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GOVERNMENT OF WEST BENGAL
OFFICE OF THE SUPERINTENDING ENGINEER
WEST CIRCLE, MUNICIPAL ENGINEERING DIRECTORATE

PATAL BAZAR, 3RD FLOOR, TINKONIA, PURBA BARDHAMAN, PIN:-713101, E-mail-sewestmed@yahoo.com

Memo. No. MED/ SE (W) / 621 /W-291/2025

Date: 28.11.25

NOTICE INVITING e-TENDER

Notice Inviting e-Tender No: 10/ SE(WC)/MED/2025-2026

The Superintending Engineer, West Circle, Municipal Engineering Directorate, on behalf of Hon'ble Governor of West Bengal, invites e- competitive Bid on Turnkey Basis (Two-part System) from reliable and resourceful Companies / Firms / Contractors having experience and acumen in construction work as noted below with the eligibility as depicted hereunder for participating in the e-Bid.

1) Details of the Work:-

Sl. No.	Name of the work	Type of Tender	Departmental estimated cost (Tentative)	Initial Earnet Money (₹)	Period of Completion of the work	Name of the concerned Division & Circle	Eligibility of bidders
1.	Augmentation and strengthening of Water Supply Scheme within Dubrajpur Municipality under AMRUT 2.0 which includes Sinking of Tube Wells with Electro-Mechanical works , Supplying and laying of DI-K ₉ Rising Main, Construction of OHRs with Geotechnical investigation & Design of sub-structure, Supplying & laying of Distribution pipe lines (DI-K ₇ , HDPE) with temporary road restoration, Jack Pushing/HDD works for NH/Rail crossing, Pipe carrying bridges, Pump Houses, Staff Quarter, Sub-Station and all other allied works complete in all respect, commissioning, trial run and O&M for 5 years.	On Turnkey Basis	Rs 39.11 Cr	₹ 10.00 Lakh	730 days	The Executive Engineer, Birbhum Division, MED under The Superintending Engineer, West Circle, MED.	As stated under Clause-3

2) Location of Work:-Dubrajpur Municipality, District:-Birbhum, State-West Bengal

3) Eligibility to participation of Bid:-

- i) The prospective bidders shall have satisfactorily completed during the last 5 (five) years prior to the date of issue of this NIT **at least one work** of similar nature (# as defined below) under the authority of State/Central Govt., State/Central Govt. undertaking, Statutory/Autonomous Bodies constituted under the statute of the Central/State Government and having a magnitude not less than **40%** of Departmental justified cost.

OR

- ii) The prospective bidders shall have satisfactorily completed during the last 5 (five) years prior to the date of issue of this NIT at **least two works** of similar nature (# as defined below) each, under the authority of State/Central Govt., State/Central Govt. undertaking, Statutory/Autonomous Bodies constituted under the statute of the Central/State Government and having a magnitude each of minimum value of **30%** of Departmental justified cost.

OR

- iii) The prospective bidders should produce credential **at least one single running work** of similar nature (# as defined below) which has been completed to the extent of **80%** or more and value of which is not less than the value as mentioned in serial no. (i) above under the authority of State/Central Govt., State/Central Govt. undertaking, Statutory/Autonomous Bodies constituted under the statute of the Central/State Government.

(In case of Joint Venture, credential for running work will not be considered.)

*N.B.- In case, the applicant is a **Joint Venture (JV)**, the required credentials criteria are to be fulfilled jointly, provided **minimum 60% of the criteria** is fulfilled by the Lead Member and **minimum 25% of the criteria** is fulfilled by the other Member.*

Similar nature of works defined as:-

“ works include OHR/CWR/Intake Wells/ Water Treatment Plants with Electro-Mechanical works in a single tender or multiple tenders executed within last 5 years.”

Note:-For running work, only those tenderers who will submit the certificate of satisfactory running works from the concerned Executive Engineer or equivalent competent authority will be eligible for the tender. In the required certificate, it should be clearly stated that the work is in progress satisfactorily mentioning progressive value of the work and also that no penal action has been initiated against the executing agency, i.e. the tenderer.

N.B.: Estimated amount, Date of completion of project or percentage of physical progress of works for running works, Value of Work done, Salient feature & nature of the work executed is to be mentioned in the Credential Certificate. Date of Completion of project along with telephone number & detail address for communication of client must be indicated in the Credential Certificate. Payment Certificate will not be treated as Credential. Credential Certificate issued by the Executive Engineer or equivalent or competent authority of State/Central Govt., State/Central Govt. undertaking, Statutory/Autonomous Bodies constituted under the statute of the Central/State Government will be taken as Credential. However, Credential Certificate issued to sub-contractor by Central or State Govt. undertaking /Govt. Enterprise shall not be accepted.

Tender Id, BOQ, Work Order shall also be furnished additionally OR shall able to furnish as & when required during scrutiny at the West Circle Office.

AND

The Electrical Licence of the bidder and Electrical Supervisory Licence (employed under the same bidder) of

appropriate category of Licence are mandatory to submit for Electro-Mechanical works

Annual Turn Over (**Minimum Rs.15 Crore in any one year within last 3 years**) in 3CD format in duly authenticated by registered C.A. shall be submitted. The Audited Report should contain the signature, name, address, contact no./email ID and membership no., UDIN no. of Chartered Accountant clearly.

AND

Valid Bank Solvency certificate from any Nationalise/ schedule Bank having minimum value of **Rs. 15 Crore**

AND

Having valid GST, P. Tax clearance Certificates, PAN Card and ESI and EPF registration certificates etc.

AND

Particular of ownership / partnership or board of directors pertaining to the organization / company / firm.

AND

In case of Proprietorship or Partnership Firms or Company the Tax Audited Report in 3CD/3CB Form for the **last three years** along with balance sheet, trading account and profit & loss account and all schedules forming the part of Balance Sheet and Trading Account. Tax Audited report, Balance Sheet, Trading account and Profit & Loss Account including all schedules forming the part of Balance Sheet and Trading Account should be in favour of applicant. The Audited Report should contain the signature, name, address, contact no./email ID and membership no., UDIN no. of Chartered Accountant clearly. [Non Statutory Documents]

AND

Registered Unemployed Engineers' Co-operative Societies/ Unemployed Labour Co.-Op. Societies are required to furnish Certificate of Registration, Bye Laws, Tax Audit Report in 3CD/3CB Form with balance sheet, trading account and profit & loss account, Registered Power of Attorney, Professional Tax deposit challan. PAN Card, valid Trade License, GST registration Certificate (GSTIN) with, EPF registration, ESI registration along with other relevant supporting papers. [Non Statutory Documents]

AND

A prospective bidder shall be allowed to participate in the particular Job either in the capacity of individual or as a partner of a firm. If found to have applied severally for a single job, all his applications will be rejected for that job, without assigning any reason thereof. A bidder (either in the capacity of individual or as a partner of a firm) & his/her co-partners of another firm will not be allowed to participate in the same work under a NIT.

AND

In case of the JV, The Lead member should have a stake of at least 51% and the partners of the Joint Venture shall have a stake of at least 10%. The JV members shall be jointly and severally liable under the contract.

On successful completion of the project, the Credential Certificate, if needed by the JV, shall be given according to the stake, mentioned in their JV agreement.

AND

N.B. – 1. Work completed as sub-contractor will not be accepted as credential.

2. The successful bidder shall have sufficient qualified Engineering personnel, Certified Electrical Supervisor with necessary valid Electrical licences (to be employed under the firm with sound knowledge and experience in execution of similar nature of works. List of machineries & equipment necessary for fields and list of technical personals employed under the organization in details with name, qualification, experience and address with contact number will have to be furnished by the successful bidder at the time of contract agreement.

4) Documents to be produced in support of Credential for Bid:-

As mentioned in Sl. No. 3 above.

Note: - Failure of submission of any of the above-mentioned documents will render the Bid liable to be summarily rejected.

All documents in original may need to be produced at any time of tender evaluation process, if desired by the concerned Superintending Engineer of MED, which may be communicated by the Tender Inviting Authority. Corresponding address, telephone/ mobile numbers, contact mobile number and e-mail number of the organization shall be provided.

5) Earnest Money: -

- a) 2% of the Quoted Bid price in two parts, an **Initial Earnest Money** with Bid Proposal as mentioned under details of work and rest as mentioned below.
- b) **Initial Earnest Money** is to be deposited with bid proposal and may be remitted by selecting from either of the following payments modes:
 - i) Net Banking: (any of the banks listed in the ICICI Bank Payment Gateway) in case of payment through ICICI Bank Payment Gateway. Bank Acknowledgement Slip to be uploaded during online bid submission:
 - ii) RTGS / NEFT in case of offline payment through bank account in any bank and also to be documented through e-filing.
- c) **Balance Earnest Money Deposit** i.e. 2% of bid amount beyond Initial Earnest Money (if any) shall have to be deposited by L1 Bidder after acceptance of Bid Proposal in the form of Bank Draft from any nationalised/scheduled Bank in favour of "**Executive Engineer, Birbhum Division, Municipal Engineering Directorate**", Payable at Suri, dist.-Birbhum, and/or as per direction of TIA.
- d) Additional Performance Security Deposit @ 10% of the accepted amount is to be deposited in due course as per GoWB norms if the accepted amount to be found to be @80% or less than the departmental justified amount in terms of GO No. 4608 f(Y) dated 18.07.2018.
- e) **In case of Joint Venture, the earnest money and / or security deposit including earnest money shall be in the name of the Joint Venture that submits the Bid.**

6) Date and time schedule:-

Sl. No.	Particulars	Date & Time
1	Date of uploading of NleB. and Bid Documents (online) (Publishing Date)	28/11/2025 at 06.30 p.m
2	Date of Pre-Bid Meeting with the intending bidders in the office of the Superintending Engineer, West Circle, Municipal Engineering Directorate.	10/12/2025 at 01.00 p.m.
3	Documents download start date (Online)	29/11/2025 at 10.00 a.m.
4	Documents download end date (Online)	29/12/2025 at 05.00 p.m.
5	Bid submission start date (On line)	30/11/2025 at 10.00 a.m.
6	Bid Submission closing (On line)	29/12/2025 at 05.00 p.m.
7	Bid opening date for Technical Proposals (Online)	02/01/2026 after 10.00 a.m.
8	Date of uploading list for Technically Qualified Bidder (online)	To be notified later
9	Date for opening of Financial Proposal (Online)	Minimum 48 Hours from the time of uploading the list for Technically Qualified Bidder(s)*
10	If necessary for further negotiation through off line for final rate	To be notified later

***All bidders are requested to raise objection(s), if any, regarding the decision of TIA with respect to acceptance/non-acceptance of technical bid within these hours through official e-mail of TIA only, failing which the objection(s) may not be considered.**

7) Cost price of Bid Document:-“Nil” (However L1 bidder has to pay cost of Additional BID documents for agreement as per norms)

8) Time of completion:-

Time of completion of the Contract is 730 days from the date of issue of Work Order.

9) Site inspection & general information: -

Intending Bidders are required to inspect the site of the Project with particular reference to location and infrastructure facilities. They are to make a careful study of all relevant data with regard to availability of Sufficient Quantum of Water as per the Requirement for the project and all relevant factors as might affect the rates and prices. They should make themselves acquainted with the relevant IS specifications, CPHEEO manuals, Clauses & Sub Clauses of the Bid documents and to have fully acquainted with all details of work front, communications, underground utility services, seasonal weather and its variation including High Flood level, labour, water supply, existing & proposed site levels, position and diversion of transportation and barricading if required, electricity and any other general information including topological condition & existing level which are needed for the work to be completed in scheduled time properly.

10) Bid documents:-

A full set of Bid documents consists of 2 Parts. These are;

- (a) Part I containing all documents in relation to the name of the firm applied credentials possessed by them, all documents as depicted in Sl. No. 4 along with this NIEB and its all corrigenda's.
- (b) Part II containing following documents; Bid Price / Price Schedule (BOQ).

AND

- | | |
|------------|--|
| Section A: | Description of the Project and scope of work (Civil). |
| Section B: | Conditions & requirements for Bidding. |
| Section C: | General conditions of the contract. |
| Section D: | General specifications of Workmanship & materials for Civil Works. |
| Section E: | Specification for supply of Ductile Iron (K9) pipes & DI Fittings. |
| Section F: | General technical specification. |
| Section G: | Electro- Mech specifications and Scope of work |
| Section H: | Vendors' list for E/M works |

11) Validity of Bid:-

A Bid submitted shall remain valid for a period of **365 calendar days** from the date set for opening of Bids. Any extension of this validity period if required will be subject to concurrence of the Bidders.

12) Withdrawal of Bid:-

A Bid once submitted shall not be withdrawn within the validity period. If any Bidder/Bidders withdraw his / their Bid(s) within the validity period then Earnest Money as deposited by him / them will be forfeited and necessary legal action will be applied as per Govt. order.

13) Acceptance of Bid: -

The Superintending Engineer, West Circle, Municipal Engineering Directorate will accept the Bid on recommendation of the Competent Authority. He does not bind himself to accept otherwise the lowest Bid and reserves to himself/herself the right to reject any or all of the Bids received without assigning any reason thereof.

14) Intimation:-

The successful Bidder will be notified in writing of the acceptance of his Bid. The Bidder then becomes the "Contractor" and he shall forthwith take steps to execute Formal Contract Agreement in appropriate Superintending Engineer, West Circle, Municipal Engineering Directorate and fulfil all his obligations as required by the Contract.

Escalation of Cost:-

There will be no escalation in cost for materials or labour and the contract price mentioned in the contract stands valid till completion of the operation and maintenance of the contract.

15) Name & address of Engineer-In-Charge (EIC) of the Work

The Executive Engineer, Birbhum Division, M.E.Dte. Indoor Stadium, Suri, dist.-Birbhum

16) Execution of Work:-

The Contractor is liable to execute the whole work as per direction and instruction of the Executive Engineer, Birbhum Division, M.E.Dte., who is the **Engineer-in-Charge** of the work.

17) Payment:-

Payment will be made to the successful Bidder from the Executive Engineer, Birbhum Division, M.E.Dte. as per availability of fund from the Govt.

18)Influence:-

Any attempt to exercise undue influence in the matter of acceptance of Bid is strictly prohibited and any Bidder who resorts to this will render his Bid liable to rejection.

Following clauses are to be adhering to by the concerned Bidder during the process of Bidding.	
19.	In case office faces sudden closure owing to reason beyond the scope and control of the Superintending Engineer, West Circle, Municipal Engineering Directorate any of last date / dates as schedule in Sl. No 7 may be extended up-to / to next and following working day without issuing further and separate notice should the TIA feel it to be necessary and exigent.
20.	Persons having authenticated and having registered Power of Attorney may be considered lawfully becoming to be acting on and for behalf of the Bidder.
21.	Sufficient care has been taken to avoid variance in between the contents of the listed documents in the Bid documents. However, if there is any variance between the contents of different documents, the provision of documents appearing earlier in the list shall prevail over the same provided in the contents coming later.
22.	Imposition of any duty / tax / rule etc. owing to change / application in legislations / enactment shall be considered as a part of the contract and to be adhering to by the Bidder / contractor strictly.
23.	Bid Acceptance Authority is the Superintending Engineer, West Circle, Municipal Engineering Directorate.
24.	In case of any dispute arising from any clauses of similar nature between bid documents and Municipal tender form, the decision of the Superintending Engineer, West Circle, MED and Engineers of E/M Section of MED will be final and binding.
25.	All usual deductions for GST, IT, and Labour welfare Cess etc. as applicable will be made from the bills from time to time which is inclusive in Cl.-57 of section C.
26.	No conditional / incomplete /Bid shall be entertained. The unnecessary, illegible documents should not be uploaded, otherwise theses bid liable to be rejected
27.	In the event of e-Filing intending bidder may download the tender document from the website http://wbtenders.gov.in directly by the help of Digital Signature Certificate free of cost. Technical Bid & Financial Bid both will be submitted concurrently duly digitally signed in the Website http://wbtenders.gov.in . Tender document may be downloaded from website & submission of Technical Bid/Financial Bid as per Tender Schedule.
28.	The requisite cost of Earnest Money, as specified in this NleB shall be paid to ICICI bank by online internet bank transfer or NEFT or RTGS (as per GO No. 3975-F(Y) dt. 28.07.2016 of Finance Department, Govt. of West Bengal). Every such Transfer shall be done on or after the date of publish of NleB. Any Bid without such Transfer of EM (Except exemption as per G.O.) shall be treated as informal and shall be automatically cancelled. Online transfer of Earnest Money receipt (Scanned copy) shall be uploaded as Statutory document.
29.	The Bidder, at the Bidder's own responsibility and risk is encouraged to visit and examine the site of works and its Surroundings and obtain all information that may be necessary for preparing the Bid and entering into a contract for the work as mentioned in the Notice inviting Tender, the cost of visiting the site shall be at the Bidder's own expense. Traffic management and execution shall be the responsibility of the Agency at his / her / their risk and cost.

30.	The intending Bidders shall clearly understand that whatever may be the outcome of the present invitation of Bids, no cost of Bidding shall be reimbursable by the Corporation. The TIA reserves the right to reject any application for purchasing Bid documents and to accept or reject any or all the offered bid / bids without assigning any reason whatsoever and is not liable for any cost that might have incurred by any Bidder at any stage of Bidding.
31.	Prospective applicants are advised to note carefully the minimum qualification criteria as mentioned in 'Instructions to Bidders' before bidding.
32.	During scrutiny, if it is come to the notice to tender inviting authority that the credential or any other papers found incorrect / manufactured / fabricated, that Bidder will not be allowed to participate in the tender and that application will be out rightly rejected without any prejudice.
33.	Before issuance of the work order, the tender inviting authority may verify the credential & other documents with the original of the lowest bidder if found necessary. After verification, if it is found that such documents submitted by the lowest bidder is either manufacture or false, in that case, L.O.A. / work order will not be issued in favour of the bidder under any circumstances.
34.	If any discrepancy arises between two similar clauses on different notifications, the clause as stated in later notification will supersede former one in following sequence: i) 2911 (WB) tender form ii) NleB/NleT iii) Special terms & Condition iv) Detailed Scope of work. v) Financial bid
35.	Contractor shall have to comply with the provisions of (a) the contract labour (Regulation Abolition) Act. 1970 (b) Apprentice Act. 1961 and (c) minimum wages Act. 1948 of the notification thereof or any other laws relating thereto and the rules made and order issued there under from time to time.
36.	Where an individual person holds a digital certificate in his own name duly issued to him against the company or the firm of which he happens to be a director or partner, such individual person shall, while uploading any tender for and on behalf of such company or firm, invariably upload a copy of registered power of attorney showing clear authorization in his favour, by the rest of the directors of such company or the partners of such firm, to upload such tender. The power of attorney shall have to be registered in accordance with the provisions of the Registration Act, 1908. In case of Joint Venture, either all Members shall sign or only the Lead Member shall sign, in which case the power of attorney in favour of such Lead Member to sign on behalf of all members of the Joint Venture shall be attached.
37.	Any legal matter will be settled within the jurisdiction of Hon'ble District Judges Court at Bardhaman, Dist:- Purba Bardhamn, West Bengal.
38.	Bidder would be at liberty to point out any ambiguities, contradictions, omissions etc. seeking clarifications thereof or interpretation of any of the conditions of the Bid documents before the Bid Inviting Authority in writing 48 hours prior to Pre-Bid Meeting, beyond such period no representation in that behalf will be entertained by the Bid Inviting Authority.
39.	The successful Bidder will remain liable for following with West Bengal Contract Labour (Regulation & Abolition) Act 1970 and necessary certificates from appropriate authority to be submitted within 07 (seven) days from the date of issue of work order, otherwise the work order may be cancelled.
40.	The work is of Construction and subsequent operation and maintenance in nature, the Defect Liability Period of the work shall be Sixty months from the actual date of completion of the work. For work with 5 Years Defect Liability Period: (i) 8% Security Deposit amount which is deducted from every running bill shall be refunded to the contractor as per Govt. norms vide PWD Order No. 5784-PW/L&A/2M-175/2017 dated 12.9.2017 for the item 1 of BOQ.

	(ii) S.D. Money shall be refunded after completion of success full maintenance and operation of 5 Years i.e. in the time of releasing of 5 th year operation & maintenance cost.
41	The successful bidder has to provide detailed estimate along with rate analysis (if any) for all civil and electro mechanical works including planning, designing and drawings as per the clause 57 of Section C with all necessary break up elaborately for comparison of rate with departmental estimate if asked by the concerned authority before acceptance of bid which will be treated as part of the bid document.
42.	Clause 57 of Section C has been prepared on the basis of major items of the work so that contractor may get payment after completion of major items in a phase wise way . If any item the contractor feels as major item but not reflected in the clause will be pointed out during pre-bid meeting. All other items (if any) not shown in the payment schedule or in bid document but required for successful completion and commissioning of the project will be in the scope of Bidder.
44.	Agency's whole responsibility is to ensure that the require quantum of the water should available from the structure and for this extensive survey work to be done in all respect
45.	If there is any contradiction between any clauses of the NieB, decision of the Superintending Engineer, West Circle, MED will be final.
46.	Deviation in quantities of item 1.01 & 1.02 of BOQ may done as per PWD Rule 239 & other relevant GO.
47.	Job Card holders shall be mandatorily engaged where unskilled workers required.
48.	Successful contractor shall furnish certificate after completion of work that only Job Card holders where engaged where unskilled workers required.

**Superintending Engineer, West Circle,
Municipal Engineering Directorate**

INSTRUCTION TO BIDDERS/BIDDERS

SECTION – A1

1. General guidance for e-tendering

Instructions / Guidelines for Bidders for electronic submission of the tenders have been annexed for assisting them to participate in e-tendering.

2. Registration of Bidder

Any Bidder willing to take part in the process of e-tendering will have to be enrolled and registered with the Government e-procurement system, through logging on to <http://wbtenders.gov.in>. The Bidder is to click on the link for e-tendering site as given on the web portal.

3. Digital Signature certificate (DSC)

Each Bidder is required to obtain a class-II or Class-III Digital Signature Certificate (DSC) for submission of tenders, from the service provider of the National Information's Centre (NIC) or any other bonafide service provider on payment of requisite amount. Details are available at the Web Site stated in Clause 2 of Guideline to Bidder. DSC is given as a USB e-Token.

4. The contractor can search and download NIB and Tender Documents electronically from computer once he logs on to the website mentioned in Clause 2 using the Digital Signature Certificate. This is the only mode of collection of Tender Documents.

5. Submission of Tenders.

General process of submission, Tenders are to be submitted through online to the website stated in Cl. 2 in two folders at a time for each work, one in Technical Proposal and the other is Financial Proposal before the prescribed date and time using the Digital Signature Certificate (DSC) the documents are to be uploaded virus scanned copy duly Digitally Signed. The documents will get encrypted (transformed into non readable formats).

A. Technical proposal

The Technical proposal should contain scanned copies of the following further two covers (folders).

A-1. Statutory Cover Containing

1. Prequalification Document

- i. Prequalification Application (Sec-B, Form – I)
- ii. Scanned Copy online Transaction of earnest money (EMD) as prescribed in the NIEB against each of the serial of work.

2. NIEB with Bid Documents (downloads and upload the same Digitally Signed)

3. Technical Document (To be filled, scanned & digitally signed)

- i. Financial Statement (Section – B, Form – II).
- ii. Affidavits (Ref:- format for general affidavit shown in “Y” Part “B”.)
- iii. Bank Solvency Certificate.
- iv. Form III & IV Of Section B.

A-2. Non statutory Cover Containing / My Documents

- i. GST Certificate (up to date).

- ii. Registration Certificate under Company Act. (if any).
- iii. Registered Deed of partnership Firm/ Article of Association and Memorandum, if applicable.
- iv. Power of Attorney (For Partnership Firm/ Private Limited Company, if any)
- v. 3 CD form for Tax Audit Report along with Balance Sheet and Profit and Loss A/c for the period up to last five years(year just preceding the current Financial Year will be considered as year – I)
- vi. Clearance Certificate for the Current Year issued by the Assistant Registrar of Co-Op (S) (ARCS) bye laws are to be submitted by the Registered labour Co-Op(S) Engineers’ Co.-Opt.(S), if applicable.
- vii. Credential: Scanned copy of Original Credential Certificate as stated in NleB

Intending Bidders should upload Non-Statutory documents as per following folders in My Document:

E-Bidding system of Government of West Bengal			
Bidder Document Sub Category Master			
Sl. No.	Category Name	Sub Category Name	Sub Category Description
A	CERTIFICATES	A1. CERTIFICATES	1. GST Certificate 2. E.S.I & EPF Registration Certificate.
B	COMPANY DETAILS	B1. COMPANY DETAILS	1. Proprietorship Firm (Trade License). 2. Registered Deed of partnership Firm 3. Registration Certificate under Company Act. (if any). Ltd. Company (Incorporation Certificate, Trade License) 4. Power of Attorney (For Partnership Firm / Private Limited Company, if any) 5. Society (Society Registration copy, Trade License)
C	CREDENTIAL	C1. CREDENTIAL1	Similar nature Work & Completion Certificates along with work order and payment certificate issued by competent authority (as per Sl. No. 3 of NleB)
D	EQUIPMENT	D1. LABORTARY	1. List of Machineries and equipment necessary for field as well as laboratory test of all materials as per NleB
		D2.CIVIL MACHINERIES	
		D2. ELECTRICAL MACHINERIES	
		D2. MECHNANICAL MACHINERIES	
		D2. MISCELLENEOUS MACHINERIES	
E	FINANCIAL INFO	E1. P/L & BALANCE SHEET 2011- 2012	P/L & BALANCE SHEET (as per NleB)-3CD form
		E2. PAYMENT CERTIFICATE 1	Payment Certificate in support of valid Credential only to be submitted
		E3 PAYMENT CERTIFICATE 2	
F	MANPOWER	F1. TECHNICAL PERSONNEL	1. List of sufficiently qualified technical person (as per SI No 3 of NleB)
		F2. TECHNICAL PERSONNEL ON CONTRACT	1. List of technical personnel employed under the organisation (or on contact basis) in details with name, qualification, experience and, address with contact number.

G	DECLARATION	DECLARATION 1	1. Bank Solvency Certificate (As per NleB)
		DECLARATION 2	2. Valid Document in support of annual turnover as per NleB.
		DECLARATION 3	3. Corrigendum and additional document (if any).

Note:- Failure of submission of any of the above mentioned documents (as stated in A1 & A2) will render the Bid liable to summarily rejected for both statutory & non statutory cover. All Corrigendum & Addendum Notices, if any, have to be digitally signed & uploaded by the contractor in the Declaration Folder of My Documents.

