running on the top with multi-tier module units in the centre and having vertical bus-bar chamber and cable alley on either side.

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5.2.3 The modules shall be enclosed on all sides and shall be so arranged that larger ones are placed at the bottom portion of the panel. Fixed type modules shall be at least 300 mm from the base channel.

5.2.4 The number of modules in the panel shall not exceed six for motor starter feeders and eight for switch fuse/MCB/MCCB feeders. The minimum size of module shall be 300 mm and 200 mm for starter and switch fuse feeders. The incomer and bus coupler module sizes for ratings up to 400 A shall be half the panel size. For higher ratings they shall be housed in single panel.

5.2.5 The module door shall be so interlocked that it shall not be possible to open the door with switch in closed position. Defeat interlock facility shall be provided.

5.2.6 The relay, meters, switches and lamps shall be flush mounted. All components of one module shall be mounted on the same module on a rigid sheet steel chassis. A 20 mm dia. rotating knob on the door shall be provided for closing and opening.

5.3 Bus Bars and Connections

5.3.1 The bus-bar shall be suitable for the supply system specified in the Specification Sheet. The bus-bar and connections shall be made of electrolytic copper or high conductivity aluminium alloy conforming to Grade E91E of IS: 5082.

5.3.2 The bus-bar shall be amply sized to carry the rated continuous current under the specified ambient temperature without exceeding the temperature of 90ºC. The bus-bars shall also be designed to withstand the system fault current for 1 second without exceeding the temperature of 200ºC for bare aluminium and 250ºC for bare copper. The minimum acceptable size of bus-bars shall be 250 sq. mm (Al). Calculation for the bus-bar sizing shall be furnished along with the offer.

5.3.3 In case of double front arrangement of distribution boards, different sets of vertical bus-bars shall be provided. The vertical bus-bars shall be PVC sleeved or shrouded by insulating barriers which shall have cut-outs to permit entry of power wires. It shall be possible to remove the shroud for inspection and maintenance. Neutral-bars shall be provided in this chamber.

5.3.4 Horizontal bus-bars shall be of same cross-section through out. Stepped bus-bars shall not be acceptable.

5.3.5 All bus-bars shall be arranged and colours coded according to IS: 5578/11353.

5.3.6 The horizontal bus-bar shall run in a separate bus chamber located at the top shall have separate screwed cover for inspection purpose.

5.3.7 The bus-bars shall be rigidly supported at equal intervals to withstand maximum short circuit stresses. The supports shall be of moulded construction with built in anti tracking barriers. The support material shall be of fibre glass reinforced thermosetting plastic.

5.3.8 All joints shall be suitably treated to avoid oxidation of contact surfaces and bimetallic corrosion. A minimum of two bolts with spring washers shall be used for horizontal bus-bar joints.

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5.3.9 Horizontal bus bars shall be insulated with heat shrinkable PVC sleeves of reputed makes. Insulating shrouds shall be provided for all joints of insulated bus-bars.

5.4 Clearance and Creepage Distances

5.4.1 The clearance and creepage distances shall not be lower than the values specified below :

i)	Minimum clearance between two live conductors	--	20 mm
ii)	Minimum clearance between live part and accidentally dangerous part	--	20 mm
iii)	Minimum creepage distance	--	28 mm

5.4.2 The clearances and the creepage, as specified above, shall definitely be maintained in the bus-bar system. Provision of bus-bar insulations, separator or barriers shall not be considered to reduce the clearance from the values specified above.

5.4.3 At the termination points in the equipment, e.g. switches, contactors, thermal relays, etc. it is realized that above clearance shall not always be possible to be maintained. All such points where above clearance are not possible to be maintained shall, therefore, be insulated or taped.

5.5 Insulation

5.5.1 The insulation used shall be non-hygroscopic and shall be of porcelain, Epoxy-resins or fibre glass moulded with plastic. It shall be of adequate electrical and mechanical strength to give trouble free service during normal operation and short circuit conditions.

5.5.2 The insulation shall be treated suitably to withstand the tropical conditions and atmospheric pollution as specified in Specification Sheet.

5.6 Power Wiring

5.6.1 The connections from bus-bar including neutral to individual units on the modules shall consist of PVC insulated flexible copper cable or tapped copper strip.

5.6.2 The power wiring size shall be decided based on the rating of the switch, after using a rating factor of not more than 50% over the current rating in free air. In any case the minimum size of power wiring shall not be less than 4 sq. mm copper.

5.6.3 The size of connection from incomer to horizontal bus-bar and from horizontal bus-bar to bus coupler shall not be less than the size adopted for horizontal bus-bar.

5.7 Control Wiring

5.7.1 The switch board shall be completely factory wired and ready for external connections.

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5.7.2 The wiring shall be carried out with flexible stranded PVC insulated copper conductor cables of 1100 Volt grade. The size of wires shall be as follows:

C.T. Circuit -- 2.5 sq. mm

V.T. and Control Circuits -- 1.5 sq. mm

5.7.3 All wiring shall be provided with dependent both end marking as per IS: 5578. Numbered ferrules, reading from the terminals outwards, shall be provided at both ends of all wiring for easy identification. These shall be interlocking type plastic ferrules.

5.7.4 Control wiring circuits, fed from a supply common to a number of feeders, shall be so protected that failure of a circuit in one feeder does not affect the operation of the other feeders.

5.7.5 The wiring to the equipment mounted on the doors shall be carried out with flexible multi strand copper conductor cable and supported so that opening of the door, there is no undue strain on wire leads.

5.7.6 The control cables shall be neatly arranged and properly supported.

5.8 External Cable Termination

5.8.1 All power and control cables shall enter the distribution board from the bottom unless otherwise specified in Specification Sheet. Sufficient space shall be provided for ease of connection and termination of cables.

5.8.2 All cables shall be of 1.1 KV grade PVC insulated armoured and PVC sheathed except for single core cable which shall be unarmoured. The number and sizes of cable shall be as indicated in Feeder details.

5.8.3 Compression type cable glands along with the cable lugs as required shall be provided for termination of cables.

5.8.4 The cable glands shall be of rolled Aluminium or Nickel/Cadmium plated brass heavy duty double compression type and shall be mounted on a removable gland plate, provided at a minimum height of 75 mm from the bottom of the distribution board. Two numbers spare knockouts of size 20 mm shall also be provided on the gland plates for future use.

5.8.5 For all power cables crimped type aluminium lugs for aluminium cables and tinned copper lugs for copper cables shall be provided.

5.8.6 The terminal blocks shall be pressure clamp type up to 35 sq. mm cable and bolted lug type for higher sizes of cables. These shall be protected type and rated for 1100 Volts service. The minimum current rating of terminal block shall be 16 Amp. The construction shall be such that after the connection of cables by means of lugs, necessary clearance and creepage distance are available.

5.8.7 Where more than two cables in parallel are required to be terminated, a system of bus links shall be provided with adequate clearance and spacing.

5.8.8 Suitable clamps to support the vertical run of cables shall be provided.

5.8.9 The terminal block shall be grouped according to circuit functions and suitably numbered. 20% extra terminals shall be provided in the terminal block.

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5.8.10 For power connections, suitable marking on the terminals shall be provided to identify the phases.

5.9 **Feeder Details**

5.9.1 The requirements of incomer, bus coupler and outgoing feeders shall be as indicated in the single line diagram, feeder details and corresponding schematic diagram.

5.9.2 The bus coupler shall be so located that it is possible to maintain half of the bus-bars while the other half is still alive. Complete segregation of bus-bar connections to bus coupler shall be provided.

5.9.3 Castle key type mechanical interlocks shall be provided between incomers and bus section modules to avoid paralleling of incomers. In addition padlocking facilities shall be provided in OFF position.

5.9.4 Single phase loads shall be distributed as far as possible on all the three phases.

6.0 COMPONENT DETAILS

6.1 The make of the components shall be as specified in Specification Sheet and shall conform to type of co-ordination C as per IS: 13947.

6.2 **Moulded Case Circuit Breakers**

6.2.1 The circuit breaker shall conform to IS: 13947 (Part 2) and shall be of P2 category having rupturing capacity as specified in Specification Sheet.

6.2.2 The circuit breaker shall be provided with spring assisted quick make quick break type manually operated trip free mechanism, mechanical ON/OFF position indicators, thermal tripping devices of inverse characteristics, instantaneous short circuit tripping devices and necessary auxiliary and alarm switches. The MCCB cubicle shall be provided with service, test and isolated position and automatic safety shutter.

6.2.3 The thermal and short circuit tripping device shall be adjustable type.

6.2.4 When used for motor circuit shunt trip devices shall be provided and the let through power of controlling MCCB shall be lower than the respective contactor.

6.2.5 In addition, under voltage trip shall be provided, if specified.

6.3 **Switches**

6.3.1 The switches shall be Motor duty type AC23 category and shall comply with the requirements laid down in IS: 13947 (Part 3). Switches up to 63 Amps shall be rotary type and those of 100 Amp and above shall be link type.

6.3.2 ‘ON’ and ‘OFF’ positions of the switches shall be indicated on the panel. Provision shall be made to lock the switch in the ‘OFF’ position.

6.3.3 The fixed contacts shall be shrouded and the contacts shall be silver plated.

6.3.4 Two Pole switches shall also isolate the neutral circuit along with phase circuit. 4 Pole / 2 Pole switches shall be used for 3 Phase/1 Phase circuits respectively.

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6.4 **Fuses**

The fuses shall be of non-deteriorating HRC cartridge link type and conform to IS: 13703. They shall be suitable for the load and the service required in the circuit.

6.5 **Air Break Contactors**

6.5.1 The Air Break Contactor shall be of AC3 category unless otherwise specified, conforming to IS: 13947 (Part-4) and flapper type. Gravity operated contactors are not acceptable.

6.5.2 The dropout voltage shall not exceed 65% of rated voltage.

6.5.3 Each contactor shall be provided with auxiliary contacts as required. The rating of the auxiliary contacts shall be 5 Amps. AC or 1 Amp DC at the specified control voltages. The spare auxiliary contacts shall also be wired terminal block.

6.6 **Bimetal Thermal Overload Relays**

6.6.1 The contactor shall be provided with three pole bimetal thermal overload relays unless otherwise specified. The bimetal relays shall be of suitable range, ambient temperature compensated and shall be separate mounting type. They shall be adjustable through graduated scale and shall be provided with changeover contact.

6.6.2 Bimetal relays shall conform to IS: 3231 and shall have built in single phasing preventor.

6.6.3 The bimetal relays shall be provided with a manual reset device resetable after opening the cubicle door. Auto reset thermal relays are not acceptable.

6.7 **Current Transformers**

6.7.1 The current transformers shall conform to IS: 2705.

6.7.2 Current Transformers shall be Class-F insulated and vacuum impregnated. The Current Transformers shall be rigidly mounted and shall be easily accessible for maintenance and testing.

6.7.3 The Current Transformers shall be of 7.5 VA output. The output shall be adequate for the instrument and metering duties involved with sufficient margin. The Current Transformers shall have the accuracy Class-1 for the metering duty.

6.7.4 All the Current Transformers shall be provided with terminals and shorting links. One of the terminals of C.T. shall be earthed. The polarity of the C.T. shall be clearly marked.

6.7.5 The C.T.s shall be capable of withstanding momentary open-circuit on the secondary side without injurious effects.

6.8 **Instruments and Meters**

6.8.1 All instruments shall be flush mounting type with square face and shall be tropicalized and dust tight.

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6.8.2 The size of the instruments shall be 96 mm x 96 mm for full and half size modules and 72 mm x 72 mm for lower size modules.

6.8.3 Dials shall be parallax free with scale marked in black on white background and shall be suitable for direct reading.

6.8.4 Zero adjusters shall be provided for operation from the front of the cases.

6.8.5 All ammeters and voltmeters shall have 0 - 240º scale moving iron spring controlled type and of Class 1.5 accuracy as per IS: 1248. The scale range of the ammeter and voltmeter shall be as indicated in the feeder details.

6.8.6 In case of motor feeders, the ammeter shall be graduated uniformly upto C.T. primary current and with a compressed end scale upto 6 times the C.T. primary current. Red pointer shall be provided, which can be adjusted at site for indicating full load current.

6.8.7 KWH meter shall be 3 phase 4 wire type. These shall conform to the requirements of relevant IS and shall be C.T. operated. The current coil shall be rated for 5 Amp.

6.8.8 All kWh meters shall be provided with test blocks for current and voltage coils for testing them at site without interrupting their recording while in service.

6.9 Push Button and Control Switches

6.9.1 The switches and push buttons shall conform to utilization category AC 11/DC 11 as per IS: 13947 (Part-5). The contact shall be rated to make, break and carry inductive current of 5 Amp. at 415 V AC and 1 Amp at 220 V DC.

6.9.2 The control switches shall be spring return rotary type unless otherwise specified and provided with pistol grip type handle. The control switches for circuit breakers shall be additionally fitted with lost motion devices and sequencing devices.

6.9.3 The selector switches shall be stay-put rotary type and provided with oval shape handles.

6.9.4 The push buttons shall be of momentary contact spring loaded type with a set of normally close and open contacts. The push button for ‘Start’ shall be shrouded type and coloured green, stop push button shall be un-shrouded type and coloured red and other push buttons shall be un-shrouded type coloured black. The fixing ring shall be metallic white.

6.9.5 Emergency stop push buttons, if specified, shall be lockable in pushed position.

6.10 Miniature Circuit Breakers

6.10.1 The miniature circuit breakers shall conform to IS: 13032 and shall be of duty category M-9.

6.10.2 It shall be provided with overload and short circuit protective devices in a heat resistant housing.

6.10.3 A certificate of short circuit rating and current time tripping curve shall be furnished alongwith the offer.

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6.11 **Signal Lamps**

6.11.1 Signal lamps shall be provided to indicate the various circuit conditions as shown in scheme drawings. The colour of the lamps for various functions shall be as follows:

Red -- Switch/Contactor closed.
Green -- Switch/Contactor open.

6.11.2 The lamps shall be LED type having lumen output 200 milli candela in axial direction.

6.11.3 It shall be possible to remove the globe from outside for replacement of lamps.

7.0 ACCESSORIES

7.1 The supplier shall include the following accessories.

-- Fuse Puller.
-- Test plug for kWh meters.

7.2 **Space Heater**

Each vertical section shall be provided with a thermostatically controlled space heater, rated for 240 V, 50 Hz and controlled through double pole miniature circuit breaker.

7.3 **Name Plates**

7.3.1 The distribution board shall have large name plate on the top to indicate its name and designation.

7.3.2 Each feeder shall be provided with name plate. Each single front panel shall have name plate both in front and back.

7.3.3 All control switches, push buttons, lamps etc. shall have functional identification labels.

7.3.4 Name plate shall be of black perspex with white engraving and of minimum 3 mm thick.

7.3.5 Any other accessories required, but not specified shall also be supplied to make the distribution board complete in all respects to ensure safe and proper operation.

8.0 PAINTING

8.1 The enclosure after degreasing, pickling in acid, cold rinsing phosphatising, passivating etc. shall be painted with two coats of anti-rust paint followed by two coats of anticorrosive paint.

8.2 Epoxy based paint shall be used, if indicated in Specification Sheet.

8.3 All paints shall be carefully selected to withstand tropical heat and extremes of weather. The paint shall not scale off, crinkle or be removed by abrasion due to normal handling.

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8.4 Unless otherwise specified, the finishing shade shall be light grey Shade No.631 as per IS: 5.

8.5 One litre of paint shall be supplied along with each board for touch up at site.

9.0 TESTS AND INSPECTION

9.1 The distribution boards shall be subjected to routine test as per IS: 8623.

9.2 Additional tests, wherever specified, shall be carried out.

9.3 All the above tests shall be carried out in presence of purchaser's representative. In addition, the equipment shall be subjected to stage inspection during process of manufacture at works and site inspection.

9.4 These inspections shall however, not absolve the vendor from his responsibility for making good any defect which shall be noticed subsequently.

10.0 DRAWINGS AND DOCUMENTS

10.1 Drawings and documents as per Annexure-I shall be supplied unless otherwise specified.

10.2 All drawings and documents shall have the following description written boldly:

- Name of client
- Name of consultant
- Enquiry / Order Number with plant / project name
- Code No. and Description

11.0 SPARES

11.1 Spares for operation and maintenance

Item wise unit prices of spare parts with recommended quantity shall be quoted along with the equipments as listed in the Annexure-II for the period as stipulated in specification sheet.

11.2 Commissioning Spares

Commissioning spares, as required, shall be supplied with the main equipment. Item wise list of recommended commissioning spares shall be furnished for approval.

11.3 Any other spare parts not specified, but required, shall also be quoted along with the offer.

11.4 All spare parts shall be identical to the parts used in the equipments.

12.0 PACKING

12.1 The distribution board shall be properly packed before despatch to avoid damage during transport, storage and handling.

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12.2 The packing box shall contain a copy of the installation, operation and maintenance manual.

12.3 A sign to indicate the upright position of the panels to be placed during transport and storage shall be clearly marked. Also proper arrangement shall be provided to handle the equipment.

13.0 DEVIATIONS

13.1 Deviations, if any, from this standard shall be clearly indicated in the offer with reasoning.

13.2 Deviations, if any, from the data furnished in specification sheet shall be indicated therein beside the data by encircling it.

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ANNEXURE - I

DOCUMENTATION FOR SHEET STEEL DISTRIBUTION BOARDS

Sl.No.	Documents	Documents Required (Y / N)		
		With Bid	For Approval	Final
1.	Specification Sheet, duly completed	Y	Y	Y
2.	Technical Particulars, duly filled-in	Y	Y	Y
3.	Feeder Details	Y	Y	Y
4.	General Arrangement and Foundation Drawings	Y	Y	Y
5.	Schematic Diagrams with Terminal arrangement drawings	N	Y	Y
6.	Calculation for Bus-bar sizing	Y	Y	N
7.	Illustrative and Descriptive literature	Y	N	Y
8.	Catalogues for bought out accessories	Y	N	Y
9.	Installation, Operation and Maintenance Manual	N	N	Y
10.	Test Certificates			
	-- Type (for MCCB & MCB)	Y	N	N
	-- Routine	N	N	Y
11.	Guarantee Certificates	N	N	Y
12.	Spare Parts List	Y	N	Y

Note:

1. 4 hard copies & 1 soft copy shall be supplied with bid.
2. 4 hard copies & 1 soft copy shall be supplied for approval after order within 4 weeks from the date of LOI.
3. 8 hard copies & 2 soft copies in CD shall be submitted as final documents prior to despatch of the equipment. These shall be made in sets and supplied in fine plastic coated folder.

Y - Yes, N - No

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ANNEXURE - II

LIST OF SPARES

The following spare parts shall be quoted along with the offer.

A **MOULDED CASE CIRCUIT BREAKER** (OF EACH RATING)
- i) Complete Breaker Assembly
- ii) Complete Breaker Assembly.

B **SWITCHES** (OF EACH RATING)
- i) Assembled switch in open execution
- ii) Single pole moving blade assembly
- iii) Single pole base assembly

C **FUSES** (OF EACH RATING)
- i) Assembled switch in open execution
- ii) Single pole moving blade assembly
- iii) Single pole base assembly

D **CONTROL SWITCHES**
- i) Trip-Neutral-Close Control Switch
- ii) Local-Remote Selector Switch
- iii) Heater Switch
- iv) Thermostat
- v) Ammeter Selector Switch
- vi) Voltmeter Selector Switch
- vii) Push Button
- viii) Push Button Element
- ix) Push Button Actuator of each type

E **CONTACTOR** (OF EACH RATING)
- i) Contactor with Auxiliary Contacts
- ii) Operating Coil
- iii) Auxiliary Contact Block

F **INDICATING LAMPS**
- i) Indicating lamps globes of each colour
- ii) Indicating lamp fittings
- iii) Indicating lamp bulbs

G **METERS**
- i) Ammeter
- ii) Voltmeter

H **PROTECTIVE RELAYS**
- i) Relays
- ii) Thermal overload relay of each type

NOTE: 1. All spare parts shall be identical to the parts used in the distribution boards**.**

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ENGINEERING STANDARD

CABLES

2	20.01.07	01.02.07	ISSUED FOR IMPLEMENTATION	AV	BKC/SC	BB
1	16.01.06	30.01.06	ISSUED FOR IMPLEMENTATION	AV	BKC	BB
0	JAN'98	--	ISSUED FOR IMPLEMENTATION	RNS/ JKT/ SC	JKT	HSW
REV	**REV DATE**	**EFF DATE**	**PURPOSE**	**PREPD**	**REVWD**	**APPD**

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1.0 SCOPE

1.1 This standard covers the technical requirements of design, manufacture, testing at works and dispatch in well packed condition of power and control cables.

1.2 The standard shall be read in conjunction with relevant specification sheets and other relevant references as specified therein.

2.0 STANDARDS TO BE FOLLOWED

2.1 The design, manufacture and testing of cables covered by this standard shall comply with the latest issue of following Indian Standards, unless otherwise specified. Equipment complying with equivalent IEC standards shall also be acceptable.

IS: 1554 Part (I)	--	PVC insulated (heavy duty) electric cables for working voltages upto and including 1100 volts.
IS: 1554 Part (II)	--	PVC insulated (heavy duty) electric cables for working voltages from 3.3 KV upto and including 11 KV.
IS: 7098 Part (I)	--	Cross linked polyethylene insulated PVC sheathed cables for working voltages upto and including 1100 volts.
IS: 7098 Part (II)	--	Cross linked polyethylene insulated PVC sheathed cables for working voltages from 3.3 KV upto and including 33 KV
IS: 7098 Part (III)	--	Cross linked polyethylene insulated thermoplastic sheathed cables for working voltages from 66 KV upto and including 220 KV
IS: 692	--	Paper insulated lead sheathed cables for rated voltages upto and including 33KV
IS: 694	--	PVC insulated cables for working voltages upto and including 1100 volts
IS: 5831	--	PVC insulation and sheath of electric cables

2.2 The design and operational features of the cables offered shall also comply with the provisions of latest issue of the Indian Electricity Rules and other relevant Statutory Rules & Regulations. The supplier shall, whenever necessary, make suitable modification in the cables to comply with the above mentioned rules.

2.3 Wherever any requirement, laid down in this standard, differs from that in Indian Standard Specifications, the requirement specified herein shall prevail.

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3.0 SERVICE CONDITIONS

3.1 Ambient Conditions

These shall be as indicated in specification sheet.

3.2 System Details

These shall be as indicated in specification sheet.

4.0 OPERATING REQUIREMENTS

The cables shall be suitable for operating continuously at the rated capacity as specified in relevant I.S. under the ambient conditions in specification sheet without exceeding the permissible temperature rise and without any detrimental effect on any part.

5.0 GENERAL DESIGN AND CONSTRUCTIONAL FEATURES

5.1 The design, manufacture and workmanship of cables shall be in accordance with the latest practice.

5.2 All materials to be used shall be new, unused and of the best quality.

5.3 Conductors

The power cables shall be of stranded Aluminium / copper round or shaped conductors and control cables shall be of annealed high conductivity stranded copper round conductors. The conductors shall comply with the requirements of IS: 8130.

5.4 Insulation

The conductor insulation shall be type A/C as indicated in specification sheet and shall comply with relevant IS.

5.5 Fillers

The cables shall have suitable fillers wherever required, laid up with conductors to provide substantially circular cross section before the inner sheath is applied.

5.6 Inner Sheath

Inner sheath, wherever applicable shall be ST1/ ST2 type compound applied by extrusion process except for paper cables for which it shall be of lead or lead alloy.

5.7 Armouring

All power and control cables shall be armoured as specified in specification sheet. The single core cables shall be armoured with hard drawn Aluminium

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taps/ wires or any other suitable nonmagnetic material. All other cables shall have galvanized steel wire / strip armouring.

5.8 **Outer Sheath**

The outer sheath shall be ST1/ ST2 type compound applied by extrusion process and suitable to withstand atmospheric pollution, resistance to termites, fire retardant and coloured black.

5.9 **Screening**

Screening over conductor and insulation shall be provided as per relevant standard unless specified otherwise. The screening for control cables if specified shall be of aluminium, mylor or equivalent and provided with tinned drain wire which shall be continuous and permanently connected to the screen.

5.10 **Identification**

The individual cores of cables shall be coloured as per relevant IS. Where it is not possible to distinguish the cores by colour, coloured strip shall be applied on the cores or core nos. shall be marked on each core at regular intervals. All cables shall carry the manufacturer's name or trade mark, the cable size, voltage rating and year of manufacture at intervals not exceeding 100 meters. Running meter markings shall also be provided throughout the length of the cable.

5.11 **Dimension**

The overall dia. and dia. under armour of the cables shall be indicated by the vendor in the technical particulars. These shall be guaranteed with a tolerance of ± 5% but not exceeding 2 mm.

5.12 The cut ends of the cables shall be sealed by means of non-hygroscopic materials.

6.0 SPECIAL PURPOSE CABLES

6.1 **Flame Retardant Low Smoke Cables**

Flame retardant low smoke cables, where specified in specification sheet, shall have outer sheath of PVC having following values.

- Minimum oxygen index - 29%
- Minimum temperature index - 250ºC
- Maximum acid gas generation - 20%
- Maximum smoke density rating - 60%

6.2 **Heat Resistant Cables**

Heat resistant cables, where specified in specification sheet, shall be of silicon rubber insulated laid circular with asbestos worming and overall glass fibre

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braided and varnished. Silicon rubber insulating compound shall conform to IS:6380 and the constructional features shall conform generally to IS:9968.

7.0 CABLE DRUM

7.1 The cables shall be supplied in non-returnable wooden drums (or steel drums if specified) of heavy construction. The wood used for construction of the drums shall be properly seasoned, sound and free from defects.

7.2 Cables shall be supplied in specified drum lengths. Where no such indication is given, standard drum lengths may be offered.

7.3 The tolerance on each drum of cable shall not exceed ± 2.5%. However, no negative tolerance on HV cables is acceptable.

7.4 All cable drums shall have stencilled data as per relevant IS as well as the purchaser's order no., item no. & drum no.

8.0 TESTS AND INSPECTION

8.1 The following tests shall be carried out on the cables as per relevant IS.

i) Routine Tests - On all cables

ii) Acceptance tests - On representative length of each size

iii) Type tests - Wherever specified on one cable drum of each size

8.2 In addition, the following tests shall be carried out on all fire retardant low smoke cables as per IS or as per the following standards:

i) Oxygen and temperature index test as per ASTM-D-2863

ii) Acid gas emission test as per IEC-754 Part-I

iii) Smoke density test as per ASTM-D-2843

iv) Flammability test as per IEC-332 Part-I or IS-10810

8.3 All the above mentioned tests shall be carried out in the presence of purchaser's representative. In addition, the cables shall be subjected to stage inspection at works and inspection at site for final acceptance.

8.4 These tests and inspections shall, however, not absolve the vendor from their responsibility for making good any defect which may be noticed subsequently.

9.0 DRAWINGS AND DOCUMENTS

9.1 Drawings and documents as per Annexure-I shall be supplied, unless otherwise specified.

9.2 All drawings and documents shall have the following descriptions written boldly.

- Name of client

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- Name of consultant
- Enquiry / Order Number with plant / project name
- Code No. and Description

10.0 DEVIATIONS

10.1 Deviations, if any, from this standard shall be clearly indicated in the offer with reasoning.

10.2 Deviations, if any, from the data furnished in specification sheet shall be indicated therein beside the data by encircling it.

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ANNEXURE - I

DOCUMENTATION FOR CABLES

Sl. No.	Document Description	Documents Required (Y / N)		
		With Bid	For Approval	Final
1.	Specification Sheet, duly completed	Y	Y	Y
2.	Technical Particulars, duly filled-in	Y	Y	Y
3.	Illustrative and Descriptive catalogues	Y	N	Y
4.	Installation, Termination and Jointing Instructions	N	N	Y
5.	Test certificates			
	a) Routine	N	N	Y
	b) Type	Y	N	Y
6.	Guarantee Certificates	N	N	Y

Note:

1. 4 hard copies & 1 soft copy shall be supplied with bid.
2. 4 hard copies & 1 soft copy shall be supplied for approval after order within 4 weeks from the date of LOI.
3. 8 hard copies & 2 soft copies in CD shall be submitted as final documents prior to despatch of the equipment. These shall be made in sets and supplied in fine plastic coated folder.

Y - Yes, N - No

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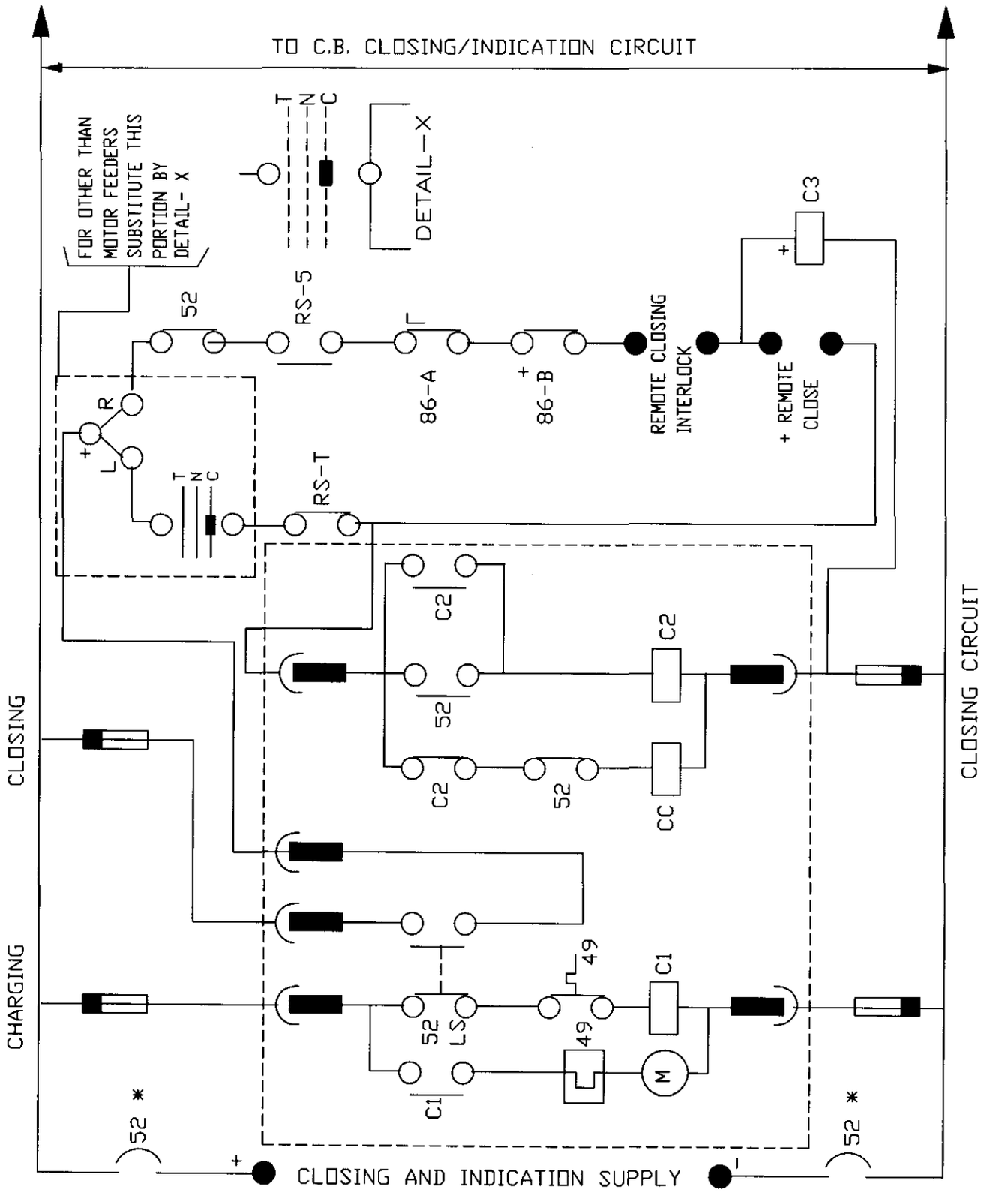
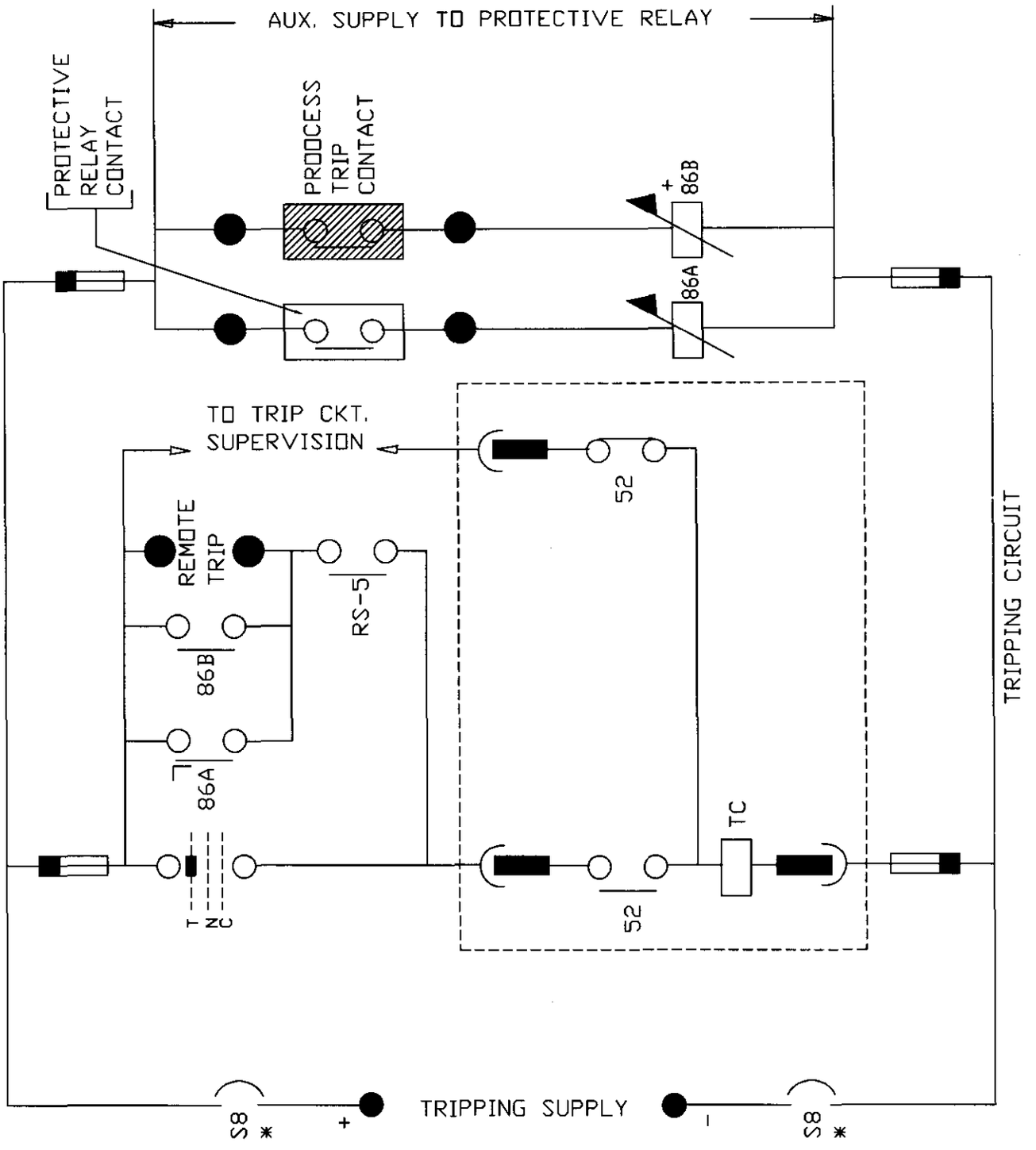
PDIL	SCHEMATIC DIAGRAM CIRCUIT BREAKER CONTROLLED FEEDERS	PDS:E 451	1
		DOCUMENT NO.	REV
		SHEET 1 OF 4	



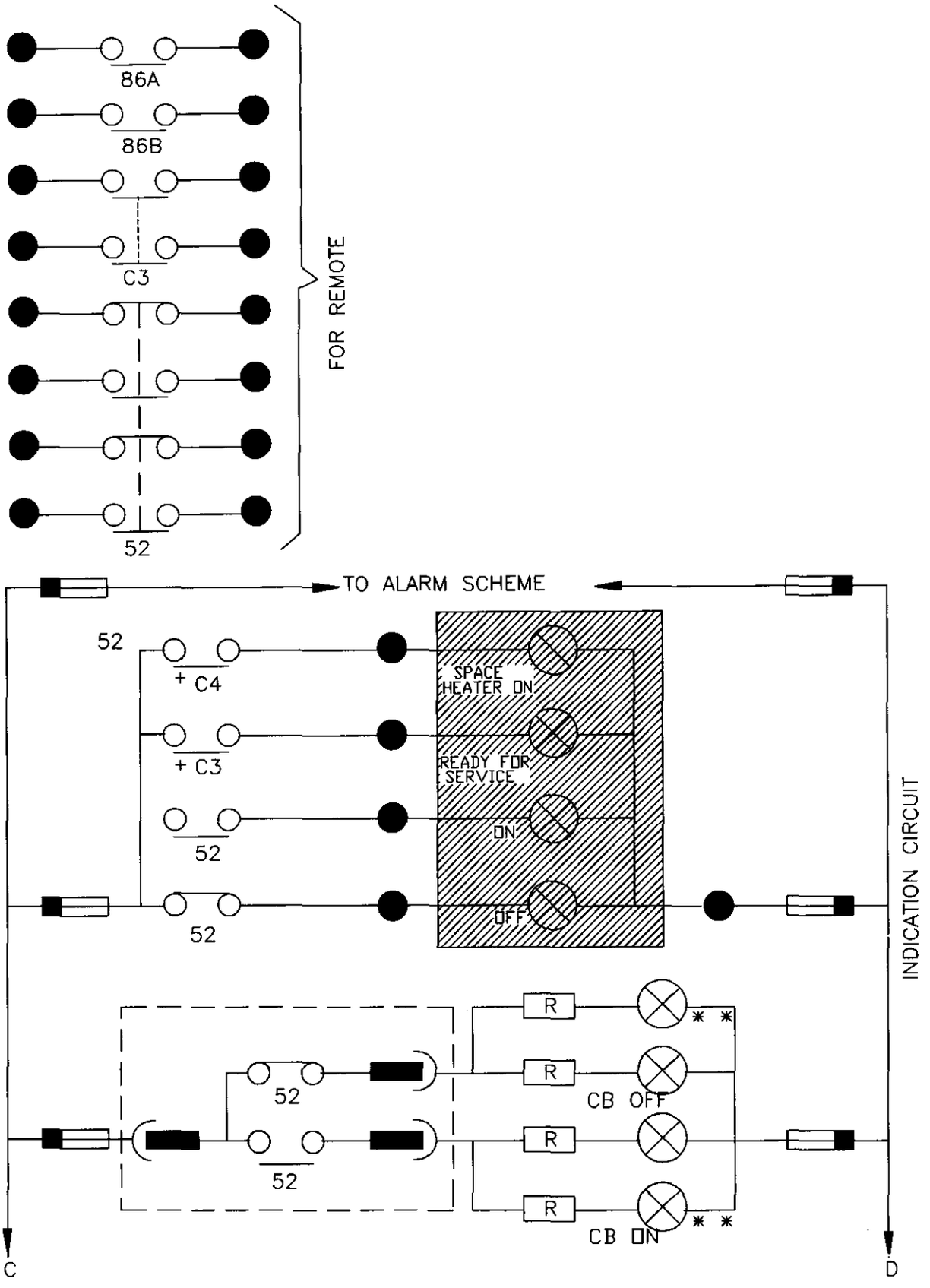
1	16.01.06	30.01.06	ISSUED FOR IMPLEMENTATION	RUNDA	AV	BB
REV	REV.DATE	EFF.DATE	PURPOSE	PREPD	REVWD	APPD