B. Bid Evaluation

i. Opening and evaluation of Bid :- If any Bidder is exempted from payment of EMD, copy of relevant Government order needs to be furnished (applicable in case of Registered Labour Co-Operative Society).

ii. Opening of Technical proposal: - Technical proposals will be opened by the Bid Inviting Authority electronically from the website using his/ her Digital Signature Certificate.

iii. Cover (folder) of statutory documents (vide Cl. No. 5.A-1) should be opened first and if found in order, cover (Folder) for non-statutory documents (vide Cl. No.– 5.A-2) will be opened. If there is any deficiency in the statutory documents the Bid will summarily be rejected.

iv. Decrypted (transformed in to readable formats) documents of the non-statutory cover will be downloaded and handed over to the Bid Evaluation Committee. Scrutiny of technical proposal and recommendation thereafter and processing of comparative statement for acceptance etc. will be made by the Municipal Engineering Directorate, under the department of Municipal Affairs, Govt. of West Bengal. Comparative Statement may be forwarded to appropriate authority depending on the value of the work as applicable as per existing norms and guidelines under AMRUT programme.

v. Uploading of summary list of technically qualified bidders.

vi. Pursuant to scrutiny and decision of the screening committee the summary list of eligible Bidder and for which their proposal will be considered and uploaded in the web portals.

vii. While evaluation, the committee may summon the bidders and seek clarification / information or additional documents or original hard copy of any of the documents already submitted and if these are not produced within the stipulated time frame, their proposals will be liable for rejection.

Bid Evaluation Committee:

A Bid Evaluation Committee (BEC) has been constituted under the Superintending Engineer of concerned Circle, Municipal Engineering Directorate, Government of West Bengal, who is the tender inviting authority for all works beyond the tender accepting power of the Executive Engineers.

The members of Bid Evaluation Committee would be:-

1. The Superintending Engineer, West Circle - Chairman
2. The Executive Engineer, West Circle - Member
3. The Assistant Engineer, West Circle-Member
4. The Junior Engineer, West Circle - Member

The Bid Evaluation Committee will do the technical and financial evaluations of the bidders for different types of works and make recommendation to the tender accepting authority. The bidders will have to meet all the minimum criteria regarding:-

- a) Financial Capacity
- b) Technical Capability

c) Experience / Credential

The eligibility of a bidder will be ascertained on the basis of his digitally signed documents in support of the minimum criteria as mentioned in (a), (b), (c) above with the help of his DSC and the declaration executed through prescribed affidavit in non-judicial stamp paper of appropriate value duly notarized. If any document submitted by a bidder is either manufactured or false, in such case the eligibility of the bidder/ tenderer will be out rightly rejected at any stage without any prejudice and further penal action may be taken against him as per rule.

C. Financial proposal

As per Sl. 9 Part II (a) Bid Price / Price Schedule. To be uploaded digitally signed by the Bidder.

6. Financial capacity of a Bidder will be judged on the basis of working capital and available bid capacity as mentioned in the N.I.T. to be derived from the information furnished in FORM-I and II (Section-B) i.e., Application (for Pre-qualification) and Financial Statement. If an applicant feels that his / their Working Capital beyond own resource may be insufficient, he/they may include with the application a letter of guarantee issued by a first class Bank to supplement the applicant. This letter of guarantee should be addressed to the Tender Inviting / Accepting Authority and should guarantee duly specifying the name of the project that in case of contract is awarded to the Bidder, the Bidder will be provided with a revolving line of credit. Such revolving line of credit should be maintained until the works are taken over by the Authority.

The audited Balance sheet for the last five years, net worth bid capacity etc. are to be submitted which must demonstrate the soundness of Bidder's financial position, showing long term profitability including an estimated financial projection of the next two years.

7. Penalty for suppression / distortion of facts:

Submission of false document by Bidder is strictly prohibited and in case of such act by the Bidder the same may be referred to the appropriate authority for prosecution as per relevant IT Act with forfeiture of earnest money forthwith.

8. REJECTION OF BID

The Employer (tender accepting authority) reserves the right to accept or reject any Bid and to cancel the Bidding processes and reject all Bids at any time prior to the award of Contract without thereby incurring any liability to the affected Bidder or Bidders or any obligation to inform the affected Bidder or Bidders of the ground for Employer's (tender accepting authority) action.

The Bidder who's Bid has been accepted will be notified by the Tender Inviting and Accepting Authority through acceptance letter/ Letter of acceptance. The Letter of acceptance will constitute the formation of the Contract.

The Agreement in Printed Tender Form will incorporate all necessary documents e.g. N.I.B., all addenda-corrigendum, special terms and condition (Section –C), different filled-up forms (Section –B), Price Schedule and the same will be executed between the Tender Accepting Authority and the successful Bidder.

**Superintending Engineer, West Circle,
Municipal Engineering Directorate**

SECTION – B1
FORM –I
PRE-QUALIFICATION APPLICATION

To
Superintending Engineer, West Circle,
Municipal Engineering Directorate.PatalBazar ,Bardhaman

Ref: - Tender for _____

(Name of work) _____ N.I. B. No.:

Dear Sir,

Having examined the Statutory, Non statutory and NIT documents, I /we hereby submit all the necessary information and relevant documents for evaluation. The application is made by me / we on behalf of _____ in the capacity _____ duly authorized to submit the order.

The necessary evidence admissible by law in respect of authority assigned to us on behalf of the group of firms for Application and for completion of the contract documents is attached herewith. We are interested in bidding for the work(s) given in Enclosure to this letter. We understand that:

- (a) Tender Inviting and Accepting Authority/Engineer-in-Charge can amend the scope and value of the contract bid under this project.
- (b) Tender Inviting and Accepting Authority/Engineer-in-Charge reserves the right to reject any application without assigning any reason.

Enclose: - e-Filling:-

- 1. Statutory Documents
- 2. Non Statutory Documents

Date: - _____ Signature of applicant

Including title and capacity in which application is made.

SECTION- B1
Form-IIA
B.2. FINANCIAL STATEMENT

(as applicable)

B.2.1. Name of applicant:

B.2.2. Information of audited financial statements for the last year to demonstrate the current soundness of the bidder's financial position:

1. The bidder's networth for the last year calculated on the basis of capital, profit and free reserve available to the firm should be positive.
2. Bidders, who meet the minimum qualification criteria, will be qualified only if their available bid capacity at the expected time of bidding is more than the total estimated cost of the works. The available bid capacity will be calculated as under:

Assessed Available Bid capacity=(AxNx2-B)= _____ where,

A= Maximum value of engineering works in respect of projects executed in any one year during the last five years (updated to the price level of the year indicated in table below under note) taking into account the completed as well as works in progress. The projects include turnkey project / item rate contract / Construction works.

N= Number of years (i.e.,.....year) prescribed for completion of the works for which bids are invited. Please refer table for List of Schemes in page1.

B= Financial liability of the bidder to be incurred for existing commitments and ongoing works during the period of the subject contract.

To calculate the value of "A"

- i) A table containing value of Engineering works in respect to projects (Turnkey projects / item rate contract / Construction works) undertaken by the Bidder during the last 5 years is as follows:

Sl. No	Financial Year	Value of Engineering works undertaken w.r.t. projects (Rs. In Crore)	Updation Factor	Value updated to the price level of the year
(1)	(2)	(3)	(4)	(5)= Col (3) X Col (4)
1	Last Year Year-1		1.00	
2	Year before last year Year - 2		1.05	
3	Previous Year to Year-2 Year-3		1.10	
4	Previous Year to Year-3 Year-4		1.15	

5	Previous Year to Year-4 Year-5		1.20	
---	--------------------------------------	--	------	--

- ii) Maximum value of projects that have been undertaken during the F.Y-----out of the last five years and value thereof is Rs-----Crore (Rupees-----).
- iii) Net worth for the last Financial year is (Rs in figure)_____.

<p>Signature, name and designation of Authorised Signatory</p> <p>For and on behalf of</p> <p>.....(Name of the applicant)</p>	<p>Name of the Statutory Auditor's Firm / Chartered Accountant</p> <p>Signature:-</p> <p>Seal of the Audit / Chartered Accountant Firm:</p> <p>Name of signatory (in capital):-</p> <p>Membership No.:-</p> <p>Firm Regn. No.:-</p> <p>Date of Birth:-</p> <p>Mobile No.</p> <p style="text-align: right;">UDIN:-</p>
--	---

NB:-All information sought w.r.t. Firm / Chartered Accountant is mandatory.

To calculate the value of "B"

3. A table containing value of all the existing commitments and on-going workings to be completed during the next 1.5 years (prescribed time for completion of the works for which bids are invited) is as follows:

Sl. No.	Name of the Project	Name of the Employer	Percentage of participation	Stipulated period of completion as per Work Order with	Value of Contract as per Agreement /Work	Value of work completed	Balance value of work to be completed	Anticipated date of completion	Financial Liability to incur for the said
---------	---------------------	----------------------	-----------------------------	---	--	-------------------------	---------------------------------------	--------------------------------	---

			of Bidder in the project	<u>the start date</u>	Order		ed		work / project during the period of the subject contract Rs.....
					Rs.....	Rs.....	Rs.....		
1	2	3	4	5	6	7	8	9	10
1									
2									
3									

.....

Signature, name and designation of
Authorised Signatory

For and on behalf of

.....(Name of the Applicant)

Note:

1. All the documents to be submitted in support of above must be duly signed and sealed by the applicant / bidder and authenticated by Statutory Auditor's Firm.
2. Progression Certificate issued below the rank of Executive Engineer will not be accepted.
3. **Last Financial Year 2024-2025** will be considered as year-

This is to certify that we have verified the consolidated financial statement of _____(Name of the Firm in which application is made) having its Registered Office at _____(address of the Firm). Based on our examination of Books and Records and other documentary evidences we certify that the financial data of the company given in the balance sheets are detailed hereunder for the financial year(s) as mentioned below are true and correct.

Sl, No.	Description	Financial Data for the last 5 audited Financial Year				
		Previous to Year 4 Year 5	Previous to Year 3 Year 4	Previous to Year 2 Year 3	Previous to Year 1 Year 2	Last Year Year 1
1	Net Worth (Calculated on the basis of capital, profit and free reserve available to the firm should be positive)					
2	Working Capital					
3	Annual Turnover (Engineering Works)					

Available Liquid Assets (Last Financial Year):

1.Working Capital =Rs_____

2.UncommittedBank Guarantees =Rs_____

3.Creditfacilities =Rs_____

(Certificate to be submitted in **Form IIC**)

Total Liquid Assets = Rs_____

<p>Signature, name and designation of Authorised Signatory</p> <p>For and on behalf of</p> <p>.....(Name of the applicant)</p>	<p>Name of the Statutory Auditor's Firm / Chartered Accountant</p> <p>Signature:-</p> <p>Seal of the Audit / Chartered Accountant Firm:</p> <p>Name of signatory (in capital):-</p> <p>Membership No.:-</p> <p>Firm Regn. No.:-</p> <p>Date of Birth:-</p> <p>Mobile No.</p> <p style="text-align: right;">UDIN:-</p>
--	---

N.B:- THIS FORM (i.e. FORM-IIB) MUST BE PROPERLY MADE IN THE LETTER HEAD OF THE AUDITOR'S /CHARTERED ACCOUNTANT FIRM, CLEARLY MENTIONING THE ADDRESS, e-mail ID, and CONTACT NUMBER OF THE FIRM &should preferably be made in a single page else to be authenticated in each page similarly.

NB:-i) All information sought w.r.t. Firm / Chartered Accountant is mandatory.

ii) All relevant data as mentioned in form IIB shall be available through UDIN verification

FORM-IIC

(Format for Credit Facility issued by the bank which is authorized to conduct Government business in West Bengal by Reserve Bank of India as notified by State Government from time to time and any other Bank which has been authorized by the State Government)

Ref.No:-

Date:-

Certified that we here by undertake to declare that a Credit Facility of Rs.....shall be provided to the agency..... (name of the agency)..... forthe execution of the work_____ (name of the work)_____ (vide eNIT No-_____) if awarded by the competent authority / Tender Inviting Authority.

Signature of the Bank Authority

Designation:

Code No-

Counter Signed by the intending Bidder

NB:-Devoid of Ref. No:-&Date:-, may lead to non-acceptance of this document.

AFFIDAVIT — "Y"

(To be furnished in Non — Judicial Stamp paper of a appropriate value duly notarized)

1. I/We, the under-signed do certify that all the statements made in the attached documents are true and correct. In case of any information submitted is proved to be false, incorrect or concealed, the application may be rejected and no objection/claim will be raised by the under-signed.
2. The under-signed also hereby certifies that neither our firm _____ nor any of its constituent partners had been debarred to participate intender by any government organization/semi-government organization/government undertaking organization/autonomous bodies/statutory bodies/local bodies/local authorities/PSU, etc. during the last 5(five) years prior to the date of publication of this NIT.
3. Certified that I have access to or have available liquid assets (aggregate of working capital, cash-in-hand, uncommitted Bank Guarantees) and/or credit facilities not less than 10% of the estimated cost. In this respect, I have attached necessary documents with this application. The under-signed would authorize and request any Bank, person, Firm or Corporation to furnish pertinent information as deemed necessary and/or as requested by the Department to verify this statement.

If the applicant is a Joint Venture, insert the following: Certified that we have access to or have available liquid assets (aggregate of working capital, cash-in-hand, Bank Guarantees) and for and /or credit facilities (i) for all partners combined not less than ₹.....Crore, (ii) for each partner, not less than ₹.....Crore and (iii) for one partner, not less than ₹.....Crore. In this respect, we have attached necessary documents with this application

4. The under-signed understands and agrees that further qualifying information may be requested and agrees to furnish any such information at the request of the Department.
5. Certified that I/we have applied in the tender vide e-NIT noin the capacity of individual/ as a partner of a firm /& I have not applied severally for the same job.

If the applicant is a Joint Venture, insert the following: We have applied in the Tender as a Joint Venture with: [Insert a list with full name and the legal address of each member. and the Lead the indicate Member). We have attached a [insert: "of copy memorandum of understanding of the Joint Venture" signed by every participating member, which details the likely legal structure of and the confirmation of joint and several liability of the members of the said Joint Venture till completion of the work including the defect liability period.

6. The under-signed also hereby certifies that the Bid shall remain valid for a period not less than **365 calendar days**, after the dead line date for Bid submission.
7. I/We, the under-signed, declare that all the statements made in the attached documents in respect of mode of ownership of machineries are true and correct. I shall arrange facilities for different types of day to day testing as per MoRTH, IRC & IS guideline at the working site at my own cost relate to work.
8. Certified that required specified machineries for the works under this NIT will be installed at the working site within 15(fifteen) days from the date of issue of Work Order.
9. I / we do hereby certify that I shall bring all requisite technical personnel and /or plants/ testing machineries / equipments for all the items of works as per relevant IRC / IS codes of practice and as per BOO and as per direction of the Engineer-In-Charge at the time of execution of work at site even if upon Technical evaluation I am declared as "qualified" without having all the requisite technical personnel and /or plants/ testing machineries / equipments at the time of submission of tender.
11. I/We, the under-signed do certify that all the statements made in the attached documents are true and correct. If any declaration submitted is found / ascertain to be incorrect / fabricated / misrepresented / fraudulent etc. accordingly tender will be liable to be cancelled / terminated immediately & I / my firm / company shall also be liable to prosecuted under section 197, 199 & 200 of Indian Penal Code, 1860 along with section-71 & section-73 of Indian

Information & Technology Act 2008 & any other applicable law for the time being in force in addition to forfeiture of Earnest Money / Security Deposit.

Date :

Signature, name and designation of Authorized Signatory

For and on behalf of

(Name of the Applicant with seal

[For a Joint Venture, either all members shall sign or only the Lead Member shall sign, in which case the power of attorney in favour of such Lead Member to sign on behalf of all members of the Joint Venture shall be attached]"

SECTION – B1

FORM- III

STRUCTURE AND ORGANISATION

A.1 Name of applicant:

A.2 Office Address:

Telephone No. and Cell Phone No. :

Fax No. :

E mail id:

A.3 Attach an organization chart showing the structure of the company with names of Key personnel and technical staff with Bio-data. :

Note: Application covers Proprietary Firm, Partnership, Limited Company or Corporation,

Signature of applicant including title

and capacity in which application is made.

SECTION –B1
FORM – IV
DEPLOYMENT OF MACHINERIES (in favour of owner / lessee)

(Original document of own possession arranged through lease deed to be annexed)
(If engaged before Certificate from E.I.C. to be annexed in respect of anticipated dated of release of
Machineries.)

Name of Machine / Instrument	Make	Type	Capacity	Motor / Engine No.	Machine No.	Possession Status		Date of release If Engaged
						Idle	Engaged	

For each item of equipment the application should attach copies of

- (i) Document showing proof of full payment, (ii) Receipt of Delivery,
(iii) Road Challan from Factory to delivery spot, is to be furnished.

Signature of applicant including title

and capacity in which application is made.

Successful agency shall have to make an agreement (in two copies) with the Superintending Engineer, West Circle, Municipal engineering directorate in the prescribed pro-forma by depositing requisite cost in cash stating that the agency is agreeable to supply the Pipe materials as and when require (as per the rates quoted and terms and conditions laid down in the quotation papers) to the Municipal engineering directorate with in the Municipal/Adjoining areas (as the case may be).

Superintending Engineer, West Circle,
Municipal Engineering Directorate

Memo. No. MED/ SE (W) / 621 (1-5) /W-291/2025

Date:28.11.25

Copy Forwarded for information and favour of wide circulation to:

1. The Chairman, Dubrajpur Municipality.
2. The State Mission Director, AMRUT, SUBHANNA, Saltlake, Kol-106.
3. The Chief Engineer (South), M.E. Dte.,Bikash Bhawan, Saltlake, Kol-106.
4. The District Magistrate, Birbhum.
5. The Executive Engineer, M.E. Dte. Birbhum Division, Suri

Superintending Engineer, West Circle,
Municipal Engineering Directorate

SECTION – A

DESCRIPTION OF THE PROJECT

Name of Work:Augmentation and strengthening of Water Supply Scheme within Dubrajpur Municipality under AMRUT 2.0 which includes Sinking of River Bed Tube wells **with Electro-Mechanical works** , surging of existing Tube-Wells , Supplying and laying of DI-K9 Rising Main, Construction of OHRs with Geotechnical investigation, Design of Electro-Mechanical works, Supplying & laying of Distribution pipe lines (DI-K7 and HDPE) with temporary road restoration, Jack Pushing works for NH/Rail crossing, pipe crossing by HDD, Pipe carrying bridges, Pump Houses, Staff Quarter, Sub-Station building, Boundary Walls, Approach Road, Land Development and all other allied works complete in all respect, commissioning, trial run and O&M for 5 Years.

The General arrangement (Schematic diagram and index map) of proposed and existing infrastructure is attached in Annexure I of Section H which is to be followed and all necessary arrangement required to complete the project in comprehensive manner will be in the scope of bidder.

(A-1) SCOPE OF WORK OF WITHIN THIS TENDER

The following main Civil and Electro-Mechanical components are to be executed by the contractor. The salient components are-

- (i) Sinking of 11 nos. of Tube-Wells Surging of existing 4 nos. of Tube wells
- (ii) Construction of 5 nos. of Pump Houses.
- (iii) Construction of 2 nos. of R.C.C. Over Head Reservoir-500 m³ capacity each with Raft foundation
- (iv) Construction of Staff Quarter.
- (v) Supply and Laying of Rising Main Pipe lines.
- (vi) Supply and Laying of Distribution Pipe lines
- (vii) Construction of Boundary Walls, Guard Room, Approach Road, Land Development and Masonry Drain
- (viii) Jack Pushing of pipes underneath N.H.-14
- (ix) H.D.D. of pipes underneath N.H.
- (x) Construction of Sub-Station Building having 5 nos. of room of approx. size 5 m X 5 m
- (xi) Electro-Mechanical works for Tube Wells, pump houses at T.W. sites and Existing CWR sites

1.0 Tube wells:

1.1 General:

The work involves Sinking of **11 nos.** Tube wells of size 300 x 200 mm dia.and Fiber glass strainer at various locations near/within Dubrajpur Municipality, Provision of Trial boring, yield test & electro-logging at proposed location for river bed/bank tube wells. There existing **4 nos.** of Tube-Wells are also needed **to be surged** to maintain its desired yield.

1.2 LOCATION:

Various locations near/within Dubrajpur Municipality as directed by the EIC.

1.3 BRIEF DESCRIPTION OF WORK: (Civil work)

- (i) Size-300 mm X 200 mm, depth 35 m
- (ii) Pipe & Fittings - PVC as per Schedule 80 (medium duty) conforming to ASTM D - 1785 and threaded to match with GI Pipes as per IS : 1239
- (iii) Fibre glass strainer reinforced Epoxy resin slotted of 1 mm slot with 6.1 m length
- (iv) Washing and developing of tube well
- (v) Electro-logging
- (vi) Water sample test from govt./ reputed institute
- (vii) Packing of annular space with suitable materials

- (viii) Surging of existing Tube well with standard method to obtained desired yield with necessary water test report.

2.0 4 Nos. of Pump House (5.0m x 4.0 m) for Tube Well sites& 1 no. (10.0 mX8.0 m) near Existing CWR location (Drawings are be submitted by the contractor as per standard practices and I.S,codefor approval from competent authority)

3.0 Over Head Reservoirs (Intze Type)

3.1 General

Construction of Over Head Reservoirs of capacity as mentioned below and as per enclosed drawing of Superstructure(as per IS:3370-2009 & others relevant Codes).

Geo-technical investigation to be done by the contractor. If the SBC comes below the D.P.R. value, then revised foundation design & drawings (**to be vetted by reputed Engineering Institute**) are be submitted for approval, otherwise, Dept. drawings are to be adopted for construction. The Super- structure will remain same for both the case.

Name of Zone	Name of Ward	Capacity of Reservoir (cu. m)
Zone No.-IV	Ward No. - 1	500.00
Zone No.-V	Ward No. -11	500.00

3.2 Salient description of works:

- (i) Construction of Annular Raft foundations using M25 design mix concrete. Below RCC –Sand filling,PCC(1:3:6), Polythene Sheet shall be provided as per specifications and drawings and as per direction of E.I.C.
- (ii) Construction of R.C.C. columns and bracings up to bottom of heel beam including RCC stair case using M25 design mix concrete as per specifications and drawings and as per direction of E.I.C.
- (iii) Construction of R.C.C. heel beam and above components shall be done with M30 design mix concrete as per specifications and drawings and as per direction of E.I.C.
- (iv) Construction of all allied works like R.C.C. stair case, M.S. ladders, G.I.railings, plastering works using cement: mortar 1:4 (applicable to all exposed surface including column and bracing, Cement : mortar 1:3 for top dome, bottom dome, conical dome and shell wall,and bottom dome shall be used.ASF shall be done inside of conical ,shell wall and bottom dome
- (v) Non-toxic water proofing coating, painting works with emulsion paint with acrylic primer on plastered surfaces , lightning conductors with earthing, mechanical water level indicator , Non-toxic Epoxy paint coating on ceiling of top dome inner face, bituminous coating on the top of dome, supplying erection ,fitting, fixing of down pipes from OHR and diameter of CIDF pipes as per direction of EIC, valves with chambers, drain etc. as per specifications and drawings and as per direction of E.I.C.
- (vi) Steel or Ply shuttering shall be used.

- (vii) The Concrete Cube Testing Machines shall be deployed at OHR site for testing concrete samples on regular basis.

4.0 Construction of Staff Quarters.(As per uploaded drawings)

4.1 Salient description of works: (Plinth Area-90 sq.)

- (i) Isolated footing with RCC frame structure with C.C. –M-20 nominal mix.
 - (ii) 250 mm thick B.M in C.M (1:6)
 - (iii) 125 mm th. B.M. with C.M. (1:3)
 - (iv) Plaster on RCC member -10 mm thick, C.M. (1:4)
 - (v) Plaster on Brick works -20 mm thick, C.M. (1:6)
 - (vi) Flooring- Living room –vitrified tiles, toilet- ceramic tiles
 - (vii) Stair case - Kota stone
 - (viii) Door & Window- Wooden panel shutter, Sal- Frame, Toilet-PVC door
 - (ix) Painting- Primer- Acrylic (inside & Outside walls), Finishing- Inside- distemper, Outside- Acrylic emulsion
 - (x) Septic tank -10 users along with Inspection pit and Soak well
 - (xi) Internal Electrification all complete as per direction of EIC
 - (xii) Plumbing & Sanitation work- pipe- PVC
- (All other details of work will be instructed by the EIC as per DPR provision)

5.0 Supply and Laying of Rising Main Pipe line:

Pipe material- D.I.-K₉ (any approved make) and E.R.W.M.S. (TATA make) black pipe with inside and outside epoxy coating.

5.1: Brief description of the work:

(i) Supply and Laying of D.I. (K-9) pipes with all D.I. Specials and valves including Supply and delivery at site ISI marked Socket and Spigot jointing system centrifugally cast DI (K9) Pipes conforming to IS 8329-2000 (Third revision) in standard length 4 m, 5 m, 5.50 m, 6 m for push-on joint (rubber gasket) with internal cement mortar lining and external protection by metallic zinc coating with finish layer of bituminous /epoxy coating on outside as per IS: 8329-2000 specification with necessary jointing material rubber gasket (IS: 5382:1985) and **M.S. Pipes including transportation**, loading unloading and stacking at site, including earth work in excavation in trenches, shoring (if necessary) of adequate width having minimum depth to keep the top surface of pipe 1.10 m below of the existing ground level in any kind of soil mixed with boulder, metal crust, concrete pavement, any road sub-grade and its flank etc., dewatering the trenches, preparing the bottom surface of the trenches for continuous bedding including sand filling (if necessary) Over-Ground installation to cross small ditches etc. supported with RCC pillars and fitting, fixing, jointing (all types of joints) valves, specials etc. as per requirement, in position, cutting, chamfering of pipes as required, carriage of materials from departmental store to work site (if any), constructing sluice valve chambers including supply and fitting in position sluice valve of different dia. & supply and fitting in position D.I. Specials ,Thrust Blocks as per requirement, filling of the trenches with excavated materials, consolidating the same in layers, guarding trenches with temporary bamboo railing for safety where necessary, emergency horizontal auger boring (for roads other than NH and Railway) where necessary, removing the surplus materials from the site as per municipal rules in vogue including all labour charges, tools and plants, hydraulic pressure testing, cleaning and disinfection of pipes etc. complete in all respect as per IS 12288-1987 (latest edition) and Temporary Roads Restoration for vehicular movement as per instruction of the E.I.C. (The valves and its chamber will be paid separately).

Diameters-150,200,250 & 300 mm

(ii) **E.R.W.M.S.. black pipe** of ISI mark (TATA make) as per relevant IS specification (heavy quality) having wall thickness not than 8 mm including " Food Grade Epoxy Resin" coating having thickness not less than 240 micron for inner surface and "Epoxy Resin" coating having thickness not less than 160 micron for outer surface of the pipe complete as per direction of EIC.

Diameters-150,200,250 & 300 mm

5.0 Supply and Laying of Distribution Pipe line:

Pipe material- D.I.-K₇ (any approved make), HDPE (any approved make) and E.R.W.M.S. (TATA make) black pipe with inside and outside epoxy coating.

6.1: Brief description of the work:

(i) Supply & Laying HDPE pipe (Materials grade PE-100, PN-6)/ D.I. (K₇)/MS pipe including supplying & laying with Specials & Connection with existing Pipe in distribution, carriage of materials to work site carefully(including loading-unloading) in trenches maintaining proper levels and alignment including earth work in excavation in trenches, shoring (if necessary) of adequate width having minimum depth to keep the top surface of pipe 1.1 m below of the existing ground level in any kind of soil mixed with boulder, metal crust, concrete pavement, any road sub-grade and its flank etc., dewatering the trenches, preparing the bottom surface of the trenches for continuous bedding including sand filling (if necessary) and fitting, fixing, jointing (all types of joints) valves, specials etc. as per requirement, in position, cutting, chamfering of pipes as required,including supply of EPDM Rubber gasket, Nuts & Bolts (TATA /GKW make) & other materials as per site condition, filling of the trenches with excavated materials, consolidating the same in layers, guarding trenches with temporary bamboo railing for safety where necessary, emergency horizontal auger boring (HDD Method) for SH/PWD roads other than NH & Railway where necessary, temporary road restoration for vehicular movement, removing the surplus materials from site including all labour charges, tools and plants, hydraulic pressure testing, cleaning and disinfection of pipes etc. complete in all respect as per IS 12288-1987 (latest edition) and instruction of E.I.C. including submission of 6 sets of completion drawings (In case of damage of any kind of cable line during excavation, necessary damage charges as applicable by the respective authority will be borne by the agency in his own cost.)

Diameters- DI K₇-100,150,200,250 & 300 mm HDPE-110,125 140 , mm

(ii) **E.R.W.M.S.. black pipe** of ISI mark (TATA make) as per relevant IS specification (heavy quality) having wall thickness not than 8 mm including " Food Grade Epoxy Resin" coating having thickness not less than 240 micron for inner surface and "Epoxy Resin" coating having thickness not less than 160 micron for outer surface of the pipe complete as per direction of EIC.

Diameters- 100,150,200,250 & 300 mm

7.0 Construction of Boundary Walls, Guard Room, Approach Road and Land Development

7.1 Boundary Wall :

7.1.1 : Brief description of the work:

- (i) Foundation- Isolated Footing 1.50 x 1.50 m, RCC- M-20 Nominal mix with Column 250 x 250 mm
- (ii) Height of Wall above **Finished** Ground Level-2.35 m
- (iii) Tie beam 250 x 300 mm, Coping 250 x 150 mm
- (iv) Wall 250 mm and 125 mm
- (v) Plaster inside & Outside -15 mm C.M. (1:6)
- (vi) Painting- Acrylic emulsion (inside & Outside walls), with Acrylic primer
- (vii) Fencing – 3ply , 12 gauge ,4 point line barbed wire, with angle support of size 50x50x 6 mm
- (viii) M.S. gate as per direction of EIC, mim-6 m wide – 3 m avg. Height with locking and handle arrangement

7.2 Guard Room : 6 x 4 m

7.2.1 Salient description of works: (Plinth Area-90 sq.)

- (i) Isolated footing with RCC frame structure with C.C. –M-20 nominal mix.
- (ii) 250 mm thick B.M in C.M (1:6)
- (iii) 125 mm thick B.M. with C.M. (1:3)
- (iv) Plaster on RCC member -10 mm thick, C.M. (1:4)
- (v) Plaster on Brick works -20 mm thick, C.M. (1:6)
- (vi) Flooring—vitrified tiles, toilet- ceramic tiles
- (vii) Door & Window- Wooden panel shutter, Sal- Frame, Toilet-PVC door
- (viii) Painting- Primer- Acrylic (inside & Outside walls), Finishing- Inside- distemper, Outside- Acrylic emulsion
- (ix) Septic tank -10 users along with Inspection pit and Soak well
- (x) Internal Electrification all complete as per direction of EIC
- (xi) Plumbing & Sanitation work- pipe- PVC

(All other details of work will be instructed by the EIC as per DPR provision)

7.3: Approach Road: Near OHR sites

7.3.1:Salient description of works:

- (i) C.C. road M-15 nominal mix 3 m width, 100 thickness
- (ii) BFS and sand filling below C.C.

7.4: Land Development: Approximate size 35 m x 35 m inside of the 2 nos. OHR premises.

7.4.1:Salient description of works:

- (i) Surface dressing.
- (ii) Earth filling to make the surface in requisite level.
- (iii) Preparation of soil for plantation using manure as directed by EIC.
- (iv) Plantation of different plants as directed by EIC.
- (v) Supply and laying of 25 mm thick Tiles with PWD specifications.
- (vi) Supply and laying of 60 mm thick ICBP with PWD specifications.

7.5: Masonry drain: Approximate section 250 m x 300 m inside of the 2 nos. OHR premises.

7.5.1:Salient description of works:

- (i) C.C. base over BFS
- (ii) 250 mm thick B.W. in C.M. (1:6)
- (iii) 15 mm thick plaster with N.C.P.

- (iv) ASF with chamfering at invert level.
- (v) C.I. square Jali -450 mm

8.0 Jack Pushing of pipes underneath N.H.-14:

8.0.1:Salient description of works:

- (i) Approximate length is 15 m which may vary as per site condition
- (ii) Casing pipe – M.S. pipe 600 mm dia. , 10 mm thick, length may vary as per site condition.
- (iii) Carrier pipe- M.S. pipe 350 mm dia. , 8 mm thick, length may vary as per site condition.
- (iv) All connection with the pipes at both the ends.
- (v) Filling of sand in the annular space.
- (vi) All standard procedures and specifications shall be followed.

Note: The necessary NOC will be obtained by the Department/ Municipality

9.0 Supplying and laying pipes underneath N.H.-14 by H.D.D. technique:

8.0.1:Salient description of works:

- (i) Approximate length is 15 m which may vary as per site condition
- (ii) Casing pipe – M.S. pipe 350 mm dia. , 8 mm thick, length may vary as per site condition.
- (iii) Carrier pipe- M.S. pipe 200 mm dia. , 8 mm thick, length may vary as per site condition.
- (iv) All connection with the pipes at both the ends.
- (v) All standard procedures and specifications shall be followed.

10.0 Construction of Sub-Station Building having 5 nos. of room of approx. size 5 m X 5 m

10.0.:Salient description of works:

- (i) Design and drawing shall be provided by the Contractor for approval.
- (ii) Isolated footing with frame structure shall be done.
- (iii) Provision for duct for cable shall be provide as per requirement.
- (iv) Height of building as per IE rules.
- (v) Floor level shall be 1.5 m above HFL.
- (vi) The Floor finish shall be Ironite ASF

11.0 Electro-Mechanical works for Tube Wells, pump houses at T.W. sites and Existing CWR sites:

Please see **Section – G and Section - H** of this Bid Document (p-84 &134)

A-2 ADDITIONAL GUIDELINES OF WORK

I. The agency has to quote the rate on the basis of quantity of laying as per approved drawing and existing condition of the site as unit rate diameter wise. The participating agency has to carefully inspect the site with the attached drawing and collect all data for preparation of justified estimate and thereafter evaluation of unit rate against each item of BOQ. The participating agency also includes the cost of all such items in estimating the total cost which is required to complete the work complete in all respect.

II. The work is to be executed as per related IS Specification, Form No. 2911 and other specification laid down in the bid. The DI Pipes of different diameter and rubber gaskets will be supplied by the agency which should be procured directly from the Manufacturer only. Sluice valve, Air Release valve, D.I. Fittings, Mechanical Joints etc., where necessary, will be supplied by agency and it should of have reputed make and should be approved by the EIC./Competent Authority

III. The contract comprises of laying of Clear Water Rising Main network (D.I.PipesK9) including all D.I. Specials and laying, fitting, fixing, jointing and all other works incidental thereto as desired and set-forth in the specification. Bidders are advised to inspect the site before tendering, extra claims on the ground of insufficient data and absence of knowledge about conditions prevailing at site shall not be entertained. The M.S. pipes of requisite diameter also to be laid as per direction of EIC.

IV. A tentative network drawing is attached with the bid document in .pdf format. The agency may collect the network from the concerned division and plan everything on the drawing i.e., where additional work of shoring, BFS, RCC column, sand filling, Sluice valve and chambers etc. are required. The final drawing (6 copies) prepared on the basis of the above will be prepared after issuance of work order and will be approved by competent authority, if found correct. In that case any alternation /addition etc. done by the EIC and /or Superintending Engineer concerned will be final and the contractor will be bound to execute the work as per drawing approved by the SE concern.

V. The work has to be carried out on the basis of the approved drawing and part drawing has to be submitted along with each R.A bill submitted by the Contractor.

VI. After completion of the work, a completion drawing (6 copies) in suitable scale with position of pipes (diameter wise and its length), specials/fittings, valves etc. have to be submitted along with final bill. The final bill shall not be paid unless the said stipulation is complied with.

VII. Under all circumstances, the contractor will be held responsible for the satisfactory completion. In case of any discrepancy between the drawing and the schedule of tender, the decision of the Superintending Engineer will be final and binding.

VIII. The works are to be carried out strictly in accordance with approved drawing and specification supplemented by other detailed working drawings as the Engineer-in-Charge may sign, if necessary, from time to time. For any change, no extra claim will be entertained.

IX. The pipes are to be laid as far as practicable along road flanks with lowest hindrances to the vehicular traffic. The contractors are to obtain the information regarding the layout and precise position of the underground Electric Main, Telephone or other Cables. No responsibilities in this respect will be taken by the Directorate. The contractor will have to cut CC road or bituminous road of any thickness where suitable Road flank is not available and its cost is included in the relevant items of the work.

- X. The trenches will have to be adequately protected against accidents continuously throughout day and night. Demonstrations of danger signals, red lamps and other signs as may be required at the vintage point and imperative upon the contractors in the interest of public safety.
- XI. The contractors' will further shore up and support to the satisfaction of the Engineer-in-Charge, all Building Works, Electric Mains, Telephone or Other Cables, Surface Storm Water, Drains, Ditches, Culverts, Water Sources, Water Mains and Other Pipes which may be or likely to be affected or endangered or disturbed by the works, being in the line thereof and continuous thereto.
- XII. The contractors' will be liable for and make good at their own expenses within a reasonable period of time to be fixed by the Engineer-in-Charge, all damages which may be occasioned to one or combination of items in building, walls, water mains and other pipes by or in consequence of the execution of the works or accident whatsoever, in the event of default (in lapse with respect to the time limit) it shall be lawful for the undersigned to employ other agency to make good the damages at the risk at cost of the contractors' after a 24 hours written notice period has elapsed. The expenditure amount in above situation will be deducted from the bills of agency.
- XIII. In case of trenches in front of any holding so as to block its passage of communication, the contractors' will have to make for temporary arrangements to remove the difficulties by provision of wooden planks or otherwise and removing the same after the trenches are filled up.
- XIV. The tenderers will consider the conditions and adjust the extent of liabilities involved and quote their rate accordingly. Since no extra claims will be entertained separately on that account, inspection of sites prior to tendering, therefore, should be done by the tenderer.
- Further "Laying of Pipes" shall also include excavation of trenches upto a depth ensuring a minimum cover of 1.10 metre over the top of the pipe (Except in case where any obstacle or hindrance prevent to keep the said height). For ditches /low land etc. pipes will be laid over RCC pillars as per specification and drawing duly approved by the EIC. Cost of which to be included by bidder in his quoted rate. Any Jack Pushing work , HDD or Steel Bridge is required for the laying work, to be constructed by the contractor. The contractor shall submit the detailed structural design and drawing which will be approved by the Superintending Engineer, West Circle, M.E. Dte.
- XV. Decision of the Engineer-in-Charge in this respect is final. The excavation shall have to be done through any materials (e.g. — soil, premixed road surface, concrete to roads etc.) with shuttering and dewatering as may be required to protect the trenches and facilitate the works during execution. This also includes cutting and removing trunks and roots of trees.
- XVI. Cutting the pipes to sizes lowering and placing them along trenches including laying, fitting and jointing with rubber gasket and / or solvent cement joint and/or D.T. joint as the case may be. Filling the trenches in layers of 15cm, each layer being adequately watered and consolidated. The filling has to be done after completion of the joints and after affecting the hydraulic test as per specification and at location where defects will be found during hydraulic tests. However, no trenches should be left open at the end of the day (at the time of closing of work).
- XVII. After removal of the surplus excavated materials (except road metal) after the trenches have been rammed to the satisfaction of the Engineer-in-charge, if any, serviceable materials such as bricks and stones, ballast and chips, stone-setting, asphalt etc. are available from roads and other road flanks along which the pipes have been laid for restoration of the same, contractor will arrange for stacking these materials properly and separately as per direction of Engineer-in-Charge for which, no extra payment will be entertained in this situation.
- XVIII. The contractors' rates for laying pipes will also include the cost of all the items of works mentioned with this Clause excepting that for which, a separate item has been provided in the schedule.

XIX. In general, the pipes have to be laid below 1.0 metre from the existing ground level but if 1.0 metre cushion cannot be maintained anywhere to maintain the hydraulic gradient in the undulating terrain, (+/-) 10 % deviation in respect of such situation will be acceptable.

XX. The contractor will provide his own arrangement for every cost, charges or expenses which may be claimed or any person public or private or Government concerned, occurred to the property of life of any such concern or person (as the case may be) by or in consequence of the execution of the said work or in respect of any labour of work, entitled upon said work for which, no extra payment will be allowed.

XXI. Pipe carrying steel bridge is to be constructed for crossing river and large drainage channel with adequate width and suitable foundation.

XXII. Soil Test to be conducted by the contractor at all the locations of pipe carrying steel bridge at his own cost. No's of Bore holes, depth of boring etc. to be decided by the EIC.

XXIII. TEMPORARY ROAD RESTORATION:

Temporary Road Restoration is to be made suitable for vehicular movement and as per direction and satisfaction of E.I.C. where excavation for pipe laying will be done. The necessary compaction, removal of large chunks of concrete and bituminous components shall be done properly. Protection shall be taken to remove dust from the road

XXIV. EXCAVATION OF FOUNDATION, FILLING UP TRENCHES:

Foundation of trenches excavated as per drawing. The depth and width of trenches properly maintained during execution. The bed of trench is to be properly levelled and rammed. Any water accumulated in the trenches due to sewage or rain water to be dewatered at the cost of contractor. The laying rate includes for excavation in whatever soil and stone, hard or soft, that may be found and breaking through any underground structure surface metalling, pegging and trimming and pumping, if necessary, for removal of water or muddy water, taking out mud keeping the top soil separately or unavailing of surplus materials, tapping and shoring excavated materials, matching temporary instalment and maintenance of surface and every other expense in strict conformity with the specification.

The excavated areas around the foundation structure are to be filled up properly to the required levels with the earth obtained from excavation. The filling should be done properly consolidated with Iron Rammer and sprinkling water. The cost of filling up the trenches includes relevant items of work for which, no extra payment will be made.

XXV. TECHNICAL SPECIFICATION AND GENERAL CONDITIONS:

1. While furnishing the prices, Bidders should quote their rates including the cost of different categories of pipes diameter wise for class K9/K7 as per BIS Standard and prices shall be including all taxes & duties and all cost of loading, unloading and transportation at site within the Municipal town of West Bengal.
2. Centrifugally Cast (Spun) Ductile Iron Pressure Pipes (Class K9/K7) for Water Supply Application with Socket and Spigot ends conforming to IS: 8329/2000 with latest Amendment.
3. D I Pipes should conform to ISI Marked embossed on the pipes D.I. Pipes Manufacturers should have valid BIS registration.
4. Inspection may be carried out by Third Party Inspection (TPI) Agency as stipulated through RITES/M ECON/EI L/PDI L in respect of successful bidder.
5. Internal surface should quoted with cement mortar lining and external surface should have the protection by metallic zinc coating with finish layer of epoxy coating of outside as per IS 8329-2000
6. Rubber Gasket should be conforming to IS 5382: 1985.

7. Each pipe shall have to be cast or stamped or legibly and indelibly painted on it with the approved mark as per relevant IS specification (IS : 8329-2000) as follows :
 - i. Name of trade mark
 - ii. The nominal diameter of pipe
 - iii. Batch Number
 - iv. Class of pipe
 - v. ISI certification mark
 - vi. The last two digits of the year of manufacturer
8. Materials supplied without inspection and stamping shall not be accepted and the same shall have to be replaced by the supplier at their risk and cost within seven (7) days from the date of receipt of such intimation.

XXVI. RECOVERY OF MATERIALS:

For loss of damage of materials, if any supplied by Government or non-returning of surplus materials, recovery will be made from the contractor at the highest of the following rates:-

Fifty percent in excess of departmental stock rate or the rate at which Department buy the material from agency at the time of recovery of value.

Ten per cent in excess of market rate at the time of recovery of value. Decision of the Executive Engineer/E.I.C. concerned in respect of market price is final and bindings.

The contractors' should carefully examine the materials supplied from Govt. Store regarding its quality and suitability. No complaint in this regard will be entertained once the materials have been supplied to and received by the Contractors.

XXVII. DEPARTMENTAL MATERIALS AND COST:

No departmental material will be supplied. All the materials have to be supplied by the contractor.

XXVIII. ACCIDENT OR INJURY TO WORKMEN:

The Employer shall not liable for or in respect of any damages or compensation payable at law in respect or in consequence of any accident or injury to any workman or other; person in the employment of the Contractor or any sub-contractor, have and except any accident or injury resulting from any act or default of the employer, his agents, or servants. The Contractor shall indemnify and keep indemnified the Employer against all such damages and compensation, save and except as aforesaid and against all claims, proceedings, costs, charges and expenses whatsoever in respect thereof or in relation thereto.

A-3 SPECIFICATION OF DIFFERENT ITEM OF WORKS TO BE EXECUTED

a) Laying of D.I. pipes (K9/K7) including supplying with specials & supplying, fitting & fixing of M.S. Pipes including earth work in excavation in of adequate width as per relevant IS Code having minimum depth to keep the top surface of pipe 1.10 M below of the existing ground level in any kind of soil mixed with boulder, metal crust, concrete pavement, road sub-grade and its flank etc., in position and carriage of materials from departmental store to work site, filling of the trenches with excavated materials, consolidating the same in layers, removing the surplus materials

from site including all labour, tools and plants etc. Surplus materials out of excavation are to be cleared by the Agency within 20 Km. Radius of the Municipal boundary at his own cost.

b) Laying of **D.I** pipes & specials over brick or concrete pillar or wall upto height of 2m aboveground level aligning assembling etc. all complete including cost of all sal-ballah staging, bamboo scaffolding tools & plants specials for hoisting and positioning etc. all complete as per specification and direction of E.I.C.

c) Cutting D.I. (all types) by chisel/Hacksaw including rendering the surface smooth to make it suitable for rubber gasket/ rubber ring etc. complete as per direction of EIC. (for old line only).

d) Chamfering the spigot end of the D.I pipes for using in Tyton joints line or otherwise by means of electric grinder set at site as per direction of F.I.O

e) Cleaning thoroughly the inner surface of pipe line including special & valves by flushing with water & subsequently disinfection of the same pipe line by flushing again with water containing bleaching powder resulting in residual chlorine not less than 10 mg / Hr. after 24 hours of such filling including laboratory testing of water sample obtained from disinfected pipe line & disposal of water from the pipe line after completion of the work. The rate is including of cost of requisite water to be arranged by the Contractor.

f) Supplying & delivery at working site CIDF sluice valve conforming to IS 14846-2000 (ISI marked), with latest amendment, including stacking and inclusive of Departmental inspection, packing charges, all taxes and duties as applicable and payable, Flanged drilled as per IS 15381993 with latest amendment all complete along with installation of the same as per direction of EIC. All products must have BIS certification.

(Approved make: Kirlosker/IVC/L&T/VAG/M&P/Upadhyay and any other approved)

Class PN 1.0 with cap. (Sluice Valve to be supplied by agency)

g) Making flange joint to D.I pipes and specials and valves including dewatering of trenches, tools & plants, labour etc. as per specification and instruction of E.I.C.

h) Hydraulically testing of different types of pipes in sections for a head of water not less than 1/2 (Half) the pressure recommended by I.S or corresponding pipe materials whether the gauge pressure will remain static for 30 minutes by filling water including supply of necessary equipment's such as generator sets, pumps gauges etc. All complete as per specification and instruction of E.I.C. [Water have to be arranged by the bidder himself and whole testing procedure will be accordance with as per IS : 3114 -1965]

i) Hire and labour charges for 75 mm dia bamboo railing on Jhau / Eucalyptus or other approved timber / bamboo posts 1.4 m above GL and 0.6 m below GL including tying strongly with coir ropes and boring holes for posts in any soil/ concrete surface / Bituminous surface packing the sides etc. including cost of restoration to the damages of the ground to its original condition as per direction of EIC after removing barricade. 75 mm dia bamboo railing and 100 mm dia bamboo posts @1.4 m apart. railing with 3 rows.

j) Dismantling all type of masonry including cement concrete, stacking serviceable materials at site and removing rubbish as directed within a lead of 75m in ground floor including roof.

k) Cutting sub -grade of road (concrete bituminous carpeting & consolidated Ballast/brick soling & other sub-grade materials by means of chisels/Hammer other equipment(for trenches & laying of pipe line.)

ℓ) Emergency horizontal road crossing by **Auger-boring/ HDD** including boring charge, pipe laying and jointing, making barricades, lighting arrangement etc. all complete as per direction of E.I.C. (including PWD /NH Road). Horizontal road crossing **by Jack pushing method** including boring charge, pipe laying and jointing, making barricades, lighting arrangement etc. all complete as per direction of E.I.C. (Including National Highways and Railways crossing).

m) Construction of sluice valve chamber as per drawing supplied by concerned division or standard drawing given by contractor and approved by E.I.C. with brick work in cement mortar (6:1) over 15 cm. of WCC (6:3:1) with supply of approved quality (Heavy type) C.I surface box embedded in 100mm thick removable slab in (4:2:1) including fitting, fixing and overhauling and instruction of E.I. C. (Valves will be supplied by Agency).

n) Installation of CI Bolted collar as per IS 13382-1992 with latest amendment or end cap up to date including all taxes & other incidental charges what so ever, carriage, loading unloading & stacking at working site.

o) Pipe carrying steel bridge of adequate width is to be constructed with adequate foundation for crossing at various location) in clear water rising main and distribution network.

p) Hire and labour charges for shuttering with centring and necessary staging upto 4 m using approved stout props for and thick hardwood planks of approved thickness with required bracing for concrete slabs , beams and columns , lintels curved or straight including fitting , fixing and striking out after completion of works (upto roof of g.f), as per drawing, specification & direction of E.I.C.

q) Cement concrete above grade more than M-20 shall be of **Controlled mix**. The Design mix shall be approved prior to execution of work. The graded stone chips (20 mm nominal size), coarse sand as per relevant IS Codes shall be used.

Cement shall be PPC or PSC as per relevant I.S. Code shall be used. The manufacture brand shall be approved by the competent authority.

r) Reinforcement conforming to relevant IS code for all reinforced concrete work in all sorts of structures including distribution bars, stirrups, binders etc. including supplying of rods, initial straightening and removal of rust (if necessary), cutting to requisite length, hooking & bending to correct shape (if necessary) placing in proper position & binding with 16 gauge black annealed wire at every intersection etc. complete as per drawing & specification including cost of wire.

The Steel shall be of SAIL/ TATA/ RINL. No other steel shall be allowed for OHR construction.

s) Single Brick Flat Soling of Picket Jhama bricks including ramming & dressing bed to proper level & filling joints with powder earth or local sand.

t) DI Specials should be approved Make.

u) Temporary Restoration works of all roads is to be done as **suitable for vehicular movement** per enclosed drawing and as per direction and satisfaction of E.I.C.

v) The brand of the HDPE pipes shall be approved by the competent authority. The certificate by CIPET is to be submitted by the contractor with every lot of pipes.

w) The Third party (approved agencies) test of D.I. pipes shall be submitted with every lot of pipes.

A-4 Limit of Contract

The limit of contract starts from preparation of complete drawing and after approval of same by competent authority proper execution according to specification and after completion of the job preparation of final drawing and submission of the same to competent authority. In between the above, all the works required for successful completion of the component are in the scope of the above work.

The contractor shall abide all the Clauses laid down in the W.B. Form no. 2911 which is annexed with uploaded documents.