PDIL	SCHEMATIC DIAGRAM CIRCUIT BREAKER CONTROLLED FEEDERS	PDS:E 451	1
		DOCUMENT NO.	REV
		SHEET 2 OF 4	



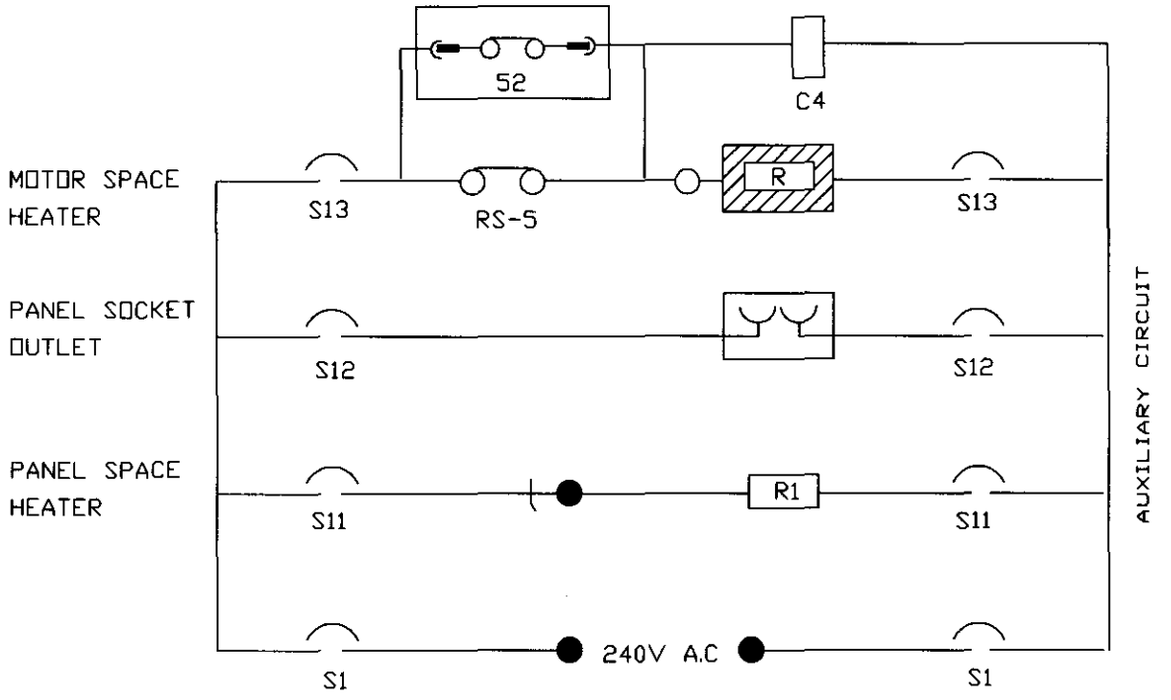
REV	REV.DATE	EFF.DATE	PURPOSE	PREPD	REVWD	APPD
1	16.01.06	30.01.06	ISSUED FOR IMPLEMENTATION	RUNDA	AV	BB

PDIL	SCHEMATIC DIAGRAM CIRCUIT BREAKER CONTROLLED FEEDERS	PDS:E 451 | 1 DOCUMENT NO. | REV SHEET 3 OF 4



REV	REV.DATE	EFF.DATE	PURPOSE	PREPD	REVWD	APPD
1	16.01.06	30.01.06	ISSUED FOR IMPLEMENTATION	RUNDA	AV	BB

	SCHEMATIC DIAGRAM CIRCUIT BREAKER CONTROLLED FEEDERS	PDS:E 451	1
		DOCUMENT NO.	REV
		SHEET 4 OF 4	

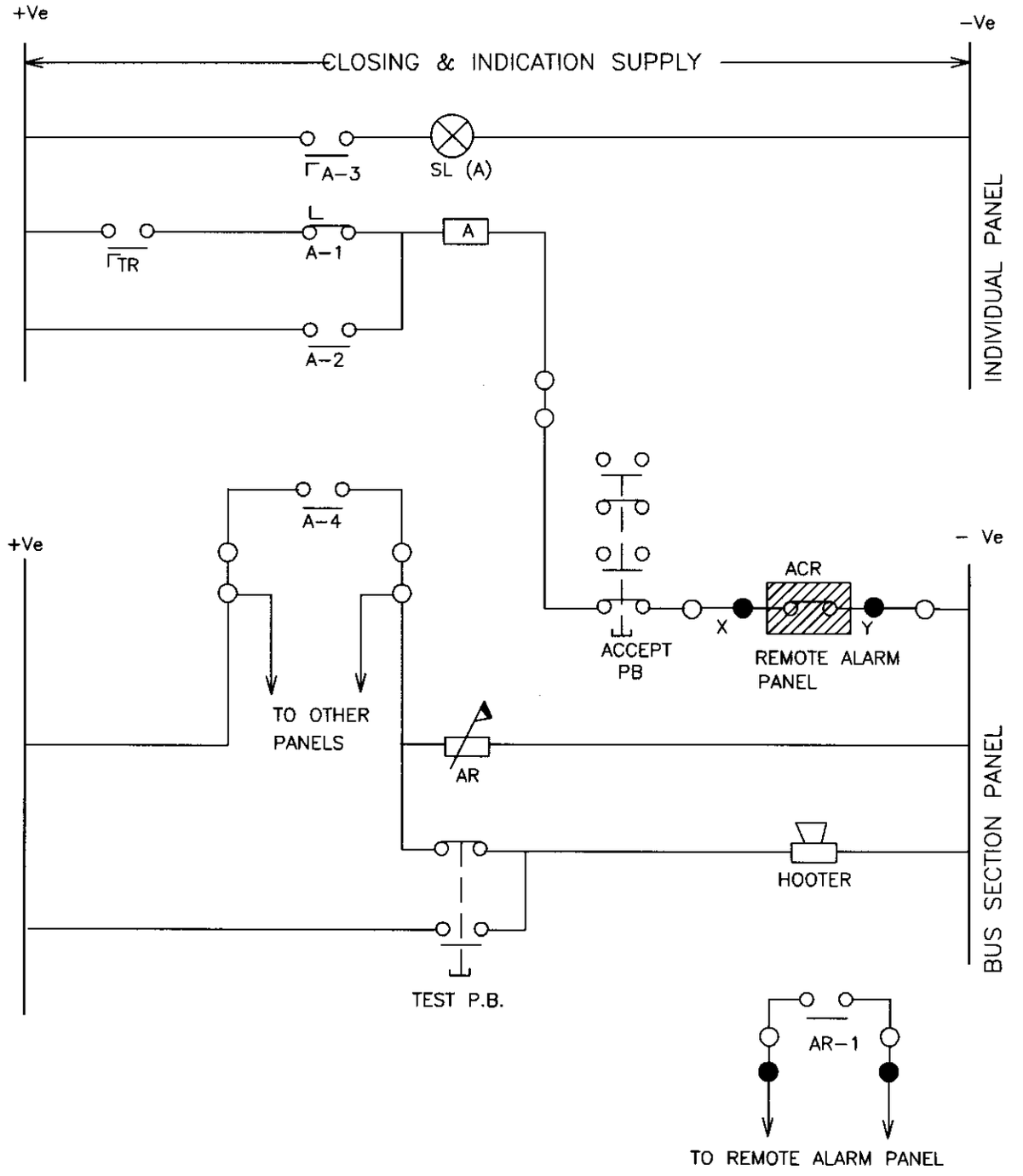


NOTE:-

1. ITEMS MARKED THUS * SHALL BE LOCATED IN BUS COUPLER PANEL.
2. ITEMS MARKED THUS * * SHALL BE MOUNTED IN BACK OF PANEL
3. ITEM SMARKED THUS + SHALL BE PROVIDED FOR MOTOR FEEDERS.
4. 52 IN SERIES WITH TC SHALL CLOSE BEFORE MAIN CONTACTS MAKE AND THAT IN SERIES WITH C3 SHALL BE OPEN ONLY AFTER MAIN CONTACTS MAKE.
5. SHORTING LINKS SHALL BE PROVIDED FOR ALL REMOTE TERMINALS.

REV	REV.DATE	EFF.DATE	PURPOSE	PREPD	REVWD	APPD
1	11.09.06	11.09.06	ISSUED FOR IMPLEMENTATION	RUNDA	AV	BB

PDIL	SCHEMATIC DIAGRAM AUTO TRIP ALARM	PDS:E 452	1
		DOCUMENT NO.	REV
		SHEET 1 OF 1	

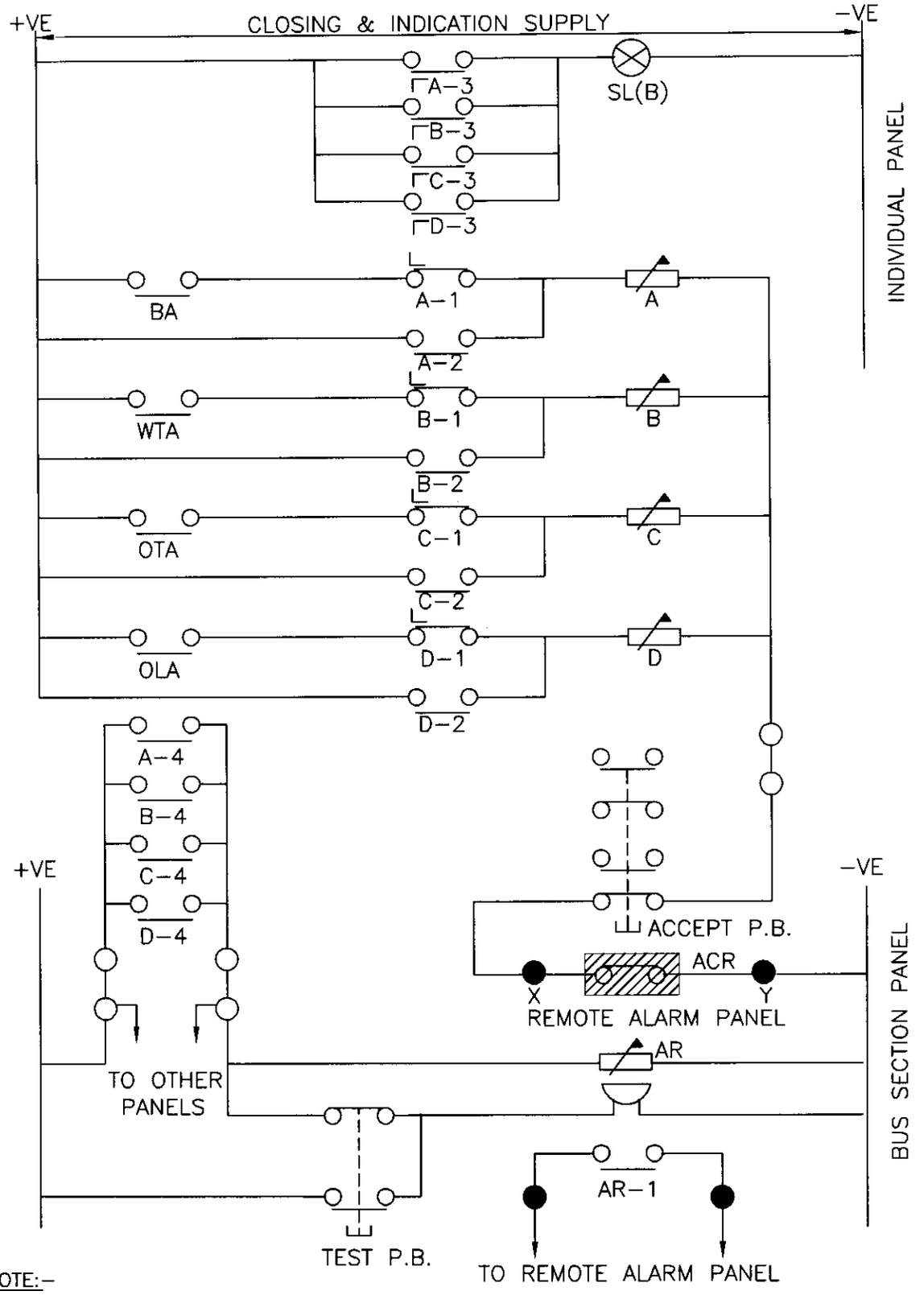


NOTE:-

1. A-1 CONTACT DELAYED OPENING TYPE
2. WHERE REMOTE MONITORING IS NOT REQUIRED SHORT TERMINAL X AND Y

REV	REV.DATE	EFF.DATE	PURPOSE	PREPD	REVWD	APPD
1	16.01.06	30.01.06	ISSUED FOR IMPLEMENTATION	RUNDA	AV	BB

PDIL	SCHEMATIC DIAGRAM NON TRIP ALARM	PDS:E 453	1
		DOCUMENT NO.	REV
		SHEET 1 OF 1	

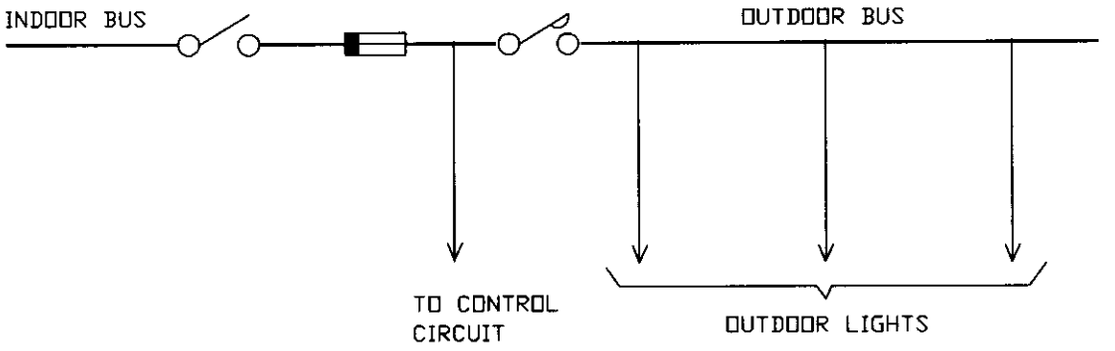


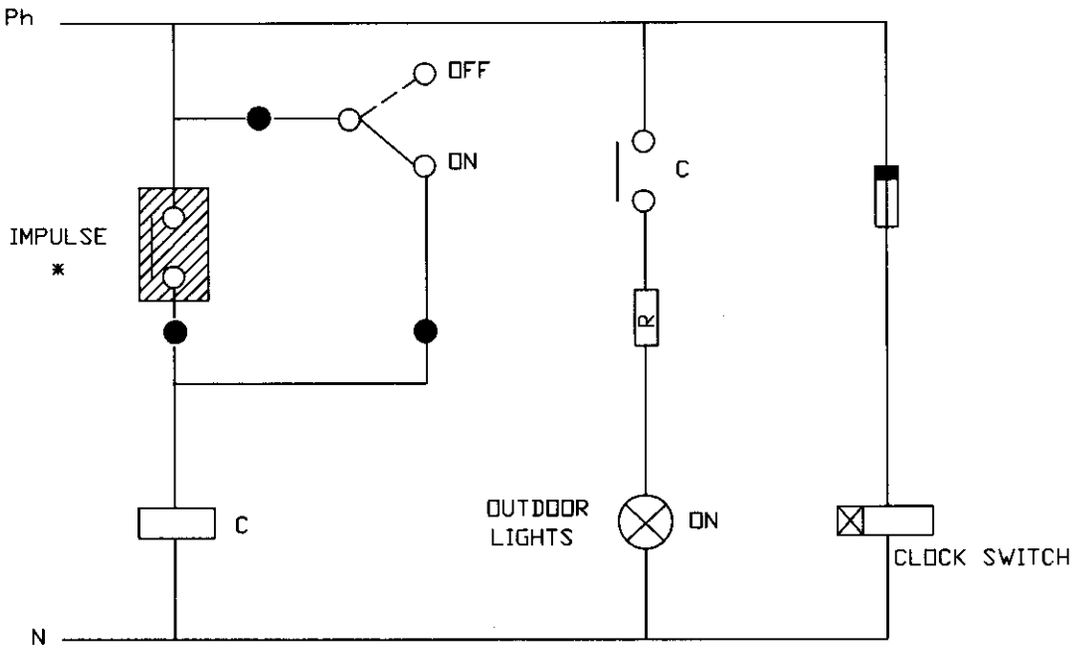
NOTE:-

1. A-1 TO D-1 CONTACTS ARE DELAYED OPENING TYPE.
2. WHERE REMOTE MONITORING IS NOT REQUIRED,SHORT TERMINAL X AND Y.

REV	REV.DATE	EFF.DATE	PURPOSE	PREPD	REVWD	APPD
1	16.01.06	30.01.06	ISSUED FOR IMPLEMENTATION	RUNDA	AV	BB

PDIL	SCHEMATIC DIAGRAM AUTO CONTROL OF OUTDOOR LIGHTING	PDS:E 461	1
		DOCUMENT NO.	REV
		SHEET 1 OF 1	





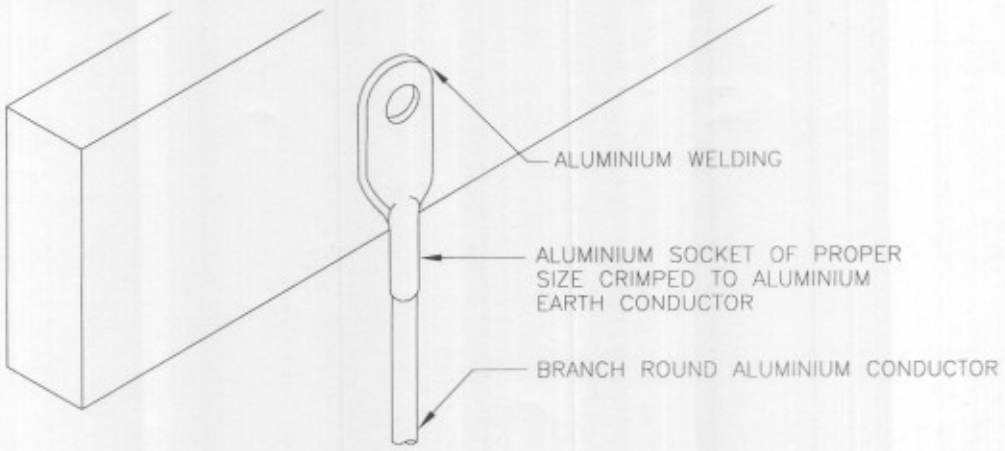
NOTES:-

(1) * AUTOMATIC IMPULSE CONTACT OF PHOTOCELL OR CLOCK SWITCH SHALL BE PROVIDED AS MENTIONED IN THE NIT.

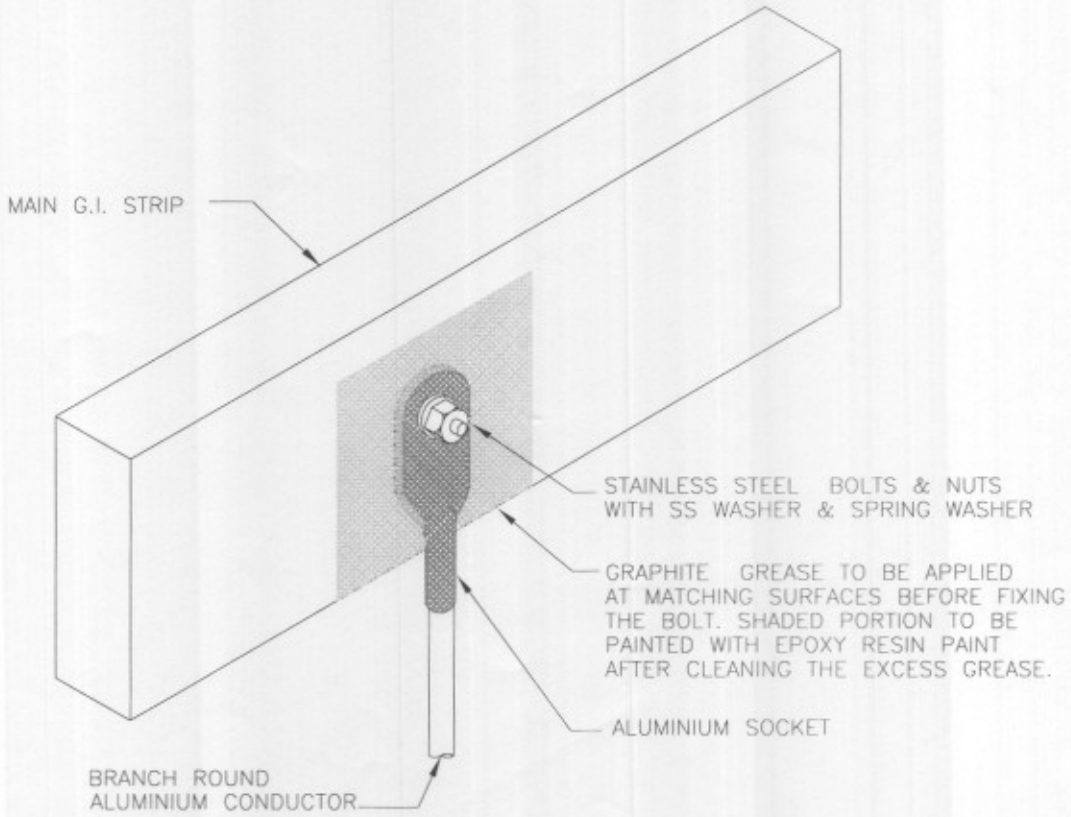
(2) CLOCK SWITCH CONNECTION SHOWN IS NOT REQUIRED IN CASE OF PHOTOCELL.

REV	REV.DATE	EFF.DATE	PURPOSE	PREPD	REVWD	APPD
1	16.01.06	30.01.06	ISSUED FOR IMPLEMENTATION	RUNDA	AV	BB

PDIL	ARRANGEMENT OF CONNECTIONS OF EARTH CONDUCTORS (T-JOINT AL STRIP & GI STRIP TO ROUND AL CONDUCTOR)	PDS:E 603	0
		DOCUMENT NO.	REV
		SHEET 1 OF 6	

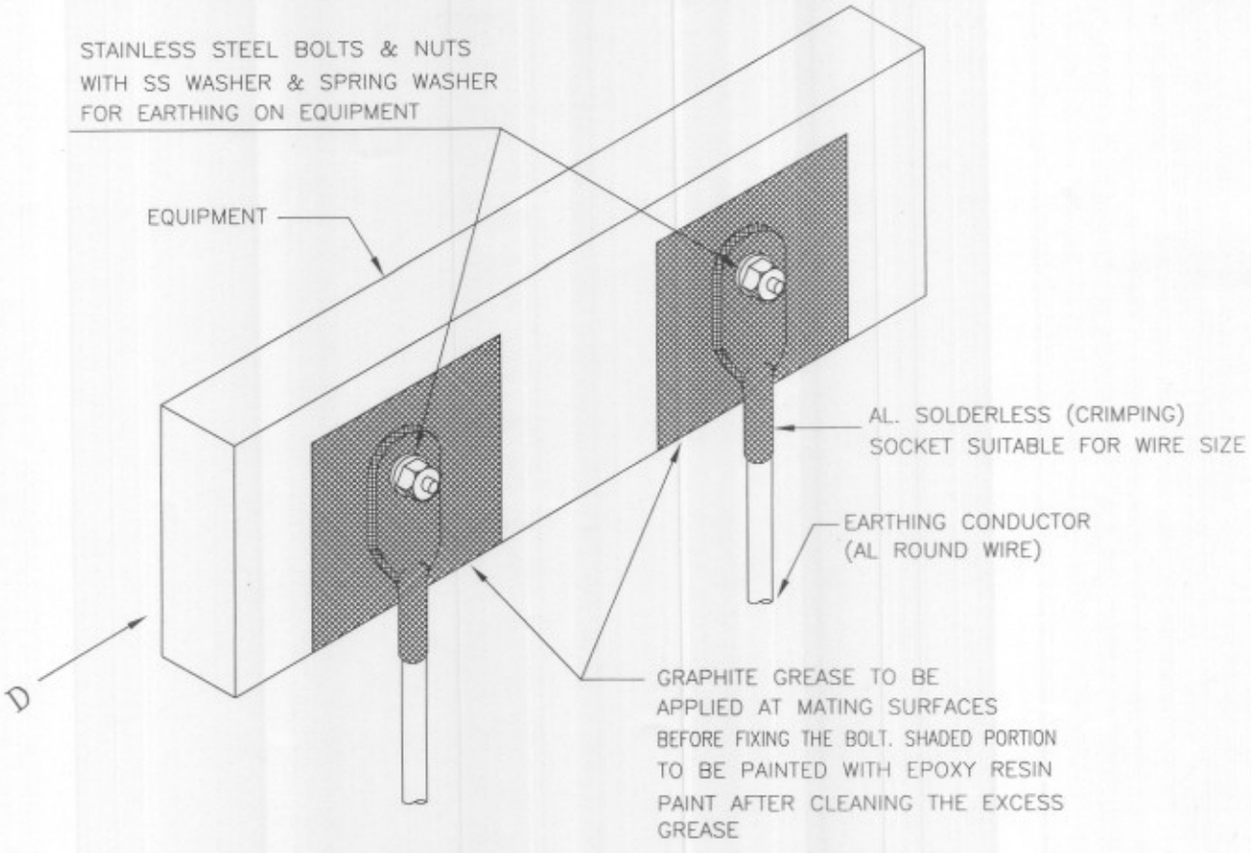


' T ' JOINT ALUMINIUM STRIP TO ROUND ALUMINIUM CONDUCTOR

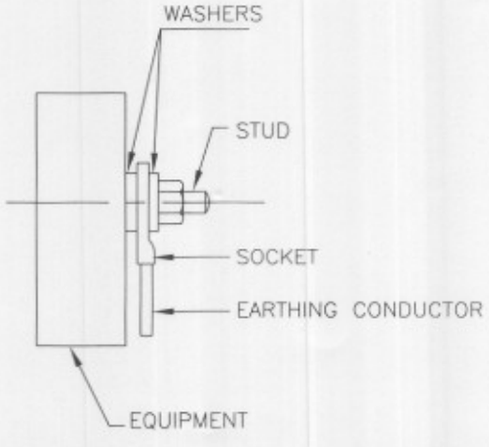


' T ' JOINT G.I. STRIP TO ROUND ALUMINIUM CONDUCTOR

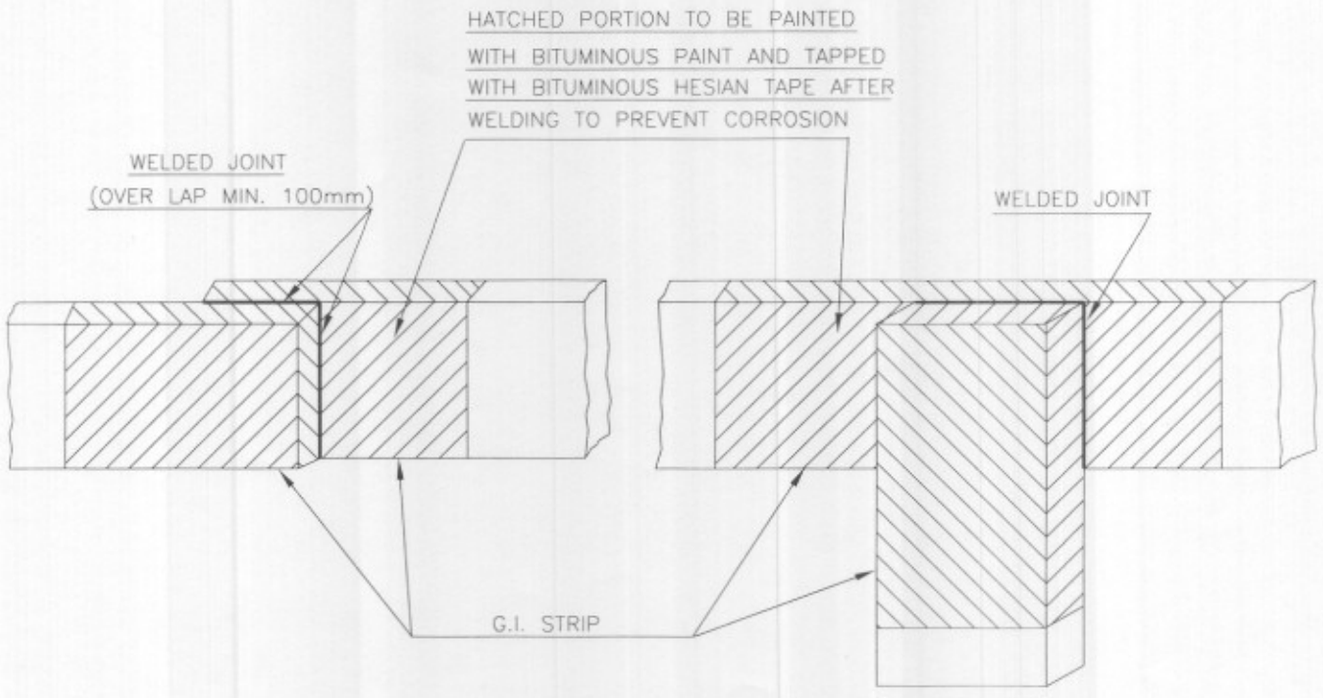
REV	REV.DATE	EFF.DATE	PURPOSE	PREPD	REVWD	APPD
0	03.01.07	15.01.07	ISSUED FOR IMPLEMENTATION	NKR	AV	BB



ARRANGEMENT OF DOUBLE EARTH CONNECTIONS TO EQUIPMENT

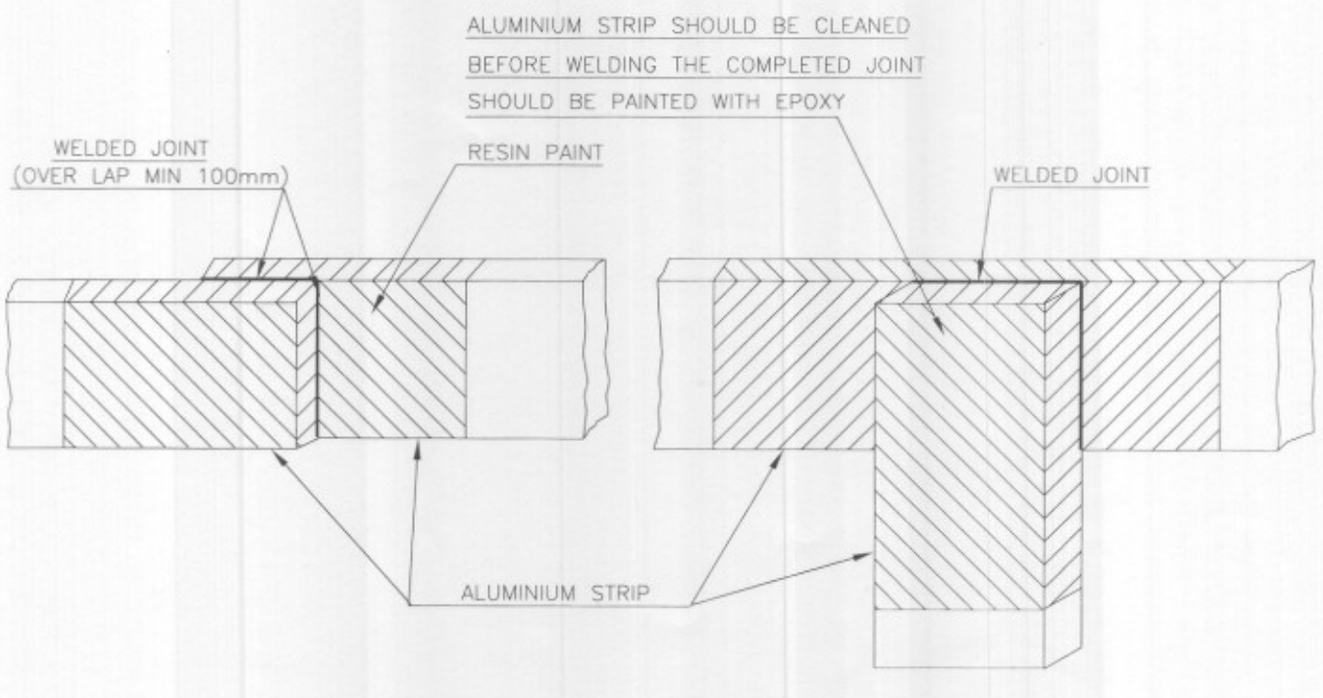


V I E W F R O M – D



STRAIGHT JOINT G.I TO G.I. STRIP

" T " JOINT G.I. TO G.I. STRIP

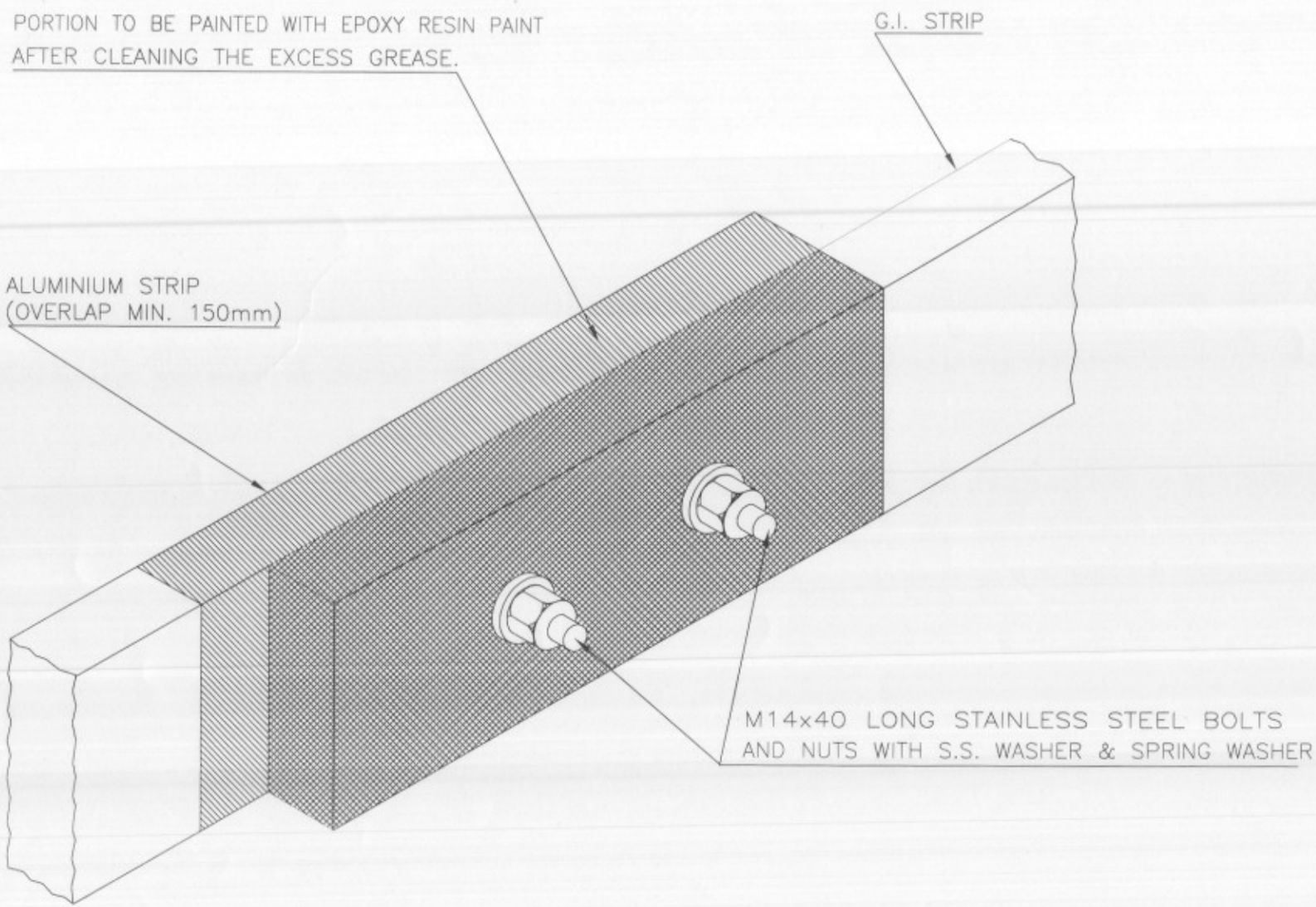


STRAIGHT JOINT AL. TO AL. STRIP

" T " JOINT AL TO AL STRIP

REV	REV.DATE	EFF.DATE	PURPOSE	PREPD	REVWD	APPD
0	03.01.07	15.01.07	ISSUED FOR IMPLEMENTATION	NKR	AV	BB

GRAFITE GREASE TO BE APPLIED AT MATCHING SURFACES BEFORE FIXING THE BOLT. SHADED PORTION TO BE PAINTED WITH EPOXY RESIN PAINT AFTER CLEANING THE EXCESS GREASE.