Superintending Engineer, West Circle
Municipal Engineering Directorate

SECTION- B

CONDITIONS & REQUIREMENTS FOR BIDDING

1. **Submission of e-Bid document will not be allowed beyond the schedule time indicated in the e-Bidding.**
2. **Each Bidder shall upload his offer in envelopes (statutory and non statutory)& .xls sheet after digitally signed super scribing the name of the work, name & address of the bidder, NIB No and date of submission of the e-Bid.**
3. **Each page of the e-Bid documents, drawing etc. has to be digitally signed / initialled by the authorized signatory.**
4. **No e-Bid proposal will be entertained without the earnest money being submitted as indicated in the e-NIB. No interest will be allowed for the said earnest money and the Bid issuing authority will hold the same till finalization of the e-Bid.**
5. **Any conditional e-Bid will be liable for rejection.**
6. **e-Bids will be opened in presence of the Bidder or their authorized representatives who opt to be present.**
7. **The Bid inviting Authority reserves the right to reserve or amend the e-Bid documents prior to the date notified for submission of the eBid or also to extend the time mentioned in the e-NIB under intimation to the Bidders.**
8. **e-Bid once offered cannot be withdrawn within a period of 180 calendar days from the date set for opening of e-Bids. Any extension of this validity period if required will be subject to concurrence of the Bidders.**
9. **Bidders would be at liberty to point out any ambiguities, contradictions, omissions, etc. seeking clarifications thereof or interpretation of any of the conditions of the e-Bid documents before the Bid Inviting Authority by uploading his/her doubt within a period of seven days from the date of publishing of Bid documents. The bidder shall submit his/her queries in writing at least four working days in advance from the date of pre-bid meeting.**

10. **Written clarification or amendments etc. as may be issued by the Bid Inviting Authority in pursuance to the representation made by the intending Bidders under Clause 10 above shall be final and binding on the Bidders and shall form a part of the e-Bid documents. Bid Inviting Authority however, reserves the right to have pre-Bid conference with the intending Bidders if deemed necessary.**
11. **Intending Bidders are required to inspect the site of the Project with particular reference to location and infrastructure facilities. They are to make a careful study with regard to availability of materials and their sources and all relevant factors as might affect their rates and prices.**
12. **If expenses incurred for site inspection and all activities in the preparation and uploading of the e-Bid shall be borne by the Bidders.**
13. **Extra claim or any concession on the ground of insufficient data or information and absence of knowledge of conditions prevailing at the site or situation arising during the execution of the work shall not be entertained.**
14. **e-Bid, which have been considered valid on the result of general examination (Prequalification stage) at the time of opening, shall be subjected to subsequent detail scrutiny. Notwithstanding the general examination carried out earlier, the Bid Inviting authority reserves the right of rejection of any e-Bid, which may be found to be defective during the detail scrutiny.**
15. **Bidders before uploading the e-Bid documents shall have to ensure that “Declaration by the Bidder” in the pro-forma set out in the e-Bid documents is to be filed separately with the e-Bid documents in the form of Affidavit to be affirmed by the same person signing the Bid documents.**
16. **The Bid inviting authority reserves the right to accept or reject any or all of the e-Bid received or to split up the work in groups or to relax any clause without assigning any reason thereof.**
17. **This set of Bid documents consists of:**
 - a) **Main Bid Documents consists of PART I & PART II (Technical) & financial (.xls sheet).**

SECTION - C
General Conditions of Contract

1.0 DEFINITIONS AND INTERPRETATION

- (1) In the Contract, as hereinafter defined, the following words and expressions shall have to be meanings hereby assigned to them, except where the context otherwise requires:
- (a) "Approved" means provisionally approved in writing, including subsequent written confirmation of previous verbal approval and "approval" means provisional approval in writing, including as aforesaid. However, in spite of approval from Competent Authority contractor is solely responsible for design-cum-execution of the whole project as it is turnkey job.
- (b) "Authority" means the TIA or his authorized representatives of Superintending Engineer, West Circle, MED
- (c) "Bank" means the "State Bank of India" or any other Scheduled Bank.
- (d) "Calendar day" means a period of twenty four hours extending from midnight to midnight.
- (e) "Cash" includes cheque, bank drafts and any other payment voucher authorizing payment from any bank or treasury.
- (f) "Contractor" means the person or persons, firm or Corporation who have entered into the contract for the performance of the work.
- (g) "Contract price" means the sum as stated in the Bid submitted by the contractor subject to such additions thereto or deductions therefore as may be made under the provisions of; the contract documents and accepted by the Employer.
- (h) "Constructional Plant" means all appliances or things of whatsoever nature required in or about the execution or maintenance of the works but do not include materials or other things intended to form or forming part of the permanent works.
- (i) "District" or Dubrajpur Municipal Area means the area described as such in Schedule-I of the Act;
- (j) "Drawings" means the drawings referred to in the Bid documents and any modification of such drawings approved in writing by the undersigned from time to time or approved in writing by the Superintending Engineer, West Circle, M.E.Dte.
- (k) "Employer" means the Superintending Engineer, West Circle, M.E.Dte.

- (l) **"Engineer in Charge"** means the Executive Engineer, Birbhum Division of Municipal Engineering Directorate to whom the Superintending Engineer, West Circle, MED, delegate his Authority by the way of declaring him as EIC in the Bid documents.
- (m) **"Engineer's Representatives"** means any Assistant Engineer or Assistant of the Engineer or any Clerk of works appointed from time to time by the Employer or the Engineer to perform the duties set forth in Clause 2 hereof, whose authority shall be notified in writing to the Contractor by the Engineer-in Charge.
- (n) **"Ground Level"** means the level of the referred point of the exposed surface of the ground, road or pavement free from extraneous materials;
- (o) **"Holidays"** means a public holiday for the purpose of Section 25 of the Negotiable Instruments Act, 1881 or such other day on which the office of the Authority remains closed for the day;
- (p) **"Local Authority"** not only means a Municipal Corporation or Municipality or other authority legally entitled to the control or manage local funds but also includes the West Bengal State Electricity Board.
- (q) **"Month"** means English calendar month;
- (r) **"Permanent Work"** means the permanent works including equipment to be supplied, executed, erected and maintained in accordance with the Contract;
- (s) **"Road"** shall include a street, avenue, lane, by-lane or any other access routes over which a person authorized by a Local Authority has a right of way;
- (t) **"Rupees"** (or Rs. in abbreviation) shall mean Rupees in Indian Currency.
- (u) **"Site"** means the land and other placed on, under in or through which the Permanent. Works or Temporary Works are to be executed and any other lands and places provided or arranged by the employer for working space or any other purpose as may be specifically designated in the Contract as forming part of the Site,
- (v) **"Specification"** means the specification referred to in the Bid and any modification thereof or addition thereto as may from time to time be furnished or approved in writing by the Superintending Engineer, West Circle, MED.
- (w) **"Store"** means such storage areas including depot, go down, stockyard, dumping yard etc. maintained by the Authority) or where supply of any material for the construction or any work has been undertaken by any authorized agent, by such agent within the district.
- (x) **"Temporary Works"** means all temporary works of every kind required in or about the execution or maintenance of the Permanent Works.
- (y) **"Bid Date"** means the date fixed for receipt of Bids as per Notice Inviting Bids or as extended by subsequent notification(s).

- (z) "Bidder" means the person, or persons, firm or corporation submitting a Bid for the work contemplated either directly or through a duly authorized representative.
- (aa) "The Act" West Bengal Municipal Act, 1975
- (bb) "Time" expressed by hours of the clock shall be according to the Indian Standard Time.
- (cc) "Water main" means any pipe or conduit of cast iron, DI (Ductile Iron) pipe, steel or of any other material intended to convey or distribute water;
- (dd) "Works" shall include both Permanent Works and Temporary Works.
- (ee) "Work" means all of the work of the project called for or shown in the Bid documents including preparation, construction improvement and cleans up.
- (2) Singular and Plural: Works importing the singular only also include the plural and vice versa where the context demands.
- (3) Headings or Notes: The headings and marginal notes in these Conditions of Contract shall be deemed to be part thereof or be taken into consideration in the interpretation or construction thereof or of the Contract.
- (4) Cost: The work "cost" shall be deemed to include overhead costs whether on or off the Site.

2.0 ENGINEERS IN CHARGE AND HIS REPRESENTATIVES

1) Duties and Powers of Engineer in Charge and his Representative - The Engineer shall carry out such duties in issuing decisions, certificates and orders as are specified in the Contract. Fixation and acceptance of rates for altered or substituted items of work or for additional items of work or their deletion shall however always rest with the same authority (by designation) as had accepted the original Bid.

2) Representative(s) shall be responsible to the EIC and his / their duties are to watch and supervise the Works and to test and examine any materials to be used or workmanship employed in connection with the works. He shall have no authority to relieve the Contractor of any of his duties or obligations under the Contract, not, accept as expressly provided hereunder or elsewhere in the Contract, to order any work involving delay or any extra payment by the Employer, nor to make any variation of or in the Works.

The Executive Engineer, Birbhum Division, MED may delegate in writing to the EIC any of the power and authorities vested in the engineer and shall furnish to the Contractor and to the Employer a copy of all such written delegations of Power and authorities. Any Written instructions or approval given by Engineer's representative to the contractor within the terms of such delegation, but not otherwise, shall bind the Contractor as though it had been given by the Superintending Engineer, West Circle, MED, provided always as follows:

- a) Failure of the Engineer's Representative to disapprove any work of materials shall not prejudice the power of the Superintending Engineer, West Circle, MED thereafter to disapprove such work or materials and to order the pulling down, removal of breaking up thereof.
- b) If the Contractor shall be dissatisfied by reason of any decision of the Engineer's Representative he shall be entitled to refer the matter to the TIA, who shall thereupon confirm, reverse or vary such decision.

ASSIGNMENT AND SUB LETTING

3.0 ASSIGNMENT

The Contractor shall not assign the Contract or any part thereof, or any benefit or interest therein or there under, otherwise than a change in the Contractor's bankers of any money due or to become due under this contract, without the prior written consent of the Superintending Engineer, West Circle, MED.

4.0 SUBLETTING

The Contractor shall not sublet the whole of the Works. Except where otherwise provided by the Contract, the Contractor shall not sublet any part of the Works without the prior written consent of the Executive Engineer, Birbhum Division, MED, which shall not be unreasonably withhold and such consent, if given, shall not relieve the Contractor from any liability or obligation under the Contract and he shall be responsible for the acts, defaults and neglects of the said sub-contractor including his agents, servants or workmen as fully as if they were the acts, defaults or neglects of the Contractor, his agents, servants or workmen, provided always that the provision' of labour on a piece-work basis shall not be deemed to be a subletting under this clause.

5.0 CONTRACT DOCUMENTS

1a) Language: The Contract documents shall be drawn up in the English language. All correspondence, orders, notices etc. shall also be in English.

1b) Law: The law of India and of the State of West Bengal shall apply to the Contract and the Contract is to be construed accordingly.

2) Documents Mutually Explanatory: The several documents forming the contract are to be taken as mutually explanatory of one another but in case of ambiguities or discrepancies the same shall be explained and adjusted by the Executive Engineer, Birbhum Division, MED, who shall thereafter issue to the Contractor instructions thereon.

6.0 DRAWINGS

1) Custody of drawing: All the approved Drawings shall remain in the safe custody of the Executive Engineer, Birbhum Division, MED, one copy of original approved drawing and design to be submitted to Dubrajpur Municipality but one copy thereof shall be furnished to the Contractor free of

charge. The Contactor shall provide and make at his own expenses any further copies required by him. At the Completion of the Contract, the Contractor shall return to the Executive Engineer, Birbhum Division, and M.E.Dte. All drawings as provided under the Contract.

2) Copy of drawing: - One copy of drawings to be kept on site. One copy of the Drawings furnished by the Contractor as aforesaid, shall be kept by the Contractor on the site and the same shall at all reasonable times be available for inspection and use by the Engineer and his/municipal Representatives and by any other persons authorized by the Engineer in writing.

3) Disruption of progress: The Contractor shall give written notice to Executive Engineer, Birbhum Division, MED whenever planning or progress of the works is likely to be delayed or disrupted order, including a direction instruction or approval is issued by the Superintending Engineer, West Circle, MED on recommendation of Executive Engineer within a reasonable time. The notice shall include details of the drawing or order required, and of why and by whom it is required and of any delay or disruption likely to be suffered if it is further delayed.

7.0 FURTHER DRAWINGS

The Executive Engineer, Birbhum Division, MED shall have full power and authority to supply to or demand from the Contractor, from time to time, during the progress of the Works, such further drawings as shall be necessary for the purpose of the proper and adequate execution and maintenance of the Works. The Contractor shall carry out and be bound by the same. Adequacy as determined by the Executive Engineer, Birbhum Division, MED shall be final and binding on the Contractor.

8.0 GENERAL OBLIGATION

(1) Contractor's General Responsibilities - The Contractor shall, subject to the provision of the Contract, and with due care and diligence, execute and maintain the Works and supply all labour, including the supervision thereof, materials, equipment, Constructional Plant and machinery, tools and all other things whether of a temporary or permanent nature, required for such execution and maintenance, so far as necessary for providing the same is specified in or is reasonably to be inferred from the Contract. The Contractor shall take full responsibility for the adequacy, stability and safety or all Site operations and methods of construction, erection etc.

9.0 CONTRACT AGREEMENT

The Contractor shall, when called upon to do so, enter into and execute a Contract Agreement, to be prepared and completed in the form annexed with such modification as may be necessary.

10.1 Security Deposit:

Security Deposit: Additional Security Deposit @ 8% (eight percent) will be deducted from each and every running bill. The entire amount of such 10% (ten percent) of Security Deposit (Initial 2% EM + additional 8%) will be refunded without any interest only after successful completion of the whole work as per PWD order No. 5784-PW/L&A/2M-175/2017 Dated: 12.09.2017, wherein, Construction of new building / new bridge / new culvert, the Defect Liability Period of the work shall be five years from the date of completion of the work;

For work with five years Defect Liability Period:

- i) No security deposit shall be refunded to the contractor for 1st 3 years from the date of completion of the work;*
- ii) 30% of the security deposit shall be refunded to the contractor on expiry of four years from the actual date of completion of the work;*
- iii) The balance 70% of the security deposit shall be refunded to the contractor on expiry of five years from the actual date of completion of the work.*

- i) All equipment shall be free from any defects due to faulty design of the components, materials and/or workmanship
- ii) The equipment shall operate satisfactory. The performance and efficiency shall not be less than guaranteed values.
- iii) Formal acceptance of the work covered under the contract will not be made by the Superintending Engineer, West Circle, MED until all the work done by the contractor has satisfactorily passed all tests required and run for a reasonable period to his satisfaction.

If during testing of work prior of formal acceptance, the same thereof must satisfy in respect of meeting the specification. in a condition which will meet the guaranteed performance and be up to the specification, in both material and workmanship.

Any such work shall be carried out by the contractor at his own expense, if such work shall, in the opinion of the Engineer-in-Charge, be necessary due to the use of materials or workmanship not in accordance with the contract and/or to the neglect or failure on the part of the contractor to comply with any obligation expressed or implied on the contractor's part under the contract. If the contractor shall fail to do any such work as per aforesaid requirement of the Engineer-in-Charge, the Superintending Engineer, West Circle, MED shall be entitled to have such work carried out by its own workman, or by others hired for the purpose, and if such work is in the opinion of the Engineer-in-Charge for which the contractor should have carried out at the contractor's own cost, the department shall be entitled to recover from the contractor the supervision cost deemed fit together with the cost increased for the purpose and may deduct the same from any money due to or that may become due to the Contractor.

10.2 PERFORMANCE GUARANTEE

The contractor will have to entered into an agreement through banker to ensure performance guarantee on non-judicial stamps Rs.10/-. Suitable proforma will be supplied in due course of time.

11.0 INSPECTION OF SITE

The Executive Engineer, Birbhum Division, M.E. Dte. or his authorized person shall have made available to the Bidder with the Bid documents such data like its location, distance from fixed point including the layout drawing and location of the primary grid point, level drawing data, the source of filling the reservoir and the Bid shall be deemed to have been based on such data. But the Bidder shall be responsible for his own interpretation thereof. The Bidder may also undertake investigations at his own cost on such levels or any other levels prior to submission of his offer.

The Bidder shall also be deemed to have inspected and examined the site and its surroundings and information available in connection therewith and to have satisfied himself, so far as is practicable, before submitting his Bid; as to the form and nature thereof, including the sub-surface conditions, topographical level of proposed site, the hydrological and climatic conditions, the extent and nature of work and materials necessary for the completion of the Works, the means of access to the Site and the accommodation he may require and, in general 'shall be deemed to have obtained all necessary information, subject as above mentioned, as to risks, contingencies and all other circumstances which may influence or affect his Bid.

12.0 SUFFICIENCY OF BID AND ADVERSE PHYSICAL CONDITIONS, ARTIFICIAL OBSTRUCTIONS

The Bidder shall be deemed to have satisfied himself before Bidding as to the correctness and sufficiency of his Bid for the Works and 'of the rates and prices quoted in the Schedule of prices, which Bid rates and prices shall, except in so far as it is otherwise provided in the Contract, cover all his obligations under the Contract and all matters and things necessary for the proper execution and maintenance of the Works.

If, however, during the execution of its Works the Contractor shall encounter physical conditions, other than Climatic conditions on the Site, or artificial obstructions, which conditions or obstructions could, in his opinion, not have been reasonably foreseen by an experienced contractor, the Contractor shall forthwith give written notice thereof to the Engineer and if, in the opinion of the Engineer, such conditions or artificial obstructions could not have been reasonably foreseen by an experienced contractor, then the Engineer shall certify and the Executive Engineer, Birbhum Division, MED shall pay the additional cost to which the Contractor shall have been put by reason of such conditions, including the proper and reasonable cost.

- a) Of complying with any instruction which the Engineer may issue to the Contractor in connection therewith, and
- b) Of any proper and reasonable measures approved by the Superintending Engineer, West Circle, MED on recommendation of Engineer in charge which the Contractor may take in the absence of specific instructions from the Executive Engineer, Birbhum Division, MED as a result of such conditions or obstructions encountered.

13.0 WORK TO BE TO THE SATISFACTION OF ENGINEER IN CHARGE

Save in so far as it is not legally or physically impossible, the Contractor shall execute and maintain the Works in strict accordance with the Contract to the satisfaction of the Executive Engineer, Birbhum Division, MED and shall comply with and adhere strictly to the Superintending Engineer, West Circle, MED's instructions and directions on any matter whether mentioned in the Contract or not touching or concerning the Works.

14.0 WORK PROGRAM

- (1) Program to be furnished: Within thirty (30) calendar days, the Contractor shall, after the acceptance of his Bid, submit to the Executive Engineer, Birbhum Division, MED for his approval a program showing the order of procedure in which he proposes to carry out the Works. The Contractor

shall, whenever required by the Executive Engineer, Birbhum Division, MED, also provide in writing for his information, general description of the arrangements and methods, which the Contractor proposes to adopt for the execution of the Works.

(2) If at any time it should appear to the Executive Engineer, Birbhum Division, MED that the actual progress of the Works does not conform to the approved program referred in sub-clause (1) of this Clause, the Contractor shall produce, at the request of the Executive Engineer, Birbhum Division, MED, a revised program showing the modifications to the approved program necessary to ensure completion of the Works within the time for completion as defined in Clause 42 hereof.

(3) The submission to and approval by the Executive Engineer, Birbhum Division, MED of such program or the furnishing of such particulars shall not relieve the Contractor of any of his duties or responsibilities under the Contract.

15.0 CONTRACTOR'S SUPERINTENDENCE

The Contractor shall give or provide all necessary superintendence during the execution of the Works and as long thereafter as the Superintending Engineer, West Circle, MED may consider necessary for the proper fulfilling of the Contractor's obligations under the Contract. The Contractor or a competent and authorized agent or representative approved of in writing by the Superintending Engineer, West Circle, MED, which approval may at any time be withdrawn, is to be constantly on the Works and shall give his whole time to the Superintendence of the same. If such approval be withdrawn by the Superintending Engineer, West Circle, MED, the Contractor shall, as soon as is practicable, having regard to the requirement of replacing him as hereinafter mentioned after receiving written notice of such withdraw, remove the agent from the works and shall not thereafter employ him again on the Works in any capacity and shall replace him by another agent approved by the Executive Engineer, Birbhum Division, MED.

Such authorized agent or representative shall receive, on behalf of the Contractor, direction and instruction from the Executive Engineer, Birbhum Division, MED or, subject to the limitations of Clause 2 hereof the Engineer's Representative. The agent or representative of the Contractor must be able to speak and communicate in English / Bengali. In the absence of the Contractor's designated agent or representative for a particular operation on any site of the works the Contractor's supervisory staff or sub-agent or leading hands shall be instructed to receive and carry out any instruction or direction issued or given by the Executive Engineer, Birbhum Division, MED or the EIC.

16.0 EMPLOYEES

- (I) Contractor's Employees - The Contractor shall provide and employ on the Site in connection with the execution and maintenance of the Works
- a) Such technical assistants as are skilled and experienced in their respective calling and such sub-agents, foreman and leading hands as are competent to give proper supervision to the work they are required to supervise, and
 - b) Such skilled, semi-skilled and unskilled labour as is necessary for the proper and timely execution and maintenance of the Works.

c) Employees covered under (a) and (b) may have to be provided with identity cards as specified by the Executive Engineer, Birbhum Division, MED.

2) The Engineer shall be at liberty to object to and require the Contractor to remove forthwith from the Work any person employed by the Contractor in or about the execution or maintenance of the Works who, in the opinion of the Executive Engineer, Birbhum Division, MED, misconducts himself, or is incompetent or negligent in the proper performance of his duties, or whose employment is otherwise considered by the Executive Engineer, Birbhum Division, MED to be undesirable and such person shall not be again employed upon the Works without the written permission of the Executive Engineer, Birbhum Division, MED. Any person so removed from the Works shall be replaced as soon as possible by a competent substitute approved by the Executive Engineer, Birbhum Division, MED.

17.0 SETTING-OUT

The Contractor shall be responsible for the true and proper setting-out of the Works in relation to original points, lines and levels of reference given by the Engineer in writing and for the correctness, subject as above mentioned, of the position levels, dimensions and alignment of all parts of the Works and for the provision of all necessary instruments, appliances/and labour in connection therewith. If, at any time during the progress of the Works, any error shall appear or arise in the position, levels, dimensions or alignment of any part of the Works, the Contractor, on hem), required to do so by the Engineer or the Engineer's Representative, shall at his own cost, rectify such error to the satisfaction of the Engineer or the Engineer's Representative, unless such error is based on incorrect data supplied in writing by the Engineer, in which case the expense of rectifying the same shall be borne by the Employer. The checking of any setting-out or of any line or level by the Engineer or the Engineer's Representative shall not in any way relieve the contractor of his responsibility for the correctness thereof and the Contractor shall carefully protect and reserve all bench-marks, sigh trails pegs and other things used in setting out the Works.

18.0 WATCHING AND LIGHTING

The contractor shall in connection with the works provide and maintain at his own cost all lights, guards, fencing, as and when/where necessary or as required by the Executive Engineer, Birbhum Division, MED or the Engineer's Representative, for the protection of the works, contractor's employees, employees supervisor or for any other reason deemed fit by the Engineer.

19.0 WORKS & RISKS

(1) Care of Works: From the commencement of the Works until the date stated in the Certificate of Completion for the whole of the Works, pursuant to Clause 47 hereof, the Contractor shall take full responsibility for the care thereof. Provided that if the Executive Engineer, Birbhum Division, MED shall issue a Certificate of Completion in respect of any part of the Permanent Works, the Contractor shall cease to be liable for the care of that part of the Permanent Works (O & M not counted) from the date stated in the Certificate of Completion in respect of that part and the responsibility for the care of that part shall pass to the Executive Engineer, Birbhum Division, MED provided further that the Contractor shall take full responsibility for the care of any outstanding work which he shall have undertaken to finish during the period to Maintenance until such outstanding work is completed.

In case any damage, loss or injury shall happen to the Works, or to any part thereof, from any cause whatsoever, save and except the expected risks as defined in sub-clause (2) of this Clause, while the Contractor shall be responsible for the care thereof the Contractor shall, at his Own cost, repair and make good the same, so that at completion the permanent Works shall be in good order and condition and in conformity in every respect with the requirements of the Contract and the Executive Engineer, Birbhum Division, MED instructions. In the event of any such damage, loss or injury happening from any of the excepted risks, the Contractor shall, if and to the extent required by the Executive Engineer, Birbhum Division, MED and subject always to the provisions of Clause 62 hereof, repair and make good the same as aforesaid at the cost of the Employer. The Contractor shall also be liable for any damage to the Works occasioned by him in the Course of any operations carried out by him for the purpose of completing any outstanding works or complying with his obligations under Clause 48 or 49 hereof.

(2) Expected Risks: The 'expected risks' are war, hostilities, invasion, act of foreign enemies, rebellion, revolution insurrection or military or usurped power, civil war or unless solely restricted to employees of the Contractor or of his sub-contractors and arising from the conduct of his workers, riot commotion or use or occupation by the Executive Engineer, Birbhum Division, MED of any part of the Permanent. Works, or a cause solely due to the Engineer's design of the Works, or ionizing radiations or contamination by radio-activity from any nuclear fuel or from any nuclear waste from the combustion of nuclear fuel, radio-active toxic explosive, or other hazardous properties of any explosive, nuclear assembly or nuclear component thereof, pressure waves cause by aircraft or other aerial devices travelling at sonic or supersonic speeds, or any such operation of the force of nature as an experienced contractor could not foresee, or reasonably make provision for or insure against all of which are herein collectively recurred to as "the expected risks."

20.0 INSURANCE OF WORKS, ETC.

Without limiting his obligations and responsibilities under Clause 19 hereof the Contractor shall insure in the names of the Employer and the Contractor against all loss or damage from whatever cause arising, other than the expected risks, for which he is responsible under the terms of the Contract and in such manner that the Employer and Contractor are covered for the period stipulated in Clause 19(1) hereof and are also covered during the Period of Guarantee for loss or damage arising from a cause, occurring prior to the commencement of the Period of Guarantee, and for any loss or damage occasioned by the Contractor in the course of any operations carried out by him for the purpose of complying with his obligations under Clause 48 or 49 hereof.

a) The Works for the time being executed to the estimated current contract value thereof together with the materials for incorporation in the Works at the replacement value.

b) The Constructional Plant and other things brought on the Site by the Contractor to the replacement value of such Constructional Plant and other things. These shall include materials belonging to the Executive Engineer, Birbhum Division, MED but issued to or intended to be issued to the Contractor for use in the Works. Such insurance shall be affected with an insurer and in terms approved by the Employer, which approval shall not be unreasonably withheld, and the Contractor shall whenever required, produce to the Executive Engineer, Birbhum Division, MED or the Engineer's Representative the policy or policies of insurance and the receipts for payment of the current premiums.

21.0 DAMAGES

i) Damage to persons and property: The Contractor shall, except if and so far as the Contract provides otherwise, indemnify the Executive Engineer, Birbhum Division, MED against all losses and claims in respect of injuries or damage to any person or material or physical damage to any property whatsoever which may arise out of or in consequence of the execution, operation and maintenance of the Works and against all claims, proceedings, damages, costs, charges and expenses whatsoever in respect of or in relation thereto except any compensation or damages for or with respect to :

- a) The permanent use of occupation of land by the Works or any part thereof.
- b) The right of the Executive Engineer, Birbhum Division, MED to execute the Works or any part thereof on over under, in or through any land.
- c) Injuries or damage to persons or property which are the unavoidable result of the execution, operation or maintenance- of the Works in accordance with the Contract.
- d) Injuries or damages to persons or property resulting from any act or neglect of the Employer, his agents, servants or other contractors, not being employed by the Contractor, or for or in respect of any claims, proceedings, damages, costs, charges and expenses in respect thereof or in relation thereto or where the injury or damage was contributed to by the Contractor, his servants or agents such part of the compensation as may be just and equitable having regard to the extent of the responsibility of the Superintending Engineer, West Circle, MED, his servant or agents or other contractors for the damage or injury.

2) Indemnity of Secretary: The Contractor shall indemnify the Executive Engineer, Birbhum Division, MED against all claims, proceedings, damages, costs charges and expenses in respect of the matters referred to the provision to sub-clause (1) of this Clause.

22.0 INSURANCE

1) Third Party Insurance: Before commencing the 'execution of the Works the Contractor, but without limiting his obligations and responsibilities under Clause 21 hereof, shall insure against his liability for any material or physical damage, loss or injury which may occur to any property, including that of the Executive Engineer, Birbhum Division, MED, or to any person, including any employee of the Executive Engineer, Birbhum Division, MED, by or arising out to the execution of the Works or in the carrying out of the Contract, otherwise than due to the matters referred to in the proviso to Clause 21 (I) thereof.

2) Minimum Amount of third-party insurance - Such insurance shall be affected with an insurer and in terms approved by the Executive Engineer, Birbhum Division, MED, which approval shall not be unreasonably withheld, and for a least the amount started in the Appendix to the Bid. The Contractor shall, whenever required, produce to the Executive Engineer, Birbhum Division, MED or the Engineer's Representative the policy or policies or insurance and the receipts for payment of the current premium. However, the Bidder should insure for an amount commensurate with the risk involved subject to the minimum amount prescribed elsewhere in the Bid.

3) Provision to indemnify Employer - The terms shall include a provision whereby, in the event of any claim in respect of which the Contractor would be entitled to receive It1dcnJmty under the policy being brought or made against the Executive Engineer, Birbhum Division, MED, the insurer will indemnify the Employer against such claims and any costs, charges and expenses in respect thereof.

23.0 ACCIDENT, INJURIES

1) Accident or injury to Workmen:-The Executive Engineer, Birbhum Division, MED shall not be liable for or in respect of any damages or compensation payable at law in respect or in consequence of any accident or injury to any workman or other person in the employment of the Contractor or any subcontractor, save and except an accident or injury resulting from any act or default of the Executive Engineer, Birbhum Division, MED, his agents, or servants. The Contractor shall indemnify and keep indemnified the Executive Engineer, Birbhum Division, MED against all such damages and compensation, save and except as aforesaid, and against all claims, proceedings, costs, charges and expenses whatsoever in respect thereof or in relation thereto.

2) Insurance Against Accident, etc. to workmen: - The Contractor shall insure against such liability with an insurer approved by the Executive Engineer, Birbhum Division, MED which approval shall not be unreasonably withheld, and shall continue such insurance during the whole of the time that any person is employed by him on the works and shall, when required, produce to the Executive Engineer, Birbhum Division, MED or the Engineer's Representative such policy of insurance and the receipts for payment of the current premium. Provided always that, in respect of any person employed by any sub-contractor, the Contractor's obligation to insure as aforesaid under this sub-clause shall be satisfied if the sub-contractor shall have insured against the liability in respect of such persons in such manner that the Executive Engineer, Birbhum Division, MED is indemnified under the policy, but the Contractor shall require such sub-contractor to produce to the Executive Engineer, Birbhum Division, MED when required, such policy of insurance and the receipt for the payment of the current premium.

3) Notification to insurer: It shall be the duty of the Contractor to notify the insurers under any of the insurance referred to in Clause 20, 22 and 23 hereof any matter or count which by the terms of such insurance are required to be notified and the Contractor shall indemnify and keep indemnified the Executive Engineer, Birbhum Division, MED against all losses, claims, demands, proceedings, costs, charges and expenses whatsoever arising out of or resulting from any default by the Contractor in complying with the requirements of this sub-clause whether as a result of the avoidance of such insurance or otherwise.

4) All Insurances at Contractor's cost - The insurances referred to in Clause 21, 22 & 23 hereof shall be entirely at the cost and expenses of the Contractor and be included within his rates.

24.0 REMEDY ON CONTRACTOR'S FAILURE TO INSURE

If the Contractor shall fail to effect and keep in force the insurance referred to in Clause 20, 22 and 23 hereof, or any other insurance which he may be required to effect under the terms of the Contract, then and in any such case the Executive Engineer, Birbhum Division, MED may effect and keep in force any such insurance and pay such premium or premiums including fines as may be necessary for that

purpose and from time to time and deduct double the amount so paid by the employer as aforesaid from any moneys due or which may become due to the Contractor or recover the same as a debt due from the Contractor.

25 I) GIVING OF NOTICES AND PAYMENT OF FEES: The Contractor shall give all notices and pay all fees required to be given or paid by any National or State Statute, ordinance, or other law, or any rules regulation, or bye-law of any local or other duly constituted authority 111 relation to the execution of the Works and by the rules and regulations of all public bodies and companies whose property or rights are affected or may be affected in any way by the Works.

ii) Compliance with Statutes, Regulations, etc. - The Contractor shall conform in all respects with the provisions of any such Statute, Ordinance or Law as aforesaid and the Rules, regulations or bye-laws or any local or other duly constituted authority which may be applicable to the Works and with such rules and regulations of public bodies and companies as aforesaid and shall keep the Executive Engineer, Birbhum Division, MED indemnified against all penalties, fines and liability of every kind for breach of any such Statute, ordinance of Law, regulation of bye law.

26.0 FOSSILS, ETC.

All fossils, coins articles of value or antiquity and structures and other remains or things of geological or archaeological interest discovered on the site of the Works shall as between the Employer and the Contractor be deemed to be the absolute property of the Employer.

27.0 PATENT RIGHTS AND ROYALTIES

The Contractor shall save harmless and indemnify the Executive Engineer, Birbhum Division, MED from and against all claims and proceedings for or on account of infringement of any patent, rights, design Trade mark or name or other protected right in respect of any Constructional Plant, machine works, or material used for or in connection with the Works or any of them and from and against all claims, proceedings, damages, costs, charges and expenses whatsoever in respect thereof in relation thereto. Except where otherwise specified, the Contractor shall pay all tonnage and other royalties, rent and other payments or compensations, if any, for getting stone, sand, gravel, clay or other materials or equipment required for the works or any of them.

28.0 INTERFERENCE WITH TRAFFIC AND ADJOINING PROPERTIES

All operations necessary for the execution of the Works shall, so far as compliance with the requirements of the Contract permits, be carried on so as not to interfere unnecessarily or improperly with the convenience of the existing plant workers, member of the public, or the access to use and occupation of public or private roads, railways and footpaths to or of properties whether in the possession of the Executive Engineer, Birbhum Division, MED or of any other person or local authority.

29.0 TRAFFIC

1) Extraordinary Traffic: The Contractor shall use every reasonable means to prevent any of the highways, railways or bridges communicating with or on the routes to the Site from being damaged or

injured by any traffic of the Contractor or any of this sub-contractors and, shall select routes, choose and use vehicles and restrict and distribute loads so that any such extraordinary traffic as will inevitably arise from the moving of plant and material from and to the Site shall be limited, as far as reasonably possible, and so that no unnecessary damage or injury may be occasioned to such highways, railways and bridges.

2) Special Loads: Should it be found necessary for the Contractor to move one or more loads of Constructional plant, machinery or pre-constructed units or parts of units of work over part of a highway, railway or bridge, the moving whereof is likely to damage any highway, railway or bridge unless special protection or strengthening is carried out, then the Contractor shall before moving the load on to such highway, railway or bridge give notice to the Executive Engineer, Birbhum Division, MEDor Engineer's Representative or the local authority of the weight and other particulars of' the load to be moved and his proposals for protecting or strengthening the said highway, railway or bridge. The Contractor at his own cost and expenses shall carry out such proposals, including any modifications thereto that the Engineer or the local authority may require.

3) Settlement of Extraordinary Traffic Claims: If during the Carrying out of the Works damage or injury to railways, railway or bridge occurs due to moving of one or more loads of Constructional Plant machinery or pre-constructed units or parts of units of work, the Employer shall conduct the necessary investigation for the purpose of determining the Contractor's liability. If the damage is due to failure on the part of the Contractor to observe and perform his obligations under sub-clause (1) and (2) of this Clause then the restoration / repair of the damaged portion of road or structure certified by the Engineer or local authority to be due to such failure shall be undertaken by or be chargeable against the Contractor.

4) Water-borne Traffic: Where the nature of the Works is such as to require the use by the Contractor of water-borne transport the foregoing provisions of this Clause shall be construed as though "highway" included a lock, dock, sea wall or other structure related to a waterway and "vehicle" included craft, and shall have effect accordingly.

30.0 RESTRICTION

a) Restriction of Movements: The work shall have to be executed within the protected area of existing water works. The existing rules and regulation related to ingress and egress of labour and material shall have to be followed strictly in consultation with and as per direction of the Executive Engineer, Birbhum Division, MEDor the local authority as the case may be. No labour, Supervisor or Engineer of the contractor shall enter inside the treatment plant, pump house or any other existing installations without prior permission of concerned officers Executive Engineer, Birbhum Division, MED.

b) Opportunities for other contractors: The Contractor shall in accordance with the requirements of the Executive Engineer, Birbhum Division, MED, afford all reasonable opportunities for carrying out their work to any other contractors employed by the Employer and their workmen and to the workmen of the employer and of any other duly constituted authorities who may be employed in the execution on or near the Site of any work not included in the Contract or of any contract which the Employer may enter into in connection with or ancillary to the Works. If, however, the Contractor shall, on the written

request of the Executive Engineer, Birbhum Division, MED or the Engineer's Representative, make available to any such other contractor, or to the Employer or any such authority, any roads or ways for the maintenance of which the Contractor is responsible, or permit the use by any such of the Contractor's scaffolding or other plant on the Site, or provide any other service of whatsoever nature, the Employer shall pay to the Contractor in respect of such use or service such sum or sums if at all as shall, in the opinion of the Engineer, be reasonable.

31.0 CONTRACTOR TO KEEP SITE CLEAR

During the progress of the Works the Contractor shall keep the site reasonable free from all necessary obstruction and shall store or dispose of any Constructional Plant and surplus materials and clear away and remove from the Site any wreckage, rubbish or Temporary Works no longer required.

32.0 CLEARANCE OF SITE ON COMPLETION

On the completion of the Works the Contractor shall clear away and remove from the site all Constructional Plant, surplus materials, rubbish and Temporary Works of every kind, and leave the whole of the Site and Works clean and in a workmanlike condition to the satisfaction of the Superintending Engineer, West Circle, MED.

33.0 LABOUR : 1) **Engagement of labour:** The Contractor shall make his own arrangements for the engagement of all labour, local or otherwise, and save in so far as the Contract otherwise provides, for the transport, housing, feeding and payment thereof.

2) Supply of water: The Contractor shall, so far as is reasonably practicable having regard to local conditions, provide on the Site, to the satisfaction of the Superintending Engineer, West Circle, MED representative, an adequate supply of drinking and other water for the use of the Contractor's staff and work people.

3) Alcoholic Liquor or Drugs: The Contractor or his workmen shall not consume or sale or gift or be under the influence of any drug/narcotics or Alcoholic liquor within the vicinity of the Construction site.

4) Arms and Ammunition: The Contractor shall not give, barter or otherwise dispose of to any person or persons, any arms or ammunition of any kind or permit or suffer the same as aforesaid.

5) Festivals and Religious Customs: The Contractor shall in all dealing with labour in his employment have due regard to all recognized festivals days of rest and religious or other customs.

6) Epidemic: In the event of any outbreak of illness of an epidemic nature, the Contractor shall comply with and carry out such regulations, orders and requirements as may be made by the Government, or the local medical or sanitary authorities for the purpose of dealing with and overcoming the same.

7) Disorderly Conduct etc.: The contractor shall at all times take all reasonable precautions to prevent any unlawful, riotous or disorderly conduct by or amongst his employees or workers and for the preservation of peace and protection of persons and property in the neighbourhood of the Works against the same.

8) Compliance with Laws, regulation etc. relating to labour: In respect of the engagement, employment, transport, payment, feeding, housing and working conditions of labour and all matters connected there with the Contractor shall at all times during the continuance of the Contract, comply in all respects with and carry out all obligations imposed on him by the provisions and requirements of the following statutes.

a) The Apprentices Act 1961 (Act 52 of 1961) and Rules and Regulations issued there under from time to time.

b) The Contract Labour Regulation and abolition Act 1970 (Act 37 of 1970) and Rules made there under (West Bengal Contract Labour Regulation and Abolition Rules 1972) from time to time.

c) The Payment of Wages Act 1936, the Minimum Wages Act 1948, the Employees Liability Act 1938, the Industrial Disputes Act 1947, the Maternity Benefits Act 1961, the Employees State Insurance Act 1948 including modifications thereto the Rules and Regulations framed there under from time to time.

d) Other existing National or State Statute, Ordinance or other Law or any Regulation or Bye-law of any local or other duly constituted authority which may be applicable, including any such Law, Regulation or Order that may be passed or ordered from time to time and come into force during the tenure of the Contract.

9) Employees Provident Fund: The Contractor shall comply with the provisions of the relevant Employees Provident Fund Act or Rules in force in the State along with the provisions of all rules and Regulations made there under from time to time, and shall in particular be responsible for the payment of all contributions as laid down under the Act/Rules.

10) Trade union rights: The Contractor shall recognize the freedom of all workmen employed by him in and for performance of the Contract to be members of registered Trade Unions and shall not in any manner prevent or discourage any such workman from becoming a member of a registered Trade Union or discriminate against any workmen who is a member of a registered Trade Union.

11) Local Labour: As far as possible local labour shall be engaged as unskilled labour.

12) Fair Wages - The Contractor shall in respect of all workmen employed by him in and for the performance of the Contract pay rates of wages and observe the conditions of employment not less favourable than those provided under the relevant labour law as applicable to the State.

13) Medical Attendance: The Contractor shall provide, to the satisfaction of the Government or Local Authorities Concerned, adequate medical attendance for his employees and labour.

14) Report or Accident: The Contractor shall, within twenty-four (24) hours of the occurrence of any accident at or about the site or in connection with the execution of the Work, report such an accident to the Engineer. The Contractor shall also report such accident to the competent authority whenever law requires such a report.

15) Report REQUIRED BY LABOUR Commissioner: The Contractor shall submit, at the request of the Labour Commissioner or of the Assistant Commissioner of the State such returns as may be called for from time to time in respect of labour employed by the Contractor and by his subcontractors in the execution of the Contract. If so required, the Contractor shall furnish the names and address of all subcontractors to the Labour Commissioner. Statutory provisions in these regards are to be also complied with.

16) The Contractor shall be responsible for observance by his subcontractor of all the foregoing provision of sub-clause (1) to (15) of this Clause 33.

34.0 RETURNS OF LABOR ETC.

The Contractor shall, if required by the Superintending Engineer, West Circle, MED, deliver to the Superintending Engineer, West Circle, MED, or at his office a return in detail in such form and at such intervals as the Superintending Engineer, West Circle, MED may prescribe showing the supervisory staff and the number of the several classes of labour from time to time employed by the Contractor on the Site and such information respecting Constructional Plant as the Superintending Engineer, West Circle, MED his Representative may require.

35.0 MATERIALS AND WORKMANSHIP

1) All materials and workmanship shall be of the respective kinds described in the Contract and in accordance with the Engineer's instructions and shall be subjected from time to time to such tests as the Engineer may direct at the place of manufacture or fabrication, or on the Site or at such other place or places as may be specified in the Contract, or at all or any of such places. The Contractor shall provide such assistance, instruments, machines, labour and materials as are normally required for examining, measuring and testing any work and the quality, weight or quantity of any material used and shall supply samples or materials before incorporation in the Works for testing as may be selected and required by the Executive Engineer, Birbhum Division, MED, be it at site or at the manufacturer/Vendors premises or elsewhere.

2) COST OF SAMPLES: The Contractor at the cost and expense of him shall furnish all samples of materials as may be required by the Executive Engineer, Birbhum Division, MED.

3) COST OF TESTS: The cost of making any test shall be borne by the Contractor if such test is clearly intended by or provided for in the Contract and in the cases only of a test under load or of a test to ascertain whether the design of any furnished or partially finished work in appropriate for the purpose which it was intended to fulfil, is particularized in the Contract in sufficient detail to enable the Contractor to price or allow for the same in his Bid.

4) COST OF TESTS NOT PROVIDED FOR, ETC.: If the Executive Engineer, Birbhum Division, MED orders any test, which is either;

a) Not so intended by or provided for, or

b) (In the cases above mentioned) is not so particularized, or

c) Though so intended or provided for is ordered by the Engineer to be carried out by an independent person or organization at any place other than the Site or the place of manufacture or fabrication of the materials tested, then the cost of such test shall be borne by the Contractor, if the tests shows the workmanship or materials not to be in accordance with the provisions of the Contract or the Engineer's instruction.

36.0 INSPECTION OF OPERATIONS

The Engineer and any person authorized by him shall at all times have access to the Works and to all workshops stores and places where work is being prepared or from where material manufactured articles or machinery are being obtained for the Works and the Contractor shall afford every facility for and every assistance in or in obtaining the right to such access.

37.0 EXAMINATION

1) Examination of work before covering up: No work shall be covered up or put out of view without the approval of the Engineer or the Engineer's Representative and the Contractor shall afford full opportunity for the Executive Engineer, Birbhum Division, MED or the Engineer's Representative to examine and measure any work which is about to be covered up or put out of view and to examine foundations before permanent work is placed thereon. The Contractor shall give due notice to the Engineer's Representative where any such work or foundations is or are ready or about to be ready for examinations and the Engineer's Representative shall, without unreasonable delay, unless he considers it unnecessary and advises the Contractor accordingly attend for the purpose of examining and measuring such work or of examine such foundations

2) Uncovering and making openings: The Contractor shall uncover any part or parts of the Works or make opening in or through the same as the Engineer may from time to time direct and shall reinstate and make good such part or parts to the satisfaction of the Engineer If any such part or parts have been recovered up or put out of view after compliance with the requirement of sub-clause (1) of this Clause and are found to be executed in accordance with the Contract, the expenses of uncovering, making openings in or through, reinstating and making good the same shall be, borne by the Employer, but in any other case all costs shall be borne by the Contractor.

38.0 REMOVAL

1) Removal of improper work and materials: The Executive Engineer, Birbhum Division, MED shall during the progress of the works have power to order in writing from time to time.

- a) The removal from the Site, within such time or time as may be specified in the order, of any materials, which in the opinion of the Engineer, are not in accordance with the Contract.
- b) The substitution of improper, substandard and unsuitable materials, and
- c) The removal and proper re-execution, notwithstanding any previous test thereof or interim payment therefore, of any work which in respect of materials or workmanship is not in the opinion of the Engineer, in accordance with the Contract.

2) Default of Contractor in Compliance: In case of default on the part of the Contractor in carrying out such order, the Employer shall be entitled to employ and pay other persons to carry out the same and all expenses consequent thereon or incidental thereto shall be recoverable from the Contractor by the Employer, or may be deducted by the Employer from any sum due or' which may become due to the Contractor.

39.0 SUSPENSION

1) Suspension of work: The Contractor shall, on the written order of the Engineer, suspend the progress of the works or any part thereof for such time or times and in such manner as the Engineer may consider necessary and shall during such suspension properly protect and secure the work, so far as is necessary in the opinion of the Engineer. The extra cost incurred by the Contractor in giving effect to the Engineer's instruction under this Clause shall be borne and paid by the Employer unless such suspension is

- a) Otherwise provided for in the Contract, or
- b) Necessary by reason of some default on the part of the Contractor, or
- c) Necessary by reason of climatic conditions on the Site, or
- d) Necessary for the proper execution of the work or for the safety of workmen or Works of any part thereof in so far as such necessity does not arise from any act or default by the Engineer or the Employer or from any of the expected risks defined in Clause 19 hereof provided that the Contractor shall not be entitled to recover any such extra cost unless he gives written notice of his intention to claim to the Employer within twenty-eight days of the Engineer's order. The Executive Engineer, Birbhum Division, MED shall settle and determine such extra payment and/or extension of time under Clause 43 hereof to be made to the Contractor in respect of such claim as shall in the opinion of the Employer be fair and reasonable.

2) Suspension lasting more than 90 days: If the progress of the Works or any part thereof is suspended on the written order of the Executive Engineer, Birbhum Division, MED and if permission to resume Work is not given by the Executive Engineer, Birbhum Division, MED within a period of ninety days from the date of suspension then, unless such suspension is within paragraph (a), (b), (c) or (d) of sub-clause (1) of this Clause, the Contractor may serve a written notice on the Employer requiring permission within twenty eight days from the receipt thereof to proceed with the Works, or that part thereof in regard in which progress is suspended and, if such permission is not granted within that time, the Contractor by a further written notice so served may, but is not bound to, elect or treat the

suspension where it affects part only of the Works as an omission of such part under Clause 50 hereof, or where it affects the whole Works, as an abandonment of the Contract by the Employer.

40.0 COMMENCEMENT TIME AND DELAYS

Commencement of works: The Contractor shall commence the Works on Site within the period named in the Appendix to the Bid after the receipt by him of a written order to this effect from the Engineer and shall proceed with the same with due expedition and without delay, except as may be expressly sanctioned or ordered by the Engineer, or be wholly beyond the Contractors' Control.

The successful contractor shall within four weeks from the date of issue of Letter of Intent furnish one or more drawing stating and showing the following:

- 5.0 6.0 Layout of cable trenches, cable trays showing the locations and levels together without position of hooks at the underside of the operating platform stating the maximum load required to be withstood.
- 7.0 Any other data that the Bid considers relevant for construction of civil structure.
- 8. Any other reasonable data that may be asked for.

41.0 POSSESSION

1) Possession of site: Save in so far as the contract may prescribe, the extent of portions of the Site of which the Contractor is to be given possession from time to time and the order in which such portions shall be made available to him and subject to any requirement in the Contract as to the order in which the Works shall be executed, the Employer will, with the Engineer's written order to commence the Works, give to the Contractor possession of so much of the Site as may be required to enable the Contractor to commence and proceed with the execution of the Works in accordance with the Programmed referred to in Clause 14 hereof, if any, and otherwise in accordance with such reasonable proposals, of the Contractor as he shall, by written notice to the Engineer, make and will, from time to time as the Works proceed, give to the Contractor possession of such further portions of the Site as may be required to enable the Contractor to proceed with the execution of the Works with due dispatch in accordance with the said Programmed or proposals, as the case may be.

If the Contractor suffers delays or incurs cost for failure on the part of the Employer to give possession in accordance with the terms of this Clause, the Employer shall grant an extension of time for the completion of the Works and certify such sum as, in his opinion, shall be fair to cover the cost incurred, which sum shall be paid by the Employer.

42.0 TIME :-

1) Time of Completion and progress of Works: The progress of the work shall conform to the approved Work Programmed in terms of Clauses 14 hereof, and subject to any requirement in the contract as the completion of any section of the Works before completion of the whole, the whole of the Works shall be completed, in accordance with the provisions of Clause 47 hereof, within the time stated in the Contract calculated from last days of the period named in the Appendix to the Bid as that within

which the Works are to be commenced, or such extended time as may be allowed under Clause 43 hereof.

2) Failure in keeping to stages of work Programmed: If the Contractor does not keep to the approved program and continues at any stage to fail behind his schedule by as much as twenty percent (20%) of the said approved work programmed, within thirty (30) days from receipt by him of a written notice from the Engineer, or if in the opinion of the Engineer the delay will substantially affect operation activities or execution of a major work item and it is ascertained by the Engineer that the Contractor cannot remedy the occasion within the stipulated time, the Executive Engineer, Birbhum Division, MED on recommendation of Engineer shall have full authority to undertake measures to recover from such adverse condition in terms of the provisions of Clause 62 thereof.

43.0 EXTENSION OF TIME FOR COMPLETION

Should the amount of extra or additional work of any kind or any cause of delay referred to in these Conditions, or other special circumstances of any kind whatsoever which may occur, other than through a default of the Contractor, be such as fairly to entitle the Contractor to an extension of time for the completion of the works, the Executive Engineer, Birbhum Division, MED on recommendation of Engineer shall determine the period of such extension and shall notify the Employer and the Contractor accordingly. Provided that the Engineer is not bound to take into account any extra or additional work or other special circumstances unless the Contractor has within twenty-eight days after such work has been commenced, or such circumstances have arisen or as soon as is practicable, submitted to the Engineer full and detailed particulars of any extension of time to which he may consider himself entitled in order that such submission may be investigated at the time.

44.0 NO NIGHT OR SUNDAY WORK

Subject to any provision to the contrary contained in the Contract, none of the Permanent Works shall, save as hereinafter provided, be carried on during the night or on Sundays, if locally recognized as days of rest, or other locally recognized equivalent without the permission in writing of the Engineer, except when the works is unavoidable or absolutely necessary for the saving of life or property or for the safety of the Works, in which case the Contractor shall immediately advise the Engineer, provided always that the provisions of the Clause shall not be applicable in the case of any work which it is customary to carry out by rotary of shifts.

45.0 RATE OF PROGRESS AND NIGHT WORK WHEN PERMITTED

If for any reason, which does not entitle the Contractor to an extension of time, the rate of progress of the Works or any section is at any time, in the opinion of the Engineer, too slow to ensure completion by the prescribed time or extended time for completion, the Executive Engineer, Birbhum Division, MED on recommendation of the Engineer shall so notify the Contractor in writing and the Contractor shall thereupon take such steps as are necessary and the Engineer may approve to expedite progress as to complete the Works or such section by the prescribed time or extended time. The Contractor shall not be entitled to any additional payment for taking such steps. If as a result of any notice given by the Executive Engineer, Birbhum Division, MED under this Clause, the Contractor shall seek the Executive Engineer, Birbhum Division, MED permission to do any work at night or on Sundays,

If locally recognized as days of rest, or their locally recognized equivalent, such permission shall not be unreasonable refused. When work at night has to be carried out, the Contractor shall, at his own cost and expense, make adequate arrangements for lighting and provide necessary facilities for safety etc. and comply with all stipulations as may have been imposed by the Executive Engineer, Birbhum Division, MEDin granting permission for night work.