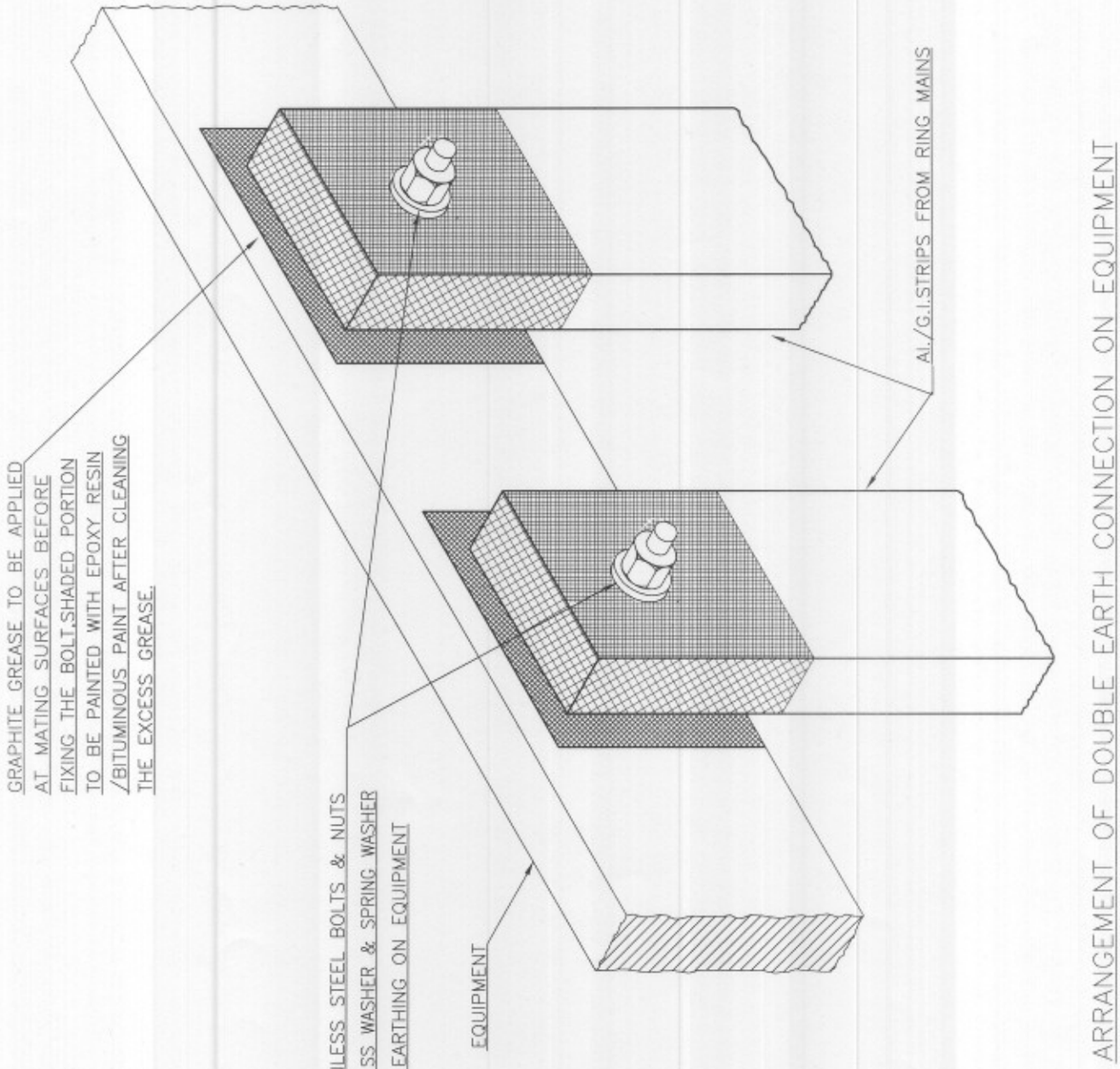


ARRANGEMENT OF LAP JOINT BETWEEN
AI. EARTH STRIP TO G.I. EARTH STRIP

PDIL

ARRANGEMENT OF CONNECTIONS OF EARTH CONDUCTORS
STRAIGHT JOINT GI TO AL STRIP

PDS:E 603	0
DOCUMENT NO.	REV
SHEET 4 OF 6	

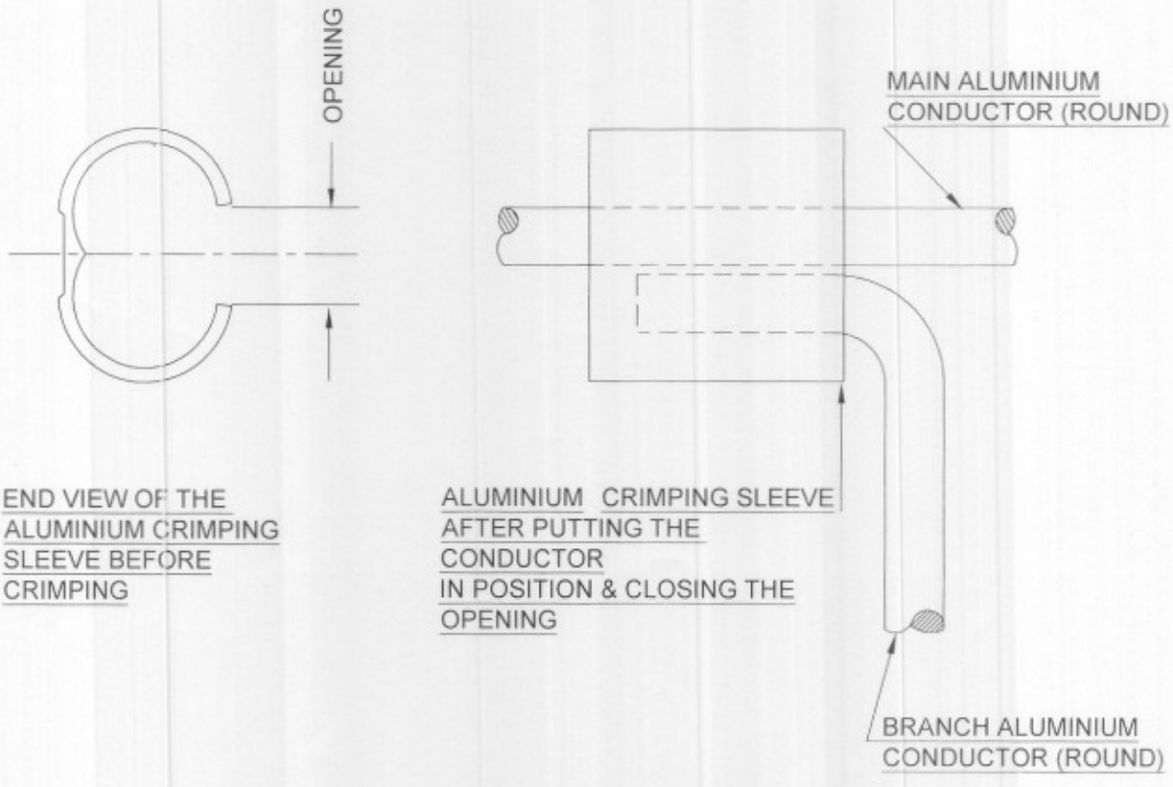


ARRANGEMENT OF DOUBLE EARTH CONNECTION ON EQUIPMENT

NOTE:-

EPOXY RESIN PAINT SHALL BE USED FOR AL STRIP AND BITUMINOUS PAINT FOR G.I.STRIP.

PDIL	ARRANGEMENT OF CONNECTIONS OF EARTH CONDUCTORS (CRIMPING OF ROUND TO ROUND ALUMINIUM CONDUCTORS)	PDS:E 603	0
		DOCUMENT NO.	REV
		SHEET 6 OF 6	

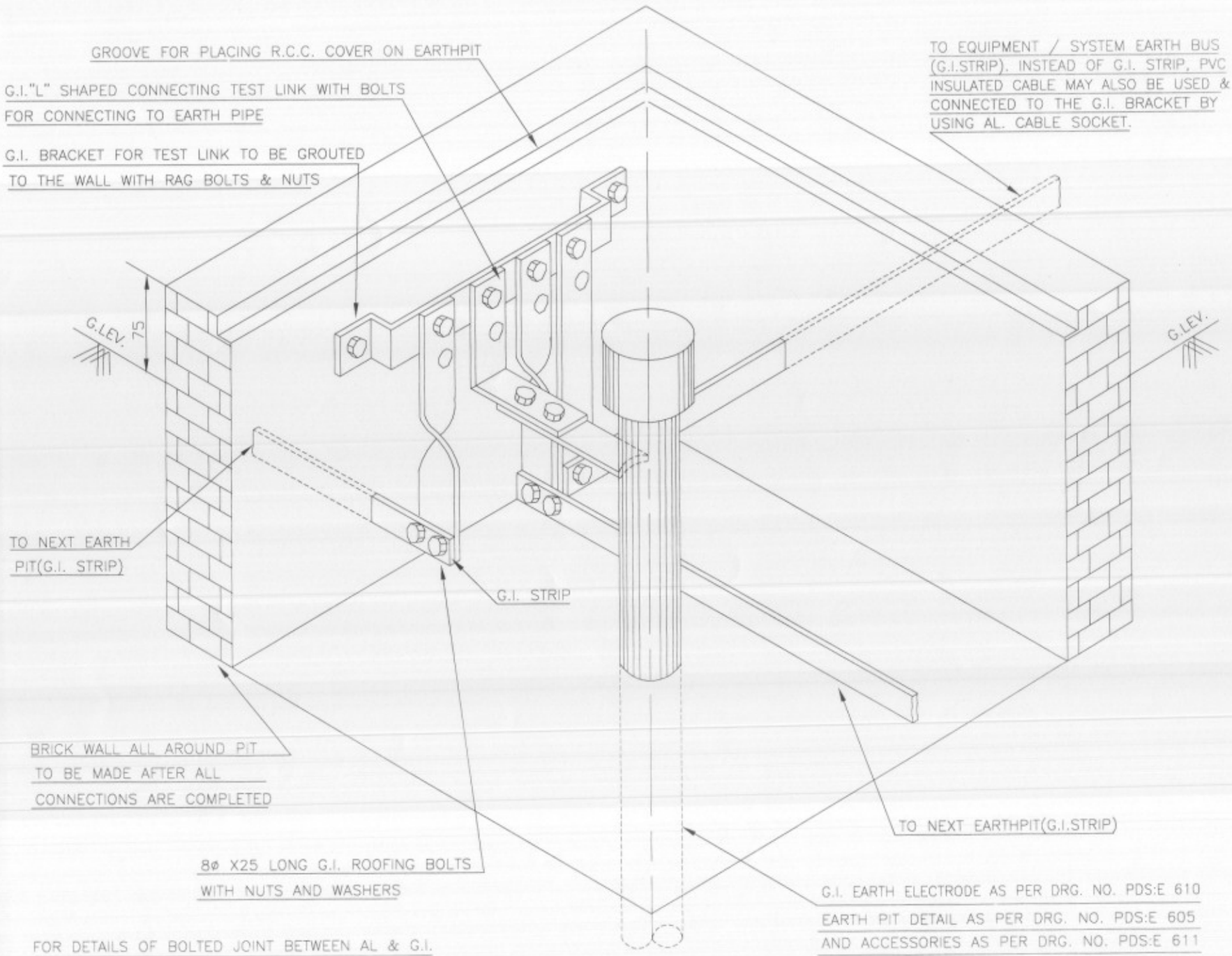


"T" JOINT ROUND ALUMINIUM CONDUCTOR TO ROUND ALUMINIUM CONDUCTOR (CRIMPING TYPE)

NOTE :-

USE CORRECT SIZE OF COMPRESSION DIES.

REV	REV.DATE	EFF.DATE	PURPOSE	PREPD	REVWD	APPD
0	03.01.07	15.01.07	ISSUED FOR IMPLEMENTATION	NKR	AV	BB



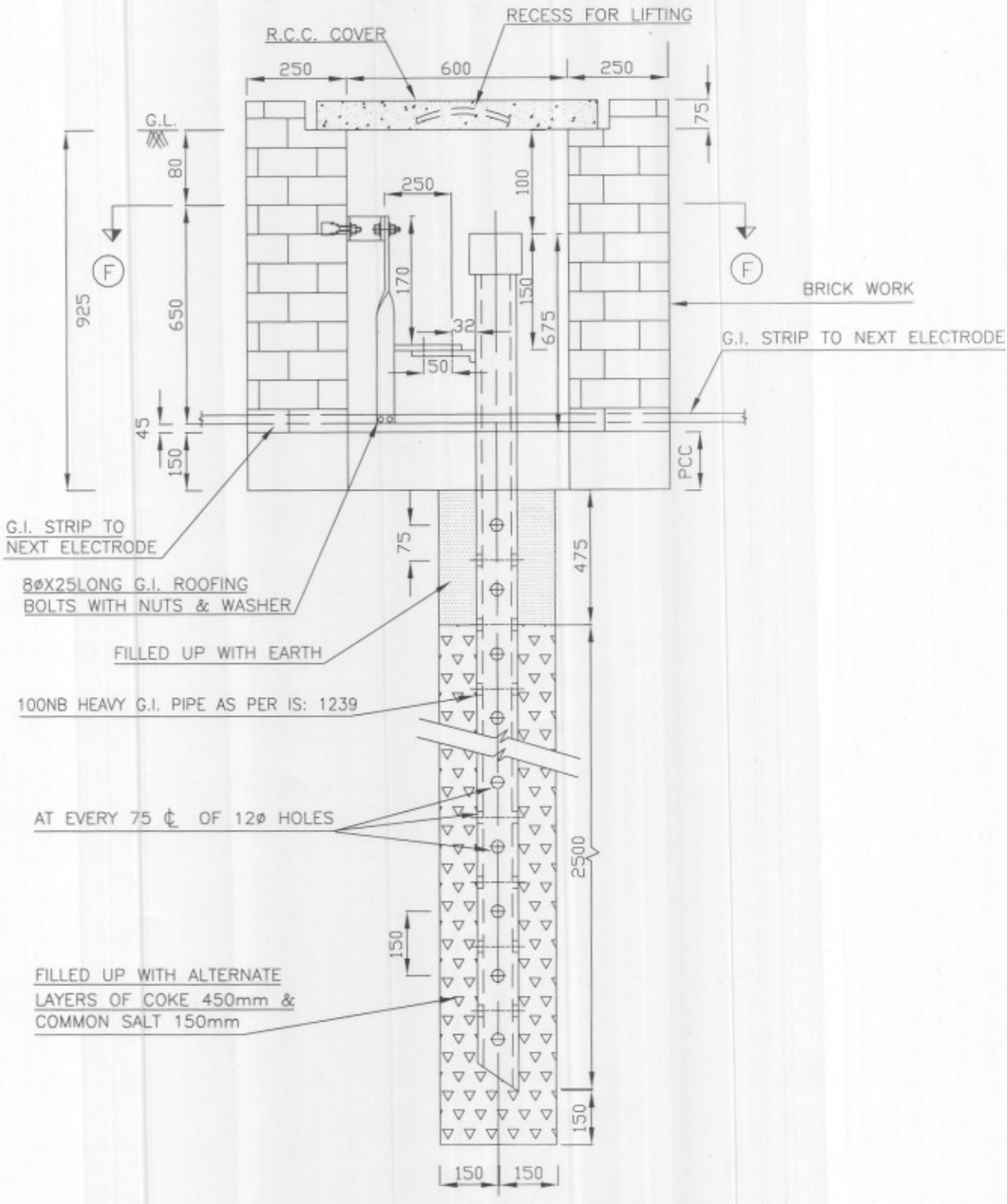
REV	REV.DATE	EFF.DATE	PURPOSE	PREPD	REVWD	APPD
0	03.01.07	15.01.07	ISSUED FOR IMPLEMENTATION	NKR	AV	BB

PDIL

TYPICAL DETAILS OF CONNECTIONS IN EARTH PIT

PDS:E 604	
DOCUMENT NO.	REV 0
SHEET 1 OF 1	

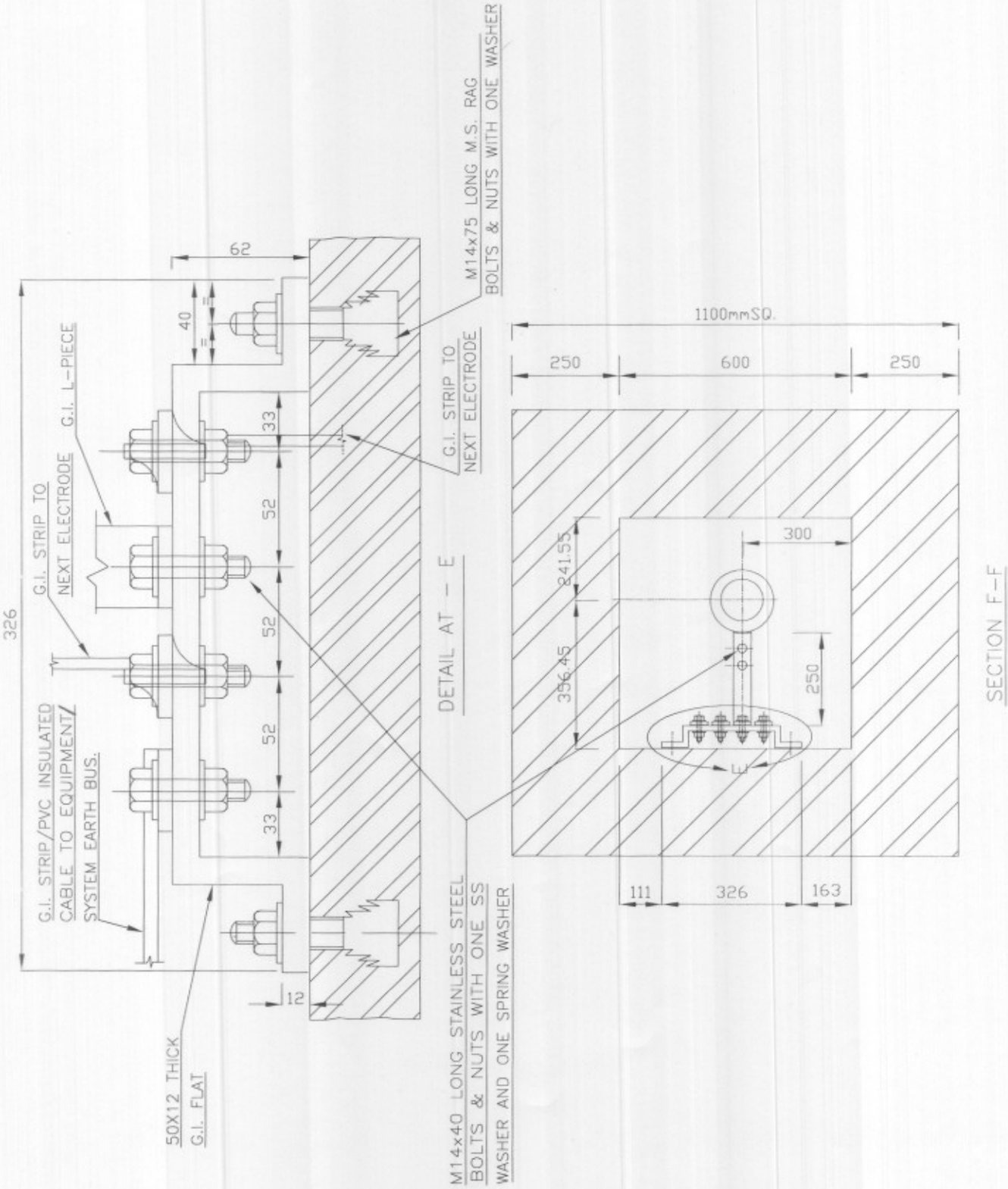
PDIL	EARTH PIT DETAILS	PDS:E 605 / 0 DOCUMENT NO. / REV SHEET 1 OF 2



SECTIONAL ELEVATION OF EARTH PIT

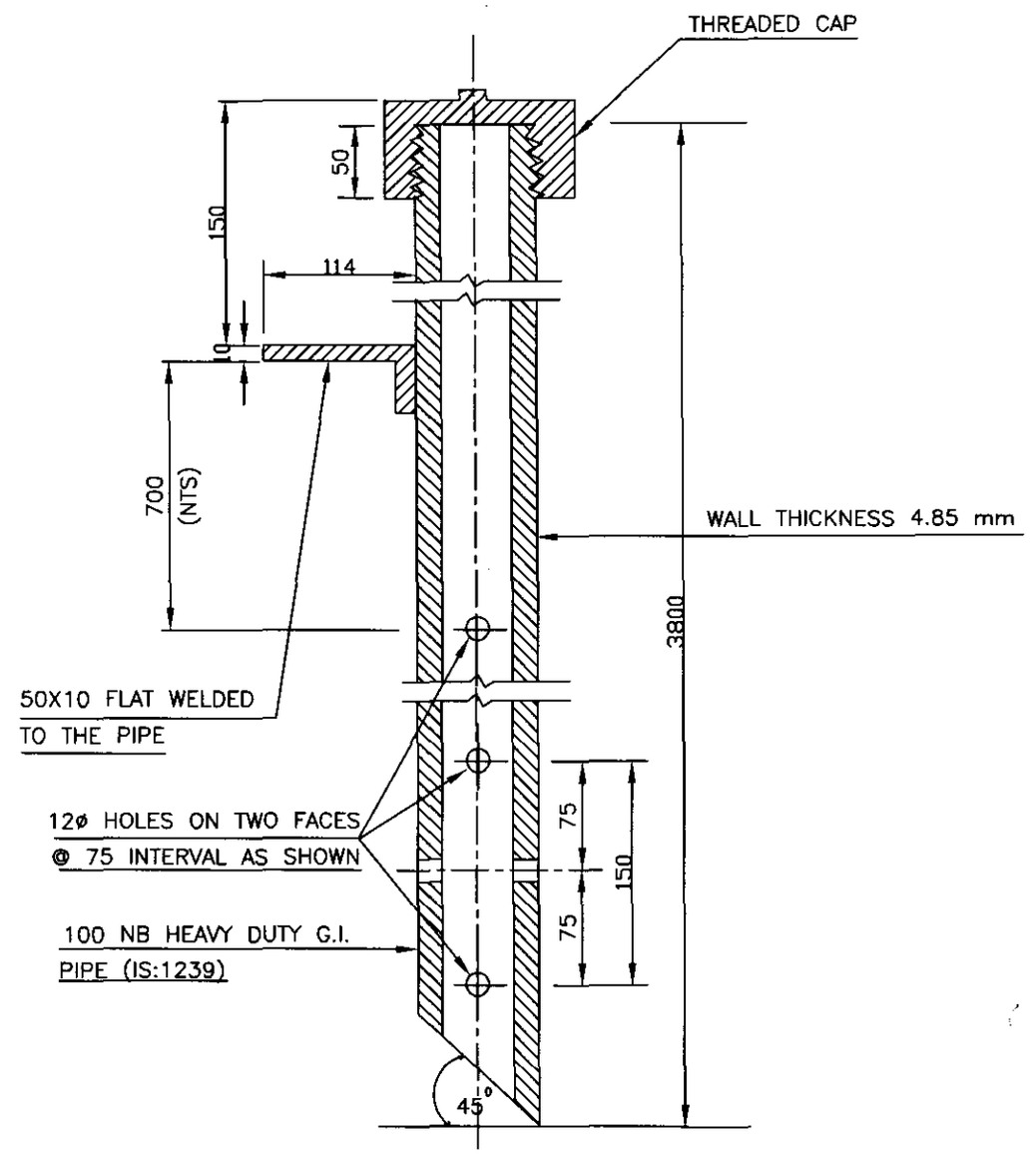
REV	REV.DATE	EFF.DATE	PURPOSE	PREPD	REVWD	APPD
0	03.01.07	15.01.07	ISSUED FOR IMPLEMENTATION	NKR	AV	BB

PDIL	EARTH PIT DETAILS	PDS:E 605 / 0 DOCUMENT NO. / REV SHEET 2 OF 2

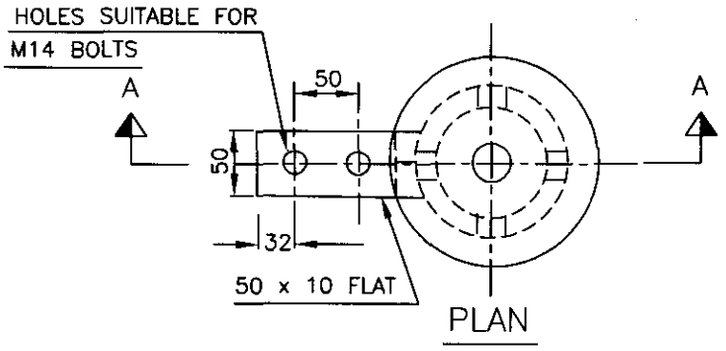


REV	REV.DATE	EFF.DATE	PURPOSE	PREPD	REVWD	APPD
0	03.01.07	15.01.07	ISSUED FOR IMPLEMENTATION	NKR	AV	BB

PDIL	3.8M G.I. ELECTRODE FOR EARTHING	PDS:E 610	1
		DOCUMENT NO.	REV
		SHEET 1 OF 1	



SECTION A–A



PLAN

NOTE:–

1. 12ø HOLES WILL BE PROVIDED AT 75mm INTERVAL ON TWO FACES THROUGHOUT THE LENGTH OF PIPE. THE FIRST ONE SHALL START 700mm BELOW THE WELDED FLAT.
2. ALL DIMENSIONS ARE IN mm.

REV	REV.DATE	EFF.DATE	PURPOSE	PREPD	REVWD	APPD
1	16.01.06	30.01.06	ISSUED FOR IMPLEMENTATION	RUNDA	AV	BB

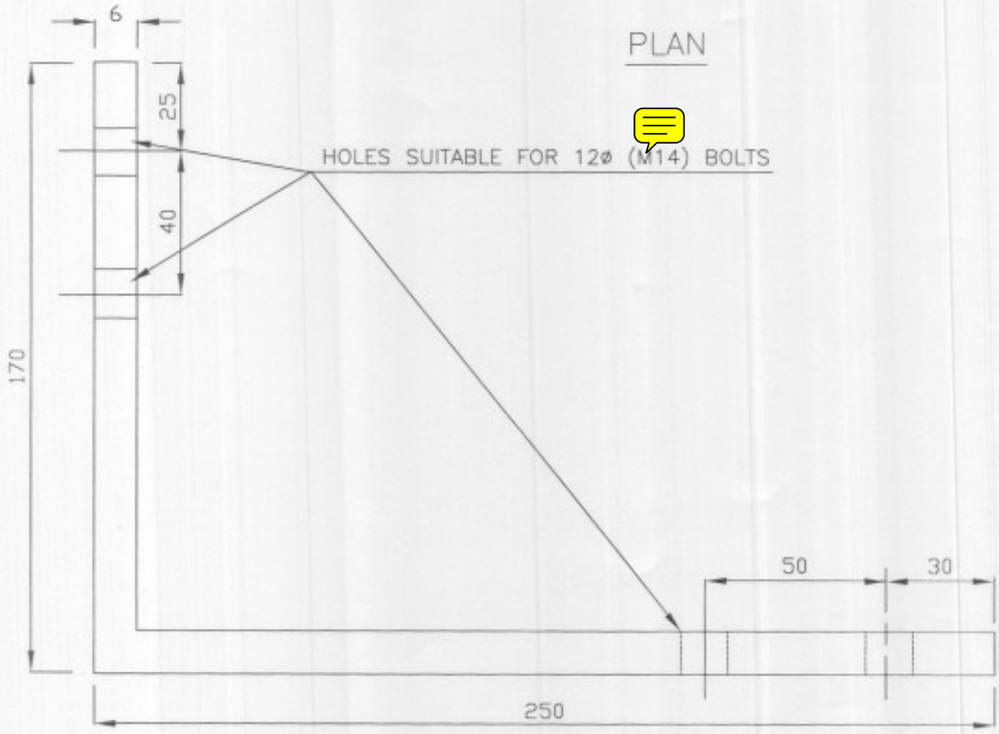
PDIL	GI / AL. ACCESSORIES FOR EARTH PIT	PDS:E 611 / 0 DOCUMENT NO. / REV SHEET 1 OF 2

ELEVATION

PLAN

G.I. TEST LINK

PLAN

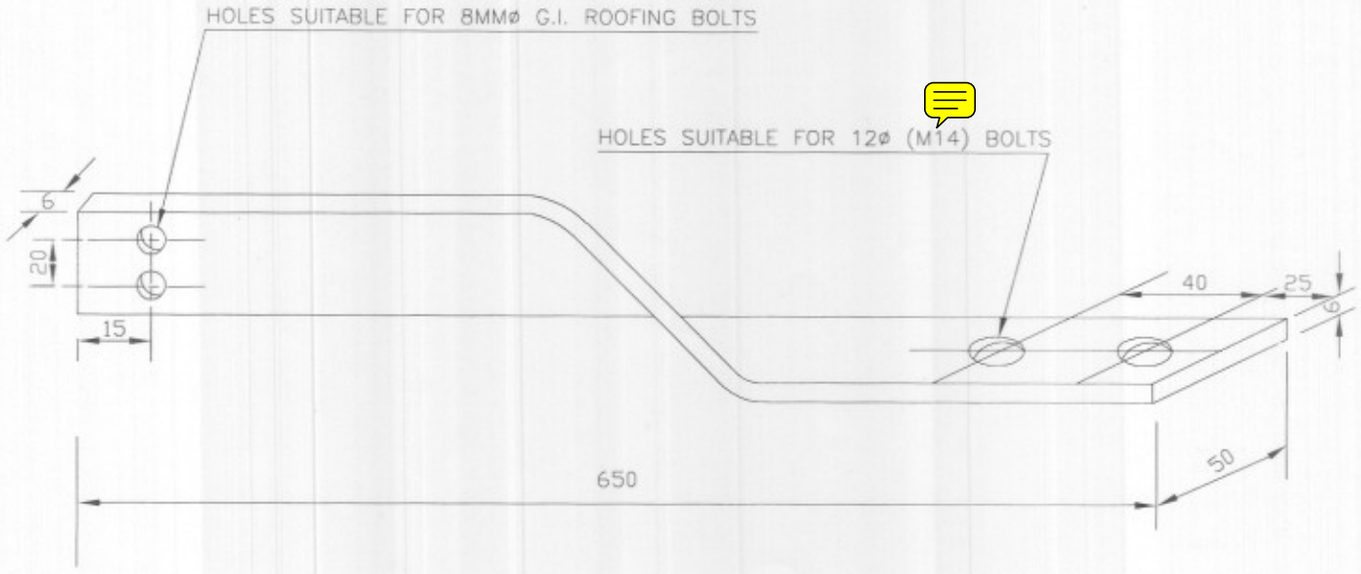


ELEVATION

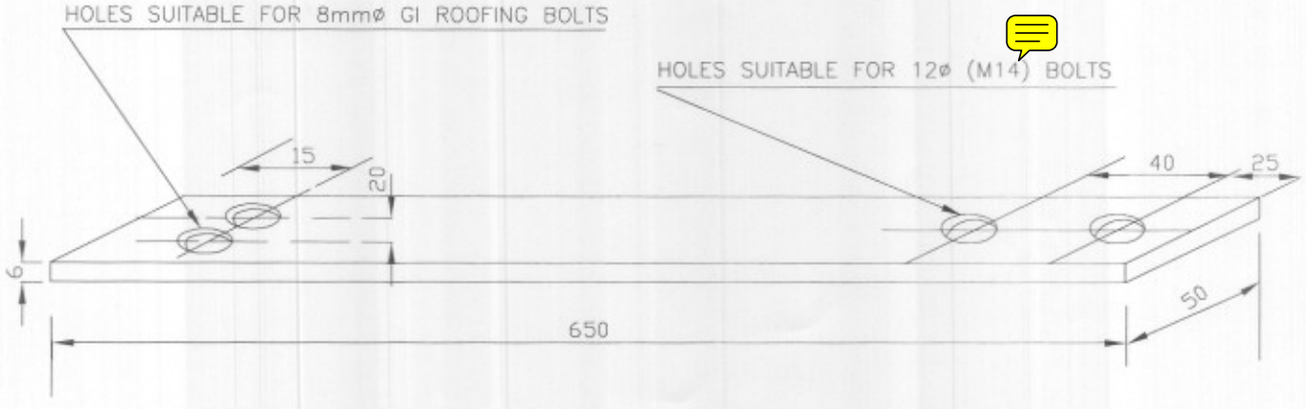
G.I. 'L' PIECE

REV	REV.DATE	EFF.DATE	PURPOSE	PREPD	REVWD	APPD
0	03.01.07	15.01.07	ISSUED FOR IMPLEMENTATION	NKR	AV	BB

PDIL	GI/AL. ACCESSORIES FOR EARTH PIT	PDS:E 611	0
		DOCUMENT NO.	REV
		SHEET 2 OF 2	



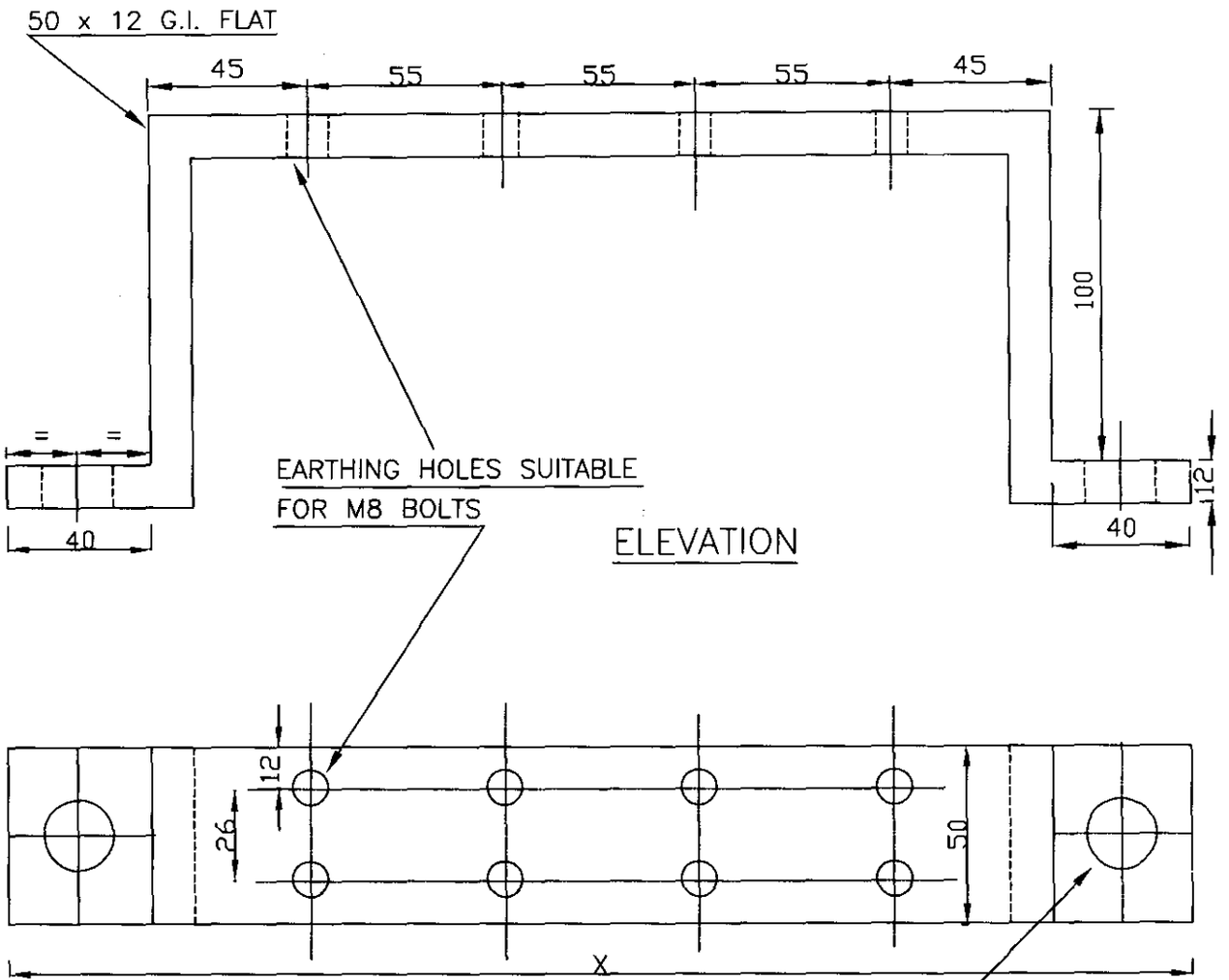
CONNECTING TWISTED ALUMINIUM FLAT PIECE



CONNECTING ALUMINIUM / G.I. FLAT PIECE

REV	REV.DATE	EFF.DATE	PURPOSE	PREPD	REVWD	APPD
0	03.01.07	15.01.07	ISSUED FOR IMPLEMENTATION	NKR	AV	BB

PDIL	G.I. EARTH BUS	PDS:E 615	1
		DOCUMENT NO.	REV
		SHEET 1 OF 1	



TYPE OF EARTH BUS	NO.OF EARTHING HOLES	OVERALL LENGTH x (mm)
1	8	335
2	10	390

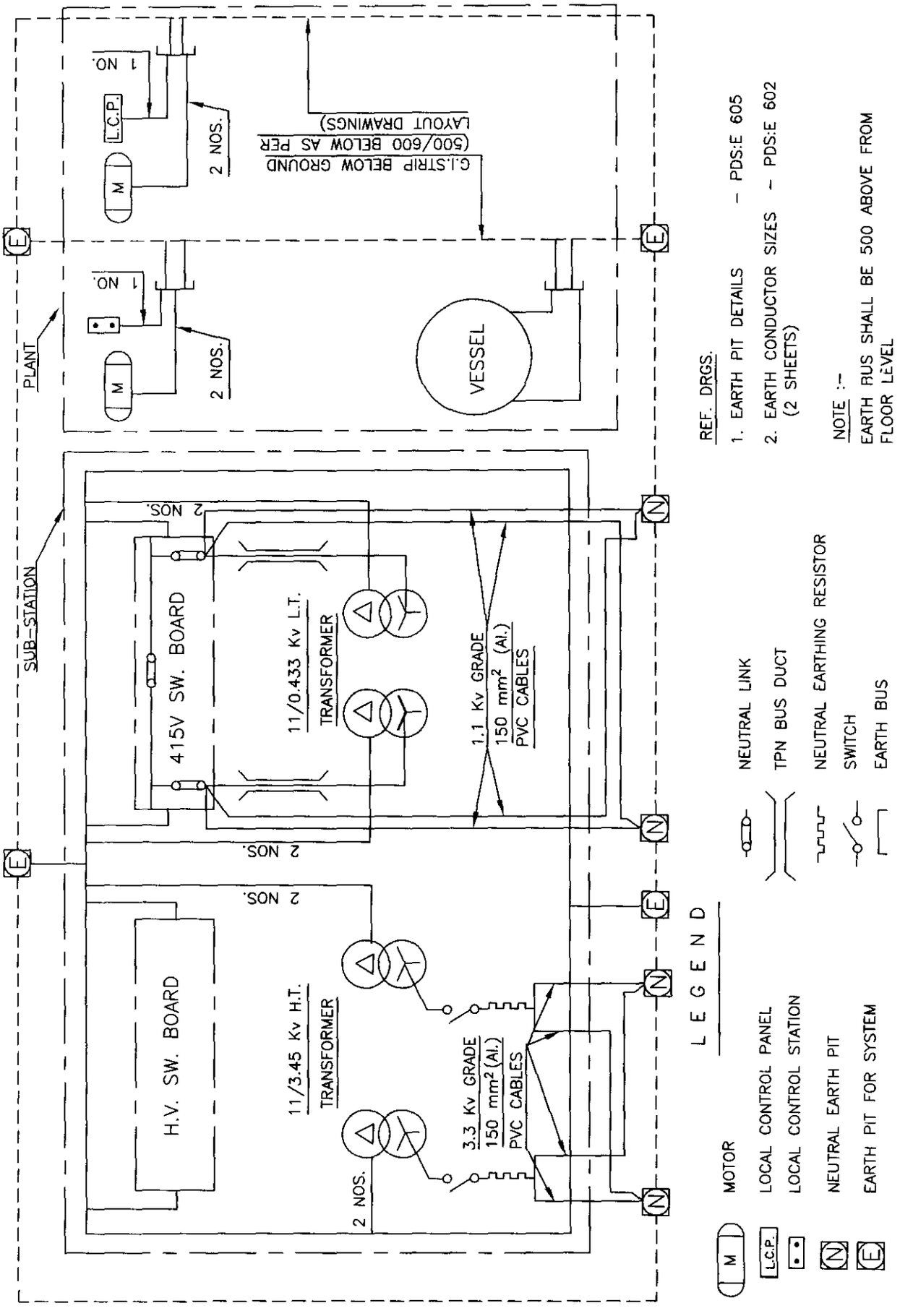
NOTES:–

1. LOCATION OF EARTH BUS TO BE DECIDED AS PER EQUIPMENT POSITION AT SITE.
2. EARTH BUSES SHALL BE LOCATED ON STRUCTURES/COLUMNS WALLS/EQUIPMENT FOUNDATION ETC.
3. MOUNTING HEIGHT OF EARTH BUS SHALL NOT BE LESS THAN 500mm FROM FINISHED FLOOR LEVEL
4. ALL DIMENSIONS ARE IN mm

REV	REV.DATE	EFF.DATE	PURPOSE	PREPD	REVWD	APPD
1	16.01.06	30.01.06	ISSUED FOR IMPLEMENTATION	RUNDA	AV	BB

TYPICAL ARRANGEMENT FOR NEUTRAL AND EQUIPMENT EARTHING

PDS:E 617	1
DOCUMENT NO.	REV
SHEET 1 OF 1	



REV	REV.DATE	EFF.DATE	PURPOSE	PREPD	REVWD	APPD
1	16.01.06	30.01.06	ISSUED FOR IMPLEMENTATION	RUNDA	AV	BB

SECTION-4.0

HEALTH, SAFETY AND ENVIRONMENT (HSE) MANAGEMENT

FOR

HINDUSTAN URVARAK & RASAYAN LIMITED

0	30.10.17	30.10.17	FOR ISSUANCE	DILIP	GC	SM
REV	**REV DATE**	**EFF DATE**	**PURPOSE**	**PREPD**	**REVWD**	**APPD**

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1.0 INTRODUCTION

1.1 The purpose of the present document is to outline the minimum safety requirements applicable to personnel, equipment and facilities during erection, pre-commissioning and commissioning activities of OWNER / CONSULTANT Construction Sites. Constructing safe structure and providing safe working environment to the personnel is a vital factor in successful construction business. Safety and health are as much as part of effective project planning and control as the cost, schedules, procurement and quality. Indeed they are all closely interrelated. Productivity, safety and quality can move forward in close proximity.

1.2 **OBJECTIVES**

OWNER/CONSULTANT Site Management has following main objectives regarding safety at site.

a) No Accident
b) To make the environment safe
c) No harm to people
d) Safety is everyone's responsibility
e) To make the job safe

2.0 GENERAL

2.1 These rules do not exempt the Contractor from statutory Health, Safety and Environmental duties but are intended to assist in attaining a high standard of compliance with those duties, in order to provide a safe and healthy working environment.

2.2 OWNER/CONSULTANT will assist Contractors in any practical way to facilitate safe working, and requires full co-operation in observing these rules.

2.3 The rules for Health and Safety specified herein are in no way intended to relieve the Contractor from any obligation or liability under the Contract, nor is it intended to relieve the Contractor of any of his legal obligations for the avoidance of accidents.

2.4 In all matters arising in the performance of the Contract, the Contractor shall conform with all Statutory Regulations and By-Laws made with statutory authority by Government Departments or by Local or other Authorities that shall be applicable to the Works.

2.5 The Contractor, in the performance of the Contract, shall not endanger the safety or unlawfully interfere with the convenience of the public in any manner.

2.6 The Contractor's representative on Site shall communicate details of these rules for Health, Safety and Environment to all Contractors' employees and to all Subcontractors and Subcontractors' employees employed on the Site.

2.7 The requirements of the Client/Owner's existing Site Rules/Regulations form part of the Contract and in the case of conflict between the OWNER/CONSULTANT'S rules, the highest standard shall be applied.

2.8 At the tender stage OWNER/CONSULTANT will require to see a copy of the Contractor's policy, organization and arrangements for the Health and Safety at Work. The Contractor shall submitted complete documents Health and Safety Questionnaire. Contractor shall deploy safety officer of adequate experience at each work site or during each shift including Sunday/holiday with approval of EIC/Owner.

3.0 SITE HEALTH, SAFETY AND ENVIRONMENT INDUCTION

3.1 All personnel shall receive OWNER/CONSULTANT and Contractors' site Health, Safety and Environment induction before they commence work on site. The induction shall comprise information on the various hazards which they may come into contact with, instructions on the site emergency procedures, warning and alarm systems, and permit to work system, first aid locations, welfare facilities, access routes and project specific rules.

3.2 It is the responsibility of the Contractor to familiarize all new personnel to the Project on the actual location of muster points, fire alarm points, first aid stations and the like.

4.0 DEMARCATION

4.1 Construction personnel are restricted to the construction areas shown on the Contract Drawings. Any personnel found on/in or interfering with the existing works/plant, without permission, will be dismissed from site. Any work outside of these areas may only be carried out with the written agreement of OWNER/CONSULTANT.

Before any work is started on the site, the Contractor's representative shall report to OWNER/CONSULTANT, who will confirm to the Contractor's representative, the limits of the working area(s) and shall be informed of any special requirements appertaining thereto.

5.0 ACCESS TO THE CLIENT'S FACILITIES/BUILDINGS

5.1 The Client's Facilities, including the canteen/cafeteria and toilets shall not be used by Construction Personnel.

5.2 Construction Personnel shall not enter any of the Owner's building unless escorted by a member of the OWNER/CONSULTANT'S staff (or working with prior agreement to Owner's Permit to Work System).

6.0 BEHAVIOR ON SITE

6.1 All Contractors' personnel shall treat everyone with respect and will refrain from any sexually suggestive or abusive comments or behavior.

7.0 SMOKING, EATING AND DRINKING

7.1 Smoking, eating and drinking is allowed in designated areas.

8.0 DRUGS AND ALCOHOL

8.1 The possession or use of illicit drugs and alcohol on site is not permitted. Anyone who is found, or suspected to be, under the influence of either will be removed from site (subject to the Contractors' disciplinary procedure).

8.2 Anyone taking prescriptive drugs shall advise their employer, in particular those drugs that may impair their performance. Their employer may make arrangements to assign them to more suitable work, but shall ensure that the OWNER/CONSULTANT Construction manager is informed without delay.

9.0 PERMIT TO WORK SYSTEM

9.1 All construction works will be carried out under a permit to work system. It is designed to protect personnel and plant and consists of an organized and predefined safety procedure. It forms a clear record of all foreseeable hazards which have been considered in advance of construction operations.

9.2 The identities of the permit "Issuing Authority" will be OWNER and the "Permit Acceptor" will be the Contractor.

9.3 The following types of permits will be issued:

- Clearance Certificate - all other permits are invalid without this Certificate, (this certificate can be used for general work).
- Hot Job Work Permit.
- Electrical Work Permit.
- Confined Spaces Work Permit.
- Excavations Work Permit.
- Working at Height work Permit.
- Radiography Work Permit.
- Cold Job Work Permit.
- Road Closure Work Permit.

9.4 Written requests for permits must be submitted to Owner at least twenty-four hours in advance and the permits will be issued daily. Permits shall be given to Safety Officers of the contractor, by representatives authorized by Owner in approved formats.

10.0 ACCESS, SITE PASSES AND SECURITY

10. 1 **Passes**

All personnel and vehicles shall enter and leave the site via the entrance authorized for construction personnel and traffic. Contractors' employees shall not enter any part of the site other than for the purpose of carrying out the Works.

All personnel shall be issued with a site pass. The site pass must be carried (or displayed on the pass holder's lapel) at all times. Details of all personnel requiring site passes shall be submitted to OWNER/CONSULTANT at least seven working days in advance of the

planned start-on-site date. Site passes shall be submitted for inspection on entering or leaving the site, or when requested for inspection by OWNER/CONSULTANT or Security.

Loss of site passes must be reported immediately to Owner/Consultant. Lack of a site pass may mean delay at the site entrance. Owner/Consultant shall not accept any responsibility for lost time or costs incurred.

On completion of their assignment, or termination or their employment, all personnel will return their site pass to Owner or Owner representative/ Owner authorized personal.

10.2 **Security**

The security of Contractor's plant, tools, equipment, materials (including free issue materials properly handed-over by Owner/Consultant) are the responsibility of the Contractor. It is the Contractor's responsibility to satisfy themselves that the security arrangements in existence on the site are adequate. The Contractor shall provide any other security measure that he deems necessary for the control and security of Contractor owned equipment and plant, including for free-issue plant and materials, both within the site establishment area and the working areas on the site.

Owner accepts no liability for any loss, damage or deterioration to the Contractor's plant tools equipment and materials.

Owner reserves the right to search at random all personnel, any Contractor's employee, or employees of its servants, agents, Contractors or any vehicle entering or leaving the site. Any package or container being taken into or out of the site may be opened and inspected by security staff or any other persons authorized by Owner/Consultant to make such a search or inspection.

It is the Contractor's obligation and responsibility to ensure that OWNER / CONSULTANT right to search and inspect persons and property, extends to and is brought to the attention of all his personnel.

Personnel shall give all possible assistance and make available any facilities required to assist OWNER/CONSULTANT and the Police in pursuance of the prosecution of any person(s) responsible for alleged malicious damage or loss to the Works or existing installations.

Owner shall not accept any responsibility for the loss or damage of personal effects. The security and safekeeping of personal effects is the responsibility of each individual.

10.3 Construction personnel will not be admitted to the Construction Areas unless they have undergone Owner/ Consultant's induction, and received a security pass.

No Induction, No Pass, No Access to the Site

10.4 OWNER/CONSULTANT reserves the right to deny access to the Construction Site/Areas and/or the Construction Car parks to any person, or vehicle.

10.5 Individuals may be excluded from and refused future entry to the Site and/or Construction Areas for any breach of Safety or Security Rules, or exceeding the speed limit (20 mph on roads leading to the site off the public highway and 5 mph in the construction area).

10.6 No plant/skips waste or materials may leave the Construction Area without the clearance of OWNER/CONSULTANT.

10.7 The taking of photographs on the site is prohibited.

10.8 Vehicles with children under the age of 16 years or animals onboard will not be allowed access.

10.9 Visitors will only be allowed by appointment (two days' notice to OWNER/CONSULTANT is required). Visitors shall be accompanied by a member of the Contractor's team (who has received Health, Safety and Environment Induction) at all times. The visitor will have to obtain a visitor's pass, and be collected from and returned to the main gate.

10.10 Each Contractor will keep a daily register of who is on site. The register will record name, pass number, time-in and time-out (records on time-clocks will not be permitted). This information shall be used to check personnel (role call) in the event of an emergency

11.0 PARKING, DELIVERIES AND VEHICLE PASSES

11.1 Contractors' personnel shall not be allowed to park any vehicle on the main car park or site. All contractors shall park in the Contractors' Temporary Car Park.

11.2 The Contractor shall arrange transport between the parking area(s), the main site gate and the Contractor's establishment and working areas if judged to be necessary.

11.3 Vehicles used solely for transporting of tools and equipment may be allowed access to the working area(s) for unloading/loading only.

11.4 Owners of vehicles parked illegally will have their car pass taken off them and told to remove the vehicle from site. They may have their site pass withdrawn and be refused further access to the Construction Site.

11.5 The Construction Areas will be restricted to construction plant and delivery vehicles.

11.6 The speed limit on site is 10 mph on the approach roads leading to the site off the public highway and 5 mph on the construction areas

12.0 SITE OPENING AND CLOSING TIMES

12.1 The site will be open from 8.00am to 6.00pm Monday to Saturday. Work outside the agreed normal working hours will be by agreement with Owner (subject to two working days' notice). All applications for out of hour working will identify the scope of work, supervision arrangements and a list of personnel.

13.0 SITE SUPERVISION

13.1 The Contractor must ensure that an employee of suitable seniority and authority, with responsibility for Health and Safety, is always present on site during the course of the works, to supervise and direct the Works and to receive and implement instructions from OWNER/CONSULTANT. Seven days before commencing works on site, the Contractor must notify OWNER/CONSULTANT of the name of that employee.

13.2 All supervisory staff shall be made aware of their responsibilities for safety.

14.0 TRAINING, COMPETENCE OF EMPLOYEES AND NOTIFICATION OF HAZARDS

14.1 Each Contractor must ensure that all his supervision and employees have had adequate safety training and are experienced to carry out their work safely, prior to starting on site. Training should be continuous throughout a project and should include regular toolbox discussions, (on site briefings at the start of each working day/shift).

To this end, the Contractor must also ensure that specific hazards likely to be experienced on the Site, whether notified to them or discovered by them, are notified to their workforce together with any precautions to be taken and local rules to be observed. Similarly, such hazards should be notified to their Subcontractors and, where discovered by them, to OWNER/CONSULTANT.

14.2 Where particularly severe or unusual hazards may arise on site, OWNER/CONSULTANT reserves the right at no additional cost to request Contractors' employees to attend special safety training and instruction sessions, whether carried out on site or externally. OWNER/CONSULTANT also requires Contractors' employees to undergo specified induction safety training. These aspects should be checked prior to submission of Tenders or execution of the works.

15.0 METHOD STATEMENTS

15.1 Contractors shall submit Safety Method Statements and JSA for all work activities, for example:

- Piling Operations.
- Excavation works.
- Lifting operations, as specified.
- Steel erection.
- Hot work operations.
- Radiography/NDT.
- Entry into confined spaces.
- Pressure testing.
- Working at height.
- Shot fired tools.
- Installation of pre-cast concrete planks.
- Pre-cast concrete structure.
- The erection of safety nets and fall arrest equipment.

Safety method statements must also be submitted for activities which have been identified as being of significant risk during the risk assessment process and activities selected by OWNER/CONSULTANT.

15.2 All Safety method statements must be submitted to OWNER/CONSULTANT at least seven days before planned commencement of the works.

15.3 The Safety method statement shall detail:

- The job to be undertaken.
- The individual activities required to complete the job.
- The individual trades/disciplines involved in each activity.
- Plant, equipment and tools be used in each activity.
- Any substances/chemicals to be used and where, and during which activity they will be used (together with a COSHH assessment).
- The Name(s) of the Supervisor(s) for each activity.
- The Name of the person in overall charge of the job.
- A detailed description of how the work will be done including control measures and procedures to complete each activity and the overall job safety.
- All hot work.

15.4 Compliance with the contents of the safety method statement shall be monitored on a daily basis and addressed during Contractors' safety management meetings.

15.5 The Contractor must ensure that employees executing the works are fully briefed and are made aware of the details within the approved Safety Method Statements, prior to starting the task, this includes highlighting hazards associated, associated risk assessments and reduction measures.

16.0 RISK ASSESSMENTS

16.1 Contractors will be required to produce risk assessments for all works under their control. The risk assessment shall be submitted as part of the Safety Method Statement to OWNER/CONSULTANT at least seven days before the job commences, and include the following information:

- Identification of all hazards applicable to significant risk activities.
- Details of measures in place to control the risk.
- Justification that the existing control measures are adequate or if not, a detailed action plan on how the risk(s) shall be controlled.

16.2 The use of Generic Risk Assessments is only acceptable if they follow the logical progression of the method statement and that specific operation, otherwise, task specific risk assessments will be required.

16.3 All risk assessments must be communicated to the workforce who will be responsible for undertaking the work.

17.0 COMPLIANCE WITH STATUTORY REGULATIONS

17.1 Contractors shall carry out their work in accordance with statutory legislation.
It is the duty of the Contractor to have knowledge of all relevant legislation and take account of it in the planning and execution of the work on OWNER/CONSULTANT' Sites.

18.0 INFORMATION TO BE PROVIDED AND POSTED

18.1 Contractors shall have in place, and issue to OWNER/CONSULTANT the following documents or information prior to commencement of their work, (where detailed within these rules):

18.1.1 Safety, Health and Environmental Policy.
18.1.2 Employer's Liability Insurance Certificate.
18.1.3 A detailed Health, Safety and Environment Plan, compliant with the project plan developed by the Planning Supervisor and/or Principal Contractor.
18.1.4 Work Method Statement Lifting Studies.
18.1.5 COSHH Procedures and Assessments.
18.1.6 Noise Procedures and Assessments.
18.1.7 Name of the individual appointed as the Site Safety Supervisor/Advisor.
18.1.8 Test certificates and examination for lifting gear, plant and appliances to be used on site. (Duplicates to be provided for OWNER/CONSULTANT's records.)
18.1.9 Drawings and calculations relating to false work, designed scaffolds, ground works and supporting temporary works.
18.1.10 Details of young persons to be employed on site.
18.1.11 Information relating to hazards associated with plant, operation and materials used in the works.
18.1.12 Proof of training for all personnel engaged in the works.
18.1.13 Daily Labour Returns.
18.1.14 Monthly Return of Accident Statistics to submitted OWNER/CONSULTANT format (Nil returns required).
18.1.15 Personal Injury Report to submitted to OWNER/CONSULTANT format (all injuries, however minor, to be reported). OWNER/CONSULTANT may request a detailed investigation into an accident. OWNER/CONSULTANT' decision on which incidents require detailed investigation is final.
18.1.16 Dangerous Occurrences, Incidents, Damage to Equipment and/or Property report to be submitted to OWNER/CONSULTANT format.
18.1.17 All entries/records of accidents entered into the Contractor's Accident Book shall also be copied into OWNER/CONSULTANT' Accident Book by the Contractor.
18.1.18 Copies of all Statutory Registers to be submitted weekly to OWNER/CONSULTANT.
18.1.19 Copies of the Contractor's Safety Officer/Advisor's reports of their findings on site visits/inspections.

18.2 **Accidents, Incidents, Dangerous Occurrences and Notifiable Diseases**

18.2.1 Accidents/Incidents/ Dangerous Occurrences/Near Misses

All accidents/incidents/dangerous occurrences/near misses must be notified to OWNER/CONSULTANT immediately, and a report prepared.

For reportable incidents, a copy the report to the Authority must be submitted to OWNER/CONSULTANT on completion but no later than two calendar days after the accident.

18.2.2 OWNER/CONSULTANT reserves the right to decide which accident, incidents or minor injuries shall be Investigated, and to what extent/format/contents of any investigation.

Note: All such notification or reports to OWNER/CONSULTANT do not release the Contractor of his statutory duties to report such matters to the Authorities by the quickest possible means (viz, telephone, fax and e-mail) immediately following the incident/accident.

19.0 PERSONAL PROTECTIVE EQUIPMENT/CLOTHING

19.1 All personnel on OWNER/CONSULTANT' site must wear as a minimum safety helmet, hi-vis vest, safety glasses and protective footwear. Additional personal protective equipment may be required dependent on the tasks being undertaken or as dictated by the risk assessment.

19.2 Contractors shall provide all necessary personal protective clothing and equipment for their employees and renew as necessary. Records of the issue of such equipment must be maintained for inspection by OWNER/CONSULTANT.

19.3 The Contractor shall:

- Provide personal protective equipment which is comfortable and fit for purpose.
- Maintain and clean personal protective equipment.
- Replace free of charge defective, broken or lost personal protective equipment.
- Provide storage for personal protective equipment when not being used.
- Ensure that personal protective equipment is properly used.
- Give training, information and instruction on its use to employees.
- Ensure that all personnel wear suitable clothing at all times **(no shorts, no sports shirts and no colours that may invite aggression - HSE "Keep Your Tops On" is enforced).**
- OWNER/CONSULTANT reserves the right to direct the contractor to change/replace personal protective equipment if they determine that it is unsuitable or inadequate for its proposed use.

20.0 SUBSTANCES (Control of Substances Hazardous to Health – COSHH)

20.1 Substances hazardous to health must be identified prior to taking them onto site and, if they cannot be substituted or eliminated, assessments stating how the substances will be controlled and what precautions will be introduced must be carried out and recorded in writing by a competent person. This assessment must be communicated to, and understood by, the members of the workforce who are likely to come into contact with the substance(s). A copy of all assessments should be submitted to OWNER/CONSULTANT.

20.2 Hazardous substances may only be brought to site with OWNER/CONSULTANT' permission. They shall be kept to a minimum and must be stored in secure, appropriate containers with the contents clearly labelled. The containers must be stored in a secure

area, preferably quarantined from the main stores areas, with suitable warning notices and signage posted.

20.3 Hazardous materials must not be allowed to discharge into natural watercourses or drainage systems.

20.4 All hazardous material waste must be kept separate from normal waste and be disposed of in a specialist disposal facility.

21.0 NOISE

21.1 When any operation of a Contractor is likely to expose any employee on site to an average noise level of 85 dB(A) and above, an assessment shall be carried out, by the Contractor, and records maintained for OWNER/CONSULTANT' inspection. In such circumstances, the Contractor must keep stocks of adequate ear defenders or other suitable hearing protection.

21.2 In addition to the foregoing, noise must be kept to a minimum at all times and must not exceed acceptable and/or locally specified rules and conditions relating to noise imposed by the Contract. Due regard must always be given to noise levels, and their effects on the local community and persons not involved in the operations. Permissible times for noisy work operations, and other restrictions, may be imposed by the Local Authority. Contractors receiving Notices or Prohibition Notices under the related legislation must notify OWNER/CONSULTANT of such Notices.

22.0 FIRST AID

22.1 All Contractors shall provide or ensure that they are provided with, such equipment and facilities as are adequate and appropriate in the circumstances for enabling first-aid to be rendered to any of their employees if they are injured or become ill at work.

22.2 No work shall commence on site until Contractors have trained first aid personnel on site. Contractor at all times during execution, shall station at site an emergency vehicle without any extra cost or claim.

23.0 TOOL BOX TALKS

23.1 Tool Box Talks will be implemented by all Contractors. The agenda for these talks will be agreed with OWNER/CONSULTANT prior to the commencing of work.

24.0 HEALTH, SAFETY AND ENVIRONMENT INSPECTIONS/HEALTH, SAFETY AND ENVIRONMENT ADVISORS

24.1 The OWNER/CONSULTANT' Health, Safety and Environment Engineer/Advisor will visit the sites and carry out Site Safety Inspections. Contractors must co-operate in these inspections. Whenever Contractors' own Health, Safety and Environment Advisors visit site they must report their arrival and departure to the OWNER/CONSULTANT' Senior Representative, and provide a report of their findings and any necessary corrective action to be undertaken.

24.2 Contractors on the project must provide a full-time site based Health, Safety and Environment Advisor, when the intensity of the work requires or at the request of the OWNER/CONSULTANT.

24.3 Contractors who do not have full-time site based Health, Safety and Environment Advisors, shall ensure that their Health, Safety and Environment Advisor visits site once per week as a minimum.

24.4 **Appointment of Health, Safety and Environment Supervision**

The Contractor shall appoint safety supervision. The name of each appointee, together with evidence of his or her competence to carry out the requirements of the role, shall be submitted to OWNER/CONSULTANT for their approval.

25.0 HEALTH, SAFETY AND ENVIRONMENT MEETINGS

25.1 Health, Safety and Environment will form part of the agenda at all Site Progress Meetings. The Contractor's Safety Advisor may be asked to attend these progress meetings.

25.2 Once per month OWNER/CONSULTANT' Resident Construction Manager shall convene a Health Safety and Environment Meeting of all Contractors. Attendees at the meeting shall be all Contractors' Safety Advisors and Site Managers.

26.0 HEALTH, SAFETY AND ENVIRONMENT COMMITTEES AND SAFETY REPRESENTATIVES

26.1 OWNER/CONSULTANT encourages the workforce to nominate Safety Representatives as a way of improving communication on Health, Safety and Environment issues. Wherever Contractors' Safety Representatives have been appointed, OWNER/CONSULTANT must be informed of their appointment in writing.

27.0 HOUSEKEEPING

27.1 Contractors are expected to carry out their work in a clean, safe and orderly manner.

27.2 Dust shall be kept to acceptable levels for the work being carried out. Waste materials and rubbish shall be cleared up as the work progresses and not left to introduce a safety hazard for other personnel engaged on the works.

27.3 Construction waste should never obstruct emergency exit routes, Firefighting equipment, emergency alarm call points or other emergency facilities.

27.4 From time to time as judged necessary, at the expiration of the contract, or when instructed to do so by OWNER/CONSULTANT, the Contractor shall undertake to clean and tidy his areas of occupation and work to the satisfaction of OWNER/CONSULTANT. Should the Contractor fail to do this, OWNER/CONSULTANT reserves the right to remove all offending materials and debris and to deduct the cost of this operation from the Contract Price. OWNER/CONSULTANT accepts no responsibility for any materials and/or tools which may be removed during this operation.

27.5 The Contractor must ensure that the following requirements are strictly enforced:

- Ample provision of refuse bins for all rubbish including organic waste such as food scraps, etc.
- Daily clearance of all such bins to the area designated for this discharge.
- No discharge of deleterious matter such as oils or other industrial waste.

27.6 All site offices, toilets, eating facilities, changing rooms, drying areas, stores, etc, which are the responsibility of the Contractor, shall be cleaned daily as a minimum by the Contractor. These facilities shall be checked for vermin on a two weekly rota.

28.0 FIRE PREVENTION

28.1 Before welding, flame or arc cutting of metals, or other processes involving heat or naked lights are permitted, a fire risk assessment shall be carried out by the contractor and arrangements agreed with OWNER/CONSULTANT who will issue a Permit to Work.

28.2 Contractors shall familiarize both themselves and their employees with the fire safety arrangements, fire alarms, means of escape and emergency evacuation procedures.

28.3 Before leaving the premises and site, contractors shall ensure that naked lights and other ignition sources have been extinguished and electrical apparatus, where practicable, switched off and/or disconnected.

28.4 Contractors shall store Highly Flammable Liquids and Liquefied Petroleum Gases in a manner approved by OWNER/CONSULTANT.

28.5 OWNER/CONSULTANT' fire protection equipment shall only be used in an Emergency. Fire extinguishers/fire blankets for use when carrying out hot work shall be provided by the Contractor.

29.0 REMOVAL OF WASTE FROM CONSTRUCTION SITES

29.1 The removal of waste shall only be undertaken by Licensed Waste Carriers.

29.2 Where there is any doubt of the composition of excavation spoil, it must be analyzed before it is removed from site.

29.3 Evidence of compliance shall be submitted to OWNER/CONSULTANT prior to the removal of any waste from site.

29.4 Controlled waste is any kind of household, industrial or commercial waste. This includes, for example:

- Scrap metal.
- Building, construction, demolition and excavation waste, including waste from any repair or renovation.
- Clinical waste.

- Anything which is unwanted because it is surplus, broken, worn out, contaminated or spoiled in some other way.

Controlled waste disposal must be managed via a chain of transfer notes, maintained by the contractor and readily retrievable for OWNER/CONSULTANT' inspection.

30.0 EXCAVATIONS AND OPENINGS

30.1 No excavation work shall be commenced by the Contractor unless a valid excavation permit has been issued. The Contractor shall have on site at all times while excavation work is being carried out, detection equipment which meets the latest technology.

30.2 Prior to the start of any excavation, OWNER/CONSULTANT shall be consulted and the presence of overhead and buried service records shall be checked. Where "live" services are present, hand excavation must be carried out until the location of the service has been identified, recorded and made safe.

30.3 The Contractor must erect suitable solid edge protection (i.e., double handrails) around excavations or openings. During the hours of darkness any excavations, openings or obstructions near or on roadways and walkways must be indicated by a sufficient number of warning lamps.

30.4 The sides of all excavations should be properly shored, battered or stepped to prevent collapse. No excavation work shall commence unless there are adequate resources present to ensure the stability of the excavation. Excavations shall be inspected prior to, or re-commencement of the work to ensure the excavation is still in a safe condition.

30.5 All excavations shall have a proper ladder access point provided.

30.6 Spoil from excavations must be piled at least 1m from the edge of the hole.

30.7 Vehicular traffic shall be restricted from the edges of excavations, to prevent possible collapse.

31.0 ELECTRICITY

31.1 All Contractors must provide their own electrical power supplies or as per Technical ITB.

31.2 Contractors must not interfere with, or work on any of, the Client's electrical installations or equipment without written consent.

31.3 Where Contractors have to work in the vicinity of electrical equipment they must carry out a risk assessment prior to commencement of any works.

ALL EQUIPMENT MUST BE TREATED AS "LIVE" UNLESS ISOLATED/LOCKED OFF AND TAGGED.

31.4 Repair or installation of any electrical equipment must only be carried out by a competent qualified electrician.

31.5 The electrical supply to powered hand tools must not exceed permissible volts, centre tapped giving appropriate volts to earth. Where this is not possible, due to the type of tool being used, the approval of OWNER/CONSULTANT must be sought in writing.

Electrical lighting for use in confined spaces must not exceed 24 volts (and be explosion proof where applicable). Powered hand tools used in confined spaces should, where possible, be air operated.

31.6 Contractors requiring to install temporary electrical supply equipment shall submit a temporary electrical supply procedure to OWNER/CONSULTANT for approval. The procedure shall, where necessary, cover installation of 380/440 volt system, installation of 110 volt system, lighting system, welding equipment installation, inspection testing operation and maintenance of temporary electrical systems.

31.6.1 **Distribution Boards** - Semi-permanent or Long Term

These should be accommodated in weatherproofed locations and be so arranged, if possible, that they will not need to be moved during the Contract. They should be proofed against interference or unauthorized operation and they should be large enough to accommodate all the necessary apparatus required. Each circuit should be clearly labeled and a circuit diagram should be located at each board.

31.6.2 **Distribution Boards** – Temporary

These are usually small portable panels or boards containing two or three socket outlets. They must be of robust construction, preferably all-insulated and should be supplied by heavy duty flexible cables, these cables shall not be spliced. Socket outlets, plug connectors and cable couplers should comply with High Standards or equivalent industry standard.

31.6.3 **Distribution Cables**

These cables run from the main distribution boards to the local distribution boards throughout the site.

The cables will normally be multi-strand multi-core armored PVC cables but, in certain cases, may take the form of Mineral Insulated Copper Clad (MICC) cables. The latter type should be sheathed with PVC.

The installation must be so arranged as to prevent the need for long trailing cables. Socket outlets should be located as near the working point as possible.

Power and lighting circuits should be kept separate.

A full record should be made of all parts of the installation and should be kept up to date when alterations or extensions are made.

31.6.4 **Underground Cables**

Cables may be provided by the Contractor and laid underground or overhead to connect the supply or metering point to the semi-permanent site distribution boards.

The cables must be suitable for the duty and loading expected, e.g., armored PVC cables.

The cables should be buried at a safe depth or taken from a height so as not to obstruct the movement of persons and vehicles and their routes clearly marked both on the site and on the site plans.

The cables should be properly terminated and be provided with efficient circuit protection.

Cable routes should be so arranged that the minimum of obstruction is caused. The cables should be treated with care and given the same supervision and protection as other cables.

31.7 No temporary electrical supply shall be installed or modified without the agreement and approval of OWNER/CONSULTANT.

31.8 Any tool, plant or equipment exceeding 110 volts (55v to earth) shall be connected to an earth leakage circuit breaker (ELCB).

32.0 WORK IN CONFINED SPACES

32.1 All work in confined spaces must be covered by a safety method statement.

Safety method statements for work in confined spaces should include arrangements for the following as a minimum:

- Issue of a permit to work
- Work scope and method.
- Nominated Supervisor.
- Tally man.
- Rescue procedures and equipment.
- Training.
- Tools and equipment to be used, including low voltage or pneumatic.
- Lighting requirements, including standby/emergency.
- Explosion proof fittings.
- Low voltage or pneumatic tools.
- Ventilation.
- Access.
- Bonding to prevent both electrical shock and static discharge.
- Work cycles, to reduce risk of heat exhaustion.
- Fire safety and extinguisher requirements.

32.2 Contractors shall not enter or commence work in any excavation, tank, vessel, pipe or chamber or other enclosed space, until a valid permit to work has been issued. Where Contractor's operations result in a dangerous atmosphere arising during the monitoring of the work activity, the permit to work issuing authority must be informed and all personnel removed from the area.

No new activity shall be introduced into a confined space without the permission and signed approval of the permit to work issuing authority.

Whilst work is ongoing within a confined space, the Contractor will be required to provide a trained standby/tally man.

32.4 All personnel who have to enter confined spaces must have undertaken the training appropriate to this task.

33.0 MOBILE CRANES

33.1 All cranes (including piling rigs, fork lift trucks, mobile elevated work platforms, hand lorries and similar equipment), whether owned by the Contractor or hired, must carry relevant test certificates and thorough examination reports, together with the manufacturer's handbook. Copies of this documentation must be submitted to Owner/Consultant prior to commencing work.

33.2 Only persons who are certificated as competent and authorized shall be allowed to operate cranes. The Contractor must be able to prove the competence of their employees to operate such equipment prior to its use.

33.3 Crane operators or other competent persons must carry out daily inspections and enter these in the crane register. Failure to maintain the register properly may lead to suspension of operations. This obligation is the responsibility of the crane hirer when he is supplying the crane and the operator. In addition, the Contractor will implement a regular inspection and maintenance programme to ensure that all components of the lifting device are in good condition.

33.4 Travel routes for cranes and crane standing must be agreed with OWNER/CONSULTANT in order to avoid such things as overhead lines and other structures, underground services, excavations, made up ground, etc. Load spreader pads of sufficient size and thickness area, and of suitable material, e.g., metal plates, timber, etc, are to be placed under each outrigger foot, before all crane lifting operations are allowed to commence.

33.5 Crane duty charts (Load Radius Tables) must be displayed on or be available in the crane for easy reference. In addition, crane manufacturers' rigging/de-rigging instructions must be available on site. During rigging/de-rigging of jibs/booms, provision must be made to support sections/either side of rigging points, from below, utilizing tightly packed blocks.

33.6 All cranes shall be fitted with:

- A reverse warning audible alarm.
- Load radius indicator.
- Automatic safe load indication.
- Crane hooks with safety catches.

All of which must be serviceable.

33.7 All lifting equipment accompanying the crane shall comply with the requirements of lifting regulations.

33.8 The assembly, rigging and de-rigging of any crane components, including fly jibs, shall only be done under the supervision of a competent lifting supervisor. An approved risk assessment, together with the manufacturers' rigging/de-rigging instructions must be in place covering rigging activities for the equipment.

33.9 Every Contractor involved in lifting operations with a crane (including a piling rig) or mobile crane shall appoint, in writing, a lifting supervisor to oversee all lifting operations.

33.10 No crane shall travel with a suspended load.

33.11 Outriggers, when installed, must always be used.

34.0 LIFTING OPERATIONS

34.1 A Lifting Study and Safety Method Statement must be prepared for all heavy lifts exceeding 10 tons, or of a complex nature, e.g., tandem lifts or as specified by the Construction Manager (or the Rigging and Lifting Supervisor) and submitted to OWNER/CONSULTANT for review.

34.2 Every lifting operation must be properly planned by a nominated, competent person.

34.3 Every lifting operation shall be appropriately supervised.

34.4 All slinging and rigging of loads must be carried out by competent personnel.

34.5 Clear communications between the crane operator and the person responsible for controlling the lift must be established.

All statutory Inspection Reports/Certification/Documentation and proof of the driver's training shall be photocopied and handed to OWNER/CONSULTANT prior to the setting up of the crane. Certification for lifting equipment to be used in the lift shall be identified and cross checked with the item of plant

35.0 STEEL ERECTION

35.1 The weight of each component in excess of 500 kg shall be clearly marked upon it.

35.2 Erectors must be fully informed of the correct erection sequence, by their supervisor, prior to each stage of work commencing.

35.3 Vertical access provision should, whenever possible, be fixed to the steel before it is lifted into position. Where this is not possible permanent access, ie, stairways or permanent metal ladders, shall be installed as early as possible.

35.4 Where horizontal access along structural members is required, as much work as possible must be completed before the steel is lifted into position. This includes:

Fixing of handrails or posts for securing steel wire ropes to be used in conjunction with safety harnesses or inertia reels.

The fixing of scaffold tubes (needles) to the lower flange of an I-beam to allow a working platform to be erected.

Where scaffold tubes (needles) are used they shall not support a working platform wider than three boards, or one lightweight staging without being "picked up".