46.0 DAMAGES FOR DELAY

1) Liquidated Damages for Delay: If the Contractor shall fail to achieve completion of the Works within the time prescribed by Clause 42 hereof, then the Contractor shall pay to the Employer the sum stated in the Contract as liquidated damages for such default and not as a penalty for every day of part of a day which shall elapse between the time prescribed by Clause 42 hereof and the date of certified completion of the Works, the Employer may without prejudice to any other method of recovery, deduct the amount of such damages from any money in his hands, due or which may become due to the Contractor. The payment or deduction of such damages shall not relieve the Contractor from his obligation to complete the Works, or from any other of his obligations and liabilities under the Contract.

2) Reduction of liquidated Damages: If, before the completion of the whole of the Works any part or section of the Works has been certified by the Engineer as completed, pursuant to Clause 47 hereof, and occupied or used by the Employer, the liquidated damages for delay shall, for any period of delay after such certificate and in the absence of alternative provision in the contract be reduced in the proportion which the value of the part or section so certified bears to the value of the whole of the Works.

3) Extent of Liquidated Damages: The liquidated damages referred to in sub-clause (1) for delay of each day or part thereof, shall be at the rate of one percent (1 %) or such smaller amount as the Employer may decide, or the total value of the Contract Price excluding the value of such part or section of the works as may have been covered by certificate of completion in terms of the provisions of sub-clause (2) above, Provided however that in no case shall be total amount of liquidated damages exceed ten percent (10%) of the total Contract Price for whole Works.

4) Liquidated Damage as Reasonable Compensation: The 'Liquidated damage' referred to in sub-clause (1) to (3) above, shall be considered as reasonable compensation to be applied to the use of the Employer without reference to the actual loss or damage sustained and whether or not any damage shall have been sustained.

5) No bonus for early completion: The Contractor shall not be entitled to payment of any bonus for early completion of the Works.

47.0 CERTIFICATION OF COMPLETION OF WORK

1) Erection: Erection of Mechanical and electrical equipment shall be construed to have been completed where equipment in question is placed in position undergoes all necessary tests such as those for alignment, verticality, leak proof mess, insulation etc. as may be specified elsewhere in the Bid documents and put to operation.

2) Completion: Completion is a stage when the equipment and the structure as a whole are certified by the Employer. The date shall only be indicative for the purpose of reckoning the period of Maintenance Period and shall not be co-related with the release of any payment provided that non-continuous or sporadic functioning shall not be deemed as commissioning and also provided that non-commissioning of minor works, the decision on determination of major or minor works resting with the employer, shall not mollify the act of completion for the aforesaid purpose. An item shall be considered as minor work where its non-completion may not in the opinion of the employer, stand in the way of commencement of plant operation.

3) Trial Run: The Trial Run period shall be for 3 months including 72 hours with load operation of 8 hours at a stretch operation of all equipments as per specification and to the satisfaction of Engineer-in-Charge.

48.0 MAINTENANCE

1) Maintenance Period: Defect liability period for 5 years

2) Cost of Execution of work of repair, etc.: The repair work shall be carried out by the Contractor at his own expense if the necessity thereof shall, in the opinion of the Engineer, be due to the use of materials or workmanship not in accordance with the Contract, or to neglect or failure on the part of the Contractor to comply with any obligation, expressed or implied, on the Contractor's part under the Contract. If, in the opinion of the Engineer, such necessity shall be due to any other cause, the value of such work shall be ascertained and paid for as if it was an additional work.

3) Remedy on contractor's failure to carry out work required: If the Contractor shall fail to do any such work as aforesaid requirement by the Engineer, the Employer shall be entitled to employ and pay other persons to carry out the same, which in the opinion of the Employer, the Contractor was liable to do at his own expense under the Contract. In the said event, all expenses consequent thereon or incidental thereto shall be recoverable from the Contractor by the Employer, or may be deducted by the Employer from any sum due or which may become due to the Contractor.

49.0 CONTRACTOR TO SEARCH

The Contractor shall, if required by the Executive Engineer, Birbhum Division, MED in writing, search under the directions of the Engineer, for the cause of any defect, imperfection or fault appearing during the progress of the Works or in the period of Maintenance. Unless such defect, imperfection or fault shall be one for which the contractor is liable under the contract, the cost of the work carried out by the contractor in searching as aforesaid shall be borne by the Employer. If such defect, imperfection or fault shall be one for which the contractor is liable as aforesaid, the cost of the work carried out in searching as aforesaid shall be borne by the contractor and he shall in such case repair, rectify and make good such defect, imperfection or fault at his Own expense in accordance with the provisions of Clause 48 hereof to the satisfaction of the Engineer.

50.0 ALTERATIONS, ADDITIONS AND OMISSIONS

1) Variations: The Employer may make any variation of the form, quality or quantity of the Works or any part thereof that may, in his opinion, be necessary and for that purpose, or if for any other reason it shall, in his opinion, be desirable, he shall have power to order the Contractor to do and the Contractor shall do any of the following:

a) Increase or decrease the quantity of any work included in the contract.

b) Omit any such work.

c) Change the character or quality or kind of any such work.

d) Change the levels, lines position and dimensions of any part of the Works and

e) Execute additional work of any kind necessary for the satisfactory completion of the works or for deriving satisfaction of the Employer. It is expressly provided that no such variation shall, in any way vitiate or invalidate the Contract, but the value, if any, of all such variations shall be taken into account in ascertaining the amount of the Contract Price.

2) Orders for variations to be in writing: The Contractor shall make no such variations without an order in writing from the Employer. Provided that no order in writing shall be required for insignificant increase or decrease in the quantity of any work where such increase or decrease is not the result of an order given under this Clause, but is the result of the quantities exceeding or being less than those stated in the Schedule of prices. Provided also that if for any reason the Employer shall consider it desirable to give any such order verbally, the Contractor shall comply with such order and any confirmation in writing of such verbal order given by the Employer whether before or after the carrying out of the order, shall be deemed to be an order in writing within the meaning of this Clause. Provided further that in the event of non-receipt of written confirmation from the Employer, the Contractor shall, within eleven working days, confirm the same from his end in writing to the Employer, and if such confirmation is not contradicted in writing within fourteen working days by the employer, it shall be deemed to be an order in writing by the Employer.

51.0 VALUATION

1) Valuation of variations: All extra or additional work done or work omitted or substituted by order of the Employer shall be valued at the rates and prices set out in the Contract if, in the opinion of the Employer, the same shall be applicable as it is or with addition to or subtraction from an accepted item, if the Contract does not contain any rates or prices applicable to the extra or additional work, then the rates or prices shall be obtained from the Eastern Circle, Public Works Department schedule of rates as was in vogue on the date of submission of the Bid. Where such rates are not available in P.W.D. schedule of rates, the market-analysed rate as approved by the Employer shall be final and binding. In case of such analysed rates, 10% profit including overhead consultant's fees, ST. Turnover Tax etc. shall be allowed. No other overhead, or other expenses shall be taken into account shall be considered to be inclusive of contractors profit.

2) Variation: not allowed.

c) Claims: No final or interim claim for payment for any such work or expense will be considered which has not been included in such particulars. Provided always that the Employer shall at his discretion be entitled to authorize payment to be made for any such working expense, notwithstanding the Contractor's failure to comply with this condition.

52.0 PLANT TEMPORARY WORKS AND MATERIALS

1) Plant, etc. exclusive use for the works: All Constructional Plant, Temporary Works and materials provided by the Contractor shall, when brought to the Site be deemed to be exclusively intended for the execution of the Works and the Contractor shall not remove the same or any part thereof, except for the purpose of moving it from one part of the Site to another, without the consent, in writing, of the Engineer which shall not be unreasonably withheld.

2) Removal of plant, etc.: Upon completion of the Works the Contractor shall remove from the Site all the said Constructional Plant and Temporary Works remaining thereon and any unused material provided by the Contractor to the satisfaction in the Engineer.

3) Employer not liable for damage to plant, etc.: The employer shall not at any time be liable for the loss of or damage to any of or damage to any of the said Constructional Plant, Temporary Works or materials same as mentioned in Clause 19 and 62 hereof.

4)) GST, Cess and other imposts. The Contractor shall pay GST, Cess, and all other taxes, duties and charges as may be applicable from time to time in respect of materials purchased by him or plants and equipment brought to Site. No separate payment shall be made for all these and they shall be deemed to have been covered within the Contractor's rates for the finished items of work.

5) Temporary Works: At least fourteen (14) days in advance of taking up any temporary works, the contractor shall submit to the Engineer for approval complete drawings of all temporary works he may require for the execution of the Works. He shall, so required by the Engineer, submit his calculations relating to the strength of the temporary works proposed. Modifications that the Engineer may require shall be made by the Contractor at the latter's cost and expenses. At the discretion of the Engineer, a higher stress up-to a maximum of twenty five percent (25%) in excess of the stress normally allowed for permanent structures may be permitted in the design of temporary works.

Notwithstanding the approval by the Engineer of any of the temporary works, the contractor shall remain wholly responsible for their adequacy, safety, proper maintenance and of all obligations in regard to such works specified or implied in the Contract, until the removal of such works.

53.0 APPROVAL OF MATERIAL, ETC. NOT IMPLIED

The operation of Clause 52 hereof shall not be deemed to imply any approval by the Engineer of the materials or other matters referred to therein shall not interfere with rejection of any such materials at any time by the Engineer.

54.0 MEASUREMENT :For measurement, the metric system should be used.

55.0 WORKS TO BE MEASURED

The engineer shall, except as otherwise stated, ascertain and determine by measurement the value in terms of the Contract of work done in accordance with the Contract. He shall, when he requires any part or parts of the works to be measured, give notice to the Contractor's authorized agent or representative, who shall forthwith attend or send a qualified agent to assist the Engineer or the Engineer's Representative in making such measurement, and shall furnish all particulars required by either of them. Should the Contractor not attend, or neglect or omit to send his agent on two consecutive occasions, then in the third occasion the measurement shall be made unilaterally by the Engineer, which shall be taken to be the correct measurement of the work. For the purpose of measurement such permanent work as is to be measured by records and drawings at suitable intervals of such work and the Contractor, as and when called upon to do so in writing shall, within fourteen days, attend to examine and agree upon such records and drawings, with the Engineer or Engineer's Representative and shall sign the same when so agreed. If the Contractor does not so attend to examine and agree upon such records and drawings on two consecutive occasions they shall be taken to be correct. If, after examination of such records and drawings, the Contractor does not agree with the same or does not sign the same as agreed, they shall nevertheless be taken to be correct, unless the Contractor shall, within fourteen days of such examination, lodge with the for decision by the Engineer, a notice in writing giving details of the respects in which such records and drawings are claimed by him to be incorrect together with reasons thereof.

56.0 METHOD OF MEASUREMENT

The Works shall be measured but, notwithstanding any general or local custom, except where otherwise specifically described or prescribed in the Contract.

57. PAYMENT

Payment of RA as well as final bill will depend upon the availability of fund and no financial claim in case of any delay in payment will be entertained. Payment on supply without successful erection and commissioning will not be entertained. Materials which will be supplied should be supported by valid challans.

The bidder will notify the authority regarding the work being completed. The quantity and quality of executed work will be taken into account for the preparation of bill. The engineers shall field verify the work executed. Only the items which are successfully installed and commissioned will be taken in the preparation of bill.

All the applicable routine test, type test and other test reports shall be submitted along with the bill prayer.

The successful bidder will propose detailed payment break up schedule. The Superintending Engineer, West Circle will approve the payment break up schedule after necessary correction or modification as he/she deemed fit and which will be final. Payment will be made by the EIC as per payment break up schedule strictly. This schedule also will be the part of Contract agreement.

Security Deposit: Additional Security Deposit @ 8% (eight percent) will be deducted from each and every running bill. The entire amount of such 10% (ten percent) of Security Deposit (Initial 2% EM + additional 8%) will be refunded without any interest only after successful completion of the whole work as per PWD order No. 5784-PW/L&A/2M-175/2017 Dated: 12.09.2017, wherein, Construction of new building / new bridge / new culvert, the Defect Liability Period of the work shall be five years from the date of completion of the work;

For work with five years Defect Liability Period:

- iv) No security deposit shall be refunded to the contractor for 1st 3 years from the date of completion of the work;*
- v) 30% of the security deposit shall be refunded to the contractor on expiry of four years from the actual date of completion of the work;*
- vi) The balance 70% of the security deposit shall be refunded to the contractor on expiry of five years from the actual date of completion of the work.*

58.0 APPROVAL ONLY BY MAINTENANCE CERTIFICATE

No certificate other than the maintenance certificate referred to in clause 59 hereof shall be deemed to constitute final approval of the works.

59.0 MAINTENANCE CERTIFICATE

1) The Maintenance Certificate stating that the Works have been completed and maintained to the satisfaction of the Engineer, shall be issued by him within twenty eight days after the expiration of the period of Maintenance, or if different periods of maintenance shall become applicable to different sections or parts of the Works, the expiration of the latest such period, or as Soon thereafter as any works ordered during such period, pursuant to Clauses 4) and 48 hereof (shall have been completed to the Satisfaction of the Engineer). With regard to defects that may arise during the Period of Maintenance, the Contractor shall be responsible to carry out restoration/rectification of damages as are attributable to defects in works carried out under this Contract. The decision of the Employer in the regard shall be final and binding on the contractors.

2) Cessation of Employer's liability: The Employer shall not be liable to the Contractor for any matters or thing arising out of or in connection with the Contractor for any matters or thing arising out of or in connection with the Contract or the execution of the Works, unless the Contractor shall have made a claim in writing in respect thereof before the delivery of the Maintenance Certificate under this Clause.

3) Unfulfilled obligations: Notwithstanding the issue of the Maintenance Certificate the Contractor and, subject to the sub-clause (2) of the Clause, the Contractor shall remain liable for the fulfilment of any obligation incurred under the provisions of the Contract prior to the issue of the Maintenance Certificate which remains imperforated at the time such Certificate is issued and for the purpose of determine the nature and extent of any such obligation, the Contract shall be deemed to remain in force between the parties hereto,

60.0 REMEDIES AND POWERS

1) Default of contractor: If the Contractor shall become bankrupt, or have a receiving order made against him, or shall present his petition in bankruptcy, or shall made an arrangement with or assignment in favour of his creditors, or shall age to carry out the Contract under a committee of inspection of his creditors or, being a corporation, shall go into liquidation (other than a voluntary liquidation for the purpose of amalgamation or reconstruction), or if the Contractor shall assign the Contract, without the consent in writing of the Employer first obtained, or shall have an execution levied on his goods, or if the Engineer shall certify in goods, or if the Engineer shall certify in writing to the Employer that in his opinion the Contractor :

a) Has abandoned the Contract, or

b) Without reasonable excuse has failed to commence the Works or has suspended the progress of the Works for twenty eight days after receiving from the Engineer written notice to proceed, or

c) Has failed to remove materials from the Site or to pull down and replace work for twenty eight days after receiving from the Engineer written notice that the said materials or work had been condemned and/or rejected by the Engineer under these conditions, or

d) Despite previous warnings by the Engineer, in writing, is not executing the Works in accordance with the Contract, or is persistently or flagrantly neglecting to carry out his obligation under the Contract, or

e) Has, to the detriment of good workmanship, or in defiance of the Engineer's instructions to the contrary, sublet any part of the Contract.

Then the Employer may, after giving fourteen day's notice in writing to the Contractor, enter upon the Site and the Works and expel the Contractor therefore without thereby avoiding the Contract, or releasing the Contractor from any of his obligations or liabilities under the Contract, or affecting the rights and powers conferred on the Employer or the Engineer by the Contract, and may himself complete the Works or may employ any other contractor or agency to complete the Works. The Employer or such other contractor may use for such completion so much of the Constructional Plant, Temporary Works and materials, which have been deemed to be reserved exclusively for the execution of the Works, under the provisions of the Contract, as he or they may think proper and the Employer may, at any time, sell any of the said Constructional Plant, Temporary Works used and unused materials and apply the proceeds of sale in or towards the satisfaction of any sums due or which may become due to him from the Contractor under the Contract.

2) Valuation at date of forfeiture: The Engineer shall, as soon as may be practicable after any such entry and expulsion by the Employer, fix and determine expert, or by or after reference to the parties, or after such investigation or enquiries as he may think fit to make or institute and shall certify what amount, if any, had at the time of such entry and expulsion been reasonably earned by or would reasonably accrue to the Contractor in respect of work then actually done by him under the Contract and the value of any of the said unused or partially used materials, and Constructional Plant and any Temporary Works.

3) Payment after forfeiture: If the Employer shall enter and expel the Contractor any money on account of the Contract until the expiration of the Period of Maintenance and thereafter until the costs

of execution and maintenance, damages for delay in completion, if any and all other expenses incurred by the Employer have been ascertained and the amount thereof certified by the Engineer. The Contractor shall then be entitled to receive only such sums or sums, if any, as the Engineer may certify would have been payable to him upon due completion by him after deducting the said amount. If such amount shall exceed the sum which would have been payable to the Contractor on due completion by him, then the Contractor shall, upon demand, pay to the Employer the amount of such excess and it shall be deemed a debt due by the Contractor to the Employer and shall be recoverable accordingly.

61.0 URGENT REPAIRS

If, by reason of any accident, or failure, or other event occurring to in or in connection with the Works, or any part thereof, either during the execution of the Works, or during the period of Maintenance, any remedial or other work or repair shall, in the opinion of the Engineer or the Engineer's Representative, be urgently necessary for the safety of the Works and the Contractor in unable or unwilling at once to do such work or repair, the Employer may employ and pay other persons to carry out such work or repair as the Engineer or the Engineer's Representative may consider necessary.

If the work or repair so done by the Employer is work which in the opinion of the Engineer, the Contractor was liable to do at his own expense under the Contract, all expenses properly incurred by the Employer in so doing shall be recoverable from the Contractor by the Employer, or may be deducted by the Employer from any sums due or which may become due to the Contractor, Provided always that the Engineer or the Engineer's Representative, as the case may be, shall, as soon after the occurrence of any such emergency as may be reasonably practicable, notify the Contractor thereof in writing.

62.0 SPECIAL RISKS

Notwithstanding anything in the Contract contained:

1) No liability for war, etc., Risks- The Contractor shall be under no liability whatsoever whether by way of identity or otherwise for or in respect of destruction of or damage to the Works, same to work condemned under the provision of Clause 38 hereof prior to the occurrence of any special risk hereinafter mentioned, or to property whether of the Employer or third parties, or for or in respect of injury or loss of life which is the consequence of any special risk as hereinafter defined The employer shall indemnify and save harmless to Contractor against and from the same and against and from the same and against and from all claims, proceedings, damages, costs, charges and expenses whatsoever arising there out or in connection therewith.

2) Damage to works, etc., by special risks - If the Works or any materials on or near or in transit to the Site, or any other property of the Contractor used or intended to be used for the purposes of the Works, shall sustain destruction of damage by reason or any of the said special risks the Contractor shall be entitled to payment for:

a) Any permanent work and for any materials so destroyed or damaged and so far as may be required by the Engineer, or as may be necessary for the completion of the Works, or the basis of cost plus such profit as the Engineer may certify to be reasonable;

b) Replacing or making good any such destruction or damage to the Works;

c) Replacing or making good such materials or other property of the Contractor used or intended to be used for the purposes of the Works.

3) Projectile missile etc.: Destruction, damage, injury or loss of life caused by the explosion or impact whenever and wherever occurring of any mine, bomb, shell, grenade, or other projectile, missile, ammunition, or explosive of war, shall be deemed to be a consequence of the said special risks.

4) Increase cost arising from special risks: The Employer shall repay to the Contractor any increased cost of or incidental to the execution of the Works, other than such as may be attributable to the cost of reconstructing work condemned under the provisions of Clause 38 hereof, prior to the occurrence of any special risk, which is howsoever attributable to or consequent on or the result of or in any way whatsoever connected with the said special risks, subject however to the provisions in this Clause hereinafter contained in regard to outbreak of war, but the Contractor shall as soon as any such increase of cost shall come to his knowledge forthwith notify the Executive Engineer,Division, MED thereof in writing.

5) Special Risks: The special risks are war, (whether war be declared or not), invasion, act of foreign enemies, the nuclear and pressure waves risk described in Clause 19(2) hereof, or in so far as it relates to the country in which the works are being or are to be executed or maintained, rebellion, revolution, insurrection, military or usurped power, civil war, or unless solely restricted to the employees of the Contractor or of his Sub-Contractor and arising from the conduct of the Works, riot, commotion or disorder.

6) Outbreak of war: If, during the currency of the Contract, there shall be an outbreak of war, whether war is declared or not, in any part of the world which, whether financially or otherwise, materially affects the execution of the works, the Contractor shall, unless and until the Contract is terminated under the provisions of this Clause, continue to use his best endeavours to complete the execution of the Works. Provided always that the Employer shall be entitled at any time after such outbreak of war to terminate the Contract by giving written notice to the Contractor and upon such notice being given, this Contract shall, except as to the rights of the parties under this Clause and to the operation of Clause 64 hereof, terminate but without prejudice to the rights of either party in respect of any antecedent breach thereof

7) Removal of plant of termination: If the Contract shall be terminated under the provisions of the last proceeding sub-clause, the Contractor shall, with all reasonable dispatch, remove from the Site all constructional Plant and shall give similar facilities to his Sub-Contractors to do so.

8) Payment if Contract terminated: If the Contract shall be terminated as aforesaid, the Contractor shall be paid by the Employer, in so far as such amounts or items shall not have already been covered by payments on account made to the Contractor, for all work executed prior to the date of termination at the rates and prices provided in the Contract and in addition

- a) The amounts payable in respect of any preliminary items, so far as the work carried out or performed, and a proper proportion as certified by the Engineer of any such items, the work or service comprised in which has been partially carried out or performed.
- b) The cost of materials or goods reasonably ordered for the Works which shall have been delivered to the Contractor or of which the Contractor is legally liable to accept delivery such materials or goods becoming the property of the Employer upon such payments being made by him.
- c) A sum to be certified by the Engineer, being the amount of any expenditure reasonably incurred by the Contractor in the expectation of completing the whole of the Works in so far as such expenditure shall not have been covered by the payments in this sub-clause before mentioned.
- d) Any additional sum payable** under the provisions of sub-clause (1), (2) and (4) of this Clause. Provided always that against any payments due from the Employer under this sub-clause, the Employer shall be entitled to be credited with any outstanding balances due from the contractor for advances in respect of Constructional Plant and materials and any other sums which at the date of termination were recoverable by the Employer from the Contractor under the terms of the Contract and provided that if the termination be made in exercise of Clause C-60(1), no payment shall be released under ClauseC-62(8) (a) to (d).

63.0 FRUSTRATION

Payment in event of Frustration: A war, or other circumstances outside the control of both parties, arises after the Contract is made so that either party is prevented from fulfilling his contractual obligations, or under the law governing the Contract, the parties are released from further performance, then the sum payable by the Employer to the Contractor in respect of the work executed shall be the same as would have been payable under Clause 62 hereof if the Contract had been terminated under the provisions of Clause 62 thereof.

64.0 SETTLEMENT OF DISPUTES

Settlement of Disputes: If any dispute or difference of any kind whatsoever shall arise between the Employer and the Contractor or the Engineer and the Contractor in connection with, or arising out of the Contract, of the execution of the Works, whether during the progress of the Works or after their completion and whether before or after the termination, abandonment or breach of the Contract, it shall be settled in the court of law having jurisdiction within Birbhum District, provided that such a recourse shall not be resorted to without exhausting all other reasonable avenues of redresser.

65. NOTICES

1) Contractor's local office and service of notices to contractor: The Contractor shall have a local office at or near the Site of work; full address thereof shall be intimated by the Contractor or his authorized Agent to the Employer as well as to the Engineer. All Certificates notice or written orders to be given by the Employer or by the Engineer to the Contractor under the terms of the Contract shall be deemed to have been served by sending by post to or delivering the same to the Contractor's local office.

2) Service of notice to employer: All Notice to be given to the employer under the terms of the Contract shall be served by sending by Registered post or delivering the same to the address given below:

(3) Change in Address of the Employer, the Engineer or the Contractor may change a nominated address to another address by prior written notice to the other two and in that event shall resume receiving of communication 28 days after delivery of such notice.

66.0 PRICE ADJUSTMENT

(1) The prices to be paid to the contractor for the whole work shall remain firm during the stipulated contract period or extension thereof and no price adjustment shall be allowed.

(2) The statutory changes in price in the form of Taxes, duties etc. shall however be taken into account. For this purpose the taxes and duties prevailing on the last date of submission of the technical bid (or revised price bid, if applicable) shall be taken as the base. Such taxes and duties for different bought out items shall be specified by the contractor, falling which the assessment of the Employer shall be final and binding. Changes in price of Petrol, Diesel Lubricants, and Electricity etc. shall not be considered.

67.0 MISCELLANEOUS

Dangerous materials: Explosive, chemicals, combustible articles and items and similar materials intended for the Works shall be conveyed, stored and used by the Contractor and his sub-contractors In accordance with all laws, decrees, instruments, orders and regulations imposed by the Government or any of its instrumentalists. Observance of all safety provisions shall be the obligation of the Contractor and nothing herein shall release him from full responsibility for damage or injury to persons or properties resulting from his use of these dangerous materials.

67.0 CONTRACT CONFIDENTIAL

Except with the prior written approval of the Employer and to subject the such conditions as may be prescribed, the Contractor and/or any member of his organization shall not in any case communicate to any person or entity and information connected with the performance of the Services or in carrying out the Works not make public any information for the purpose of publication or advertisement. The Contractor shall treat all matters related to the Contract as private and confidential.

68.0 CONTRACTOR TO PROVIDE FACILITIES

The Contractor shall provide such labour, materials and other facilities that the Engineer or his Representative may require to assist them in carrying out normal tests and checks on materials and workmanship and in measurement of works.

69.0 INTERFERENCE WITH EXISTING FACILITIES

The Contractor shall carry out the works in such a way as to the minimum extent of interference to the use of existing facilities of any kind.

70.0 ACTS OF INFLUENCE

Neither the Contractor nor any of his Agents, Representatives, Employees or members of his organization shall commit any act which may influence the judgment or decision of the Employer or the Engineer or any their agents, representatives, employees or members of their respective organization. Any breach of this provision shall constitute a breach of Contract on the part of the Contractor and apart from penal measures against the Contractor according to the law the Employer shall have the Authority to take action for the Contractor's default in terms of the provisions of Clause 60 hereof.