Where no ladder access, permanent stairway, etc, leads onto working platforms, as described above, employees must use man riding baskets or mobile elevated work platforms as far as reasonably practicable to access working areas.

36.0 SCAFFOLDING

36.1 All scaffolding must be of good quality, be erected in compliance Good Practices for Access and Working Scaffolds, and special scaffold structures in steel. In addition to the main guard rail, an additional guardrail is required such that the gap between the toe-board and main guardrail does not exceed 470mm and all boards must be secured, without causing a tripping hazard.

36.2 All scaffolding shall be erected, modified and inspected by qualified competent scaffolders.

36.3 Where materials are to be positioned on scaffolding the Contractor's supervision must ensure that the scaffolding is not overloaded.

36.4 Before use, scaffolding shall be inspected by an authorized Scaffold Inspector who shall complete a "scaffold tag" and secure it in a prominent position at the base of all ladder access points. The scaffolding tag will clearly show the following information as a minimum:

- Location.
- Reference number.
- Requested by.
- Access Scaffold Classification.
- Maximum distributed load/working lift.
- Maximum number of working lifts to be used simultaneously.
- Date erected.
- Erected by.
- Inspected by.

36.5 Scaffolds shall be inspected at weekly intervals or after storms by the authorised Scaffold Inspector who shall sign and date the "Scaffold Tag" after each inspection. Scaffolding not considered safe shall have the Scaffold Tag withdrawn and a prominent "DO NOT USE" sign displayed.

36.6 A scaffold register shall be maintained by the authorized Scaffold Inspector. This shall contain:

- Date of first and subsequent weekly inspections.
- Individual identifications of all scaffolds which shall be cross-referenced to the Scaffold Tag identity number.
- Clear name and signature of the authorized Scaffold Inspector against each separate scaffold inspected.

36.7 No scaffold may be erected which impedes normal access or can be accidentally struck by moving plant without prior consultation with OWNER/CONSULTANT to ensure that a safe system of work is in place.

36.8 Contractors are not permitted to erect or carry scaffolding near live overhead electrical cables, or equipment because of the danger of tubes making accidental contact with electrically charged apparatus.

36.9 If there is any doubt about the security of any anchorage, suspension points or ties for a scaffold, e.g., strength of existing buildings/structures, or those under construction, OWNER/CONSULTANT must be consulted before proceeding with erection.

36.10 All scaffolds must be provided with suitable access. Where ladders are used for this purpose they must be of adequate length and properly secured by lashing or fixing to prevent displacement.

36.11 Action shall be taken to warn personnel against using partly erected or dismantled scaffolds. A prominent “DO NOT USE” sign shall be clearly displayed.

36.12 OWNER/CONSULTANT shall approve the sitting of the scaffold material racks/compounds.

36.13 Mobile tower scaffolds shall not be constructed with a height greater than 3 times the minimum base width and shall only be used on level ground. Towers shall only be erected by trained personnel.

36.14 In addition to weekly inspections, wooden scaffold boards shall be subject to a monthly inspection to ensure wood has not rotted or been subject to insect damage

36.15 The Contractor shall ensure that the system of work employed for the erection and dismantling of scaffolding shall not expose the Scaffolders to any risk.

36.16 All scaffolding must be erected and dismantled to the requirements laid down in the current regulations and guidance notes and to the requirements of OWNER/CONSULTANT.

37.0 LADDERS/STEPS

37.1 Ladders must be in good condition and free from defects, i.e., broken rungs, split stiles.

37.2 Ladders must not be painted.

37.3 Ladders must:

- Be securely fastened at the top.
- Be properly positioned at the base.
- Extend at least 1m (5 rungs) above the working platform.
- Be at an angle of 300mm out for every 1.2m vertical drop.

37.4 **All steps used on the project Site**.

37.5 Only one person must be allowed on a set of steps at any one time.

37.6 Persons must work with a set of steps of the appropriate height for the task.

37.7 The top rung of the steps must be kept at waist height, no work to be carried out above this height on steps.

37.8 Ladders are to be used as a means of access not as a working platform except for light, minor or one off activities. Then the person must wear a harness and tie-off to a suitable anchorage whilst carrying out the minor task.

38.0 FALL PROTECTION

38.1 Depending on the task and the risks, harnesses and appropriate anchorages/running lines will be used for activities carried out above a height of 2 meters.

38.2 Fall protection equipment shall be subject to regular inspection by a competent person, and a register maintained for OWNER/CONSULTANT' inspection.

38.3 During the execution of work at height, where it is not practicable to work from within a standard working platform with double handrail and toe boards (for example erection of structural steelwork, installation of roof components, etc), safety netting capable of catching a falling person must be installed as far as reasonably practicable.

38.4 The provision of safety netting does not relieve individuals from utilizing fall protection devices during the execution of the works.

38.5 The safety nets should be manufactured to Indian Standard and erected in accordance with good practices by a competent person.

38.6 The safety nets must bear a label stating the normal size of the net; the date of manufacture, the deflection at the centre of the net during the prescribed test and the maximum distance below the working height for which the net is designed to be used.

38.7 Test certificates must be provided for all safety nets, which will state the breaking strength of the net and provide details of the drop test carried out.

38.8 All safety nets must be periodically tested at intervals not exceeding three months – and records of these tests must be retained.

38.9 A formal inspection of safety nets must be carried out weekly to check for damage, loose ties, changes in anchorage points, etc. Records of these inspections must also be retained.

39.0 MOBILE ELEVATED WORK PLATFORMS

39.1 The term Mobile Elevated Work Platform (MEWP) covers the following types of equipment:

- Scissor lifts.
- Telescopic booms or jibs.
- Articulating and telescopic booms.

39.2 Anyone who is to operate a MEWP must be competent and have received formal training accredited by manufacturer.

39.3 Prior to any MEWP being used on site, a formal risk assessment must be carried out to identify any potential hazards which may exist as a consequence.

39.4 Whilst working within the platform of a MEWP, all personnel must wear a safety harness which is attached to a secure anchorage point within the platform.

39.5 Before commencing work from a MEWP, the surrounding area should be cordoned-off to prevent personnel straying into a potentially hazardous area.

39.6 The Safe Working Load specified on the MEWP must not be exceeded.

39.7 If the MEWP has been manufactured with outriggers or stabilizers, they must always be deployed.

39.8 Prior to commencing work, ground conditions must be checked to ensure that the ground bearing capacity will not be exceeded by the loading from the MEWP. Where required, spreader plates shall be used to distribute the loading.

39.9 The MEWP shall only be permitted to travel with the platform occupied and/or the boom extended if it is within the machine's specified operational capabilities.

39.10 MEWP shall not be used as a jack, prop or support.

39.11 MEWP shall not be used as a crane or lifting device.

39.12 MEWP shall not be used primarily for the transport of goods or materials.

39.13 MEWP shall not be used in wind speed exceeding 30 mph (12.5 m/s).

39.14 All MEWPs must be subjected to a regular maintenance and inspection regime, which as a minimum will require weekly inspections by a competent person and a thorough examination every six months.

40.0 CONTRACTORS' TOOLS AND EQUIPMENT

40.1 All Contractors' tools and equipment must be fit for purpose. Tools should be CE marked.

40.2 Guards and electrical trip switches must work effectively and must not be removed or by-passed.

40.3 All tools shall be of good quality and maintained in a safe working condition. Home made tools are not permitted.

40.4 The Contractor shall provide suitable storage with suitable racks and bins for storing tools and equipment.

40.5 All temporary construction leads, lighting and portable electric tools shall be of appropriate volts.

40.6 The Contractor shall nominate or employ the services of a competent qualified person to inspect and tag electrical power hand tools, transformers, distribution boards, extension cables, etc, on an at least a three monthly basis (PAT testing). The tag shall display name, signature of the individual inspecting the tool and date of inspection.

40.7 The Contractor shall keep, on site, a register of all electrical power hand tools in use. The register shall detail:

- Individual identity number of the tool.
- Name, signature and company of the qualified electrician carrying out the inspection.
- Date of inspection.
- Maintenance and Inspection schedule.
- Remarks on condition of tool and whether repaired or withdrawn from use.

40.8 No electrical powered hand tool shall be used unless it is tagged with a current "INSPECTION" tag.

40.9 All electrical leads must be connected to the power source through standard industrial waterproofed plugs and sockets, which shall be in good condition.

41.0 MECHANICAL PLANT AND EQUIPMENT

41.1 Mechanical plant and equipment is defined as:

- Earthmoving plant.
- Road making plant and equipment.
- Concrete batching plant and mixers.
- Forklift trucks.
- Miscellaneous plant, including generators and compressors.
- Mobile elevating work platforms (e.g., star- lift, cherry picker, etc).

41.2 All items of mechanical plant transported to the project shall be in a safe and sound condition and shall be properly maintained. Emissions shall be to acceptable limits and no smoke shall be discharged.

41.3 A programme of regular, preventative maintenance shall be established by the Contractor, as per the manufacturer's handbook, to ensure that all plant equipment is systematically inspected, maintained and repaired as necessary.

41.4 The preventative maintenance programme and the Contractor's employee responsible for taking the action shall be clearly detailed, identified and given to OWNER/CONSULTANT.

41.5 A safe system of work must exist during all maintenance and repair operations to ensure that no part of the machinery is set in motion while work is being carried out.

41.6 Plant maintenance must not be carried out within the main construction site.

41.7 Where refueling is required, facilities provided shall be adequately covered by fire extinguishers, earthing, warning signs, bonding and proper fuel dispensers. Refueling areas shall be curbed to avoid spills.

41.8 Waste oil removed from vehicles after servicing shall be sent to the appropriate off-site waste disposal facility and this is the responsibility of the Contractor.

41.9 The OWNER/CONSULTANT'S tools, plant and equipment may not be used by Contractors without their express permission.

42.0 COMPETENCY/PLANT EQUIPMENT

42.1 All drivers and operators of mobile plant (mechanically propelled vehicles) shall be in possession of the appropriate license for the class of vehicle.

42.2 It is the responsibility of the contractor to ensure that all drivers, operators and banks men of mobile plant (mechanically propelled vehicles) are certificated as competent.

42.3 General

42.3.1 Every dangerous part of machinery shall be securely guarded.

42.3.2 Any guards removed for maintenance or repair purposes must be replaced before the machine is set in motion.

42.3.3 No mobile plant (mechanically propelled vehicles) shall carry passengers unless a proper fixed seat is provided, except when the equipment is specifically designed for standing personnel.

42.3.4 Mobile plant (mechanically propelled vehicles) must be parked on firm level ground when unattended, the engine stopped, brakes on and any load or attachment lowered to the ground and the keys left in the ignition.

42.3.5 No mechanical plant or equipment shall be sited on or operated on any area of the project without express the permission of OWNER/CONSULTANT.

42.3.6 All items of mobile plant (mechanically propelled vehicles) shall be fitted with a reverse warning audible alarm.

42.3.7 All drivers/operators of mobile plant (mechanically propelled vehicles) shall strictly obey the instructions of the site security, traffic regulations and speed limits. A banks man shall be in attendance during all reversing procedures.

42.4 Inspection

All mobile equipment (mechanically propelled vehicles) shall be inspected by a competent person appointed by the Contractor prior to use on site. Equipment considered to be unsafe, by OWNER/CONSULTANT, shall not be allowed access to the site.

42.5 Flame Arrestors

42.6 All mobile plant for use in Petro Chemical Live Plant Areas, or during the Start-up and Commissioning Phase of the project, must be fitted with Exhaust Flame Arrestors and Chalwyn Valves where there is a risk of flammable gas releases.

43.0 MACHINERY GUARDING

43.1 Unauthorized personnel must not operate, interfere or tamper with plant or equipment.

43.2 Persons authorized to use machines must first check that guards are in position and that any other safety devices, e.g., emergency stops, are in working order.

43.3 All plant or equipment brought onto the site must be properly guarded to prevent injury and be CE marked.

NO GUARD OR FENCE MAY BE REMOVED FROM MACHINERY.

44.0 WELDING

44.1 Welding sets shall be in good condition, properly maintained and earthed.

44.2 Isolation switches on welding sets shall be readily accessible.

44.3 Terminals and live components shall be adequately protected.

44.4 Cables shall be frequently inspected to ensure the insulation is intact.

44.5 Damaged cables or electrical holders shall be properly repaired or replaced.

44.6 The welding return cable shall be secured onto the work piece. If this is not practical it shall be as near as possible.

44.7 Proper cable connectors shall be used when connecting runs of cables.

44.8 Welders shall wear:

- Face and eye protection with correct grade of filter.
- Welder's gauntlets.
- Long sleeved flame retardant overalls.

Welders shall wear safety helmets at all times, except whilst welding, when it is agreed as impractical and written permission is granted by OWNER/CONSULTANT, subject to mitigation of hazard, i.e., no work overhead, or shielded from falling objects.

44.9 Welding areas should whenever possible be screened off using flame retardant blanket or other suitable material. All combustible materials must be cleared from the vicinity of all welding operations.

44.10 Asbestos material shall not be used on the project.

44.11 Electric Arc Welding equipment and accessories shall conform to Latest Engineering Standards.

44.12 Fire extinguishers must be provided and kept adjacent to any welding or cutting activity.

45.0 ABRASIVE WHEELS

45.1 Contractors must ensure that any of their employees authorized to change Abrasive Wheels have attended an approved course of training and have been appointed in writing.

45.2 Details of each employee trained must be entered in the training register kept on site. Contractors must produce certificates and registers on request.

45.3 Machines used to drive Abrasive Wheels must be in good condition and properly guarded.

45.4 Pedestal or bench mounted grinders must have an emergency stop button and be fitted with a properly adjusted tool rest and guard.

45.5 All hand held grinders shall have a “Dead Man” switch and appropriate guards fitted.

45.6 The use of hand held angle grinders over 115mm shall only be permitted for specific tasks, subject to Owner’s / Consultant’s approval.

46.0 USE OF GAS AND OXYGEN EQUIPMENT

46.1 Compressed gas cylinders shall:

- Be in good condition and not suffering from corrosion.
- Be properly colour coded (reference should be made to National Standards).
- Be individually identified.

Hoses shall be properly colour coded to the internationally recognized standard for the gas being used, in good condition and fitted with hose connectors attached by permanent clips.

Check valves and flashback arrestors must be used on both hoses at all times.

46.2 Users shall check the equipment for perished, damaged hoses, regulators, and pressure gauges, etc. Defects must be reported to their supervisors and faulty equipment must be replaced.

46.3 When on site, cylinders must be in trolleys or secured in an upright position at all times. A bottle key shall be kept with cylinders in use.

46.4 Stored oxygen and fuel gas cylinders shall be kept separate with minimum separation distance of 5m. Cylinders must never be stored or used in a horizontal position cylinders must be secured in an upright position. Empty cylinders must also be separated from full cylinders. Cylinders shall be stored in lockable open mesh bottle cages.

46.5 All gas cylinders must be handled with care and they must not be misused or abused. They must be properly shut off when not in use and safety caps must be fitted when being moved.

46.6 Great care must be taken to ensure that gas equipment, including hoses, are not allowed to cause obstruction of roadways, walkways, manholes, ladders or other means of access where they can cause hazards or be damaged. Hoses not in use should be coiled up and put in a safe place. Hoses should whenever possible be supported off the ground.

46.7 Where any operation involves the use of gas and oxygen equipment in enclosed or semi-enclosed spaces, Contractors' supervision must carry out frequent checks to ensure these procedures are complied with.

46.8 During meal breaks and at stopping times, hoses and equipment must be removed from confined spaces or excavations. Oxygen or gas cylinders must not be taken into confined spaces for use or storage.

46.9 No modification to tanks or drums which have contained flammable liquid shall be undertaken at the site.

47.0 ABRASIVE AIR BLAST CLEANIN

47.1 Blast cleaning shall be carried out in an enclosed designated area.

Provision shall be made to prevent the spread of grit and dust out of the blast area and to collect and dispose of the spoil to an approved location.

47.2 The blast cleaning area shall be indicated by prominent warning signs.

47.3 Only approved abrasives having no free silica shall be used.

47.4 Personnel involved in the actual blasting of material shall be protected by a positive pressure, blast hood, meeting approved standards and providing both respiratory and eye protection, with breathing air supplied via a suitable filter.

47.5 The nozzle shall be fitted with a properly functioning dead man's handle, and anti-static abrasive blast hoses. It is required that all equipment be grounded and checked for ground potential

47.6 A standby man shall stay by the blast pot.

48.0 COMPRESSED AIR

48.1 All air receivers and compressors shall be in good condition and properly maintained.

48.2 Air receivers shall be individually identified and marked with their safe working pressure.

48.3 Air receivers shall be accompanied by a valid test certificate which shall be kept on site by the Contractor and shown to OWNER/CONSULTANT before bringing the vessel onto site.

48.4 All air receivers must be fitted with a properly set pressure relief valve.

48.5 Air receivers shall be examined and the pressure relief valve tested by an independent examiner at yearly intervals.

48.6 There shall be a register of all air receivers containing:

- Individual identification numbers.
- Dates of independent inspections.
- Name and signature of independent examiner.

- Rates safe working pressure.
- Pressure at which pressure relief valve lifted shall be kept on site by the Contractor along with all current certification.

48.7 The requirements inclusive also apply to compressor mounted air receivers.

48.8 All compressed air fittings shall be wired and/or restrained to prevent them from whipping should the coupling separate.

48.9 Only hose clamps designed for compressed air service shall be used. Worm drive (Jubilee) clips are not acceptable.

COMPRESSED AIR MUST NEVER BE USED FOR CLEANING CLOTHES.

48.10 Nozzles used for air blowing must be fitted with a “Dead Man” valve.

49.0 MOBILE PHONES AND PAGERS

49.1 Radios, personal CD and tape players are not allowed in the construction areas.

49.2 Mobile phones and pagers are prohibited in the designated construction areas by any hands-on personnel. External to the designated construction areas, providing it does not detract the user from any safety requirements and the user is stationary, then mobile phones and pagers may be used. **Other uses of this equipment will be at the discretion of OWNER/CONSULTANT.**

50.0 RADIOGRAPHY/NDT

50.1 Contractors who carry out radiography/NDT on the site must comply with safe systems of work. In particular, they MUST ensure that:

- Radiography areas are clearly marked using barrier tapes, notices and flashing lights.
- Audible warning (horns) must be sounded before a source is exposed.
- Only Classified Workers are engaged in radiography work.
- All other personnel are clear of the area before radiography takes place.
- Radiography work is supervised by a Qualified Radiological Protection Supervisor. Such supervisors must be nominated in writing and notified to OWNER/CONSULTANT.
- Any incident which may have resulted in over-exposure of any personnel is brought to the attention of OWNER/CONSULTANT for investigation.
- They have a written emergency procedure to be followed in the event of loss of an isotope or damage or malfunction of associated equipment. This procedure must be submitted to OWNER/CONSULTANT for approval before commencement.
- A certified meter is available on site.
- Radiography is carried out at the times agreed with OWNER/CONSULTANT normally this will only be during silent hours. OWNER/CONSULTANT requires twenty-four hours notice of such planned work.

50.2 Contractors who are not involved in radiography work must ensure that their employees observe warning notices, alarms and barriers in use where such work is being carried out.

50.3 Contractors must ensure that statutory notification is made to the authorities of radiography works.

50.4 Disposal of spent radioactive sources shall be agreed with OWNER/CONSULTANT.

51.0 WORKING OVER WATER/DIVING OPERATIONS

51.1 The Contractor shall provide a buoyancy aid to any employee working over (or near) water where there is a likelihood of falling in.

The Contractor shall also supply a sufficient number of life buoys to be permanently located at the point(s) of danger. The life buoys shall be attached to a throwing line.

Where rescue of a person falling into the water may be difficult, OWNER/CONSULTANT may require the Contractor to supply a standby boat, crewed by a competent boatman trained in rescue and resuscitation techniques.

51.2Diving operations may only be carried out using approved specialist diving contractors, employing certified commercial divers, and upon acceptance by OWNER/CONSULTANT of their Health, Safety and Environment plan and method statements (Diving Rules).

52.0 ASBESTOS

52.1 Only certified Contractors are allowed to handle asbestos.

53.0 IMPROVEMENT AND PROHIBITION NOTICES

53.1 In the event of an Improvement or Prohibition Notice being served by an Inspector, the OWNER/CONSULTANT Senior Representative must be notified immediately and the Contractor shall comply with the terms of such Notice immediately.

54.0 CARTRIDGE OPERATED FIXING TOOLS

The use of Cartridge Operated tools shall only be permitted with the express permission of OWNER/CONSULTANT, subject to an approved method statement and risk assessment, and use only by competent, trained operators).

55.0 SITE ESTABLISHMENT AND AMENITIES

55.1 Details of temporary services to be provided by Contractor or as Per Technical portion of ITB.

56.0 ACCOMMODATION

56.1 An area will be allocated for temporary site establishment facilities/services.

56.2 When required by the Contract, the Contractor shall provide and maintain (including de-watering when necessary) a suitable level and hardcore surface in the area allocated for temporary buildings such as offices, stores, workshops, mess huts and a stores compound.

56.3 When required by the Contract, the Contractor shall provide all site offices, stores facilities, workshops and mess huts for the accommodation of staff/site personnel. Proposals for the Contractor's temporary buildings shall be submitted to OWNER/CONSULTANT for approval with their tender.

56.4 **Storage in Permanent Buildings**

No Plant, Contractor's Equipment or Construction Aids shall be stored in any permanent building without first obtaining the written permission of OWNER/CONSULTANT. Such permission will not relieve the Contractor of the obligation to protect the building from damage whilst used as a store. If permission to use the building is refused by OWNER/CONSULTANT, the Contractor shall provide alternative storage facilities at no additional cost to OWNER/CONSULTANT.

56.5 **Sanitary Facilities**

All toilets and washing facilities shall be provided by the Contractor.
The supply and installation of necessary water sewage/drainage pipe work, pits, etc, for the facilities and the regular emptying and servicing are the responsibility of the Contractor.

56.6 **Canteen**

The Contractor must provide mess-huts for his employees and arrange any canteen facilities required for his employees and those of any others employed by him in connection with the Work.

57.0 TEMPORARY SERVICES

57.1 **Telephone, Facsimile, etc**

Arrangements for the provision of telephones, computer modems and/or facsimile facilities shall be made directly with providers of such facilities by the Contractor.

57.2 **Electricity**

If under the contract the Contractor is responsible for providing electricity for the site establishment amenities and working area(s), the Contractor shall ascertain the type, location and available spare capacity of the electrical point(s) of supply and provide cable, connections, isolating switches and earth leakage protection of approved specification.

If the Contractor's requirements for temporary electrical supplies exceed those agreed and render the available service inadequate, the Contractor shall provide the additional requirements at no extra cost to OWNER/CONSULTANT.

Electrical installations including all cables, temporary connections, wandering leads and all electrical facilities and/or equipment required for the execution of the Works shall be properly installed and maintained by the Contractor.

Temporary electrical installations must comply with all appropriate statutory requirements, the latest edition of the Institution of Electrical Engineers Regulations, COP for Distribution of Electricity on Construction and Building Sites and Electrical Safety on Construction Sites.

Electrical equipment and installation shall at all times be subject to inspection and approval by OWNER/CONSULTANT but this shall not relieve the Installer/User of their responsibilities for the safety of the system.

Electrical equipment or cables forming part of the permanent installation shall not be used by the Contractor for temporary services.

Temporary buildings shall have an external isolating switch.

The Contractor shall supply, install and maintain any temporary workface lighting.

57.3 **Water**

Supply of potable water for drinking and raw water for washing/toilet facilities, mixing concrete, hydrostatic testing and other construction purposes shall be in Contractor's scope. The Contractor shall ascertain the location of the supply point and shall provide and install any temporary pipe work necessary for the provision, use and disposal of such water.

58.0 DISCHARGES INTO THE INTERNAL AND EXTERNAL DRAINAGE SYSTEMS, LAND AND CONSTRUCTION AREAS

58.1 All proposed controlled discharges into the site drainage systems shall be agreed with OWNER/CONSULTANT.

58.2 Any water discharged on existing roads, hard shoulders or drainage systems shall first pass through a filtering interceptor (which must be regularly cleaned) to prevent the discharge of sludge or solids.

58.3 Any damage to the Works caused by prolonged or excessive pumping and any damage or nuisance arising out of pumping operations shall be the liability of the Contractor.

58.4 Subsequent to filling with water and testing of any part of the Works for hydraulic testing, the Contractor shall be responsible for safe disposal of the water, and shall ensure that the rate of discharge is controlled and kept within the capabilities of any drainage system utilized.

58.5 The Contractor shall provide all requisite equipment and materials to ensure that all drains, rivers, streams or waterways are safeguarded against pollution.

59.0 MAINTENANCE OF ROADS AND DRAINS

59.1 Existing roads, road gullies and drains shall be inspected by OWNER/CONSULTANT and the Contractor prior to work commencing. A record of this inspection shall be compiled and on the completion of the Works, a further inspection will be carried out and any necessary repairs to road surfaces or cleaning of drains shall be to the Contractor's cost.

59.2 The Contractor shall provide temporary protection to any existing roads to prevent all possibility of damage whatsoever arising from the Works.

59.3 The Contractor shall at all times in the execution of the work maintain all public and site roads in a clean condition to the satisfaction of OWNER/CONSULTANT.

59.4 The Contractor shall immediately remove all mud, earth and debris from road surfaces.

59.5 Track-laying cranes and similar vehicles must not travel on finished roads without written authority from OWNER/CONSULTANT and then only with the use of timber mats or approved precautions to prevent damage to the roads. Timber mats or other approved precautions shall be supplied by the Contractor.

60.0 MATERIALS – STORAGE AND CONTROL

60.1 The Contractor must give a minimum of twenty-four hours notice of the intention to uplift and transport materials/equipment supplied free-issue from OWNER/CONSULTANT/Client' storage facilities to the point of erection or Contractor's storage facility.

60.2 Free-issue materials/equipment furnished by OWNER/CONSULTANT shall be accepted by the Contractor and become the responsibility of the Contractor until acceptance of the Works. Any damage caused to free-issue materials after acceptance shall be repaired or replaced by the Contractor to OWNER/CONSULTANT' satisfaction.

60.3 **Storage of Petrol, Fuels, Lubricants etc**

All fuel and construction materials which may contaminate the site drains, land or watercourses shall be stored in bounded areas. Refueling of plant shall be via bounded bowers. All construction plant in static locations shall have drip trays which shall be cleared daily.

60.4 **Environmental Impacts**

The Contractor shall, prior to commencement of the work, present to OWNER/CONSULTANT for their approval a register of environmental impacts that necessarily arise from their works.

Each identified environmental impact shall be accompanied by an individual Risk Assessment, clearly showing the reduction measures put in place to ensure mitigation of residual risk.

61.0 PENALTY

The Contractor shall adhere consistently to all provisions of HSE requirements. In case of noncompliances and also for repeated failure in implementation of any of the HSE provisions, Consultant/Owner may impose stoppage of work without any cost & time implication to the Owner and/or impose a suitable penalty.

The amount of penalty shall be limited to 0.5 % (Zero decimal five percent) of the contract value.

The amount of penalty applicable for the Contractor on different types of HSE violations is as below.

1. For not using personal protective equipment (Helmet, Shoes, Goggles, Gloves, Full body harness, Face shield, Boiler suit, etc.) **Rs 500/- per day/ Item / Person.**

2. Working without Work Permit/Clearance **Rs 20000/- per occasion.**

3 Execution of work without deployment of requisite field engineer / supervisor at work spot **Rs. 5000/- per violation per day.**

4. 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 10000/- per item per day.**

5. 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. 10000/- per case per day.**

6. Unsafe handling of compressed gas cylinders (No trolley, jubilee clips double gauge regulator, and not keeping cylinders vertical during storage/handling, not using safety cap of cylinder).**Rs 500/- per item per day.**

7. Use of domestic LPG for cutting purpose / not using flash back arresters on both the hoses/tubes on both ends. **Rs. 3000/- per occasion.**

8. No fencing/barricading of excavated areas /trenches.Rs. 3000/- per occasion.

9. Not providing shoring/strutting/proper slope and not keeping the excavated earth at least 1.5M away from excavated area. Rs.5, 000/- per occasion.

10. Non display of scaffold tags, caution boards, list of hospitals, emergency services available at work locations.Rs.1000/- per occasion per day

11. Traffic rules violations like over speeding of vehicles, rash driving, talking on mobile phones during vehicle driving, wrong parking, not using seat belts, vehicles not fitted with reverse horn / warning alarms / flicker lamps during foggy weather. Rs. 2000/- per occasion per day

12. 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 Consultant/Owner & failure to nominate his immediate deputy (in the site organ gram) for such HSE meetings. Rs10000/- per meeting.

13. Failure to maintain HSE records by Contractor Safety personnel, in line with approved HSE Plan/Procedures/Contract specifications.Rs 10000/- per month.

14. Failure to conduct daily site safety inspection (by Contractor's safety engineers/safety officers), internal HSE meeting, internal HSE Awareness/Motivation Program, Site HSE Training and HSE audit at predefined frequencies (as approved in HSE Plan).Rs.10000/- per occasion.

15. Failure to submit the monthly HSE report by 5th of subsequent month to Project's Engineer-in-Charge /Owner Rs. 10000/- per occasion and Rs.1000/- per day of further delay.

16. Poor House Keeping Rs. 5000/- per occasion per subject

17. Failure to report & follow up accident (including Near Miss) reporting system within specific timeframe.Rs. 20000/- per occasion

18. Degradation of environment (not confining toxic spills, spilling oil/lubricants onto ground).Rs10000/- per occasion

19. Not medically examining the workers before allowing them to work at height / to work in confined space / to work in shot-blasting / to work for painting / to work in bitumen or asphalt works, not providing ear muffs while allowing them to work in noise polluted areas, made them to work in air polluted areas without respiratory protective devices,etc. Rs 5000/- per occasion per worker.

20. Violation of any other safety condition as per job HSE plan / work permit and HSE conditions of contract (e.g. using crowbar on cable trenches, improper welding booth, not keeping fire extinguisher ready at hot work site, unsafe rigging practices, non-availability of First-Aid box at site, not using hood with respiratory devices by blaster for shot//grit blasting, etc.) Rs. 5000/- per occasion.

21. Failure to carry-out Safety audit in time (internal & external), close-out of identified shortfalls of Observations of Safety Aspects(OSA),etc. Rs. 20,000/- per occasion.

22. Carrying out sand blasting instead of grit/shot blasting Rs. 50,000/- per day.

23. Failure to deploy adequately qualified and competent Safety Officer Rs. 10000/- per day per Officer.

24. Utilization of hydra/ back-hoe loader for material shifting or any other unauthorized /unsafe lifting works Rs 25,000/- per occasion.

25. Any violation not covered above to be decided by Consultant/Owner.

26. Any physical injury - maximum of Rs.2,00,000 per injury

27. Fatal accident - Rs. 25,00,000 per fatality

62.0 FOLLOWING SHALL BE APPLICABLE FOR MANDATORY MEDICAL EXAMINATION OF CONTRACTOR WORKERS BEFORE DEPLOYMENT AT WORK SITE:

Medical examination will be in the scope of the contractors.
Medical examination to be conducted by a doctor with minimum MBBS qualification, having registration number for practicing.

Certificate issued should have endorsement on the photo & clearly mention general health/fitness of the candidate to carryout work inside plant, including eye sight, Vertigo, BP,Heart, convulsion problem etc.

Certificate of fitness is to be issued on letter head of doctor and to be produced with application for photo Gate pass to the E-I-C for the job.

Validity of medical certificate will be for one year from the date of issuance.

Gate pass issued by CISF will bear “Medically Fit” stamp based on the E-I-C‘s recommendation.

Accordingly, this shall be treated as part of the tender.

MEDICAL CERTIFICATE

Affix latest PHOTO impression of the workmen half covering the photo.

Form for Medical Check Up for the Workman engaged by the Contractor

Certified that I, _____ have examined Shri _____Age _____
who has signed / thumb impression above on the photo in my presence. The details of his examination
as required are given in the enclosed medical examination report. I certify that all clinical and pathological tests were done in my hospital/dispensary under my instructions. General and physical examinations of Shri _____ do not reveal any abnormality. He does not suffer from any
acute / chronic disease or any contagious or infectious disease. He is medically fit to work inside plant. He is free from Vertigo, Epilepsy or Fits, general giddiness and height related disease. His B.P.Pulse, Eyesight etc. are normal.

In my opinion, Shri _____ is physically and mentally fit for undertaking physical labour inside the plant.

Sign_____
Date: _____

Signature and Rubber stamp of medical practitioner with name

Note: This certificate is to be given on the letterhead of the registered medical practitioner who is possessing MBBS qualification as recognized by the Indian medical council. Below the signature, the
rubber stamp of the medical practitioner should be affixed. The letterhead normally should contain the following:

1) Name of the Medical practitioner:
2) Qualifications:
3) Registration Number:
4) Designation:
5) Address*:*

63.0 ADDITIONAL SAFETY REQUIREMENT

A. Strict implementation of IS marked safety helmets & IS/CE marked safety shoes for contract personnel

All the contractors working inside the plant shall ensure that their supervisors/labourers compulsorily wear IS marked safety helmets & IS/CE marked safety shoes while entering plant premises. No contract personnel shall be allowed inside battery area without wearing IS marked safety helmets & IS/CE marked safety shoes. All EIC's/site engineers and F&S department shall sensitize and spread awareness among the contract personnel.

Name of Tenderer: ……..

Signature & Seal of Tenderer: ……

SECTION-5.0

SCHEDULE OF RATES (SOR)

SECTION-5.1

SOR for Civil, Structural & Other Allied Works

PART-II: TECHNICAL
SECTION-5.1

SCHEDULE OF RATES (SOR)

FOR

CIVIL, STRUCTURAL AND OTHER ALLIED WORKS

FOR

Part A (i) : RENOVATION OF ADMINISTRATIVE BUILDING

&

Part A (ii) : RENOVATION OF BUNGALOWS

AT

HURL, GORAKHPUR

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PREAMBLE TO SCHEDULE OF RATES (SOR)

1.00 GENERAL

1.01 The plans have been evolved tentatively based on information available with Owner / Consultant but the dimensions and details etc. are liable to changes. The Tenderers shall not be entitled to claim any higher rate or compensation on this account. The tender drawings are intended mainly to give an indication of the probable type of construction. The successful Tenderers will, however, be required to execute the work as per detailed approved drawings issued to them from time to time. Steel structures can be changed to R.C.C. or vice versa. Owner reserves the right to add / delete any of the building works mentioned in the N.I.T., during the currency of the contract.

1.02 The Tenderers shall note that the quantities of the different Items, as given in the "Schedule of Rates" are tentative based on tentative tender drawings and are subject to variation and they shall not be entitled to claim any higher rate or compensation on this account. Owner / Consultant reserves the right to change / modify the size and type of sections at any time. Owner / Consultant does not guarantee work under each item of the Schedule of Quantities. The total quantum of work may vary up to 25% on either side and nothing extra will be paid on this account. Quantum of individual item may vary to any extent.

1.03 The Tenderers shall be fully responsible for the correct setting out and execution of the work in accordance with approved drawings which will be supplied to them progressively. All tools, tackles, construction equipments etc., required for the successful execution / construction of the complete work, shall be responsibility of the Tenderers.

1.04 The quantities given in the "Schedule of Rates" are approximate and are given only for the guidance for quoting rates. Payments on bills shall, however, be made on actual measurements of quantities of work done as per approved drawings. Unless otherwise specified, measurements of quantities shall be taken as per Indian Standards IS: 1200.

1.05 The rates to be inserted in the "Schedule of Rates" are to be inclusive of the value of the work described under several items including all costs and expenses which may be required for the construction of the work described together with all taxes, general risks, liabilities and obligations such as temporary buildings / hutments, fencing, watching, lighting, insurance, labour regulations, indemnity, maintenance and the like. The prices shall be inclusive of all labours, materials, tools, plants, equipment, hoists, tackles, scaffoldings, the sundries, etc., as may be necessary for the completion of the work in all respects.

1.06 No work shall be undertaken at site until detailed approved drawings have been issued by the Owner / Consultant in writing. Subsequent revision in the drawings which become necessary shall be incorporated and revised drawings issued to the Contractor who shall execute the work as per the latest revised drawings. Nothing extra will be paid on this account and no

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claim whatsoever will be entertained on this account. The Owner / Consultant reserves to themselves the right to modify / revise / alter etc. in any drawing supplied to the Contractor.

1.07 Any fabrication / construction done before final approval of the drawings shall be the Contractor's responsibility.

1.08 In case of any discrepancy between the description of items given in the "Schedule of Rates" and Specifications, drawings and other documents, the decision of the Owner / Consultant in writing shall be final, binding and conclusive for the purpose of this contract.

1.09 The term "Design and drawings" mentioned in the description of Items in the "Schedule of Rates" means the detailed approved design drawings marked "Good for Construction".

1.10 The work "As described", "As shown", "As directed" or "As approved", "As mentioned" in the description of Items shall mean as directed in design or detailed drawings and as directed by the Engineer-in-Charge.

1.11 The Owner shall furnish the Contractor with only reference points of the job site and a level bench mark, and the Contractor shall at his own cost and initiative, set out the works to the satisfaction of the Engineer-in-Charge but shall solely be responsible for the accuracy of such setting up not withstanding satisfaction as aforesaid of the Engineer-in-Charge or any other assistance rendered by the Engineer-in-Charge for the purpose.

1.12 The Contractor shall provide, fix and be responsible for the maintenance of all stakes, templates, level marks, profiles and the like and shall take all precautions necessary to prevent their removal or disturbance, and shall be responsible for the consequence of such removal or disturbance and for their efficient and timely reinstatement. The Contractor shall also be responsible for the maintenance of all survey marks, boundary marks, distance marks and centre line marks, whether existing or supplied / fixed by the Contractor.

1.13 Before commencing the work, the Contractor shall at his own cost and initiative provide all necessary references, level posts, pegs, bamboos, flags, ranging rods, strings and other materials for proper layout of the work in accordance with the scheme for fixing bench marks acceptable to the Engineer-in-Charge. The centre of longitudinal or face line and cross line shall be marked by means of small masonry pillars. Each pillar shall have distinct mark at the center to enable a TOTAL STATION to be set over it. No work shall be started until all these points are approved by the Engineer-in-Charge in writing.

But such approval shall not relieve the Contractor of any of his responsibilities in respect of the adequacy or accuracy, thereof. The Contractor shall also provide all labour, material and other facilities necessary for the proper checking of layout and inspection of the points during construction.