71.0 INDIVIDUALS NOT PERSONALLY RESPONSIBLE

No personal liability shall be imposed on the members or the Employer or on the Engineer or their duly authorized representatives, agents or employees for acts performed or discharged in the exercise of their authorized duties or responsibilities or in carrying out their obligations by virtue of the provisions or scope of work contained in the Contract, if being understood that they are acting solely as agents and representatives of the Employer in good faith.

72.0 CONTRACT EMBODIES WHOLE ARRANGEMENT

The Contract becomes effective immediately on Issue of the letter of acceptance to the successful Bidder. The Contract (with annexure if any) as subsequently executed embodies the whole arrangement between the parties entering into the Contract All previous correspondence, negotiations, representation, explanations statements, promises or guarantees (whether oral or written) as are not included with the Contract as executed, shall normally be excluded in the interpretation of the Contract.

73.0 COMPLETION DRAWING

Completion drawing including detailed construction drawing shall have to be submitted in original with 6 (six) copies of prints of each. The original drawings shall be drawn on thick polyester film approved by the Engineer-in-Charge. Scale and size of drawings shall also be as specified by the Engineer-in-Charge. Soft copy of drawing copied in CD/DVD should be submitted in addition. No extra payment will be made for it. The Completion drawings are to be got approved by the Employer and shall have to be submitted before the issue of certificate of final acceptance as in Clause C-57 (6).

Superintending Engineer, West Circle
MunicipalEngineering Directorate

SECTION – D

GENERAL SPECIFICATIONS OF WORKMANSHIP AND MATERIALS FOR CIVIL WORK

1.0 GENERAL

1.1 General Materials

- 1.1.1 All materials used in the temporary works shall be of the best quality of the kind and to the approval of the Engineer-in-Charge. Any material not covered by these Specifications, shall comply with the relevant latest Indian Standard Specifications (Referred to as IS as revised or modified up-to the date one month prior to Tender date). British or American Standard Specifications shall be referred to in case any particular specification is not available in any of the aforesaid Specifications. For materials not specified in the aforesaid, direction of the Engineer-in-Charge shall be followed. All disputes shall be referred to the Employer, whose decision shall be final and binding.
- 1.1.2 Samples of materials to be supplied and used, by the Contractor in the works shall be to the prior approval of the Engineer-in-Charge. For this purpose, the Contractor shall furnish in advance representative samples in quantities and in the manner as directed by the Engineer-in-Charge for his approval. Materials brought to the Site, which in the option of the Engineer-in-Charge do not conform to the approved sample, shall, if so directed by him, be removed by the Contractor from the Site and replaced by the materials of approved quality.
- 1.1.3 In spite of approval of the Engineer-in-Charge of any materials brought to the site, he may subsequently reject the same if in his opinion the material has since deteriorated due to long or defective storage or for any reason whatsoever and is thereby considered unfit for use in the temporary works. Any material thus rejected shall be immediately removed from the Site at Contractor's cost and expense.
- 1.1.4 All materials brought to the Site shall be properly stored and guarded in the manner as directed by the Engineer-in-Charge and to his satisfaction.
- 1.1.5 The Engineer on written request of EIC may carry out test of materials as he may decide. The Contractor shall, at his cost and expenses, for this purpose supply requisite materials and render such assistance to the Engineer-in-Charge as he may require.

1.2 Workmanship

All works are to be carried out in proper workman like manner. Items of works not covered by these Specifications or by other tender documents shall be carried out as per best practice according to the direction of the Engineer-in-Charge and to his satisfaction. The relevant IS Specifications or in case of necessity British or American Standard Specifications shall be taken as guide for the purpose.

1.3 Works Included

The rates for all items, unless specifically stated otherwise in the Contract, must cover the cost of all materials, labours, tools, machinery, plant, pumps, explosives, scaffolding, staging strong props, bamboos, ropes, templates, pages and all appliances and operations whatsoever necessary for efficient execution of work.

1.4 Ground Conditions

The Contractor is to visit the site and ascertain local conditions, traffic restrictions and obstructions in the area and allow for extra expenses likely to be incurred due to any limitations whatsoever. The Finished ground level (FGL) have to obtained by the bidder and quoting the rate by E.I.C in written.

1.5 Setting Out and Levelling

The Contractor is to set and level the works, and will be responsible for the accuracy for the same. He is to provide all instruments and proper qualified staff required for checking the Contractor's work.

1.6 Safety

The Contractor shall take, adequate precaution to provide complete safety for prevention of accidents on the site.

1.7 Keeping Works Free from Water

The Contractor shall provide and maintain at his own cost, electrically or other power-driven pumps and other plant and equipment to keep site excavated foundation pits and trenches free from surface as well as subsoil/leakage water from any other source thereof and continue to do so to the complete satisfaction of the Engineer-in-Charge till the site is handed over. Method of dewatering shall need approval of the Engineer-in-Charge but no payment whatsoever is allowed on this count.

1.8 Rubbish

1.8.1 The Contractor shall clear all rubbish, vegetation, roots, soda etc., and dump them in the area indicated to the satisfaction of Engineer-in-Charge. No separate rate shall be allowed for the above work.

1.8.2 After the work is completed, the Contractor shall clear the area surrounding the buildings, all hutments and excess stores and remnants of building materials such brick bats, metal, sand, timber, steel etc.

1.9 Bench Marks and Ground water Gauges

The Contractor shall protect surveyor's benchmarks and ground water gauges, zero-line marks and base line marks and base line marks from damage of movement during work.

1.10 Inspection

The Contractor shall inspect the Site of works and ascertain site condition and the nature of soil to be excavated.

1.11 Contractor's Staff

The Contractor must provide at all times efficient staff of trustworthy, skilful and experienced assistance capable of carrying out the work in accordance with the drawings and specification and to correct levels. The cost this establishment should be included in his rates.

1.12 Method of Measurement

Unless otherwise specified, the method of measurement for building works shall be as per IS: 1200.

2.0 EARTH WORK IN EXCAVATION & FILLINGS

2.1 General

Applicable provisions of Conditions of contract shall govern work under this section.

2.2 Excavation for Foundation, Trenches, Pit etc.

The excavation work shall be carried out in all kinds of Soil including Sand in workman like manner without endangering the safety of the nearby Structures or works without causing any hindrance to other activities in the area. The existence of old buildings, boundary walls, hutment, sewer lines, water lines, if any very close to the area of excavation should be given careful consideration while designing carrying out the excavation work. The excavation shall be done in such method as would technically be appropriate and befitting the site conditions subject to the approval of the Engineer-in-Charge. All foundation trenches shall be excavated to the full width and depths shown on the approved drawing or to such ordered to the Contractor. The Contractor shall not undertake any earthwork without having obtained prior approval from the Engineer-in-Charge to the methods he proposes to employ in order to execute the work in the most efficient manner. He shall not modify such methods without the approval of the Engineer-in-Charge. This approval, however, shall not in any way make the Engineer-in-Charge responsible for any consequent loss or damage.

- 2.2.1 Should any excavation be taken down the specified levels, the Contractor shall fill in such excavation at his own cost with concrete as specified for foundations, well rammed in position until it is brought up to the specified level.
- 2.2.2 The Contractor shall notify when the excavation is completed and no concrete or masonry shall be laid until the soil for each individual footing, rafts etc. is approved.
- 2.2.3 The Contractor shall keep the site clear of water at all times. To this end he shall provide arrangements for bailing and pumping or any special arrangements as required within his quoted prices.
- 2.2.4 All foundation pits shall be refilled to the finished ground level (formation level) with approved materials, which shall be suitably consolidated in layers to the satisfaction of the Engineer-in-Charge.
- 2.2.5 Nothing extra will be paid for bailing out water collecting in excavation due to rains, ordinary springs, leakage from any other sources etc., or any other reason.
- 2.2.6 For the work of excavation the Tenderer shall include in his quotation the shoring, sheeting, bracing and sheet piling (if required). The quotation shall also include the cost of compaction of foundation sub-base, removal and storage of excavated materials and back filling.

2.3 Shoring

Timber shoring whenever required shall be closed boarded with minimum 50mm thick good and seasoned timber planks of sufficient length driven side-by-side to the required depth. The gaps between adjacent timber planks shall such would not allow any flow of soil particles, if necessary, the sides of the planks shall be planed smooth to ensure this. Sufficient numbers of bracing struts, walling etc. are to be provided to make the shoring rigid and non-yielding by earth pressure. Where necessary, sheet piling shall be done to ensure safety to the adjoining structures, if it is found that it is not feasible to protect the structure by timber shoring only. The Tenderer is strongly advised to inspect the site before tendering and apprise himself of the requirement of any Sheet piling in addition to the timber shoring before submitting his Quotation accordingly.

2.4 Back Filling

The space around the foundations in trenches or sites shall be cleared of all trash and loose debris and filled with approved excavated earth, all clods being broken up to the finished G.I. Filling shall be done in 200mm layers, each layer to be properly moistened and well rammed. Excavated materials which is surplus or which is consolidated unsuitable for back filling shall have to be disposed of in spoil dumps as directed by the Engineer-in-Charge. No extra payment will be made for this.

3.0 CONCRETE

3.1 General

3.1.1 Applicable provisions of Conditions of Concrete shall govern work under this section.

3.1.2 All concrete work, plain or reinforced shall be carried out strictly in accordance with this specification and any working drawing or instructions given from time to time to the Contractor.

3.1.3 The Contractor's states shall allow for wastages in all materials as well as for all tests of materials and concrete.

3.1.4 No concrete shall be cast in the absence of the Engineer-in-Charge or any other person duly authorized by him. The Contractor's Engineer shall personally check that both the form work and reinforcement have been correctly placed and fixed, and shall satisfy himself that all work preparatory to the casting is completely ready, before informing the Engineer-in-Charge for final inspection and approval and for which purpose at least 24 hours' notice shall be given by the Contractor.

3.1.5 The Indian Standards wherever referred to herein shall be the latest addition of such standards.

3.2 CEMENT

The IS code for Portland Pozzolana Cement (PPC) is **IS 1489 (Part 1)** for fly-ash based cement and **IS 1489 (Part 2)** for calcined clay-based cement. and the IS code for Portland Slag Cement (PSC) is **IS 455:1989** shall be used.

Cement shall conform for IS: 12269; 1987 Cement tests shall have to be carried out at Contractor's expense as and when directed. Cement, which has or practically set, shall not be used under any circumstances. *The brand of cement used for the work will selected & approve by the E.I.C in writing before execution of work.*

3.3 AGGREGATES

The fine and coarse aggregates shall conform to all provisions and test methods of IS: 383 and/or IS: 515. Samples of aggregates, proposed to be used in the work shall be submitted free of charge in sufficient quantities to the Engineer-in-Charge with sieve analysis and other physical and chemical analysis data for his approval. He will preserve approved samples for future reference. This approval will not in any way relieve the Contractor of his responsibility of producing of specified qualities.

3.3.1 Coarse Aggregates

Coarse aggregates for use all reinforced and other plain cement concrete works shall be crushed black granite trap stone obtained from approved source and shall consist of uncoated, hard, strong dense and durable pieces of crushed stone, and be free from undesirable matters, viz. Disintegrated stones soft, friable, thin, elongated or laminated pieces, dirt, salt, alkali, vegetable matter or other deleterious substances. The aggregates shall be thoroughly washed with water and cleaned before use to the satisfaction of the Engineer-in-Charge at no extra cost of the Employer.

The maximum size of coarse aggregates shall be as follows unless specified otherwise elsewhere.

Reinforced Concrete : 20 mm

Plain Concrete : 20 mm

Thin R. C. C. Members

With very narrow space : 12 mm.

Mat/Lean Concrete : 20/40 mm.

(The actual size to be agreed by the Engineer-in-Charge)

Grading of coarse aggregates for a particular size shall generally conform to relevant I.S Codes and shall be such as to produce a dense concrete of the specified proportions and or strength and consistency that will work readily in position without segregation.

3.3.2 Fine Aggregates

Sand shall be clear River sand brought from approved source and consist of siliceous material, having hard, strong, durable uncoated particles, free from undesirable matters viz. dust lumps, soft or flaky particles or other deleterious substances. The amount of undesirable shall not exceed the percentage limits by weights as specified in relevant IS Codes. Washing of aggregates by approved means shall be carried out, if desired by the Engineer-in-Charge, at no extra cost to the Employer.

Coarse and fine sand shall be well graded within the limits by weight as specified in relevant IS Code. Fineness Modulus shall not vary by more than plus or minus 0.20 from that of the approved sample. Fineness Modulus for sand should not be less than 2.5.

3.4 REINFORCEMENT

3.4.1 The Contractor shall prepare and furnish to the Engineer-in-Charge, Bar Bending Schedules in considerations of the approved drawings for all R.C. C. works for review and checking by the Engineer-in-Charge well before taking up the work.

3.4.2 The High Yield strength deformed bar (HYSD) shall conform to IS: 1786-1990.

All steel for reinforcement shall be free from loose, oil, grease, paint or other harmful matters immediately before placing the concrete.

3.4.3 The Reinforcement shall be bent to the shapes shown on the approved drawings prior to placing and all bars must be bent cold. The Steel shall be placed in such a way that it is rigidly held in position while concrete is being cast. The correct clearance from the form shall be maintained by either pre-cast mortar blocks or by metal supporting chairs to be supplied by the Contractor free of charge.

The intersection of roads crossing one another shall be bound together with soft pliable with No. 16 to 18 SWG at every intersection so that reinforcement will not be displaced in the process of depositing concrete. The loops of binding wire should be tightened by pliers and welding of reinforcement for lapping & binding should be done if desired by E.I.C. No extra payment will be made for this purpose.

3.4.4 The work of reinforcement shall also be inclusive of stirrups distribution bars, binders, initial straightening and removing of loose rust, if necessary, cutting to requisite length, hooking and bending to correct shape, placing in proper position including supplying and binding with block annealed wire as stated in clause 3.4.3 above.

3.4.5 The brand of steel for OHR construction shall be SAIL/TATA/RINL

3.5 WATER

The Water shall be clean and free from Alkali oil or injurious amounts of deleterious materials. As far as possible, the water is of such quality that it is potable. If any chemical analysis of water is necessary and ordered, the same shall be carried out at an approved laboratory at the Contractor's cost and expenses.

3.6 CONCRETE PROPORTIONING

- 3.6.1 The concrete proportions shall be as indicated on the approved drawings and shall conform to IS: 456 & IS: 3370. The quality and character of concrete shall be governed by IS: 10262. It should be sampled and analysed as per IS: 1199. The concrete should stand the test specified in IS: 516.
- 3.6.2 The minimum cover of main reinforcement shall be as per relevant IS: Codes. Cover to any reinforcement of R.C.C. piles shall be minimum 65 mm in case in-situ and 50 mm in case of pre-cast piles. Suitable spacer blocks shall be provided at intervals not exceeding 1.2 m. throughout the length of the pile.
- 3.6.3 The workability shall be measured by slump. Slump for different grades of concrete shall not exceed following unless specifically permitted by the Engineer-in-Charge.
- i) For M 15(1;2:4) concrete - 3.75 cm.
 - ii) For M 20 concrete - 2.50 cm.
 - iii) For M 25 concrete – 2.00 cm
- 3.6.4 All concrete works shall be thoroughly compacted and fully worked around the reinforcement, around embedded fixtures and into comers of the form work.

The Concrete shall be thoroughly and shall be efficiently vibrated during laying. The use of mechanical vibrators shall comply with IS: 2608, IS: 2506 and IS: 456. Whenever vibration has to be applied externally, the design of formwork and deposition of vibration shall receive special consideration to ensure efficient compaction and to avoid surface blemishes.

3.7 WORKMANSHIP

- 3.7.1 All Concreting work shall be carried out according to the IS: 456, IS: 3370, and other related codes. It should, however, be noted that for every 15 M3 of concrete placed or for every one day's volume of concrete whichever is lower, a minimum of 3 (three) Cubes shall be kept for test purpose, and tested at the Contractor's cost and expenses at a Laboratory as approved by the Authority. The number of test cubes may, however, be altered at discretion of the Engineer-in-Charge. It is compulsory to test 3 (three) cubes in each case.
- 3.7.2 Structural Concrete

Design mix Concrete shall be on all concrete works except in case of Mud-mat concrete lean concrete where nominal mix concrete will be allowed.

Design mix Concrete will be used in Reinforced Concrete Structures and shall not be less than Grade of M20. The mix shall be designed to produce the grade of concrete having required workability and a Characteristic Strength not less than appropriate values given in IS: 456 - 2000. For mix design, procedure given in Indian Standard recommendation i.e., IS: 10262 with latest amendments shall be adopted. As long as the quality of materials does not change a mix design done earlier may be considered adequate for later work. Batching mixing, sampling and Strength Test of concrete shall be carried out in compliance with the relevant clause of IS: 456-2000 and all other relevant Indian Standards recommended therein. Proper admixtures of reputed brand should be used to maintain workability and in making concrete for water retaining structures with prior approval of E.I.C.

The mix design by the Contractor shall be used for works only after obtaining approval of mix design and written order thereafter of the Engineer-in-Charge. Mix design shall be entirely the responsibility of the Contractor and any approval by the Engineer-in-Charge shall not relieve him of his responsibility in respect thereof.

The Contractor shall prepare all the Calculations, Tabulations, Graphs etc. pertaining to Mix Design Test result and supply copies of such Calculations, tabulations, Graphs etc. required by the Engineer-in-Charge.

On proportioning concrete, the quantity of both cement and aggregate shall be determined by weight, where the weight of cement is determined on the basis of weight per bag a reasonable number of bags be weighed periodically to check the net weight or should be either weighed or measured by volume in calibrated tanks, All measuring equipment's shall be maintained in a clean serviceable condition and shall periodically checked for accuracy.

The grading of coarse and fine aggregates shall be checked frequently and frequency of testing shall be determined by the Engineer-in-Charge. Where weight batching is not possible or practicable, the quantities of coarse and fine aggregates may be determined by volume but cement in any case shall be weighed by weight only. If fine aggregate and volume batching is adopted, allowance shall be made for bulking. The bulking shall be determined in accordance with IS: 2386 (Part-III).

The Water-Cement Ratio shall be maintained to its correct value. Surface moisture content of aggregate shall be determined as per IS: 2386 (Part-III) and the amount of water to be added shall be adjusted accordingly to maintain the correct Water-cement ratio.

During the progress of work in order to ensure correct strength of concrete proper control should be exercised by the Contractor as specified in Specifications mentioned in the Clause 3.7.1 above. Test strength of every sample shall be determined in accordance with the recommendations of IS: 456-2000. If one out of ten consecutive test cubes shows a deficiency in strength up-to a maximum limit of 10%, the concrete will be deemed satisfactory. If two of the test cubes out of ten shows a deficiency in strength up to a limit of 10%, the concrete shall be deemed to be less satisfactory and a reduction of 1 % will be made on the cost of such concrete. If three out of ten test cubes show deficiency in strength up to a limit of 10%, a reduction of 5% will be made on the cost of such concrete. If more than three test cubes show a deficiency in strength up-to a limit of 10% a reduction of 10% will be made on the cost of such concrete. If more than five shows a deficiency in strength up-to a limit of 10%, the concrete shall be rejected. Such rejected concrete work shall have to be dismantled and replaced to the satisfaction of the Engineer-in-Charge by the Contractor free of cost to the Employer. No payment for the dismantled concrete, the relevant formwork and reinforcement, embedded fixtures etc. wasted in the dismantled portion, shall be made. In the course of dismantling, if any, damage is done to the embedded items or adjacent structures, the same shall also be made good free of charge by the Contractor to the satisfaction of the Engineer-in-Charge.

If the deficiency in strength of one-test cubes exceeds the 10% limit, a reduction of 5%) will be made on the cost of such concrete. if the deficiency in strength to two out of ten test cubes exceeds the 10% limit, a reduction of 10% will be made on the cost of such concrete. If the deficiency in strength of three out of ten test cubes exceeds the 10% limit, a deduction of 20% on the cost of such concrete will be made.

With permission of the Engineer-in-Charge for any above mentioned grades of concrete, if the quantity of water has to be increased in special cases, cement shall also be increased proportionally to keep the ratio of water to cement same as adopted in trial mix design for each grade of concrete. No extra payment for additional cement will be made.

3.9 FORM WORK

3.9.1 The Form Work shall conform to IS: 456. Whenever necessary, shuttering must be provided.

The work shall also include providing all necessary staging, centring, shuttering & formwork for placing concrete. Shuttering may be of approved dressed timber true to line, not less than 37 mm. thick. Surface to be in contact with concrete are to be planed smooth. Alternatively, sufficiently rigid plywood shuttering or steel shuttering may be used. In every case, joints of the shuttering are to be such as to prevent the loss of liquid from the concrete. In timber shuttering the joints shall, therefore, be either tongued or grooved or the joints must be perfectly close and lined with draft paper polythene films or other types of approved materials. In case of plywood or steel shuttering also the joints are to be similarly lined. All shuttering and framing must be adequately stayed and braced to the satisfaction of the Engineer-in-Charge for properly supporting the concrete, during concreting and the period of hardening. It shall be so constructed that it may be removed without shock or vibration to the concrete. No through bolts are allowed for holding the shuttering in water retaining structure.

3.9.2 Cleaning, Treatment and Removal of Forms

All forms shall be thoroughly cleaned of old concrete, wood shavings, saw dust, dirt and dust sticking to them before they are fixed in position. All rubbish loose concrete chippings, shavings, saw dust etc. shall be scrupulously removed from the interior of the forms before the concrete is poured. Formwork shall not be used/reused, if declared unfit or unserviceable by the Engineer-in-Charge.

If directed by the Engineer-in-Charge, compressed air jet/or water jet shall be kept handy along with wire brushes, brooms etc. for the purpose of cleaning.

Before shuttering is placed in position, the form surface in contact with the concrete shall be treated with approved non-staining oil or composition. Care shall be taken that the oil or composition does not come in contact with reinforcing steel or existing concrete surface. They shall not be allowed to accumulate at the bottom of the shuttering.

Forms shall be struck in accordance with the relevant clause of IS: 456 or as directed by the Engineer-in-Charge. The Contractor shall record on the drawings or in other approved manner, the date in which the concrete is placed in each part of the work and the date on which the form work is removed there from and have this recorded checked and countersigned by the Engineer-in-Charge.

The Contractor shall be responsible for the safe removal of the formwork, but the Engineer-in-Charge may delay the time of removal if he considers it necessary. Any work showing signs of damage through premature removal of formwork or loading shall be entirely reconstructed without any extra cost to the Employer.

3.10 PROTECTION AND CURING OF CONCRETE

Newly placed concrete shall be protected by approved means; from rain, sun and wind and extreme temperature. Concrete placed below the ground level shall be protected from falling earth during and after placing. Concrete placed in ground containing deleterious substance shall be kept free from contact with such ground or, with water draining from such ground during placing of concrete and for a period of at least 3 (three) days or as otherwise directed by the Engineer-in-Charge, the ground water around newly poured concrete shall be kept to an approved level by pumping or other approved means of drainage at the cost of the Contractor. Adequate steps shall be taken to prevent flotation or flooding. Steps, as approved by the Engineer-in-Charge, shall be taken to protect immature concrete from damage by debris, excessive loading, vibration, abrasion, mixing with earth or other deleterious materials, etc. that may impair the strength and durability of the concrete.

As soon as the concrete has hardened sufficiently for the surface to be marked it should be covered with Hessian, canvas, or similar materials and kept continuously wet for at least 7 (seven) days after final setting. This period may be extended at the discretion of the Engineer-in-Charge, up-to 14 (fourteen) days. Concrete slabs and floors shall be cured by flooding with water of minimum 25 mm depth for the period mentioned above.

Approved curing compounds may be used in lieu of moist curing with the permission of the Engineer-in-Charge. Such compound shall be applied to all exposed surface of the concrete as soon as possible after the concrete has set. No extra payment is allowed on such count.

3.11 CONCRETE FINISH

The Concrete surface on removal of form work shall be such that no finish is necessary, If, however, the surfaces is not satisfactory the Contractor shall, if so instructed, remove unwanted, projecting parts by chipping and smoothing the surface with cement rendering at his own expenses. The shutter marks shall invariably be removed by rubbing with carborandum stone. The Contractor shall therefore take all precaution for avoiding the shutter marks.

3.12 Contractor's Supervision

The Contractor shall provide constant and strict supervision of all the items of construction during progress of work, including the proportioning and mixing of the concrete and bending and placing of reinforcement. Any important operation such as concreting or stripping of form work adequate notice shall be given in advance.

The cement and sand shall be thoroughly mixed dry in specified proportions. Water shall then be added just sufficient to make a stiff and workable paste. The mortar shall be used within half an hour of mixing.

4.0 BRICK WORK

- 4.1 The Contractor shall build all brickwork uniformly no one portion being raised more than 1 meter above another at a time. The joints shall not exceed 12 mm. in thickness and should extend the full thickness of the brickwork. All joints shall be properly raked and the surface washed down.
- 4.2 All the bricks shall be kept fully immersed in water at least for a minimum period of six hours till they are completely soaked and only thoroughly soaked bricks shall be used in the work.
- 4.3 The Contractor shall keep wet all brickwork for at least 10 (ten) days after laying. The surface of unfinished work shall be cleaned and thoroughly wetted before joining new work to it.

Superintending Engineer, West Circle
Municipal Engineering Directorate

SECTION - E

Specification for supply of Ductile Iron (K9/K7) pipes & DI Fittings :

The successful L1 Bidder should supply DI(K9/K7) Pipes & Fittings as per criteria as laid down in Annexure- I , II, & III

Annexure- I

Procurement of DI pipes from bonafide manufacturers with having:

- I. The previous experience certificate of the manufacturer for supply of D.I. Pipes to Govt./PSU/reputable Private Sector bodies to be submitted, but such experience is not mandatory.
- II. Certificate to ensure that the installed pipe manufacturing capacity of the factory is sufficient to cater to the tendered requirement.
- III. Valid BIS certification of the manufacturer for each & individual dia meter of pipe tendered.
- IV. External coating of the pipes will be bituminous /epoxy over zinc coating and inside cement mortar lining as per 15:8329:2000

- V. Certificate from the reputable Govt. Institutions/Universities is essential for eligibility to participate to ensure desired hydraulic smoothness of cement mortar lining in the DI pipe the minimum Hazen William's 'C' value of 140 corroborating the guideline of CPHEEO Manual for Water Supply and Treatment.
- VI. Providing rubber gasket conforming to IS 5362:1985 for each of the joints admissible.
- VII. Third Party inspection (TPI) through RITES/MECON/EIL/PDIL of the pipe is mandatory before delivery of pipes. TPI report should cover (I) all the parameters as per IS: 8329:2000, (II) test to ensure rubber gasket quality as per IS code. The inspection charge is to be included in the quoted rates.
- VIII. The sampling size will be guided as per relevant IS Code.
- IX. The manufacturer should have valid Certificate from Pollution Control Board.