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1.14 Pillars bearing geodetic marks located at the site / unit of works under construction should be protected and fenced by the Contractor.

1.15 On completion of works, the Contractor must submit to the Engineer-in-Charge the geodetic documents according to which the work was carried out.

1.16 The Contractor shall be exclusively responsible for the provision and maintenance of horizontal and vertical alignments and levels and for the correctness of every part of the work in accordance there with and shall at his own cost rectify any errors or imperfections therein.

1.17 The Contractor shall at all times during the progress and continuance of the works be responsible for and effectively maintain and uphold in good, substantial, sound and perfect condition of all / and every part of works and shall make good from time to time and at all times as often as the Engineer-in-Charge shall require any damage or defect that may during the above period arise in or be any way connected with works.

1.18 The portion which is under HOLD shown in the approved drawing or the portion which would be brought under HOLD during execution on account of coordinating different activities of other working agencies shall be taken up by the Contractor to execution only after the said HOLD is withdrawn. The Contractor on this account shall not be entitled to claim for any compensation.

1.19 The Contractor shall maintain adequate drainage facilities at the work site at all times during the execution of the work.

1.20 No compensation shall be made by the Owner / Consultant for any damage done by rain or traffic during the execution of the work.

1.21 The Contractor shall afford all reasonable facilities such as scaffolding etc., and cooperation to the various other agencies and Contractors, for services not included in this contract, who may be working on the site simultaneously so that entire work can proceed smoothly and simultaneously to a successful completion. The Tenderer must take all the aforesaid factors into consideration while quoting his rates. Nothing extra shall be paid on any ground out of or relating to the aforesaid factors.

1.22 For details of works, materials and workmanship, attention is invited to the "Schedule of Rates", Scope Drawings, Special Conditions of Contract, Materials and Job Specifications, this section, etc. and the Tenderers must quote the rates keeping in full view the requirement of the said documents.

1.23 Except otherwise clearly stated, CPWD Specifications with Correction Slips (latest) shall be followed in all Civil, Structural and other allied Works and in absence of CPWD Specifications for any work, relevant Indian Standard codes of practices (latest) shall be followed. Where there are no Specifications available for any work either in CPWD Specifications or in IS Codes of practices, the work shall be carried out as per the direction of Engineer-in-Charge.

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1.24 The following notations have been used throughout the "Schedule of Rates" and Materials and job Specifications:

1.	Cu.M	Cubic Metre
2.	Sq.M	Square Metre
3.	m.	Metre
4.	mm	Millimeter
5.	Cm. / Cms.	Centimeter / Centimeters
6.	No. / Nos.	Number / Numbers
7.	Tonne / Te.	Metric Tonne
8.	Kg.	Kilogram
9.	RCC	Reinforced Cement Concrete
10.	PCC	Plain Cement Concrete

1.25 The quoted rates shall be applicable for all heights, depths etc. except otherwise clearly stated in the description of items and nothing extra shall be paid to the contractor on this account.

1.26 Description of items and mode of measurement for payment indicated herein shall override those given elsewhere if these are at variance.

1.27 Any materials / accessories / fittings etc. which may not be specifically mentioned in the description of items but which are normally used or necessary are to be provided by the contractor without any extra cost to Owner / Consultant and the work must be completed in all respects.

2.00 DEFINITION OF PLINTH

2.01 The portion of a structure between the surface of the finished ground and the surface of the floor immediately above the ground will be considered as plinth, which is generally 300 mm to 600 mm above finished ground level of the site area.

2.02 Plinth Level as shown in the drawing shall be treated as plinth level for the purpose of payment.

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3.00 MATERIALS

3.01 The supply / procurement of all materials, required for the job, shall be the responsibility of the Contractor unless otherwise stated in the "Schedule of Rates" and elsewhere in the tender documents. The quality of the materials procured by the Contractor shall be subject to the approval of Engineer-in-Charge or his authorized representative before the materials are allowed to be used in the works. All the materials to be procured by the Contractor shall be in conformity with the CPWD Specifications with correction slips (latest) and in absence of which as laid down in the relevant Indian Standard Codes of practices (latest).

3.02 Transport of all materials shall be the Contractor's responsibility and it shall be at their own risk and cost.

3.03 The Engineer-in-Charge shall determine the suitability of materials to be used on the job and the Contractor shall get all materials approved by the Engineer-in-Charge. Any material procured and brought to site by the Contractor, found not to conform to the specifications and does not meet the approval of the Engineer-in-Charge, for use, will be rejected, and the Contractor shall remove and dispose off the same at his own cost and he shall not have any claim for compensation in this regard.

4.00 TESTS

4.01 According to the nature and importance of works, Owner / Consultant will demand the conduct of tests on concrete and other building materials etc., in which case the Contractor shall get the same done at his own cost in a laboratory to be approved by the Owner / Consultant.

4.02 Providing and operating necessary measurements and testing devices, materials and consumables are included in the scope of work and the rates quoted shall be deemed to include the cost of such tests which are required to ensure achievement of specified quality of work.

5.00 EXECUTION OF WORK

5.01 EARTH WORK

a. The prices for all excavations shall include for removing and clearing away all shrubs, bushes, roots etc.

b. The prices for all excavations shall also include for all leveling and ramming foundation beds, trimming of sides and bottom, grading to proper level as required.

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c. Removal and carrying shall include for all loading, unloading and handling as may be necessary and also all necessary means of transport (Mechanical or animal or manual) as required.

d. The prices are also to include removal of water caused by rain, seepage, spring due to water table or any other cause, either by pumping or by bailing, that may accumulate in the trenches, foundations, pits, etc. It is likely that the subsoil water may encounter during excavation. The Contractor shall be responsible to remove all water accumulated in trenches, foundations, pits, etc. due to subsoil seepage, rainwater or from any other sources. For the above reasons, if the Contractor is required to install some special type of dewatering system, the same shall be arranged by the Contractor at his own cost and nothing extra shall be payable. The Contractor shall be fully responsible for removal of all water from the working area including necessary shoring and strutting, etc., wherever required, in order to maintain safe working condition and good engineering practice at his own cost and nothing extra shall be paid on this account.

e. Where excavations are made in excess of the depth required the Contractor shall, at his own expenses, fill up to the desired level with lean concrete of nominal mix. 1:5:10 (1 cement : 5 coarse sand : 10 graded stone aggregate 40 mm nominal size).

f. In case of hard / dense soil, the last 150 mm depth of such depth specified in the drawing or decided by the Owner shall be excavated just prior to the laying of plain cement concrete bed.

g. In case surplus excavated materials are to be disposed off at different leads as per items in the "Schedule of Rates" the distance for such disposal shall be measured over the shortest practicable route as decided by Engineer-in-Charge and not necessarily the route actually taken by the Contractor for disposal. For the purpose of measurement of lead, the area excavated shall be divided into blocks (mutually agreed) and for each block the distance from center of the block to center of disposed material pertaining to this block shall be taken.

h. For payment of Earthwork in foundations / pits / trenches, etc., the excavation in earthwork volume shall be calculated by multiplying the base area as per the dimensions of mat (lean) concrete indicated in the drawing for different foundations by the specified depth of excavation considering vertical cut up to the bottom of mat concrete level from ground level. Extra excavation carried out by the Contractor with sloping sides or with larger base area or with extra deepening of trenches / pits / foundations, etc. for working convenience shall not be measured and paid for.

The payment for back filling and disposal of surplus excavated material shall also be made on the same basis as that for excavation. Therefore excavation, back filling and disposal of surplus earth resulting from the excavation over the mat concrete dimensions and for the depth beyond bottom level of mat concrete as indicated in the drawings shall not be paid for. However, for the cases where waterproofing / acid proofing is indicated as per drawings on outer sides, the mode of measurement shall be as per IS: 1200.

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i. Nothing extra shall be paid for sorting / screening of the excavated materials to obtain good earth for filling.

j. Nothing extra shall be paid on account of any lift for disposal of excavated materials.

k. Proper precautions shall be taken during the excavations to prevent any damage to the existing structures, pipes, sewer lines etc. If such damage occurs, it shall be rectified by the Contractor at his own expense.

5.02 PLAIN AND REINFORCED CEMENT CONCRETE WORKS

a. The prices for concrete beds and slabs are to include for laying on any type of subgrade, laying to falls or camber and for preparing surface to receive concrete.

b. All concrete surfaces shall be finished to a fair face to give smooth and even surfaces and nothing extra shall be paid on this account.

c. The prices are to include leaving pockets, cutouts and holes and to provide wooden boxes or any other suitable arrangement in R.C.C for providing pockets for bolts as per approved working drawings and nothing extra shall be paid on this account.

d. All pockets / holes are to be properly covered by suitable means, so that dirt, rain water etc., should not enter the pockets / holes etc. No deduction in R.C.C quantity shall be made for pockets and nothing extra shall be paid for providing pockets as mentioned in para 5.02c above.

e. For measurement of openings in plain concrete / R.C.C work, refer clause No. 4.13 of IS: 1200 (Part-3).

f. Threads of bolts etc., which have already been fixed in the pockets, are to be greased and properly covered with gunny bags or polythene sheet to protect it from damage from all sources and nothing extra shall be paid on this account.

g. The prices shall include for all rebating, throating, chamfering, weathering, moulding etc. to accord with the details shown in the approved working drawings.

h. Nothing extra shall be paid for any intricate work for foundation of equipments and machinery (Static / Dynamic) in R.C.C walls and other superstructure work or in concreting in small and thin sections in P.C.C or R.C.C work.

i. The prices for concrete are to include for hoisting and / or lowering to any heights and / or depth required and in any type of form work, packing around reinforcement wherever required and finishing the surfaces to fair and even surfaces.

j. The prices shall include for working up or hacking of concrete surface for providing keys for further concrete work and shall also include all plane, rebated or grooved construction and other joints.

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k. All reinforced cement concrete used shall be of controlled concrete with designed mix and weigh batched conforming to IS : 456 unless otherwise specified. In all concrete and R.C.C work, broken graded coarse aggregate shall be used. The design mixes of concrete of different grades shall be established at the beginning of the work considering the required workability. However, if batching plant facility is not available, only nominal mix concrete is permissible.

l. Concrete admixtures for workability, if necessary, may be used in R.C.C., if decided by the Engineer-in-Charge. No extra payment for material or mixing etc. shall be made on this account.

m. Machine and equipment foundations shall mean all foundations including pedestals of vessels, towers, pumps, compressors, motors or any other equipment or machinery (both static and dynamic), pipe supports etc., and / or the like.

n. The prices shall include applying cement slurry on reinforced cement concrete surfaces, keys of construction joints etc. @ 2.75 Kg/Sq.m of surface area of receiving cement concrete including roughening and proper cleaning etc., complete as directed by Engineer-in-Charge.

o. The prices shall include for performing water tightness for all water retaining R.C.C structure as stipulated in IS: 3370 (Part-I), wherever specified in the drawing.

p. Cement to be used for plain & reinforced cement concrete and other works shall be of Ordinary Portland Cement conforming to IS : 269 unless otherwise stated in the "Schedule of Rates" and elsewhere in this Section of NIT.

q. Any concrete having honeycomb is not acceptable and shall be rejected and redone at contractor's cost.

5.03 REINFORCEMENT AND EMBEDMENTS

a. Wastage in cutting will not be paid for. Steel actually fixed in position only will be paid by the linear measurement including hooks and laps. Lapping of bars will be allowed only where the required bar length exceeds the standard lengths available. All other laps provided, unless otherwise specified in the drawings, shall not be measured and paid for. Weight of binding wire shall not be measured for payment.

b. Bars shall be issued in lengths and in forms as available in the stores. Nothing extra shall be paid for decoiling and straightening of the bars.

c. Reinforcement are to be tack welded in addition to binding by 18 S.W.G annealed wire wherever necessary to improve efficiency of the joint. Bars of 28 mm diameter and above shall be provided with stitch weld in addition to binding with 18 SWG annealed wire and nothing extra shall be paid for stitch welding. Welding of mild steel plain and deformed reinforcements shall conform to IS: 2751, 'Code of practice for welding of mild steel plain and deformed bars for reinforced concrete construction'.

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d. The Contractor shall prepare the bar bending schedule for all reinforced cement concrete work as per the approved / "good for construction" drawings furnished by the Owner / Consultant and nothing extra shall be paid on this account.

5.04 SHUTTERING

a. The prices for shuttering shall include for providing splayed edges, notching, chamfering, allowances for overlaps and passing at angles, battens, strutting bolting, wedging, easing, striking and removing.

b. The concrete work should have ply wood / steel shuttering as not to require any plastering, after striking out the shuttering. Any concrete having honeycomb is not acceptable and is liable to be rejected and redone at Contractor's cost.

c. The prices are also to include for all necessary supports, struts, braces, etc., dressing with shuttering compound and / or other approved method to prevent adhesion between concrete and form work and all raking for circular cutting and waste.

d. The prices shall also include for all labour and materials necessary for providing form work at all heights and depths and including striking, dismantling the form work assembly etc. after the necessary stripping period of concreting is over and also making all the joints in shuttering fully leak-proof providing low density polythene sheets / bitumen paper.

e. The prices shall also include for forming detailed design required for the form work and / or all other sundry labour.

f. All shuttering shall be either plywood or steel shuttering to produce plain, smooth and even surfaces, which will thus be integrally finished. If any impressions of the shuttering joints are noticed after the striking of the shuttering, the same should be treated by rubbing with Carborundum stones and nothing extra shall be paid on this account.

g. In case of dowel bars projecting out from R.C.C works such as columns, beams etc. nothing extra shall be paid for any special provision like making holes that may be required to be left in the form work.

5.05 MASONRY WORKS

The prices for brick work shall include the following:

a. Fair face of brick work with selected brick with class designation 75 or as specified in the description of relevant Items in the "Schedule of Rates" from the lot.

b. Raking out joints for plastering and pointing done as separate process of finishing joints, flush as the work proceeds.

c. All rough and / or fair cutting and waste unless specifically stated otherwise.

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d. Plumbing to angles.

e. Providing holes left or formed for fixing pipes etc.

f. Forming reveals to the jambs, where fair cutting on exposed face is not involved.

g. All masonry work shall be done using mortar with coarse sand.

5.06 WOOD WORK AND JOINERY

a. All joiner's work shall include necessary nails and screws, and all other necessary materials.

b. The description includes all necessary keys, wedges, dowels, hard or bamboo pins, pined tenon joints and cleaning of nail heads.

c. Nothing extra will be paid for rebated and / or splayed meeting stiles of doors and Windows.

5.07 STRUCTURAL STEEL WORK

a. The weight of structural steel work for the sake of payment shall be calculated by linear measurements and unit weight taken from the relevant IS codes based on approved fabrication drawings assuming all members to be cut square without making any deduction for bolts, bevel ends or edges, beveling of plates. Gusset plates shall be paid for minimum rectangle enveloping their actual periphery.

b. Welds, black-bolts, high tensile bolts, nuts, plain and tapered washers etc. shall not be measured and paid for. Rate for the structural steel work shall be deemed to include the same. Nothing extra shall be paid on this account.

c. Nothing extra shall be paid over the unit rates for structural members to be built up by butt or fillet welding as indicated in the approved fabrication drawings or as per the instruction of Engineer-in-Charge, from either:

   i. Plates.

   ii. Two or more rolled steel sections.

   iii. One or more rolled steel sections and plates.

d. Nothing extra shall be paid over the unit rates for sealing the joints of box sections made out of channels or joists by continuous butt welding.

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e. All paints and primers specified in various Items in the "Schedule of Rates" shall be best quality of approved brand and manufacturer such as M/s. Asian Paints, M/s. Berger Paints (India) Ltd., M/s. Johnson & Nicholson and / or other equivalent paint approved by the Engineer-in-Charge.

f. On box / compound sections, the painting shall be done before fabrication on all those surfaces which become inaccessible after fabrication.

g. Prior approval of the Engineer-in-Charge shall have to be obtained for changing the sections due to non-availability of certain sections and using built-up sections / compound sections and nothing extra shall be paid on this account.

h. The word "Fabrication" wherever used for the description of work herein shall include:

Straightening, cutting, notching, beveling, drilling or cutting holes, necessary welding, fastening, etc. to prepare the structural member as per fabrication drawings.

I. The word "Erection" wherever used for description of work shall include:

Hoisting, putting in position at all required heights, aligning and fixing with necessary welding, bolting and / or other fasteners as per approved drawings and technical specifications with all safety standards.

j. Preparation of "AS-BUILT" construction drawings incorporating all approved changes at site shall be in Contractor's scope of work and it shall be considered included in relevant Items of the "Schedule of Rates".

k. For sand blasting / painting by the specialized agency other than indicated in the NIT, if proposed by the Contractor, the same shall be got approved from the Engineer-in-Charge at site.

l. The Contractor shall prepare design of joints and detailed fabrication and erection drawings in sequence of erection on the basis of detailed design drawings supplied by the Owner / Consultant from time to time. Nothing shall be paid extra on this account. The above fabrication drawings must show clearly all shop and site joints and connection with erection marks on each loose parts.

m. The Contractor shall submit his design calculations for the design of joints. All joints shall be designed for full strength of the members or otherwise as indicated in the design drawings.

n. The design calculations of joints and fabrication drawings will be checked and approved by the Owner / Consultant as per mutually agreed time schedule and the Contractor should strictly adhere to these approved drawings and specifications. Fabrication work shall be taken up only with the approved fabrication drawings.

5.08 STEEL AND ALUMINIUM DOORS, WINDOWS & VENTILATORS

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a. The prices are to include for necessary hardware fittings and fixtures as specified and fixing to frames with necessary lugs etc., all necessary chases, holes, etc., grouting of holes and making good to match after doors, windows and ventilators, etc. are fixed. The price of steel doors / windows / ventilators is also to include application of required primer and paint of approved shade, make and manufacturer.

b. The prices shall also to include for providing good quality glass panes of required thickness as indicated in the "Schedule of Rates".

5.09 FLOORS AND BASES

a. The price for hard core shall include for all labour in laying to falls or camber, hand packing, edges of haunches forming splayed edges, watering and rolling with power driven roller and ramming wherever required to solid compaction.

b. The prices shall include also for works at all heights and depths.

5.10 FINISHING WORKS

a. The prices shall include for work at any height / depth and for all necessary scaffolding etc. as required.

b. The prices shall include for providing and laying of materials for all the Items of plaster and also raking to form key for plaster and for all work in narrow width, formed angles, chamfered external angles and for making good the faces.

5.11 MISCELLANEOUS

a. The Contractor may have to splice shorter length of structural steel members to obtain required length at site. If extra pieces of materials are required for splicing (say for lap jointing) then the same will be measured and paid for in the relevant structural steel items and nothing extra on any other account shall be paid to the Contractor for such splicing.

b. The Contractor should note that steel wedges, packing plates, shim plates, etc. used by them for leveling and alignment of structural members are to be considered erection devices and these should be taken out after proper alignment is over to the satisfaction of Engineer-in-Charge. Such erection devices shall neither be measured nor paid for.

5.12 Bidder is requested to quote the same rates for same items across Part A – (i) and Part A – (ii). If different rates are quoted for the item mentioned same, the lower of the rates shall be considered.

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Part A (i) : Administrative Building

SCHEDULE OF RATES (SOR)

FOR CIVIL, STRUCTURAL AND OTHER ALLIED WORKS

FOR

RENOVATION

OF

ADMINISTRATIVE BUILDING

AT

HURL, GORAKHPUR

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SL. NO.	ITEM NO	DESCRIPTION OF ITEMS	UNIT	QTY	UNIT RATE WITHOUT GST		AMOUNT (IN Rs.)
					(In Figure)	(In Words)	
SOR FOR ADMINISTRATIVE BUILDING [PART A (i)]							
	A	**Dismantling & Demolishing**					
1	A-01	Demolishing plain cement concrete under floor including disposal of material outside Building premises as directed by Engineer-in-charge.					
	a)	1:3:6 or richer mix.	Cu. M.	5.5			
2	A-02	Demolishing R.C.C. work manually/ by mechanical means including stacking of steel bars and disposal of unserviceable material within 50 meters lead as per direction of Engineer - in- charge.	Cu. M.	4			
3	A-03	Dismantling old plaster or skirting, raking out joints and cleaning the surface for plaster including disposal of rubbish as directed by Engineer-in-charge.	Sq. M.	350			
4	A-04	Dismantling of existing tiles/marble in floor and wall laid in cement mortar including stacking of serviceable materials as directed.	Sq. M.	50			
5	A-05	Dismantling of existing G.I. water supply pipes with all fittings / fixtures / clamps and stacking of serviceable materials as per instruction of Engineer- in charge.	R.M.	40			

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SL. NO.	ITEM NO	DESCRIPTION OF ITEMS	UNIT	QTY	UNIT RATE WITHOUT GST		AMOUNT (IN Rs.)
					(In Figure)	(In Words)	
6	A-06	Dismantling of C.I. pipes (waste water & soil water) with fittings/fixtures and clamps including traps and stacking of serviceable materials as per instruction of Engineer- in charge.	R.M.	40			
7	A-07	Dismantling C.I. or asbestos rain water pipe with fittings and clamps including stacking the material within 50 meters lead:					
	a.)	150mm dia pipe	R.M.	20			
8	A-08	Dismantling doors, windows and clerretory windows (steel or wood) shutter including chowkhats, architravs, holdfasts etc. complete and stacking within 50 m lead:					
	a.)	Of area 3 Sq.m. and below	Each	4			
	b.)	Of area beyond 3 Sq.m.	Each	5			
9	A-08	Demolishing brick work manually/ by mechanical means including stacking of serviceable material and disposal of unserviceable material within 50 metres lead as per direction of Engineer-in-charge.					
	a.)	In cement mortar	Cu. M.	35			
10	A-10	Dismantling aluminum/Gypsum partitions, doors, windows, fixed glazing, false flooring and false ceiling including disposal of unserviceable surplus material and stacking of serviceable material within 50 meters lead as directed by Engineer-in-charge.	Sq. M.	80			

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SL. NO.	ITEM NO	DESCRIPTION OF ITEMS	UNIT	QTY	UNIT RATE WITHOUT GST		AMOUNT (IN Rs.)
					(In Figure)	(In Words)	
11	A-11	Dismantling wooden boarding in lining of walls and partitions, excluding supporting members but including stacking within 50 metres lead:					
	a).	Thickness above 25 mm up to 40 mm	Sq. M.	90			
12	A-12	Disposal of rubbish / debris / malba/ similar unserviceable, dismantled or waste material by mechanical means, including loading, transporting, unloading outside Plant/Township boundary at location as permitted by Municipal corporation or local authority leaving the site clear, for all leads including all lifts involved.	Cu. M.	20			
	B	**Earth work**					
13	B-01	Excavating trenches of required width for pipes, cables, etc including excavation for sockets and dressing of sides, ramming of bottoms depth up to 1.5 m including getting out the excavated soil and then returning the soil as required in layers not exceeding 20 cm in depth including consolidating each deposited layer by ramming, watering, etc. and disposing of surplus excavated soil as directed, within a lead of 50 m:					
	a.)	Pipes, cables etc exceeding 80 mm dia but not exceeding 300 mm dia.	R.M.	25			

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					(In Figure)	(In Words)	
14	B-02	Earthwork in excavation in foundations of buildings, footings, columns, plinth beams, walls, machine/ equipment foundations, isolated pits, pavements, trenches for pipelines /cables, pipe sleepers, drains, etc., to the required levels and grades in both dry and wet conditions, including dressing of sides and ramming of bottoms, getting out excavated earth with lift up to 1.5 M and disposal of surplus excavated materials within a lead of 50 M including stacking, levelling and dressing etc., complete as per direction of Engineer-in-Charge(E.I.C.) in all kinds of soils as defined in IS: 1200 including providing temporary supports to all service lines such as overhead and underground water, sewage and drain pipes, cables etc. and shoring and strutting including dewatering wherever necessary, complete in all respects as per direction of Engineer-in-Charge.	Cu. M.	8			
	C	**Plain Cement Concrete & RCC**					
15	C-01	Providing and laying plain cement concrete, machine mixed and mechanically vibrated in foundations, plinth, under floors, etc., including all necessary cost of centering and shuttering :					
	a.)	1:5:10 (1 cement: 5 coarse sand:10 graded stone aggregate 20 mm nominal size).	Cu. M.	1			
	b.)	1:4:8 (1 cement: 4 coarse sand:8 graded stone aggregate 20 mm nominal size).	Cu. M.	1			
	c.)	1:3:6 (1 Cement : 3 coarse sand (zone-III) : 6 graded stone aggregate 20 mm nominal size).	Cu. M.	7			

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					(In Figure)	(In Words)	
16	C-02	Providing and laying in position specified grade of reinforced cement concrete, machine mixed, mechanically vibrated and finished to a fair face but including the cost of centring and shuttering excluding reinforcement in superstructure at all heights for columns, pillars, posts, attached pilasters, portals, struts, inclined posts, pedestals,Beam, walls, Roof, Slabs etc., complete in all respects as per direction of Engineer-in-Charge.					
	a.)	1:1.5:3 (1 cement : 1.5 coarse sand (zone-III): 3 graded stone aggregate 20 mm nominal size).	Cu. M.	8			
17	C-03	Supplying, providing and laying Steel reinforcement (Hot rolled deformed bars) for R.C.C. work including straightening, cutting, bending, placing in position and binding all complete above plinth level.	Kg	450			
	D	**Brick Wall**					
18	D-01	Providing brickwork of class designation 75 in cement mortar 1:6 (1 cement : 6 coarse sand) as per instruction of Engineer-in-charge.	Cu. M.	7			
19	D-02	Half brick masonry with bricks of class designation 75 in plinth and super structure in cement mortar 1:4 (1 cement : 4 coarse sand)	Sq. M.	20			

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					(In Figure)	(In Words)	
	E	**Finishing**					
20	E-01	12 mm thick cement plaster 1:4 (1 cement: 4 fine sand) after properly cleaning etc. as per instruction of PDIL Engineer (including the rate of scaffolding wherever required).	Sq. M.	200			
21	E-02	6mm thick cement plaster to ceiling of mix 1:3 (1 cement: 3 fine sand).	Sq. M.	25			
22	E-03	Wall painting with Plastic Emulsion Paint of approved brand and manufacture to give an even shade :					
	a.)	One or more coat on old work ((Including scrapping and sand rubbing & preparing the smooth surface).	Sq. M	490			
	b.)	One or more coat on new work over and including water thinnable priming coat with cement primer	Sq. M.	200			
23	E-04	Finishing walls with water proofing cement paint of required shade :					
	a.)	Old work (one or more coats @ 2.20 kg/10 sqm) complete.	Sq. M.	50			
24	E-05	Painting with synthetic enamel paint of approved brand and manufacture including a coat of approved primer, of required colour to give an even shade.	Sq. M.	250			
25	E-06	Providing and applying plaster of paris putty of 2 mm thickness over plastered surface to prepare the surface even and smooth complete	Sq. M.	490			

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					(In Figure)	(In Words)	
26	E-07	Melamine polishing on wood work on old and new work (one or more coat)	Sq. M.	200			
27	E-08	Repairs to plaster of thickness 12 mm to 20 mm in patches of area 2.5 sq. meters and under, including cutting the patch in proper shape, raking out joints and preparing and plastering the surface of the walls complete, including disposal of rubbish to the dumping ground, all complete as per directions of Engineer-In-Charge.					
	a.)	With cement mortar 1:4 (1 cement : 4 fine sand)	Sq. M.	200			
28	E-09	Renewing glass panes, with putty and nails wherever necessary including racking out the old putty:					
	a.)	Float glass panes of thickness 4 mm	Sq. M.	250			
29	E-10	Distempering with oil bound washable distemper of approved brand and manufacture to give an even shade :					
	a.)	One or more coat on old work (Including scrapping and sand rubbing & preparing the smooth surface).	Sq. M.	2550			
	b)	Two or more coat on new work over and including water thinnable priming coat with cement primer	Sq. M.	200			

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					(In Figure)	(In Words)	
	F	**Flooring**					
30	F-01	Providing and laying Vitrified finish ceramic floor tiles 600mm x 600mm (thickness to be specified by manufacturer) of first quality conforming to IS: 15622 of NAVEEN, NITCO, ORIENT, ORIENT, KAJARIA or equivalent make in all colours, shade and design as approved by E.I.C. laid on 20mm thick cement mortar (1 cement: 4 coarse sand) including pointing the joints with white cement and matching pigment of matching shade to match the level of existing floor complete in all respect at any level.	Sq. M.	345			
31	F-02	Providing and laying Vitrified finish ceramic floor tiles on skirting made from tiles 600mm x 600mm (thickness to be specified by manufacturer) of height 100mm of first quality tiles conforming to IS:15622 of KAZARIA, NAVEEN, NITCO, ORIENT, SOMANY or equivalent make in all colours, shade and design as approved by E.I.C. laid on 20mm thick cement mortar 1:4 (1 cement: 4 coarse sand) including pointing the joints with white cement and matching pigment of matching shade complete in all respect at any level.	Sq. M.	40			
32	F-03	Providing and fixing 1st quality ceramic glazed floor tiles conforming to IS : 15622 (thickness to be specified by the manufacturer) of approved make in all colours, shades except burgundy, bottle green, black of any size as approved by Engineer-in-Charge in skirting, risers of steps and dados over 12 mm thick bed of cement Mortar 1:3 (1 cement: 3 coarse sand) and jointing with grey cement slurry @ 3.3kg per sqm including pointing in white cement mixed with pigment of matching shade complete.	Sq. M.	175			

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					(In Figure)	(In Words)	
33	F-04	Rubbing and polishing of existing Terrazzo/Mosaic tiles flooring.	Sq. M.	620			
	G	**Sanitary Installations**					
34	G-01	Providing and fixing Chlorinated Polyvinyl Chloride (CPVC) pipes, having thermal stability for hot & cold water supply, including all CPVC plain and brass threaded fittings, i/c fixing the pipe with clamps at 1.00 m spacing. This includes jointing of pipes and fittings with one step CPVC solvent cement and the cost of cutting chases and making good the same including testing of joints complete as per direction of Engineer I/C					
	a.)	20 mm nominal outer dia pipes	R.M.	40			
35	G-02	Providing and fixing soil/ waste PVC pipes as required connecting properly with old and new existing pipe and filling all joints as required at any level (including tees, bends, plain junction, stays & clamps and other fixtures as required complete in all respect					
	a.)	75 mm dia.	R.M.	40			
	b.)	100 mm dia.	R.M.	40			
36	G-03	Providing and fixing 18 mm thick gang saw cut, mirror polished, premoulded and prepolished, machine cut for kitchen platforms, vanity counters, window sills , facias and similar locations of required size, approved shade, colour and texture laid with necessary opening (area less than 0.5 sqm) over 20 mm thick base cement mortar 1:4 (1 cement : 4 coarse sand), joints treated with white cement, mixed with matching pigment,epoxy touch ups, including rubbing, curing, moulding and polishing to edges to give high gloss finish etc. complete at all levels. Area of slab over 0.50 sqm"					

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					(In Figure)	(In Words)	
	a.)	Granite of any colour and shade, area of slab upto 0.5 Sq.m.	Sq. M.	3			
	b.)	Granite of any colour and shade, area of slab over 0.5 Sq.m.	Sq. M.	10			
37	G-04	Providing and fixing vitreous china wash basin of Parryware or approved make and colour with C.I. brackets 15mm C.P. brass Pillar taps Jaquar, no.011, 32mm C.P. brass waste of standard pattern , including painting of fittings and C.I. brackets, cutting and making good the walls wherever required.					
	a.)	White Vitreous China Wash basin size 630x450 mm with a pair of 15 mm C.P. brass pillar taps	Each	8			
38	G-05	Providing and fixing white vitreous china pedestal type water closet (European type W.C. pan) of Cera make or equivalent with seat and lid, 10 litre low level white PVC flushing cistern with manually controlled device conforming to IS: 7231 with all fittings and fixtures complete including cutting and making good the walls and floors wherever required, including providing and fixing jet to W.C. Pan(European).					
	a.)	W.C. pan with ISI marked white solid plastic seat and lid	Each	4			
39	G-06	Providing and fixing C.P. brass bib cock of GEM, PARKO or equivalent make, chrome finish of approved quality and 15 mm nominal bore.					
	a.)	Long body bib cock	Each	12			
	b.)	Short body bib cock	Each	10			

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					(In Figure)	(In Words)	
40	G-07	Providing and fixing C.P. brass angle valve, 15 mm nominal bore of Jaquar make no.053 chrome finish or equivalent for Wash basins, urinals etc. of approved quality conforming to IS:8931	Each	8			
41	G-08	Providing and fixing toilet paper holder C.P. brass of approved make GEM, PARKO or equivalent chrome finish	Each	10			
42	G-09	Providing and fixing PTMT liquid soap container 109mm wide, 125mm high and 112mm distance from wall of standard shape with bracket of the same material with snap fitting of approved colour and make, complete in all respect.	Each	8			
43	G-10	Providing and fixing PVC waste pipe 32mm or 40mm rigid with elbow, tee, reducer etc. as required to complete in all respect to wash basin etc.	Each	8			
44	G-11	Providing and fixing CP Jalli of approved make for traps.	Each	10			
45	G-12	Providing and fixing brass ferrule with C.I. mouth cover including boring and tapping the main :					
	a.)	20 mm nominal bore	Each	10			
46	G-13	Providing and placing on terrace (at all floor levels) polyethylene water storage tank, IS : 12701 marked, with cover and suitable locking arrangement and making necessary holes for inlet, outlet and overflow pipes but without fittings and the base support for tank.					

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					(In Figure)	(In Words)	
	a.)	Circular Tank of capacity of 1500Lit	Each	2			
47	G-14	Providing and construction of septic tank 2.0x0.5x1.0M and soakpit 0.5x0.5x0.7M in all respect as per scope of work, technical specification and direction of the engineer-incharge Rate to include cost of following item:- 1) Execavation and backfilling 2) 230 thk. Brick work.in cement morter I:6 3) 100thk RCC top slab with 300 dia C.I.cover 3) Bedding PCC (1:2:4) 4) 15th Plaster in Cement mortar 1:6 5) Chemical resistant Paint 6) Supplying and Filling of material such as Gravel, Coarse aggregate, Etc and complete in all respect	Each	1			
48	G-15	Providing and fixing white vitreous china flat back half stall urinal of size 580x380x350 mm with white PVC automatic flushing cistern, with fittings, standard size C.P. brass flush pipe, spreaders with,unions and clamps (all in C.P. brass) with waste fitting as per IS :2556, C.I. trap with outlet grating and other couplings in C.P. brass,including painting of fittings and cutting and making good the walls and floors wherever required :					
	a.)	Range of two half stall urinals with 5 litre P.V.C. automatic flushing cistern	Each	5			

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					(In Figure)	(In Words)	
49	G-16	Providing and fixing Stainless Steel A ISi 304 (18/8) kitchen sink as per IS: 13983 with C.I. brackets and stainless steel plug 40 mm, including painting of fittings and brackets, cutting and making good the walls wherever required :					
	a.)	Kitchen sink with drain board (510x1040 mm bowl depth 225 mm)	Each	2			
50	G-17	Providing and fixing water closet squatting pan (Indian type W.C. pan) with 100 mm sand cast Iron P or S trap, 10 litre low level white P.V.C. flushing cistern, including flush pipe, with manually controlled device (handle lever) conforming to IS : 7231, with all fittings and fixtures complete, including cutting and making good the walls and floors wherever required:					
	a.)	White Vitreous china Orissa pattern W.C. pan of size 580x440 mm with integral type foot rests	Each	3			
51	G-18	Providing and fixing PTMT towel ring trapezoidal shape 215 mm long,200 mm wide with minimum distances of 37 mm from wall face with concealed fittings arrangement of approved quality and colour, weighing not less than 88 gms.	Each	8			
52	G-19	Providing and fixing PTMT swivelling shower, 15 mm nominal bore, weighing not less than 40 gms	Each	4			

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					(In Figure)	(In Words)	
53	G-20	Providing and fixing 600x450 mm beveled edge mirror of superior glass (of approved quality) complete with 6 mm thick hard board ground fixed to wooden cleats with C.P. brass screws and washers complete.	Each	10			
	H	**Doors, Windows & Ventilators**					
54	H-01	Providing and fixing in position at all heights anodised aluminium glazed doors and glazing of approved standard tubular sections (3 mm thick x 101.5 x 44.5 mm size anodised with 20 micron) fixed with 65 x 30 mm and 65 x 50 mm teak wood spacer member as per drawing including fixing with 16 x 3.15 mm lugs x 10 cm long embedded in cement concrete blocks 15 cm x 10 cm x 10 cm size of concrete nominal mix 1:3:6 (1 cement: 3 coarse sand: 6 graded stone aggregate 20 mm nominal size) or with wooden plugs and screws, or with rawal plugs and screws or with fixing clips or with bolts and nuts or frames fixed to adjoining structural steel members as per design and as required, including providing and fixing 5.5 mm glass panes with snap on anodized aluminum beading and PVC gasket of approved make with matching screws, providing aluminum or aluminum alloy fixtures such as hinges, concealed bolts, base-tie, lock strike, lock operable from inside or outside, kiking plate at bottom, handles, rubber buffers, etc., applying a coat of lacquer, complete in all respects as per direct ion of Engineer-in-Charge (The rates shall be inclusive of cement concrete blocks. Anodized aluminum doors may be of approved manufacturer such as Ajit India/ ECIE/ Al Karma make or its approved equivalent).	Sq. M.	5			

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					(In Figure)	(In Words)	
55	H-02	Providing and fixing fully glazed anodised aluminium windows and ventilators, openable or partly openable of extruded hollow tubular sections standard INDAL/HINDALCO/JINDAL sections as given below, joints mitred and jointed with aluminium corner cleats and screws to match the section of frames including providing and fixing 4mm thick plain sheet glass conforming to IS:1761, anodising shall be 20 microns of natural aluminium shade as approved with snap fit aluminium beading and high quality EPDM/NEOPRENE weather proof gasket lining including polysulphide sealant filled between aluminium tube frame and wall; complete along with all aluminium fixtures such as handles, projected hinges, peg stays, tower bolts, spring catch all complete as per drawings and technical specification. SECTIONS TO BE USED FOR :- Outer frame - INDAL 9142 OR Equivalent of HINDALCO/JINDAL Shutter - INDAL 9838 or Equivalent of HINDALCO/JINDAL Mullion - INDAL 9476 or Equivalent of HINDALCO/JINDAL Snap Beading - INDAL 4122,4660 or Equivalent of HINDALCO/ JINDAL					
	a.)	Openable window and ventilators (top hung or centre hung)	Sq. M.	5			
	b.)	Partly fixed and partly openable windows and ventilators.	Sq. M.	5			
	c.)	Fixed type windows and ventilators.	Sq. M.	5			

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					(In Figure)	(In Words)	
56	H-03	Providing and fixing in position at all heights hydraulic floor springs with double action of ECIE or Everite make or equivalent I.S.I. marked approved including foundation box, etc. complete.	Each	2			
57	H-04	Providing and fixing ISI marked flush door shutters conforming to IS: 2202, core of block construction with frame of 1st class hard wood and well matched teak 3 ply veneering with vertical grains or cross bands and face veneers on both faces of shutters.					
	a.)	30 mm thick non-decorative type including ISI marked stainless steel butt hinges with necessary screws.	Sq. M.	15			
58	H-05	Providing and fixing glazed shutter for doors, windows and clerestory windows using 4 mm thick float glass panes including ISI marked butt hinges bright finished of required size with necessary screws.					
	a.)	30 mm thick Kiln seasoned and chemically treated hollock wood	Sq. M.	5			
59	H-06	Providing wood work in frames of doors, windows, clerestory windows and other frames, wrought framed and fixed in position with hold fast lugs or with dash fasteners of required dia & length (hold fast lugs or dash fastener shall be paid for separately).					
	a.)	Kiln seasoned and chemically treated hollock wood	Cu. M.	1			

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					(In Figure)	(In Words)	
60	H-07	Providing and fixing in position collapsible steel shutters with vertical channels 20x10x2 mm and braced with flat iron diagonals 20x5 m size, with top and bottom rail of T-iron 40x40x6 mm, with 40 mm dia steel pulleys, complete with bolts, nuts, locking arrangement, stoppers, handles, including applying a priming coat of approved steel primer.	Sq. M.	7			
61	H-08	Providing and fixing angle iron frames for doors, windows and ventilators of mild steel Angle sections of size 35x35x5 mm, joints mitred and welded by angle iron 35x35x5 mm or 35x 5 mm flat pieces to the existing T-iron frame or to the wall with dash fastener, including fixing of necessary butt hinges and screws and applying a priming coat of approved steel primer, all complete as per the direction of Engineer-In-charge.	Kg	250			
	J	**Miscellaneous**					
62	J-01	Providing and laying water proofing treatment in sunken portion of WCs, bathroom etc. by applying cement slurry mixed with Armourcrete of M/s The Structural water proofing Company Pvt. Ltd. or Tapecrete of M/s CICO Engineering Service consisting of applying: a) First layer of slurry of cement @ 0.488 Kg/Sq.m mixed with Armourcrete or Tapecrete @ 0.253 Kg/Sq.m. This layer will be allowed to air cure for 4 hours. b) Second layer of slurry of cement @ 0.242 Kg/Sq.m mixed with Armourcrete or Tapecrete @ 0.126 Kg/Sq.m. This layer will be allowed to air cure for 4 hours follwed with	Sq. M.	60			

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					(In Figure)	(In Words)	
		water curing for 48 hours. (The rate includes preparation of surface, treatment and sealing of all joints, corners, junctions of pipes and masonary with polymer mixed slurry.					
63	J-02	Providing and laying six courses water proofing treatment with bitumen felt over roofs consisting of first, third and fifth courses of blown or / and residual bitumen applied hot at 1.45, 1.20 and 1.70 kg per square metre of area respectively, second and fourth courses of roofing felt type 2 grade I (fibre base self finished bitumen felt) six and final courses of stone grit 6 mm and down size or pea sized gravel spread at 6cu.dm per sqm including preparation of surface, excluding grading, compete.	Sq. M.	350			
64	J-03	Treatment of existing masonry using chemical emulsion @ one litre per hole at 300 mm interval including drilling holes at 45 degree and plugging them with cement mortar 1:2 (1cement : 2 coarse sand) to the full depth of the hole :					
	a.)	With Chlorpyriphos/Lindane E.C. 20% with 1% Concentration	RM	300			
65	J-04	Treatment of soil under existing floors using chemical emulsion@ one litre per hole, 300 mm apart including drilling 12 mmdiameter holes and plugging with cement mortar 1 :2 (1 cement: 2 Coarse sand) to match the existing floor:					
	a).	With Chlorpyriphos/Lindane E.C. 20% with 1% concentration	Sq. M.	500			

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					(In Figure)	(In Words)	
66	J-05	Providing and fixing on wall face unplasticised Rigid PVC rain water pipes conforming to IS : 13592 Type A, including jointing with seal ring conforming to IS : 5382, leaving 10 mm gap for thermal expansion, (i) Single socketed pipes.					
	a.)	110 mm diameter	RM	20			
67	J-06	Providing and fixing false ceiling at all height including providing and fixing of frame work made of special sections power pressed from MS sheets galvanized with zinc coating of 120 gr per square meter at par IS 277 and consisting of angles clit of size 25 mm wide X 1.6 mm thick with flanges of 27 mm and 37 mm at 1200 mm centre to centre, 1 flange fixed to the ceiling with dash fastener 12.5 mm dia. X 50 mm long with 6 mm dia bold, others flanges of Clint fixed to the angles hangers of 25 X 10 X 0.50 mm of required length with nuts and bolts of required size and other end of angle hanger fixed with intermediate GI channel 45 X 15 X 0.9 mm running at the spacing of 1200 mm centre to centre to which the ceiling section 0.5 mm thick bottom wedge of 80 mm with tapered flanges of 26 mm each having lips of 10.5 mm, at 450 mm centre to centre shall be fixed in direction perpendicular to GI intermediate channel with connecting clicks made out of 2.64 mm dia X 230 mm long GI wire at every junction, including fixing perimeter channels 0.5 mm thick 27 mm height having flanges of 20 mm and 30 mm long, the perimeter of ceiling fixed to wall/ partition with the help of rawl plucks at 450 mm centre3, with 25 mm long dry wall screws at 230 mm interval, including fixing of gypsum					

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					(In Figure)	(In Words)	
		board to ceiling section and perimeter channel with the help of dry wall scrubs of size 3.5 X 25 mm at 230 mm c/c, including jointing and finishing to a flush finish of tapered and square edges of the board with recommended jointing compound, jointing taps, finishing with jointing compound in 3 layers covering upto 150 mm on both side of the joint and 2 coats of primer suitable for board, all as per manufacturers specifications and also including the cost of making openings for light fittings, grills diffusers, cut outs made with frame of perimeters channel suitably fixed, all complete as per specifications and direction of the Engineer-in-Charge but excluding the cost of painting with:					
	a.)	12.5 mm thick tapered edge gypsum moisture resistant board	Sq. M.	50			
68	J-07	Supplying, transporting, de-rusting, fabricating, erecting, hoisting and fixing in position with necessary welding and/or bolting with MS bolts conforming to property class 4.6 of IS: 1367 at all heights as per approved fabrication drawings of all types of structural steel work in columns, portals, girders, lattice girders, beams, crane girders, M.S rails, monorails, bracings, trusses, purlins, rafters, side runners, sag rods, hand railings, staircase stringers and steps, walkway, toe-plates, floor grids, sag rods with M.S. rounds, side walling, conveyor gantries, trestle for pipe and cable racks, gusset plates, etc., either made of rolled steel joists, channels, angles, tees, flats, plates or built up from plates and/or rolled steel sections including necessary site and shop fasteners, complete in all respects as per approved fabrication drawings, standards and direction of Engineer-in-Charge :					

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					(In Figure)	(In Words)	
	a.)	With providing and applying two coats of epoxy zinc chromate primer of approved quality on structural steel work after the preparation of surfaces including providing and applying finished coats epoxy base paint of approved make in 3 coats at a dry film thickness of minimum 200 microns(for three coats) on structural steel work complete in all respects as per specifications and direction of Engineer-in-Charge. (1 kg. of epoxy base paint of approved make covers average 8 to 9 Sq.M. per coat, including surface preparation by sand blasting / power driven brushes.	Kg	10500			
69	J-08	Providing and fixing G.I. pipes complete with G.I. fittings including trenching and refilling etc.					
	a).	25 mm dia nominal bore	R.M.	50			
	b).	32 mm dia nominal bore	R.M.	15			
70	J-09	Making connection of G.I. distribution branch with G.I. main of following sizes by providing and fixing tee, including cutting and threading the pipe etc. complete :	Each	1			
71	J-10	Supplying, fabricating and fixing in position M.S. holding down bolts assembly consisting of bolts, heads, nuts, washers etc., and the like including embedding in cement concrete/R.C.C. works as per approved drawings complete in all respects including one coat of approved quality anti-corrosive paint over a coat of approved quality primer.	Kg	17			

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					(In Figure)	(In Words)	
72	J-11	Grouting under base plates, pockets etc. with cement mortar 1:1 (1 cement : 1 sand) including necessary finishing etc.	Cu. M.	1			
73	J-12	Providing and fixing ball valve (brass) of approved quality, High or low pressure, with plastic floats complete :					
	a).	25 mm nominal bore	Each	2			
74	J-13	Providing and fixing G.I. Union in G.I. pipe including cutting and threading the pipe and making long screws etc. complete (New work)					
	a).	25 mm nominal bore	Each	4			
75	J-14	Providing and placing on terrace (at all floor levels) polyethylene water storage tank, IS : 12701 marked, with cover and suitable locking arrangement and making necessary holes for inlet, outlet and overflow pipes but without fittings and the base support for tank.					
	a).	Circular tank (5000 L) Capacity	Each	1			
TOTAL OF PART A (i)					**Rs. _____**		

Note: Bidder is requested to quote the same rates for same items across Part A (i) and Part A (ii). If different rates are quoted for an item marked same, the lower of the rates shall be considered.

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Part A (ii) : Bungalows

SCHEDULE OF RATES (SOR)

FOR

CIVIL, STRUCTURAL AND OTHER ALLIED WORKS

FOR

RENOVATION OF BUNGALOWS

AT

HURL, GORAKHPUR

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SL. NO.	ITEM NO	DESCRIPTION OF ITEMS	UNIT	QTY	UNIT RATE WITHOUT GST		AMOUNT (IN Rs.)
					(In Figure)	(In Words)	

SOR FOR BUNGALOWS [PART A – (ii)]

	A	**Dismantling & Demolishing**					
1	A-01	Demolishing plain cement concrete manually/ by mechanical means or including disposal of material within 50 meters lead as per direction of Engineer - in - charge.					
	a)	Nominal concrete 1:3:6 or richer mix	Cu. M.	150			
2	A-02	Dismantling old plaster or skirting, raking out joints and cleaning the surface for plaster including disposal of rubbish as directed by Engineer-in-charge.	Sq. M.	2100			
3	A-03	Dismantling of existing tiles in floor and wall laid in cement mortar including stacking of serviceable materials as directed.	Sq. M.	100			
4	A-04	Demolishing R.C.C. work manually/ by mechanical means including stacking of steel bars and disposal of unserviceable material within 50 meters lead as per direction of Engineer - in- charge.	Cu. M.	48			
5	A-05	Dismantling of existing G.I. water supply pipes with all fittings / fixtures / clamps and stacking of serviceable materials as per instruction of Engineer- in charge.	R.M.	375			
6	A-06	Dismantling of C.I. pipes (waste water & soil water) with fittings/fixtures and clamps including traps and stacking of serviceable materials as per instruction of Engineer- in charge.	R.M.	188			
7	A-07	Dismantling C.I. or asbestos rain water pipe with fittings and clamps including stacking the material within 50 metres lead:					

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SL. NO.	ITEM NO	DESCRIPTION OF ITEMS	UNIT	QTY	UNIT RATE WITHOUT GST		AMOUNT (IN Rs.)
					(In Figure)	(In Words)	
	a,)	150mm dia pipe	RM	308			
8	A-08	Dismantling doors, windows and clerretory windows (steel or wood) shutter including chowkhats, architravs, holdfasts etc. complete and stacking within 50 m lead:					
	a.)	Of area 3 Sq.m. and below	Each	438			
	b.)	Of area beyond 3 Sq.m.	Each	5			
9	A-09	Demolishing brick work manually/ by mechanical means including stacking of serviceable material and disposal of unserviceable material within 50 meters lead as per direction of Engineer-in-charge.					
	a.)	In cement mortar	Cu. M.	80			
10	A-10	Dismantling brick tile including stacking of serviceable material and disposal of unserviceable material within 50 meters lead.	Sq. M.	765			
11	A-11	Dismantling W.C. Pan of all sizes including disposal of dismantled materials i/c malba all complete as per directions of Engineer-in- Charge.	Each	35			
12	A-12	Disposal of / similar unserviceable, dismantled or waste materials by mechanical means, including loading, transporting, unloading to approved municipal dumping ground or as approved by Engineer-in-charge, beyond 50 m initial lead, for all leads including all lifts involved.	Cu. M.	110			

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					(In Figure)	(In Words)	
	B	**Earth work**					
13	B-01	Excavating trenches of required width for pipes, cables, etc including excavation for sockets and dressing of sides, ramming of bottoms depth up to 1.5 m including getting out the excavated soil and then returning the soil as required in layers not exceeding 20 cm in depth including consolidating each deposited layer by ramming, watering, etc. and disposing of surplus excavated soil as directed, within a lead of 50 m:					
	a.)	Pipes, cables etc exceeding 80 mm dia but not exceeding 300 mm dia	R.M.	556			
14	B-02	Earthwork in excavation in foundations of buildings, footings, columns, plinth beams, walls, machine/ equipment foundations, isolated pits, pavements, trenches for pipelines /cables, pipe sleepers, drains, etc., to the required levels and grades in both dry and wet conditions, including dressing of sides and ramming of bottoms, getting out excavated earth with lift up to 1.5 M and disposal of surplus excavated materials within a lead of 50 M including stacking, levelling and dressing etc., complete as per direction of Engineer-in-Charge(E.I.C.) in all kinds of soils as defined in IS: 1200 including providing temporary supports to all service lines such as overhead and underground water, sewage and drain pipes, cables etc. and shoring and strutting including dewatering wherever necessary, complete in all respects as per direction of Engineer-in-Charge.	Cu. M.	100			

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SL. NO.	ITEM NO	DESCRIPTION OF ITEMS	UNIT	QTY	UNIT RATE WITHOUT GST		AMOUNT (IN Rs.)
					(In Figure)	(In Words)	
15	B-03	Same as Item No. B-02 above, but lift from 1.5 M to 3.0 M.	Cu. M.	22			
16	B-04	Making plinth protection 50mm thick of cement concrete 1:3:6 (1 cement : 3 coarse sand : 6 graded stone aggregate 20 mm nominal size) over 75mm thick bed of dry brick ballast 40 mm nominal size, well rammed and consolidated and grouted with fine sand, including necessary excavation, leveling & dressing & finishing the top smooth.	Sq. M.	1000			
17	B-05	Clearing jungle including uprooting of rank vegetation, grass, brush wood, trees and saplings of girth up to 30 cm measured at a height of 1 m above ground level and removal of rubbish up to a distance of 50 m outside the periphery of the area cleared.	Sq. M.	1022			
	C	**Plain Cement Concrete & RCC**					
18	C-01	Providing and laying plain cement concrete, machine mixed and mechanically vibrated in foundations, plinth, under floors, etc., including all necessary cost of centring and shuttering :					
	a.)	1:5:10 (1 cement: 5 coarse sand:10 graded stone aggregate 20 mm nominal size).	Cu. M.	11			
	b.)	1:4:8 (1 cement: 4 coarse sand:8 graded stone aggregate 20 mm nominal size).	Cu. M.	11			
	c,)	1:3:6 (1 Cement : 3 coarse sand (zone-III) : 6 graded stone aggregate 20 mm nominal size).	Cu. M.	52			

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					(In Figure)	(In Words)	
19	C-02	Providing and laying in position specified grade of reinforced cement concrete, machine mixed, mechanically vibrated and finished to a fair face but including the cost of centering and shuttering excluding reinforcement in superstructure at all heights for columns, pillars, posts, attached pilasters, portals, struts, inclined posts, pedestals ,Beam, walls, Roof, Slabs etc., complete in all respects as per direction of Engineer-in-Charge.					
	(a.)	1:1.5:3 (1 cement: 1.5 coarse sand (zone-III): 3 graded stone aggregate 20 mm nominal size).	Cu. M.	63			
20	C-03	Supplying, providing and laying Steel reinforcement (Hot rolled deformed bars) for R.C.C. work including straightening, cutting, bending, placing in position and binding all complete above plinth level.	Kg	3530			
	D	**Brick Wall**					
21	D-01	Providing brickwork of class designation 75 in cement mortar 1:6 (1 cement: 6 coarse sand) as per instruction of Engineer-in-charge.	Cu. M.	214			
22	D-02	Half brick masonry with bricks of class designation 75 in plinth and super structure in cement mortar 1:4 (1 cement : 4 coarse sand)	Sq. M.	110			
	E	**Finishing**					
23	E-01	12 mm thick cement plaster 1:4 (1 cement: 4 fine sand) after properly cleaning etc. as per instruction of PDIL Engineer (including the rate of scaffolding wherever required).	Sq. M.	2560			
24	E-02	6mm thick cement plaster to ceiling of mix 1:3 (1 cement: 3 fine sand).	Sq. M.	297			

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					(In Figure)	(In Words)	
25	E-03	Wall painting with Plastic Emulsion Paint of approved brand and manufacture to give an even shade :					
	a.)	One or more coat on old work.(Including scrapping and sand rubbing & preparing the smooth surface)	Sq. M	7390			
	b.)	Two or more coat on new work over and including water thinnable priming coat with cement primer.	Sq. M.	330			
26	E-04	Finishing walls with water proofing cement paint of required shade :					
	a.)	Old work (one or more coats @ 2.20 kg/10 sqm) complete.	Sq. M.	6695			
27	E-05	Painting with synthetic enamel paint of approved brand and manufacture including a coat of approved primer, of required colour to give an even shade.	Sq. M.	150			
28	E-06	Providing and applying plaster of Paris putty of 2 mm thickness over plastered surface to prepare the surface even and smooth complete.	Sq. M.	7390			
29	E-07	Melamine polishing on wood work on old and new work (one or more coat)	Sq. M.	530			
30	E-08	Repairs to plaster of thickness 12 mm to 20 mm in patches of area 2.5 sq. meters and under, including cutting the patch in proper shape, raking out joints and preparing and plastering the surface of the walls complete, including disposal of rubbish to the dumping ground, all complete as per directions of Engineer-In-Charge.					
	a.)	With cement mortar 1:4 (1 cement : 4 fine sand)	Sq. M.	1940			
31	E-09	Renewing glass panes, with putty and nails wherever necessary including racking out the old putty:					
	a.)	Float glass panes of thickness 4 mm	Sq. M.	5			

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					(In Figure)	(In Words)	
32	E-10	Distempering with oil bound washable distemper of approved brand and manufacture to give an even shade :					
	a).	One or more coat on old work (Including scrapping and sand rubbing & preparing the smooth surface).	Sq. M.	297			
	b).	Two or more coat on new work over and including water thinnable priming coat with cement primer.	Sq. M.	90			
	F	**Flooring**					
33	F-01	Providing and laying Vitrified finish ceramic floor tiles 600mm x 600mm (thickness to be specified by manufacturer) of first quality conforming to IS: 15622 of NAVEEN, NITCO, ORIENT, ORIENT, KAJARIA or equivalent make in all colours, shade and design as approved by E.I.C. laid on 20mm thick cement mortar (1 cement: 4 coarse sand) including pointing the joints with white cement and matching pigment of matching shade to match the level of existing floor complete in all respect at any level.	Sq. M.	1345			
34	F-02	Providing and laying Vitrified finish ceramic floor tiles on skirting made from tiles 600mm x 600mm (thickness to be specified by manufacturer) of height 100mm of first quality tiles conforming to IS:15622 of KAZARIA, NAVEEN, NITCO, ORIENT, SOMANY or equivalent make in all colours, shade and design as approved by E.I.C. laid on 20mm thick cement mortar 1:4 (1 cement: 4 coarse sand) including pointing the joints with white cement and matching pigment of matching shade complete in all respect at any level.	Sq. M.	175			
35	F-03	Providing and fixing 1st quality ceramic glazed floor tiles conforming to IS : 15622 (thickness to be specified by the manufacturer) of approved make in all colours, shades except burgundy, bottle green, black of any size as	Sq. M.	808			

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					(In Figure)	(In Words)	
		approved by Engineer-in Charge in skirting, risers of steps and dados over 12 mm thick bed of cement Mortar 1:3 (1 cement: 3 coarse sand) and jointing with grey cement slurry @ 3.3kg per sqm including pointing in white cement mixed with pigment of matching shade complete.					
36	F-04	Floor polishing on masonry or concrete floors with wax polish of approved brand and manufacture.	Sq. M.	580			
37	F-05	Providing and fixing Ist quality ceramic glazed wall tiles conforming to IS: 15622 (thickness to be specified by the manufacturer), of approved make, in all colours, shades except burgundy, bottle green, black of any size as approved by Engineer-in-Charge, in skirting, risers of steps and dados, over 12 mm thick bed of cement mortar 1:3 (1 cement : 3 coarse sand) and jointing with grey cement slurry @ 3.3kg per sqm, including pointing in white cement mixed with pigment of matching shade complete.	Sq. M.	60			
38	F-06	52 mm thick cement concrete flooring with concrete hardener topping, under layer 40 mm thick cement concrete 1:2:4 (1 cement : 2 coarse sand : 4 graded stone aggregate 20 mm nominal size) and top layer 12 mm thick cement hardener consisting of mix 1:2 (1 cement hardener mix : 2 graded stone aggregate 6 mm nominal size) by volume, hardening compound mixed @ 2 litre per 50 kg of cement or as per manufacturer's specifications. This includes cost of cement slurry, but excluding the cost of nosing of steps etc. complete. Also include hacking of CC flooring including cleaning for surface etc. complete as per direction of the Engineer-in-Charge.	Sq. M.	120			

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					(In Figure)	(In Words)	
39	F-07	Cement plaster skirting up to 30 cm height, with cement mortar 1:3 (1 cement : 3 coarse sand), finished with a floating coat of neat cement.					
	a).	18 mm thick	Sq. M.	21.3			
	G	**Sanitary Installations**					
40	G-01	Providing and fixing Chlorinated Polyvinyl Chloride (CPVC) pipes, having thermal stability for hot & cold water supply, including all CPVC plain and brass threaded fittings, i/c fixing the pipe with clamps at 1.00 m spacing. This includes jointing of pipes and fittings with one step CPVC solvent cement and the cost of cutting chases and making good the same including testing of joints complete as per direction of Engineer I/C.					
	a.)	20 mm nominal outer dia pipes	R.M.	310			
41	G-02	Providing and fixing soil/ waste PVC pipes as required connecting properly with old and new existing pipe and filling all joints as required at any level (including tees, bends, plain junction, stays & clamps and other fixtures as required complete in all respect					
	a.)	75 mm dia.	R.M.	80			
	b.)	100 mm dia.	R.M.	80			
42	G-03	Providing and fixing 18 mm thick gang saw cut, mirror polished, premoulded and prepolished, machine cut for kitchen platforms, vanity counters, window sills , facias and similar locations of required size, approved shade, colour and texture laid with necessary opening (area less than 0.5 sqm) over 20 mm thick base cement mortar 1:4 (1 cement : 4 coarse sand), joints treated with white cement, mixed with matching pigment,epoxy touch ups, including rubbing, curing, moulding and polishing to edges to give high gloss					

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					(In Figure)	(In Words)	
		finish etc. complete at all levels. Area of slab over 0.50 Sq. M."					
	a.)	Granite of any colour and shade, area of slab upto 0.5 Sq. M.	Sq. M.	23			
	b.)	Granite of any colour and shade, area of slab over 0.5 Sq. M.	Sq. M	65			
43	G-04	Providing and fixing vitreous china wash basin of Parryware or approved make and colour with C.I. brackets 15mm C.P. brass Pillar taps Jaquar, no.011, 32mm C.P. brass waste of standard pattern , including painting of fittings and C.I. brackets, cutting and making good the walls wherever required.					
	(a.)	White Vitreous China Wash basin size 630x450 mm with a pair of 15 mm C.P. brass pillar taps	Each	53			
44	G-05	Providing and fixing white vitreous china pedestal type water closet (European type W.C. pan) of Cera make or equivalent with seat and lid, 10 litre low level white PVC flushing cistern with manually controlled device conforming to IS: 7231 with all fittings and fixtures complete including cutting and making good the walls and floors wherever required, including providing and fixing jet to W.C. Pan(European).					
	(a.)	W.C. pan with ISI marked white solid plastic seat and lid	Each	21			
45	G-06	Providing and fixing C.P. brass bib cock of GEM, PARKO or equivalent make, chrome finish of approved quality and 15 mm nominal bore.					
	a.)	Long body bib cock	Each	85			
	b.)	Short body bib cock	Each	85			

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					(In Figure)	(In Words)	
46	G-07	Providing and fixing C.P. brass angle valve, 15 mm nominal bore of Jaquar make no.053 chrome finish or equivalent for Wash basins, urinals etc. of approved quality conforming to IS:8931	Each	84			
47	G-08	Providing and fixing toilet paper holder C.P. brass of approved make GEM, PARKO or equivalent chrome finish.	Each	34			
48	G-09	Providing and fixing PTMT liquid soap container 109mm wide, 125mm high and 112mm distance from wall of standard shape with bracket of the same material with snap fitting of approved colour and make, complete in all respect.	Each	53			
49	G-10	Providing and fixing PVC waste pipe 32mm or 40mm rigid with elbow, tee, reducer etc. as required to complete in all respect to wash basin etc.	Each	74			
50	G-11	Providing and fixing CP Jalli of approved make for traps.	Each	116			
51	G-12	Providing and fixing brass ferrule with C.I. mouth cover including boring and tapping the main :					
	a.)	20 mm nominal bore	Each	21			
52	G-13	Providing and placing on terrace (at all floor levels) polyethylene water storage tank, IS : 12701 marked, with cover and suitable locking arrangement and making necessary holes for inlet, outlet and overflow pipes but without fittings and the base support for tank.					
	a.)	Circular Tank of capacity 1500 Lit.	Nos.	21			

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					(In Figure)	(In Words)	
53	G-14	Providing and construction of septic tank 2.0x0.5x1.0M and soak pit 0.5x0.5x0.7M in all respect as per scope of work, technical specification and direction of the engineer-in charge Rate to include cost of following item:- 1) Execavation and backfilling 2) 230 thk. Brick work.in cement morter I:6 3) 100thk RCC top slab with 300 dia C.I.cover 3) Bedding PCC (1:2:4) 4) 15th Plaster in Cement mortar 1:6 5) Chemical resistant Paint 6) Supplying and Filling of material such as Gravel, Coarse aggregate, Etc and complete in all respect	Each	21			
54	G-15	Providing and fixing Stainless Steel A ISi 304 (18/8) kitchen sink as per IS: 13983 with C.I. brackets and stainless steel plug 40 mm, including painting of fittings and brackets, cutting and making good the walls wherever required :					
	a.)	Kitchen sink with drain board (510x1040 mm bowl depth 225 mm)	Each	21			
55	G-16	Providing and fixing water closet squatting pan (Indian type W.C. pan) with 100 mm sand cast Iron P or S trap, 10 litre low level white P.V.C. flushing cistern, including flush pipe, with manually controlled device (handle lever) conforming to IS : 7231, with all fittings and fixtures complete, including cutting and making good the walls and floors wherever required					
	a.)	White Vitreous china Orissa pattern W.C. pan of size 580x440 mm with integral type foot rests	Each	5			

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56	G-17	Providing and fixing PTMT towel ring trapezoidal shape 215 mm long,200 mm wide with minimum distances of 37 mm from wall face with concealed fittings arrangement of approved quality and colour, weighing not less than 88 gms.	Each	51			
57	G-18	Providing and fixing PTMT swivelling shower, 15 mm nominal bore, weighing not less than 40 gms	Each	30			
58	G-19	Providing and fixing 600x450 mm beveled edge mirror of superior glass (of approved quality) complete with 6 mm thick hard board ground fixed to wooden cleats with C.P. brass screws and washers complete.	Each	53			
	H	**Doors, Windows & Ventilators**					
59	H-01	Providing and fixing in position at all heights anodised aluminium glazed doors and glazing of approved standard tubular sections (3 mm thick x 101.5 x 44.5 mm size anodised with 20 micron) fixed with 65 x 30 mm and 65 x 50 mm teak wood spacer member as per drawing including fixing with 16 x 3.15 mm lugs x 10 cm long embedded in cement concrete blocks 15 cm x 10 cm x 10 cm size of concrete nominal mix 1:3:6 (1 cement: 3 coarse sand: 6 graded stone aggregate 20 mm nominal size) or with wooden plugs and screws, or with rawal plugs and screws or with fixing clips or with bolts and nuts or frames fixed to adjoining structural steel members as per design and as required, including providing and fixing 5.5 mm glass panes with snap on anodised aluminium beading and PVC gasket of approved make with matching screws, providing aluminium or aluminium alloy fixtures such as hinges, concealed bolts, base-tie, lock strike, lock operable from inside or outside, kiking plate at bottom, handles,	Sq. M.	11			

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					(In Figure)	(In Words)	
		rubber buffers, etc., applying a coat of lacquer, complete in all respects as per direct ion of Engineer-in-Charge (The rates shall be inclusive of cement concrete blocks. Anodised aluminium doors may be of approved manufacturer such as Ajit India/ ECIE/ Al Karma make or its approved equivalent).					
60	H-02	Providing and fixing fully glazed anodised aluminium windows and ventilators, openable or partly openable of extruded hollow tubular sections standard INDAL/HINDALCO/JINDAL sections as given below, joints mitred and jointed with aluminium corner cleats and screws to match the section of frames including providing and fixing 4mm thick plain sheet glass conforming to IS:1761, anodising shall be 20 microns of natural aluminium shade as approved with snap fit aluminium beading and high quality EPDM/NEOPRENE weather proof gasket lining including polysulphide sealant filled between aluminium tube frame and wall; complete along with all aluminium fixtures such as handles, projected hinges, peg stays, tower bolts, spring catch all complete as per drawings and technical specification. SECTIONS TO BE USED FOR :- Outer frame - INDAL 9142 OR Equivalent of HINDALCO/JINDAL Shutter - INDAL 9838 or Equivalent of HINDALCO/JINDAL Mullion - INDAL 9476 or Equivalent of HINDALCO/JINDAL Snap Beading - INDAL 4122,4660 or Equivalent of					

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					(In Figure)	(In Words)	
		HINDALCO/ JINDAL					
	a.)	Openable window and ventilators (top hung or centre hung)	Sq. M.	25			
	b.)	Partly fixed and partly openable windows and ventilators.	Sq. M.	347			
	c.)	Fixed type windows and ventilators.	Sq. M.	56			
61	H-03	Providing and fixing in position at all heights hydraulic floor springs with double action of ECIE or Everite make or equivalent I.S.I. marked approved including foundation box, etc. complete.	Each	5			
62	H-04	Providing and fixing ISI marked flush door shutters conforming to IS: 2202, core of block construction with frame of 1st class hard wood and well matched teak 3 ply veneering with vertical grains or cross bands and face veneers on both faces of shutters.					
	a.)	30 mm thick non-decorative type including ISI marked stainless steel butt hinges with necessary screws.	Sq. M.	480			
63	H-05	Providing and fixing factory made uPVC door frame made of uPVC extruded sections having an overall dimension as below (tolerance ±1mm), with wall thickness 2.0 mm (± 0.2 mm), corners of the door frame to be Jointed with galvanized brackets and stainless steel screws, joints mitred and Plastic welded. The hinge side vertical of the frames reinforced by galvanized M.S. tube of size 19 X 19 mm and 1mm (± 0.1 mm) wall thickness and 3 nos. stainless steel hinges fixed to the frame complete as per manufacturer's specification and direction of Engineerin- charge					
	(a.)	Extruded section profile size 42x50 mm	R. M.	120			
64	H-06	24 mm thick factory made PVC door shutters made of styles and rails of a uPVC hollow section of size 59x24 mm and wall thickness 2 mm (± 0.2 mm) with inbuilt edging on both	Sq. M.	73			

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					(In Figure)	(In Words)	
		sides. The styles and rails mitred and joint at the corners by means of M.S. galvanised/ plastic brackets of size 75x220 mm having wall thickness 1.0 mm and stainless steel screws. The styles of the shutter reinforced by inserting galvanised M.S. tube of size 20x20 mm and 1 mm (± 0.1 mm) wall thickness. The lock rail made up of 'H' section, a uPVC hollow section of size 100x24 mm and 2 mm (± 0.2 mm) wall thickness, fixed to the shutter styles by means of plastic/galvanised M.S. 'U' cleats. The shutter frame filled with a uPVC multi-chambered single panel of size not less than 620 mm, having over all thickness of 20 mm and 1 mm (± 0.1 mm) wall thickness. The panels filled vertically and tie bar at two places by inserting horizontally 6 mm galvanised M.S. rod and fastened with nuts and washers, complete as per manufacturer's specification and direction of Engineer-in-charge. (For W.C. and bathroom door shutter).					
65	H-07	Providing wood work in frames of doors, windows, clerestory windows and other frames, wrought framed and fixed in position with hold fast lugs or with dash fasteners of required dia & length (hold fast lugs or dash fastener shall be paid for separately).					
	(a,)	Kiln seasoned and chemically treated hollock wood	Cu. M.	5			
66	H-08	Providing and fixing 25 mm thick shutters for cupboard etc.					
	a).	Paneled or un paneled & glazed shutters : Second class teak wood including ISI marked anodised aluminium butt hinges with necessary screws	Sq. M.	34			
67	H-09	Providing and fixing wire gauge shutters using galvanized					

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					(In Figure)	(In Words)	
		M.S. wire gauge of average width of aperture 1.4 mm in both directions with wire of dia 0.63 mm, for doors, windows and clerestory windows with hinges and necessary screws :35 mm thick shutters					
	a).	with ISI marked M.S. pressed butt hinges bright finished of required size: Kiln seasoned selected class of sheesham wood	Sq. M.	655			
	J	**Miscellaneous**					
68	J-01	Providing and laying water proofing treatment in sunken portion of WCs, bathroom etc. by applying cement slurry mixed with Armourcrete of M/s The Structural water proofing Company Pvt. Ltd. or Tapecrete of M/s CICO Engineering Service consisting of applying: a) First layer of slurry of cement @ 0.488 Kg/Sq.m mixed with Armourcrete or Tapecrete @ 0.253 Kg/Sq.m. This layer will be allowed to air cure for 4 hours. b) Second layer of slurry of cement @ 0.242 Kg/Sq.m mixed with Armourcrete or Tapecrete @ 0.126 Kg/Sq.m. This layer will be allowed to air cure for 4 hours follwed with water curing for 48 hours. (The rate includes preparation of surface , treatment and sealing of all joints, corners, junctions of pipes and masonry with polymer mixed slurry.	Sq. M.	150			

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					(In Figure)	(In Words)	
69	J-02	Providing and laying six courses water proofing treatment with bitumen felt over roofs consisting of first, third and fifth courses of blown or / and residual bitumen applied hot at 1.45, 1.20 and 1.70 kg per square metre of area respectively, second and fourth courses of roofing felt type 2 grade I (fibre base self finished bitumen felt) six and final courses of stone grit 6 mm and down size or pea sized gravel spread at 6cu.dm per sqm including preparation of surface, excluding grading, compete.	Sq. M.	1950			
70	J-03	Treatment of existing masonry using chemical emulsion @ one litre per hole at 300 mm interval including drilling holes at 45 degree and plugging them with cement mortar 1:2 (1cement : 2 coarse sand) to the full depth of the hole.					
	a.)	With Chlorpyriphos/Lindane E.C. 20% with 1% concentration	R.M.	1445			
71	J-04	Treatment of soil under existing floors using chemical emulsion@ one litre per hole, 300 mm apart including drilling 12 mmdiameter holes and plugging with cement mortar 1 :2 (1 cement: 2 Coarse sand) to match the existing floor:					
	a).	With Chlorpyriphos/Lindane E.C. 20% with 1%concentration	Sq. M.	1980			
72	J-05	Providing and fixing on wall face unplasticised Rigid PVC rain waterpipes conforming to IS : 13592 Type A, including jointing with seal ring conforming to IS : 5382, leaving 10 mm gap for thermal expansion (i) Single socketed pipes.					
	a.)	110 mm diameter	R. M.	308			

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SL. NO.	ITEM NO	DESCRIPTION OF ITEMS	UNIT	QTY	UNIT RATE WITHOUT GST		AMOUNT (IN Rs.)
					(In Figure)	(In Words)	
73	J-06	Supplying and stacking sludge at site including royalty and carriage upto 5km complete (sludge measured in stacks will be reduced by 8% for payment).	Cu. M.	42			
74	J-07	Supplying, transporting, de-rusting, fabricating, erecting, hoisting and fixing in position with necessary welding and/or bolting with MS bolts conforming to property class 4.6 of IS: 1367 at all heights as per approved fabrication drawings of all types of structural steel work in columns, portals, girders, lattice girders, beams, crane girders, M.S rails, monorails, bracings, trusses, purlins, rafters, side runners, sag rods, hand railings, staircase stringers and steps, walkway, toe-plates, floor grids, sag rods with M.S. rounds, side walling, conveyor gantries, trestle for pipe and cable racks, gusset plates, etc., either made of rolled steel joists, channels, angles, tees, flats, plates or built up from plates and/or rolled steel sections including necessary site and shop fasteners, complete in all respects as per approved fabrication drawings, standards and direction of Engineer-in-Charge :					
	a).	With providing and applying two coats of epoxy zinc chromate primer of approved quality on structural steel work after the preparation of surfaces including providing and applying finished coats epoxy base paint of approved make in 3 coats at a dry film thickness of minimum 200 microns(for three coats) on structural steel work complete in all respects as per specifications and direction of Engineer-in-Charge. (1 kg. of epoxy base paint of approved make covers average 8 to 9 Sq.M. per coat, including surface preparation by sand blasting / power driven brushes	Kg	21000			

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SL. NO.	ITEM NO	DESCRIPTION OF ITEMS	UNIT	QTY	UNIT RATE WITHOUT GST		AMOUNT (IN Rs.)
					(In Figure)	(In Words)	
75	J-08	Providing and fixing G.I. pipes complete with G.I. fittings including trenching and refilling etc.					
	a).	20 mm dia nominal bore	R.M.	250			
	b).	32 mm dia nominal bore	R.M.	150			
	c).	40 mm dia nominal bore	R.M.	300			
76	J-09	Making connection of G.I. distribution branch with G.I. main of following sizes by providing and fixing tee, including cutting and threading the pipe etc. complete :	Each	21			
77	J-10	Supplying, fabricating and fixing in position M.S. holding down bolts assembly consisting of bolts, heads, nuts, washers etc., and the like including embedding in cement concrete/R.C.C. works as per approved drawings complete in all respects including one coat of approved quality anti-corrosive paint over a coat of approved quality primer.	Kg	34			
78	J-11	Grouting under base plates, pockets etc. with cement mortar 1:1 (1 cement : 1 sand) including necessary finishing etc.	Cu. M.	2			
79	J-12	Providing and fixing ball valve (brass) of approved quality, High or low pressure, with plastic floats complete :					
	a).	20 mm nominal bore	Each	20			
	b).	32 mm nominal bore	Each	20			
80	J-13	Providing and fixing G.I. Union in G.I. pipe including cutting and threading the pipe and making long screws etc. complete (New work)					
	a).	20 mm nominal bore	Each	56			
	b).	25 mm nominal bore	Each	56			
	c).	32 mm nominal bore	Each	56			

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SL. NO.	ITEM NO	DESCRIPTION OF ITEMS	UNIT	QTY	UNIT RATE WITHOUT GST		AMOUNT (IN Rs.)
					(In Figure)	(In Words)	
81	J-14	Providing and placing on terrace (at all floor levels) polyethylene water storage tank, IS : 12701 marked, with cover and suitable locking arrangement and making necessary holes for inlet, outlet and overflow pipes but without fittings and the base support for tank.					
	a).	Circular tank (5000 L) Capacity	Each	2			
82	J-15	Renovating lawns including weeding, cheeling the grass, forking the ground, top dressing with sludge or manure, mixing the same with forked soil, watering and maintaining the lawn for 60 days or more till the grass forms a thick lawn free from weeds and fit for mowing and disposal of rubbish as directed, including supplying good earth if needed but including the cost of sludge or manure (The manure/sludge shall be paid for separately).	Sq. M.	7776			
83	J-16	Plantation of Trees, Shrubs, and Hedge at site i/c watering and removal of unserveiceable material's as per direction of officer in charge (excluding cast of plant & water)					
	a).	Trees Plant	Each	200			
	b).	Shrubs Plant	Each	200			
	c).	Hedge Plant	Each	200			

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SL. NO.	ITEM NO	DESCRIPTION OF ITEMS	UNIT	QTY	UNIT RATE WITHOUT GST		AMOUNT (IN Rs.)
					(In Figure)	(In Words)	
84	J-17	Providing and laying factory made chamfered edge Cement Concrete paver blocks In foot path, park & lawns driveway or light & traffic parking etc. of required strength, thickness & size/ shape, made by table vibratory method using PU mould, laid in required colour & pattern over 50mm thick compacted bed of course sand, compacting and proper embedding/laying of inter locking paver blocks into the sand bedding layer through vibratory compaction by using plate vibrator, filling the joints with sand and cutting of paver blocks as per required size and pattern, finishing and sweeping extra sand, all complete as per manufacturer's specifications & direction of Engineer in-Charge.					
	a).	80mm thick Cement concrete paver block of M-30 grade with approved colour, design & pattern.	Sq. M.	882			
85	J-18	Steel work welded in built up sections/ framed work, including cutting, hoisting, fixing in position & applying a priming coat of approved steel primer using structural steel etc. as required. In gratings, frames, guard bar, ladder, railings, brackets, gates and similar works					
	a).	In stringers, treads, landings etc. of stair cases, including use of chequered plate wherever required, all complete	Kg	2100			
	b).	In gratings, frames, guard bar, ladder, railings, brackets, gates and similar works	Kg	2100			

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SL. NO.	ITEM NO	DESCRIPTION OF ITEMS	UNIT	QTY	UNIT RATE WITHOUT GST (In Figure)	UNIT RATE WITHOUT GST (In Words)	AMOUNT (IN Rs.)
86	J-19	Fencing with angle iron post placed at required distance embedded in cement concrete blocks, every 15th post, last but one end post and corner post shall be strutted on both sides and end post on one side only and provided with horizontal lines and two diagonals interwoven with horizontal wires, of barbed wire weighing 9.38 kg per 100 m (minimum), between the two posts fitted and fixed with G.I. staples, turn buckles etc. complete. (Cost of posts, struts, earth work and concrete work to be paid for separately). Payment to be made per metre cost of total length of barbed wire used.					
	a).	With G.I. barbed wire	R. M.	351			
87	J-20	Providing and fixing submersible pump, PVC pipe, PVC jail, 1.5 HP Crompton / Kirloskar / KSB or equivalent including all necessary fittings (electrical, mechanical, etc) & civil work for successful completion of job, all complete as per direction of Engineer in-Charge.	Nos.	1			
The percentage above or below Delhi's CPWD Schedule of Rates 2016 for any item required to be executed but not covered in items above (For maximum value of Rs.20,00,000.00).			**% Age above (+) or Below (-)**				
TOTAL OF PART A (ii)					**Rs. _____**		

Note: Bidder is requested to quote the same rates for same items across Part A (i) and Part A (ii). If different rates are quoted for an item marked same, the lower of the rates shall be considered.

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SL. NO.	ITEM NO	DESCRIPTION OF ITEMS	UNIT	QTY	UNIT RATE WITHOUT GST		AMOUNT (IN Rs.)
					(In Figure)	(In Words)	

SUMMARY OF SECTION-5.1 i.e. PART-A (i) & (ii)

S.NO.	DESCRIPTION	VALUE (in Rs.)
1	Total Amount Part A (i) : SOR For Renovation of Administrative Building	
2	Total Amount Part A (ii) : SOR For Renovation of Bungalows	
	GRAND TOTAL (S.NO. 1 + 2)	**Rs.** _____

Name of Tenderer :

Signature & Seal of Tenderer :

Place :

Date :

---------- END OF SECTION-5.1 ----------

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SECTION-5.2

SOR for Electrical Works (Supply & Erection)

PART-II: TECHNICAL
SECTION-5.2

SCHEDULE OF RATES (SOR)

FOR

ELECTRICAL WORKS (SUPPLY & ERECTION)

FOR

RENOVATION OF ADMIN BUILDING

&

BUNGALOWS (TYPE B: 09NOS; TYPE C: 02NOS; TYPE D: 10NOS)

AT

HURL, GORAKHPUR, UP

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ITEM NO	DESCRIPTION OF ITEMS	UNIT	QTY	UNIT RATE WITHOUT GST		AMOUNT (IN Rs.)
				(In Figure)	(In Words)	

GENERAL INSTRUCTIONS TO BIDDER:

1. The Schedule of Rates is to be read in conjunction with Technical Specification: Electrical Works (Supply & Erection) for Renovation of Admin Building & Bungalow and other relevant sections / sub sections.
2. The rates shall be applicable for all floors, heights and depths.
3. This being an item rate contract, the unit rate shall prevail, does any discrepancy arise between unit rate and total price, unit rate shall be considered for evaluation and arriving at the Contract Value.
4. Owner / Consultant reserves the right to interpolate or extrapolate the rate for any item, which is not covered in the Schedule of rates, from the rates available for similar item / work in the Schedule of Rates.
5. Whenever it is mentioned in the specifications that the bidder shall perform certain work or provide certain facilities / materials or certain item or activity is in bidder's scope of services it is understood that the bidder shall do so at his cost within the item rates unless expressly stated otherwise.
6. Unit rates for erection shall inclusive of Unloading from Truck / Trailer, transportation from store (at site), handling, the cost of labor, supervision, all consumables, cost towards providing erection materials & hardware, necessary tools and tackles, and providing all the required facilities for execution and inspection, testing and commissioning, guarantees etc. Minor repair and touch painting work towards providing all required facilities for execution shall be in bidder's scope.
7. Work shall involve, at every stage, correct identification of all equipment including loose equipment from stores, identifying spare items / excess items, listing the same and carefully storing them under the custody of the contractor. Information to this extent shall be passed on to the concerned Engineer-in-charge / owner. Certification of balance items after erection and return to the Engineer in-charge / Owner so assigned.
8. All equipment shall be deemed to have clear tags, descriptive letter writing indicating locations / sources (from - to), cable sizes, circuit no., unit no., and any other writing required to make installation completely informative. All costs in view of above shall be deemed to have been included in installation / commissioning.
9. All primary & secondary injection tests & testing of relays and other equipment as per relevant IS, code of practice for testing and commissioning shall be deemed to have been included for testing & commissioning. No extra charges shall be provided for that.
10. Wherever quantity is indicated as lot, estimated quantity shall be indicated by the Contractor.

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11. Any item specifically not indicated but considered necessary for completion of the job shall also be quoted by the Contractor under separate sheet. Work shall also include any other item of work required to complete the work in all respect as per the specifications, drawings and instructions of the Engineer-in-Charge whether specifically mentioned or not in the tender document.
12. This being a renovation job, the Contractor must visit HURL, GORAKHPUR sites to assess the quantum and nature of work before quoting. However, the Contractor shall inform PDIL / HURL, 1 week prior to their visit.
13. Quantities mentioned in the Schedule of Rates are indicative and not exhaustive in nature. Payment shall be made as per actual quantity used / certified at site by Engineer-in-charge.
14. Contractor shall indicate the prices of all electrical items as per attached documents. The quantities indicated in Schedule of Rates are estimated quantities and may change during detailed engineering as per site condition and prior approval from owner/consultant shall be required for the same.
15. Quantity of some or all the items may increase or decrease up to any extent at the time of actual execution, however the total contract value shall be limited to total increase or decrease of 25% only. Contractor shall supply the equipments at the same rate as per these change quantities, irrespective of the changes in quantity of individual items.
16. Un-priced Price Schedule indicating quoted against each item shall be attached with bid documents for conformity that all the items have been quoted. Unit rate sought, for which quantities have not been indicated in the schedule of rates, shall also be quoted. However, the same shall not be considered for evaluation. Payment shall be made as per quantities executed.
17. Owner reserve their right to execute any additional works / extra works, during the execution of work, either by themselves or by appointing any other agency, even though such works are incidental to and necessary for the completion of works awarded to the Contractor. In the event of such decisions taken by Owner, Contractor is required to extend necessary cooperation, and act as per the instructions of Engineer-in-Charge.
18. Before procurement of any equipment / material, the Contractor shall submit drawing / document, Compliance Statement supported by Product Catalogue for review / approval. Bidder shall indicate actual quantity of cable based on actual measurement at site and get approval from PDIL/ HURL before taking procurement action.

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ITEM NO	DESCRIPTION OF ITEMS	UNIT	QTY	UNIT RATE WITHOUT GST		AMOUNT (IN Rs.)
				(In Figure)	(In Words)	
1	**DISTRIBUTION BOARD (MPDB / PDBs / LSDBs / SPDBs / FPB / MDB)**					
	Design, Supply, Installation, Testing and Commissioning at site of following weather proof Distribution Board made of CRCA sheet steel IP-55 execution having minimum thickness 2.0 mm suitable for wall / structure mounting, Indoor /Outdoor type and the same shall be suitable for DIN rail mounting MCBs/MCCBs/RCCBs etc. with provision of both (top & bottom) entry with 3nos.LED phase indicating lamps in incomers. Required nos. of suitable Elmex/ phoenix /connectwell terminals, crimping type Cu lugs and double compression rolled aluminum cable glands for Incomer and outgoing cable feeders including power and control cable glanding and terminations, handling, transportation from owner's store/ storage yard to erection site; unpacking, inspection; dressing of foundation as required; on frame works/supports grouted or welded to columns/structures; mounting in position and connecting of loose components and accessories; drilling of gland plates with required holes or enlarging existing holes for cable entries; fixing of cable glands and terminal supplied loose; plugging of all unused cable entries in the board/panels to make the same dust and vermin proof, making good of wall/column broken or chipped by cement plastering; minor repair and touch painting work; operational and functional checking; supply of fixing bolts, nuts and washers and other necessary hardwares and civil masonry materials; all work, labour and materials complete as per drawings & documents, specifications, codes and standards and directions of Engineer-in-Charge. Further please note that termination shall also include drilling, tapping of cable insulation, crimping of lugs to the conductor & connection of the lugs to equipment terminal..If any board is installed in outdoor area PVC shed shall be provided covering the total switchboard					

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ITEM NO	DESCRIPTION OF ITEMS	UNIT	QTY	UNIT RATE WITHOUT GST		AMOUNT (IN Rs.)
				(In Figure)	(In Words)	
	and safe staying of one person for maintenance during rainy season.					
a	415V Hose proof and weatherproof industrial type sheet steel enclosed, Main Power Distribution Board(MPDB) for Admin building with IP-55 degree of protection having 2 nos. 1250A 4P ACB I/C and Outgoing Feeders as indicated in SLD/ feeder details with ammeter & Voltmeter as per Technical specifications.	Nos.	1			
b	415V Hose proof and weatherproof industrial type sheet steel enclosed, 18 way Lighting Distribution Board (LSDB) for Admin Bldg. with IP-55 degree of protection having 1 no, 63A TPN MCCB, 3 nos 63A DP MCB in phase and 18 nos.16A DP MCBs outgoing as indicated in attached SLD along with technical specifications, standards etc	Nos.	4			
c	415V Hose proof and weatherproof industrial type sheet steel enclosed, 18 way Single Phase socket DB (SPDB) with IP-55 degree of protection having 1 no, 63A TPN MCCB, 3 nos 63A DP MCB in phase and 18 nos.16A DP MCBs outgoing as indicated in attached SLD along with technical specifications, standards etc.	Nos.	4			
d	415V Hose proof and weatherproof industrial type sheet steel enclosed, 21-way Power Distribution Board (PDB) for AC with IP-55 degree of protection having 1 no. 160A TPN MCCB,125ATPN MCCB in PHASE and 21 Nos. outgoing 25A DP MCB as indicated in typical SLD attached with Technical Specification.	Nos.	4			
e	415V Hose proof and weatherproof industrial type sheet steel enclosed,Feeder Pillar board (FPB) for incoing power distribution to individual bungalow with IP-55 degree of protection having 1 nos.160A 4P MCCB I/C and 4 nos 63A 4P MCCB Outgoing Feeders as per Technical specifications , SLD, standards & direction of Engineer in charge (for Bungalow).	Nos.	7			

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ITEM NO	DESCRIPTION OF ITEMS	UNIT	QTY	UNIT RATE WITHOUT GST		AMOUNT (IN Rs.)
				(In Figure)	(In Words)	
f	415V Hose proof wall mounted type 18 way MCB prewired Lighting Distribution board having 63A TPN, 30mA ELCB incomer and 12 nos 16A SPN MCB and 6 nos 32A SPN MCB outgoing feeder including 2 nos earthing with 1x16 sq.mm (Al) unarmoured cable. (for Bungalow).	Nos.	21			
g	Wall mounted Meter Distribution Board complete with 32A Fuse and 63A Isolator suitable for installation of 3 phase, 4 Wire, 415V, house service type (7KW) Meter. (for Bungalow)	Nos.	21			
2	**LIGHTING**					
	Supply, Installation, Testing and Commissioning of prewired wall/ceiling/false ceiling mounted type following LED lighting fixtures including providing & fixing LED lighting fixtures, electronic drivers, condensers, internal & external reflectors, louvers, etc. Including handling, transportation from owners store to erection site, unpacking, inspection; checking of internal wiring; Erection in position on false ceiling / floor etc, cable glanding, crimping of lugs and connections at fixtures; supply of all erection materials Including necessary GI hardware, GI clamps, GI brackets, civil masonry materials; all work, labour and materials complete as per drawings, specifications, codes and standards and directions of Engineer in charge.					
a	High quality LED tube batten complete with 2X20W tube (T5) eco friendly, having ≥ 2000 lumen output, CCT-6500K, IP-20, luminous efficacy ≥ 100 lm/watt, CRI>80, life ≥ 40000 burning hours, PF>0.95 and THD<10%, no UV radiation etc. suitable for ceiling/ wall mounted	Nos.	75			

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ITEM NO	DESCRIPTION OF ITEMS	UNIT	QTY	UNIT RATE WITHOUT GST		AMOUNT (IN Rs.)
				(In Figure)	(In Words)	
b	High quality Mirror Optics Decorative LED tube batten complete with 2x20W/2x18W tube (T5)/ Plate eco friendly, having ≥ 2000 lumen output, CCT-6500K, IP-20, luminous efficacy ≥ 100 lm/watt, CRI>80, life ≥ 40000 burning hours, PF>0.95 and THD<10%, no UV radiation etc. suitable for ceiling/wall mounted for conference rooms, Meeting rooms, Senior executive rooms & Reception area.	Nos.	30			
c	High quality LED tube batten complete with 1X20W tube (T5) eco friendly, having ≥ 2000 lumen output, CCT-6500K, IP-20, luminous efficacy ≥ 100 lm/watt, CRI>80, life ≥ 40000 burning hours, PF>0.95 and THD<10%, no UV radiation etc. suitable for ceiling/wall mounted	Nos.	285			
d	Supply of 240VAC 1 phase 90W outdoor light with LED lamp in weatherproof & hose proof light Min IP55, fixture complete with driver ,cable glands and other accessories, suitable for 3 X 2.5mm2 (Cu) cable and stopping plug for outdoor area.	Nos.	10			
e	Supply and fixing wall mounted high quality LED tube batten complete with single 9W tube (T5) eco friendly, having ≥ 900 lumen output, CCT-6500K, IP-20, luminous efficacy ≥ 100 lm/watt, CRI>80, life ≥ 40000 burning hours, PF>0.95 and THD<10%, no UV radiation etc. (for bungalow)	Nos.	145			
f	Supply and fixing bracket mounted bulk head lighting fixtures complete with bracket, 9W LED bulb eco friendly, having ≥ 900 lumen output, CCT-6500K, luminous efficacy ≥ 100 lm/watt, CRI>80, life ≥ 40000 burning hours, PF>0.95 and THD<10%, no UV radiation etc. suitable for outdoor installation.(for bungalow)	Nos.	140			
g	34W LED flat panel lighting fixture with high brightness LEDs with integral driver and suitable heat sink arrangement to ensure effective heat dissipation with approximate dimension of 2 ft x 2 ft	Nos.	10			

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ITEM NO	DESCRIPTION OF ITEMS	UNIT	QTY	UNIT RATE WITHOUT GST		AMOUNT (IN Rs.)
				(In Figure)	(In Words)	
	in CRCA housing having minimum lumen output of 100lm/w and suitable for installtion in recess/false flooring etc					
3	**WIRING**					
3.1	**POINT WIRING**					
a	**One Light Point shall controlled by one switch**					
	Supply and Providing Point Wiring system for primary light point/ceiling fan point/exhaust fan point/ call bell point/light plug point controlled by 1-6 Ampere modular type switch inclusive of the cost for providing circuit wiring from Distribution board to switch boards with 2x2.5 sq.mm.,1.1 KV grade PVC multi stranded fire resistant insulated copper conductor wire for light in required size of rigid PVC conduit with conduit accessories and 14swg bare copper earth wire continuity conductor including providing/fixing of PVC conduit of required size. Item shall also include wiring from switch board to point/fitting with 2x1.5 sq.mm copper conductor PVC insulated wire of 1100V grade with 14 SWG gcopper wire as earth continuity conductor for light in appropriate size of PVC conduit including providing & fixing PVC conduit with accessories such as bends,JB,sockets etc.required size of MS zinc passivated modular box with white inner plate and glossy white outer module plate for housing modular switch, sockets, fan regulators (Electronic heavy duty step up type) bell push on modular plate etc,The rates shall include cutting and refilling of chases/ Wall etc. including internal connections as required. All switch sockets shall be modular type fixed on modular plate. Make of modular plate, board, switch, socket etc shall be as per approved Make .(Actual nos. shall be decided at site).	Nos.	800			
b	**TWO Light Point shall controlled by one switch**					

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ITEM NO	DESCRIPTION OF ITEMS	UNIT	QTY	UNIT RATE WITHOUT GST		AMOUNT (IN Rs.)
				(In Figure)	(In Words)	
	Supply and Providing Point Wiring system for primary light point/ceiling fan point/exhaust fan point/ call bell point/light plug point controlled by 1-6 Ampere modular type switch inclusive of the cost for providing circuit wiring from Distribution board to switch boards with 2x2.5 sq.mm.,1.1 KV grade PVC multi stranded fire resistant insulated copper conductor wire for light in required size of rigid PVC conduit with conduit accessories and 14swg bare copper earth wire continuity conductor including providing/fixing of PVC conduit of required size. Item shall also include wiring from switch board to point/fitting with 2x1.5 sq.mm copper conductor PVC insulated wire of 1100V grade with 14 SWG gcopper wire as earth continuity conductor for light in appropriate size of PVC conduit including providing & fixing PVC conduit with accessories such as bends,JB,sockets etc.required size of MS zinc passivated modular box with white inner plate and glossy white outer module plate for housing modular switch,sockets,fan regulators (Electronic heavy duty step up type) bell push on modular plate etc,The rates shall include cutting and refilling of chases/wall etc. including internal connections as required. All switch sockets shall be modular type fixed on modular plate. Make of modular plate,board switch, socket etc shall be as per approved Make. (Actual nos. shall be decided at site).	Nos	85			
c	**TWIN controlled Light Point**					
	Supply and Providing Point Wiring system for primary light point/ceiling fan point/exhaust fan point/ call bell point/light plug point controlled by 1-6 Ampere modular type switch inclusive of the cost for providing circuit wiring from Distribution board to switch boards with 2x2.5 sq.mm.,1.1 KV grade PVC multi stranded fire resistant insulated copper conductor wire for light in required size of rigid PVC conduit with conduit accessories and 14swg bare copper earth wire continuity conductor including	Nos.	800			

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ITEM NO	DESCRIPTION OF ITEMS	UNIT	QTY	UNIT RATE WITHOUT GST		AMOUNT (IN Rs.)
				(In Figure)	(In Words)	
	providing/fixing of PVC conduit of required size. Item shall also include wiring from switch board to point/fitting with 2x1.5 sq.mm copper conductor PVC insulated wire of 1100V grade with 14 SWG gcopper wire as earth continuity conductor for light in appropriate size of PVC conduit including providing & fixing PVC conduit with accessories such as bends,JB,sockets etc.required size of MS zinc passivated modular box with white inner plate and glossy white outer module plate for housing modular switch, sockets, fan regulators (Electronic heavy duty step up type) bell push on modular plate etc,The rates shall include cutting and refilling of chases/ Wall etc. including internal connections as required. All switch sockets shall be modular type fixed on modular plate. Make of modular plate, board, switch, socket etc shall be as per approved Make .(Actual nos. shall be decided at site).					
d	**Light Plug Point**					
	Supply and Providing Point Wiring system for 6A Plug points with single core multi stranded PVC insulated unsheathed copper conductor fire retardant wires of 1100V grade in recessed PVC conduit including providing and fixing PVC conduits of required size complete with accessories such as bends, JB, Pull Boxes etc with plate, switches, sockets, screws and covers, Zinc Passivated MS modular boxes (16 gauge sheet construction) of suitable sizes, embedded in wall, concealed and flush with walls including cutting and refilling the chases/ Wall etc and inclusive of 14 SWG bare copper earth conductor for socket outlets as per specifications & direction of Engineer in charge. All Modular type switch & socket shall be of approved make.6 Amp 6 pin socket outlet with 6A switch mounted side by side with 2x2.5 sq.mm PVC copper wire with 14 SWG bare copper earth wire.(Actual nos. shall be decided at site).	Nos	560			

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ITEM NO	DESCRIPTION OF ITEMS	UNIT	QTY	UNIT RATE WITHOUT GST		AMOUNT (IN Rs.)
				(In Figure)	(In Words)	
e	**Power Plug Point**					
	Supply and Providing Point Wiring system for 16A /6A power plug point with following sizes PVC insulated unsheathed single core multi stranded copper conductor, fire retardant wires of 1100V grade in recessed PVC conduits of required size complete with accessories such as bends,JB,Pull boxes etc with plate switches,sockets,screws and covers, Zinc Passivated MS modular boxes (16 gauge sheet construction) of suitable size, embedded in wall concealed and flush with walls including cutting and refilling the chases/Wall etc, and inclusive of 14SWG bare copper earth conductor for socket outlets as per specifications & direction of Engineer in charge. All modular type switch & socket shall be of approved make.16A, 6 Pin socket outlet with 16A switch mounted side by side with 2x4 sq.mm PVC copper wire with 14 SWG bare copper earth wire as an independent circuit from DB. (Actual nos. shall be decided at site).	Nos	125			
f	**Secondary Power Plug Point from Primary Power Plug Point**					
	Supply and Providing Point Wiring system for 16A /6A power plug point with following sizes PVC insulated unsheathed single core multi stranded copper conductor, fire retardant wires of 1100V grade in recessed PVC conduits of required size complete with accessories such as bends, JB, Pull boxes etc with plate switches, sockets, screws and covers, Zinc Passivated MS modular boxes (16 gauge sheet construction) of suitable size, embedded in wall concealed and flush with walls including cutting and refilling the chases/Wall etc, and inclusive of 14SWG bare copper earth conductor for socket outlets as per specifications & direction of Engineer in charge. All modular type switch & socket shall be of approved make.16A, 6 Pin socket outlet with 16A switch mounted side by side with 2x4 sq.mm PVC copper wire	Nos	245			

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ITEM NO	DESCRIPTION OF ITEMS	UNIT	QTY	UNIT RATE WITHOUT GST		AMOUNT (IN Rs.)
				(In Figure)	(In Words)	
	with 14 SWG bare copper earth wire as an independent circuit from DB. Two nos. power plug point shall be looped from one primary plug point.					
g	**A.C. Point**					
	Supply and Providing Point Wiring system for 32A Industrial socket point (A.C. Point) with 2x4 sq.mm PVC insulated copper conductor FRLS cable in recessed PVC conduit along with 1x4 sq.mm. PVC insulated FRLS cable for earthing I/C,Providing & fixing 25A plug & socket unit complete with 32A DP MCB and 32A plug top including GI Box to be mounted on modular plate complete with connections, testing & commissioning etc (separate circuit for each point)					
i)	32A DP MCB with Sockets for 1.5T AC	Nos	150			
4	**TV Point**					
	Supply, providing & drawing point wiring system for co-axial TV cable RG-6 grade, 0.7 mm solid copper conductor PE insulated, shielded with fine tinned copper braid and protected with PVC sheath in the surface / recessed in appropriate size of PVC conduit including providing & fixing PVC conduit with accessories such as bends, JB etc. along with TV socket as required. The rate shall include supply and fixing of TV antenna socket outlet (modular type) complete with required size of MS zinc passivated modular box with white inner plate and glossy white outer module plate, modular base, cover plate etc. The rate shall also include cutting and refilling of chases/wall etc, including internal connections as required. All sockets shall be modular type fixed on the modular plate. Make of modular plate, board, switch, socket etc shall be of approved make.	Nos	91			

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ITEM NO	DESCRIPTION OF ITEMS	UNIT	QTY	UNIT RATE WITHOUT GST		AMOUNT (IN Rs.)
				(In Figure)	(In Words)	
5	Supply, Innstallation, Testing & Commissioning of following single phase wall fan and exhaust fan with guards/ louvers, along with necessary brackets, all required civil works, making good the walls after fixing the fans etc.	-	-			
a)	300 mm sweep heavy duty exhaust fan	Nos.	104			
6	Supply, hanging, fixing, connecting ,decorative type, 3-blade ceiling fan including provision of cable/wire from ceiling rose or connector to fan including supply and fixing hexagonal fan hook with 12 mm dia. MS rod bend to shape as reqd.					
a)	1200 mm sweep	Nos.	203			
b)	600 mm sweep	Nos.	52			
7	**EARTHING AND LIGHTENING PROTECTION**					
a)	Supply ,Installation, Testing & Commissioning of 100 NB,3.8 M. Long G.I.pipe Earth Electrode in Earth pit as per PDS attached with TS Including handling, transportation to Erection site, Excavation of Earth pit in all types of soil, back filling of pit with common salt, charcoal / coke and loose Earth after installation of Electrode there in, removal of surplus Earth away from Erection site, consolidation of loose Earth on back filled pit, making of bricks work, Inspection chamber on back filled pit and cover of RCC ,there of complete with lifting hook, fixing & connecting inside the chamber of G.I. Earth bracket and other accessories of the Earth Electrode, painting of Earth pit No. and Earthing symbol on the cover, supply of salt, charcoal /coke, bricks, sand, cement, stone chips, reinforcement rods, lifting hook, necessary stainless steel hardware, paints etc. (Excluding supply of G.I. Earth	Nos.	48			

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ITEM NO	DESCRIPTION OF ITEMS	UNIT	QTY	UNIT RATE WITHOUT GST		AMOUNT (IN Rs.)
				(In Figure)	(In Words)	
	Electrode &its accessories),all works, labour & materials complete as per Drawings, specifications, code & standards and direction of consultant/owner.					
b)	Supply Installation, Testing & Commissioning of GI earth strip / Wire conductors of following sizes as per PDS attached with TS enclosed in readymade concrete trenches or in floor slits, on brick / concrete wall under concrete floors, or paved areas, across pipe joints and valves, directly buried under ground at depth of 500 mm, including handling, transportation to erection site, bending, straightening, cutting to size, welding together of earth strips in overlapping manner, chipping in concrete floors/ paved areas for laying the earth strips under floors/ paved areas and making good by cement plastering concrete after laying of the strips ; clamping and supporting of earth strips laid above ground, connecting the strips/ wire at both ends to equipment or to earth bus / earth plates or to GI brackets fixed inside earth pit chamber, by bolting etc., Hessian tapes, all necessary GI hardware, GI clamps, civil masonry materials, etc. all work, labour as per specifications, codes and standards and directions of owner/consultant. of Hot Dip Galvanized GI earth strips & GI earth wire (with min. coating 610gm/sq.m) of following sizes : -					
	Note: The conductors shall be laid at a minimum depth of 500 mm from ground level. The excavation for the GI earth conductors/ strips shall not be separately measured and the rates quoted to include the same.					
i)	50 mm x 6 mm	Mtr	1025			
ii)	1Cx25 sq.mm Al cable Unarmoured	Mtr	250			

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ITEM NO	DESCRIPTION OF ITEMS	UNIT	QTY	UNIT RATE WITHOUT GST		AMOUNT (IN Rs.)
				(In Figure)	(In Words)	
c)	Supply, Installation & Commissioning of GI Earth Bus bars (size: 390x50x12mm thick) as per PDS attached with TS Including handling, transportation, drilling of necessary holes/enlargement existing holes as required; all associated work for fixing the Bus bars in position e.g. cutting, leveling, aligning, chipping, grouting, welding bolting etc.; making good of broken/chipped portion on walls /columns by cement plastering. Supply of all necessary hardware (GI), paints, civil masonry materials etc. all work,labour complete as per drawings, specifications, codes and standards and directions of consultant /owner. Hot dip galvanized GI earth bus bar of size 390 x 50 x 12 thick (with min. coating 610gm/sq.m of zinc) with fixing materials as per	Nos.	22			
8	**CABLES (LT)**					
	Supply, laying (horizontal & vertical), testing and commissioning of 1.1 KV Grade, XLPE Insulated, PVC inner sheathed, armoured, FRLS PVC outer sheathed cables including its termination in new & readymade trenches, on pre-fabricated/ site-fabricated cable trays/ racks, on already installed risers, support, hangers, saddles / directly buried up to 700mm depth etc. pulling through pipes on walls/columns, steel structures including transportation of cable drums from storage yard to site, unrolling the drum, including supply & fixing of cable tags, Al clamps with all labour, consumable materials and necessary hardware to make installation complete in all respect as per direction of engineer-in-charge.					
a)	3.5 x 240 mm^2 (Al)	Meter	250			
b)	3.5 x 120 mm^2 (Al)	Meter	380			
c)	3.5 x 50 mm^2 (Al)	Meter	1370			

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ITEM NO	DESCRIPTION OF ITEMS	UNIT	QTY	UNIT RATE WITHOUT GST		AMOUNT (IN Rs.)
				(In Figure)	(In Words)	
9	**Cable Glands**					
	Supply of heavy duty Industrial double compression ET Thread rolled Aluminum cable glands suitable for the following sizes of cables :-					
A	1.1 KV Grade, XLPE Insulated, PVC inner Sheath, FRLS PVC outer sheathed cables.					
i)	3.5 x 240 mm^2 (Al)	Nos	10			
ii)	3.5 x 120 mm^2 (Al)	Nos	22			
iii)	3.5 x 50 mm^2 (Al)	Nos	100			
10	**TERMINATION OF CABLES**					
	End termination and subsequent testing of XLPE insulated single core/ multi core armoured cables of 1.1KV grade, Al/ Cu cable., excluding supply of termination kits, glands but including lugs , all labour and consumable materials to make installation complete in all respect. Modification in existing switch board for accommodating the proposed cables. The rate shall include drilling, taping of cable insulation, crimping of lugs to the conductor, connection of the lugs to equipment terminal, supply and fixing of supports & clamps for cables, G.I. nuts, screws, bolts, washers and other necessary hardware, PVC tape of required grade for taping, making cable entries dust and vermin proof, earthing etc. as per instruction of manufacturer, approved drawings, specifications and directions of engineer-in-charge.					

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ITEM NO	DESCRIPTION OF ITEMS	UNIT	QTY	UNIT RATE WITHOUT GST		AMOUNT (IN Rs.)
				(In Figure)	(In Words)	
A	1.1 KV grade, XLPE Insulated, PVC inner sheath, armoured, FRLS PVC outer, Stranded Cu/ Al Conductor cables as per IS:7098 (Part-1) of the following sizes.					
i)	3.5 x 240 mm^2 (Al)	Nos	10			
ii)	3.5 x 120 mm^2 (Al)	Nos	22			
iii)	3.5 x 50 mm^2 (Al)	Nos	100			
11	**Hume Pipe**					
	Supply laying of NP2 class 100 mm dia Hume pipe including collars, jointing with stiff mixture of cement mortar in proportion 1:2 including cutting of pipes wherever required	Mtr.	20			
12	**GI Pipe**					
	Supply, laying, installation of medium class GI pipe as per IS:1239 (part-1) of following sizes					
	100 mm NB	Mtr.	600			
13	**SAFETY EQUIPMENT**					
	Supplying and installing the following including the supply of necessary clamps, rawl plugs etc., breaking the walls if required and making good the walls after completion of work, including all materials and labour etc. and as per site instructions.					

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ITEM NO	DESCRIPTION OF ITEMS	UNIT	QTY	UNIT RATE WITHOUT GST		AMOUNT (IN Rs.)
				(In Figure)	(In Words)	
a)	CO_2 type fire extinguishers (4.5 Lt capacity) with horn type (with handle) outlet	Nos.	2			
b)	Vitreous enamel caution boards (HINDI/ ENGLISH) as per IS 2551 including fixing on the wall with all required hardware etc. complete.					
i)	440 V	Nos.	2			
c)	Supply, laying, installation, testing & commissioning of of fire retardant/extinguishing Electric insulated synthetic Rubber floor Mats suitable for all voltages not exceeding 1.1KV system having minimum current leakage, dielectric strength & breakdown strength as per IS without adverse effect of mineral oil,Acid,Alkaline Diesel & Transformer oil etc of size 2000mmx1000mm,Confirming to IS15652 and bearing ISI certification marking and manufacturer's test certificate.					
i)	415 V	mtr	20			
14	Supply Fabrication and installation of MS frame supports and brackets base frame, hanger, risers, clamps, etc. for different electrical equipment as and where required. The job will include cutting, drilling, welding, reverting, bolting, grouting etc steel structural with a coat of epoxy primer and two coats of epoxy paint including supply of all consumable necessary hardware, paints etc.of various size of steel structure as required at set.	Te	0.3			
15	Dismantling of the Floor mounted/wall mounted panels, Distribution board ,Single Front /Double Front ,grouted on wall, installed on floor etc, disconnecting of the incoming/outgoing cables laid on rack/trench/buried etc , dismantling of earth wire/strip from the panel, removing of cable tray along with its					

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ITEM NO	DESCRIPTION OF ITEMS	UNIT	QTY	UNIT RATE WITHOUT GST		AMOUNT (IN Rs.)
				(In Figure)	(In Words)	
	supports, shifting of dismantled equipments/components / Material at owner's designated places, any other civil work as required as per specification and direction of engineer in charge					
a)	415V SwBD of approx.2200 mm height	Lot	1			
TOTAL (Sl. No. 1 to 15)				**Rs. _____**		

Name of Tenderer :
Signature & Seal of Tenderer :
Place :
Date :

---------- END OF SECTION-5.2 ----------

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SECTION-5.3

Summary Sheet for SOR i.e. Section-5.1 & 5.2

PART-II: TECHNICAL
SECTION-5.3

SUMMARY SHEET

OF

SCHEDULE OF RATES (SOR)

FOR

RENOVATION OF ADMINISTRATIVE BUILDING AND BUNGALOWS

AT

GORAKHPUR, UTTAR PRADESH

[NIT NO. : PNPM/PC160/E/G-240]

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NIT NO. : PNPM/PC160/E/G-240

NIT SUBJECT: RENOVATION OF ADMINISTRATIVE BUILDING AND BUNGALOWS AT GORAKHPUR, UTTAR PRADESH

SUMMARY OF SCHEDULE OF RATES

S.NO.	DESCRIPTION	UNIT	VALUE
1.	SECTION-5.1 : SOR FOR CIVIL, STRUCTURAL & OTHERS ALLIED WORKS	INR	
2.	SECTION-5.2 : SOR FOR ELECTRICAL WORKS (SUPPLY & ERECTION)	INR	
3.	**TOTAL (S.NO. 1 + 2)**	INR	
4.	GST RATE AS APPLICABLE (Not included in S.No. 1, 2 & 3 above)	in %	_____ %
5.	TOTAL GST CHARGES (S.No. 3 multiplied by S.No. 4)	INR	
	GRAND TOTAL (S.NO. 3 + 5)	INR	

NAME : _____

SIGNATURE & SEAL OF TENDERER : _____

PLACE : _____

DATE : _____

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