All the above noted documents to be submitted by the successful bidder to the concerned Superintending Engineer, West Circle for necessary approval prior to execution

Annexure-II

Procurement of DI fitting from bonafide manufacturers having:

- I. Valid certificate from Pollution Control Board.
- II. Valid BIS Certificate for their products as per BIS 9523/2000.
- III. Previous Experience Certificate but that is not mandatory.
- IV. Certificate / undertaking to ensure that the installed fittings manufacturing capacity of the factory is sufficient to cater to the tendered requirement.
- V. The company should have fully equipped laboratory within house Microscope to check Modularity and spectrometer to check Chemical composition besides Tensile, hardness & elongation testing universal testing machine. The laboratory of the manufacturer should be accredited by NABL
- VI. As per Clause 6.2 of IS: 9523 the Design of Socket and Rubber Gasket are not within the scope of the specification. So the manufacturer has to submit the Joint Performance report in line with the provisions laid down in ISO 2531 duly witnessed by any reputed Indian or International Inspection Agency. The accreditation of the Inspection Agency should be linked to National Accreditation Board of Certification Bodies (NABCB) for Indian Agencies or International

Accreditation Forum (IAF) or European Cooperation for Accreditation (EA) or ANSI-ASQ National Accreditation Board (ANAB).

VII. Third Party Inspection (TPI) through RITES/MECON/EIL/PDIL of the fittings is mandatory before delivery of the fittings. TPI report should cover (i) all the parameters as per IS: 9523:2000, (ii) test to ensure rubber gasket quality as per IS code 5382:1985. The inspection charge etc is to be include

All the above noted documents to be submitted by the successful bidder to the concerned Superintending Engineer West Circle for necessary approval prior to execution

Annexure-III

The OPVC/HDPE pipes and specials are to be tested from CIPET (Bhubaneswar/Haldia/Chennai). Pipes of each diameter have to be tested after its delivery at site. Test pieces will be drawn by the officers of Concerned Division, ME Dte. and will be sent to CIPET for testing. Charge of testing, carriage of test pieces to the testing laboratory will be borne by the contactor. If any fault is detected in test report all the pipes of the same batch will be rejected and that is to be replaced by good quality pipes. No extra cost will be provided for the same.

Superintending Engineer, West Circle
Municipal Engineering Directorate

SECTION – F

GENERAL TECHNICAL SPECIFICATION

1.0 SUB-SOIL REPORT

Sub-soil investigation is to be carried out by soil-experts engaged by the contractor at the site of all OHRs, CWRs and pipe carrying steel bridge as applicable

The Bidder should satisfy himself about the adequacy of the data for the design of pile foundation. Records of such sub-sand investigation such as borehole logs, soil samples, SPT values etc., shall be done by the contractor duly witnessed and authenticated by the Engineer in Charge or his competent authorized representative.

In the event of variation in soil data between that of Bid inviting authority and those obtained by the contractor during execution, the more conservative values obtained from the two sets of reports shall be adopted for design without any extra claim over the quoted price as accepted by the Department, unless otherwise permitted by the undersigned.

2.0 BID DRAWINGS

All drawings are part of Bid & are attached in annexure.

3.0 DESIGN CRITERIA OF THE DESCRIBED PROJECT

3.1. Design standards

- | | | |
|----|---|---|
| a) | Loading Standards | IS: 875 |
| b) | Earthquake Resistant Design | IS: 1893 & IS: 4326 |
| c) | Reinforced and Plain Concrete | IS: 456, 2000 |
| d) | Foundations | IS: 1080, IS: 2950 , IS: 2911 & IS: 2974 |
| e) | Liquid Retaining Structures | IS: 3370 |
| f) | Structural Steel | IS: 800 |
| g) | Reinforcement Mild Steel | IS: 456 & IS: 432 |
| | Ribbed Tor Steel | IS: 1786 & IS: 1139 |
| h) | Masonry and Brickwork | IS: 1905 & ISS: 2212 |
| i) | National Building Code of India | IS: 2910 |
| j) | Design & Construction of Pile Foundation | IS: 2911 |

(Considering the latest edition of the code)

If pile foundation is obligatory as per Report, piles shall be bored Cast-in-situ R. C. C. Piles. The design, construction and workmanship for these piles shall fully conform to and satisfy the requirements of IS: 2911 (Latest Edition). Concrete to be used in Piles shall be of M-25 Grade having Cement content not less than 400 kg/m³. Reinforcement in piles shall be in conformity with the requirements contained in IS: 2911 (ii). The minimum area of Longitudinal Reinforcements shall be as per requirements and such requirements shall be provided for the full length of piles. For piles subject to Upward Tension, reinforcement shall be provided throughout the full length and such reinforcement shall be designed on the basis of upward load they are supposed to carry.

The safe working loads of the R. C. C. Cast-in-situ bored piles should be that as computed as per IS: 2911 on the basis of Sub-soil Parameters of the Site with a minimum Factor of Safety 2.5 (Compression) and 3.00 (Up lift) applied there on or that indicated in a table, whichever is less.

Pile termination levels shall be chosen carefully. The safe working load of the piles shall be substantiated by Routine Load Test. The Pile termination level shall not be reduced from that stated herein above unless otherwise permitted by the Engineer-in-Charge.

These Piles shall be designed for Seismic Condition also. The Importance factor for Seismic Analysis of Structure shall be 1.50. The Bidder shall include in his Lump Sum price the cost for Load Test of at least working pile (Routine Test) per 100 piles or part thereof. The testing should be as per Code Stipulations.

3.2. While designing the Foundation of different structures, the Bidder may use the Soil Investigation results enclosed in the Bid.

4.0 DESIGN DRAWING AND OTHER INFORMATIONS TO BE SUBMITTED BY THE CONTRACTOR (SUCCESSFUL BIDDER)

4.1. On the award of the Contract, Contractor shall execute the work as per Departmental drawing submitted with the Bid for Super-Structure work, However, Sub-Soil investigation should be done by the contractor prior to commencement of work. In the event of variation in soil data between that of Bid inviting authority and those obtained by the contractor during execution, the more conservative values obtained from the two sets of reports shall be adopted for design without any extra claim over the quoted price as accepted by the Department, unless otherwise permitted by the undersigned.

A tentative work Program in Network Diagram using CPM & Bar Chart technique is required to be submitted by the successful Bidder within a fortnight from the date of issue of the letter of acceptance. The drawings from foundation onward will have to be submitted by the successful Bidder successively as per the work Program to be approved by the Engineer-in-Charge. Adequate resources are to be mobilized during execution of the work, for which no extra payment shall be made.

4.2 Completion of Drawings and Other Documents to be submitted the Contractor. The Contractor shall submit within one month after the completion of all construction works the followings drawings and documents free of cost.

a) Six copies of all approved Completion drawings. These drawings shall be on black and white prints of thick paper and there shall be one transparency of each drawing. These drawings are to be submitted in a presentable form as directed by the undersigned In addition to this, CD/DVD's with folders of these drawings drawn in Auto CAD or scanned copies are to be submitted.

b) Three copies of final designs in properly bound form as directed by the Superintending Engineer, West Circle, Municipal Engineering Directorate.

4.3 Release of Security Deposit (Retention Money):- The Security Deposit (Retention Money) shall not be released until all the above-mentioned Completion Drawings and Documents (as per Clause 7.2) are submitted by the Contractor.

Superintending Engineer, West Circle
Municipal engineering directorate

Section – G

TECHNICAL SPECIFICATION OF MAJOR E/M EQUIPMENTS FORCWR-I & II UNDER DUBRAJPUR MUNICIPALITY

This is indicative not exhaustive, will be finalized in detail engineering.

1.00.00 GENERAL INFORMATION

There will be adequate number of pumps which are to be located at the Pump House. The Clear Water pumping station shall be as under:

The horizontal axially split centrifugal pumps are to be installed in a dry pit for horizontal execution. The prime mover would be squirrel cage induction motor. Connection of pump & motor shall be with flexible coupling. The vibration level shall be 50 microns both in

horizontal & vertical direction, sound level of maximum 85 db.during running condition of pump & motor at a distance of 1.50 mtr. The pump shall be supplied with base plate, grounding pad, lifting lug, eyebolts, foundation bolts, and nuts, flexible coupling, coupling guard etc. The pump shall have provision for fixing pressure gauge, vent pipe, etc.

- The Pump models shall be selected in such a manner that apart from the present duty condition mentioned above, the future duty condition of 10% increase in flow and corresponding increase in Head could be achieved by changing only the impeller assembly. The price is to be quoted for pumps with present duty condition. Necessary Data from the pump manufacturer is required to be submitted including family curve of the offered model by the successful tenderer. Further during detail engineering, the pump head may undergo a change up to a maximum of (+) 10%. Pump rotational speed shall not exceed 1500 rpm (syn.).

2.00.00 SPECIFIC REQUIREMENTS

Design

The design, manufacturing, performance of the horizontal centrifugal axially pumps as specified hereinafter, shall comply with the requirements of applicable codes, the latest applicable Indian/British/American/DIN standards, in particular and in that order of application, the following.

- 2.01.01 IS 1520 Horizontal centrifugal pump for clean, cold, fresh water.
- 2.01.02 IS 5120 Technical requirements, rotodynamic special purpose pumps.
- 2.01.03 IS 9137 Code for acceptance test for centrifugal, mixed flow and axial pumps - Class C.
- 2.01.04 Hydraulic Institute Standards.
- 2.01.05 BS 599 Methods for Testing Pumps.
- 2.01.06 BS 5316 Acceptance tests for centrifugal, mixed flow and axial pumps.
- 2.01.07 PTC 8.2 Centrifugal Pumps-Power test codes.
- 2.01.08 The materials of the various components shall be as per data sheet or equivalent material conforming to applicable IS/BS/ASTM/DIN Standards in that order of application.
- 2.01.09 In case of any contradiction between the aforesaid standards and the stipulations as per the technical specification as specified hereinafter, the stipulations of the technical specification shall prevail. In case of contradiction between this specification and the pump data specification sheets enclosed, stipulations of the data specification sheets shall prevail.

3.00.00 GENERAL PERFORMANCE REQUIREMENTS

- 3.01.00 The pump shall be designed to have best efficiency at the specified duty point. The Pump set shall be suitable for continuous operation at any point within the — 'Range of Operation', so as to match with the system resistance curve.
- 3.02.00 Pumps shall have a continuously rising head capacity characteristics from the specified duty point towards shut off point, the maximum being at shut off.
- 3.03.00 Pumps shall be suitable for parallel operation. The characteristics curves such as head vs. capacity, KW vs. capacity EFFICIENCY vs. capacity etc., shall match to ensure equal load sharing and trouble-free parallel operation throughout the range. In the event of tripping of one of the operating pumps, the other operating pumps shall be capable of

passing the maximum flow through it as dictated by the system resistance corresponding to both maximum and minimum water level in the pump suction sump.

3.04.00 The pump motor set shall be designed in such a way that there is no damage on account of any reverse flow through the pump which may occur due to any abnormal operation of the system.

3.05.00 Where reverse flow through the pump is specified in data specification sheets, the drive motor shall be capable of bringing the pump to its rated speed in the normal direction from the point of maximum possible reverse speed without injurious heating, when power to the motor is restored with a minimum voltage of 90% at the motor terminal.

External head that may be imposed on the pump under reverse flow condition is to be decided by the Bidder after analysing the complete system and the particular abnormal condition of run. However, any specific requirement as mentioned in the Pump Data Sheet shall be adhered to Torque-speed curve for pump and motor for such reverse flow condition shall have to be submitted along with the offer.

4.00.00 **DESIGN & CONSTRUCTION**

4.01.00 **Pump type**

Pump shall be axially split case, single volute, double suction, mixed flow type and shall be constructed in a manner that they can be placed on their foundation with their shaft in horizontal axis.

4.02.00 **Casing**

The casing shall be a single volute, double suction design and shall be so constructed that when it will be placed on its existing foundation the integrally cast with one half of the casing so that the other half of the casing can be removed without having to disturb the suction and discharge pipelines. A suitable fixture shall be provided with each pump for easy removal of one half of casing, which will have no connection with the pipelines, for inspection and / or replacement of the Rotating Elements.

4.03.00 **Impeller**

The impeller shall be double entry type and dynamically balanced.

4.04.00 **Wearing Rings**

Casing wearing rings shall be provided with torque and groove arrangement to prevent rotation and shall be easily removable.

4.05.00 **Impeller Shaft**

The impeller shaft shall be ground finished on its entire length and shall be protected with sleeves so that the shaft itself cannot come into contact with the actual liquid pumped.

4.06.00 **Sleeves**

Sleeves shall be keyed onto the shaft and located by grub screws to prevent relative rotation between the sleeve and the shaft. The impeller shall be kept in position on the shaft by means of two sleeves, which in turn shall be locked by means of suitably designed sleeve nuts.

4.07.00 **Stuffing Box**

The Stuffing box shall be an integral part of the casing and shall be fitted with lantern rings. The lantern rings shall be sandwiched between gland packings. The packings inside the stuffing box shall be held in position by glands.

4.08.00 **Glands**

The glands shall be designed to facilitate easy removal for inspection and replacement of packing.

4.09.00 **Bearings**

Adequate capacity thrust bearings ball/roller shall be provided to take the full axial thrust of the pump as well as the weight of the pump-rotating element. Thrust bearing shall be placed in the non-driving end of the pump and shall be grease lubricated anti friction type and ball bearing shall be placed in the driving end of the pump and shall be grease lubricated anti-friction type. Suitable Temperature detectors shall be provided for both DE & NDE side and the signal from the same shall be hooked up to the Control Desk & Instrument Panel

4.10.00 **Discharge Branch**

4.10.01 Discharge branch pipe up to the battery limit under this specification shall be flanged and bolted and shall be complete with gaskets, nuts and bolts of shall screwed as specified in data specification sheets. A dismantling joint in to be provided in each delivery pipeline along with valves.

4.11.00 **Suction Branch**

4.11.01 A dismantling joint will be provided at the pump individual suction side pipeline along with valves to avoid the pipe assembly from any additional thrust. Any thrust loading is to be transmitted to the foundation bolts of the pump assembly.

4.12.00 **Pump Motor Supports, Base Plate etc.**

The pumps and motors shall have common base plate supporting arrangements. The pumps & motors base frame shall be fixed on the foundation through foundation bolts.

5.00.00 **Hydraulic test at shop**

5.01.00 All pressure parts shall be subject to hydraulic testing at a pressure of 150% of shut off head or 200% of rated head (effective head) whichever is higher, for a period not less than 30 minutes.

5.02.00 Performance test are to be conducted to cover the entire range of operation of the pumps. These shall be carried out to a span of at least 125% of rated capacity up to pump shut off condition. A minimum of five combinations of head and capacity are to be achieved during testing to establish the performance curves including the design capacity points and the two extremities of the Range of operation specified. For range of operation, stipulation in relevant Clause may be followed.

5.03.00 Tests shall be conducted with job/shop motors at full load and full speed.

5.04.00 Reports and test certificates of the above tests shall be submitted to the Engineer-in-charge for approval of the employer.

5.05.00 All rotating components of the pumps shall be subjected to dynamic balancing tests, & to be specified in Data Sheets.

6.00.00 **Performance test at shop**

6.01.00 Each pump shall have to be tested to determine the characteristic curves of the pumps. These tests are to be conducted, in presence of Employer or his representative, as per the requirements of the Hydraulic Institute Standard/ASME Power Test Code PTE 8.2/BS-599/I.S.S., latest edition.

6.02.00 The Contractor shall conduct necessary arrangements for establishing such test with adequate size of sump, to establish the suitability of suction conditions, flow correcting devices for measurement of flow.

6.03.00 The Employer or his authorized representative shall be given full access to all tests. Prior to performance tests, the Contractor shall intimate the Owner allowing adequate time so that if the Employer so desires.

7.00.00 **PERFORMANCE GUARANTEE, TOLERANCE AND PENALTIES**

7.01.00 **Performance Guarantee and Tolerance**

The Bidder shall guarantee the effective head at the specified designed capacity and also the corresponding pump efficiency, pump input power, unless otherwise mentioned, the Bidder shall specify the allowable tolerance considered by him on the guaranteed performance, which shall not be more than those specified under clause 2.01.03.

7.02.00 **Rectification of Deficient Performance**

The tenderer shall indicate the guaranteed efficiency of the pumps offered by him. While carrying out shop performance tests, the permissible limits of errors in measurement shall be in conformity with Class-B of BS:599 without any penalty whatsoever. Apart from that a negative tolerance of maximum (–) 3% on quoted efficiency shall be acceptable only with penalty. Variation more than (–) 3% will render the pump liable to rejection.

If the shop performance tests indicate any failure of the pump to achieve the guaranteed efficiency, the Contractor will be given a time, to be decided by the Owner, to make up the deficiency at his cost by incorporating necessary modification, alteration and replacement.

8.00.00 **CLEANING, PROTECTION AND PAINTING**

8.01.00 **Cleaning before shipment**

Surface of all parts shall be cleaned to remove scale, dirt, oil, water, grease and other foreign objects prior to final assembly of the equipment. All openings shall be covered to guard against damage and entry of foreign objects.

8.02.00 **Painting**

All surfaces shall thoroughly be cleaned in a manner approved by the manufacturer for necessary paint coating to be applied on the surface. In case of any prevalent Standard/Codes on selection and application of painting/coating, the same shall be strictly adhered to.

The colour code for finished painting on the external surface shall be subject to Employer's approval. Necessary finish paintings including touch up paints, if not applied at shop, shall be done by the Contractor from sealed containers for site application.

8.03.00 **Packing for shipment**

All parts shall be properly boxed, crated or otherwise protected for transportation to suit the mode of transportation. Exposed finished surfaces shall be thoroughly greased before transportation.

9.00.00 **TESTS.**

9.01.00 The manufacturers shall conduct all tests required to ensure that the equipment furnished shall conform the requirements of this specification and in compliance with requirements of applicable Codes and Standards. The particulars of the proposed tests and the procedures for the tests shall be submitted to the Employer for approval before conducting the tests.

9.02.00 Where stage inspection is to be witnessed by Employer in addition to above, the bidder shall submit to the Employer at the initiation of the contract, the deadline of PERT-CHART

showing the manufacturing progress and indicating the periods where inspection of the Employer or his authorized inspection agency is required at the manufacturer's premises.

9.03.00 Where stage inspection is to be witnessed by Employer, the various stages of inspection, together with the program shall be submitted to the Employer. The inspection and test procedures shall also be submitted for Employer's approval.

10.00.00 **SPECIAL TOOLS AND TACKLE**

10.01.00 The Tenderer shall quote separately for a complete and unused set of all special tools, tackles etc., if any, including tool boxes, specifying the quantum of requirement, for erection, maintenance, overhaul or complete replacement of equipment under this specification. A complete list of tools necessary shall be enclosed with the Proposal.

10.02.00 The Price quoted for tools, shall not be considered for evaluation of Tender.

12.00.00 **DELIVERY**

12.01.00 The schedule of the project demands early delivery of the equipment.

12.02.00 The delivery date shall be indicated by the Successful Tenderer in the Progress Schedule showing the time required for different phases of the work under the scope of this specification taking the date of issue of Letter of Intent as datum.

12.03.00 The Successful Tenderer shall guarantee the delivery date subject to penalty.

13.00.00 **DRAWINGS, CURVES & INFORMATION REQUIRED**

13.01.00 Characteristic curves of pumps showing effective head, pump input power, efficiency, submergence/NPSH, against capacity ranging from shut off condition to at least 125% of rated capacity.

13.02.00 Speed Vs. torque curve of the pump corresponding to recommended mode of pump starting, super-imposed on speed Vs. torque curves of the motor, corresponding to 85%, 90%, 100% rated voltage and also extending over Quadrant I & Quadrant II covering reverse flow conditions, if applicable.

13.03.00 Diagram showing the type of lubrication system, etc.

13.04.00 Complete descriptive and illustrated literature on the equipment and accessories being offered.

13.05.00 Experience list for the similar type of equipment supplied, which should indicate name of customer, date of ordering, value of order date of commissioning, pump parameters and number.

13.06.00 A comprehensive write up or brochure on the details of manufacturing and test rig facilities in the shop of the manufacturer.

13.07.00 The successful bidder shall furnish the following drawings/data for Employer's approval after award of the contract.

13.08.00 All data furnished during bidding stage including details furnished under Clause 13.00.00 above shall be treated as final and binding on the Contractor if, however, any, minor change is essential during detail design stage for any improvement in the system, such changes shall be carried out only after obtaining approval of the Employer.

13.09.00 The G.D2 values of the impeller of the pump and Rotor of the motor at 1500 R.P.M. (syn.) are to be furnished.

14.00.00 **INSTRUCTION MANUALS**

- a) The instruction manual shall present the following basic categories of information in a comprehensive manner prepared for use by operating and/or maintenance personnel:
 - i) Instruction of Erection
 - ii) Instruction for pre-commissioning check-up, operation, abnormal conditions, maintenance and repair.
 - iii) Write up on Controls and interlocks provided.
 - iv) Recommended inspection points and periods of inspections.
 - v) Schedule of preventive maintenance.
 - vi) Ordering information for all replacement parts.
 - vii) Recommendation for type of lubricants, lubricating points, frequency of lubrication and lubricant changing schedule.
- b) The information shall be organised in a logical and orderly sequence. A general description of the equipment including significant technical characteristics shall be included to familiarize operating and maintenance personnel with the equipment.
- c) Necessary drawings and/or other illustrations shall be included or copies of appropriate final drawings shall be bound in the manual. Test, adjustment and calibration information as appropriate shall be included and shall be identified to the specific equipment. Safety and other warning notices and installations, maintenance and operating cautions shall be emphasized.
- d) A parts list shall be included showing part nomenclature, manufacture's part number and/or other information necessary for accurate identification and ordering of replacement parts.
- e) Instruction manual shall be securely bound in durable folder.
- f) If a standard manual is furnished covering more than the specific equipment purchased, the applicable model (or other identification) number, parts number and other information for the specific equipment purchased shall be clearly identified and highlighted. Sectional drawing to suitable scale and characteristic curves for the particular equipment supplied must be included in the Instruction manual.
- g) The Instruction Manual shall include the list of spare parts that are required for 2 years normal operation and maintenance for equipment. It shall also include list of all special tools and tackle furnished with complete drawings and instructions for use of such tools and tackles.

15.00.00 **DEVIATIONS**

The Tenderer is required to submit with his proposal a detailed list of any and all exceptions taken to this specification by filling up the Deviations Sheet. In absence of such a list it will be understood and agreed that Tenderer's proposal is based on strict conformance to the specification in all respects. These requirements, however, are not intended to prohibit Tenderers from offering alternate quotation for equipment which they consider to be equal or superior to that specified for the intended service and for which he believes he can show economic and/or technical advantages, provided that he is not allowed to add to the Vendors list and is confined to items not appearing therein. However, acceptance of the same is at the sole discretionary power of the T.I.A.

16.00.00 **PROPOSAL DATA**

16.01.00 To complete the proposal, the Tenderer must fill up the following DATA SHEET / CHECK LIST furnished hereinafter.

16.02.00 Each Tenderer shall supply the data requested in Proposal Data paragraph as above by typing in appropriate places on each page. These filled in data sheets must be properly signed by authorised representative of the Tenderer or Manufacturer as verification of the data submitted. These signed pages, in their entirety, shall be returned with and shall be part of the Tenderer's formal proposal. The Tenderer shall completely fill in the above information required for each of the above-mentioned sheets. Failure to comply with this requirement may result in the rejection of the tender.

17.00.00 **FOREIGN EXCHANGE AVAILABILITY**

No foreign exchange license will be available for this specification, if any foreign exchange is required by any Tenderer, it will have to be arranged from his own quota, through his own arrangement.

:

18.00 **MATERIAL OF CONSTRUCTION**

18.00.01 *Impeller* : **ASTMA-743, Gr- CF8M**

18.00.02 Casing : **CI, IS- 210, FG-260**

18.00.03 Casing ring : **SS, Type- 304**

18.00.04 Pump shaft : **SS410**

18.00.05 Coupling for pump Motor : **Flexible pin and Bush**
type, C.I.

18.00.04 Shaft sleeve

: **SS, ASTMA-276, Type- 410**

18.00.06 Base Plate : **M.S**

NOTES

1. Pump motor set to be designed for starting with discharge valve partly open/closed condition.
2. Motor cooling arrangement shall be self-circulation type having fans mounted on motor shafts.
3. For sealing/cooling water shall be tapped from the pump discharge.
4. Range of operation of the pumps shall be selected by the Tenderer shall also indicate the minimum water level at which pumps can be satisfactorily operated on continuous basis. Tenderer shall furnish with his offer NPSH Vs capacity curve for the entire range of operation based on the above conditions and considering single pump operation & all installed pump operation.

SECTION - F

Technical Specifications for Motors

2.00.00 SCOPE

- 1.01 This specification covers the general requirements of the drive motors.
- 1.02 Motor shall be furnished in accordance with both this general specification and the accompanying driven equipment specification.
- 1.03 In case of any discrepancy, the driven equipment specification shall govern.

2.00 STANDARDS

All motors shall conform to the latest applicable IS/BS/DIN Publications.

3.00 TECHNICAL SPECIFICATION FOR DRIVE MOTORS

- 3.01 The drive electrical motors shall be of squirrel cage induction type horizontal axis to suit the size of the pump and shall be able to drive the pump. **The rating of the motor should not be less than 110 KW (for CWR-I), 45 KW (for CWR-II), 1500 RPM (Syn.), 415V ± 10%, 3 Phase, 50 Hz ± 5%.**
- 3.02 The motor shall be designed for Star / Delta starting arrangements. The motor starting current shall be as per IE2 of full load current + IS tolerance.
- 3.03 All the motors shall be rated for continuous duty operation (duty: S1) IE2. However, due to the operational schedule of the pumping station, the pump motor unit may demand for 8/10 start and stop in a day with a minimum time gap of 20 minutes for one stop after prolong operation and restart the same. The motor shall also be capable of one immediate hot restart and three equi spaced starts per hour.
- 3.04 The motor KW rating shall have at least 20% margin over the maximum pump input at duty point or 10% margin over the maximum pump input in the worst case of operation whichever is higher. The overload capacity of the such selected motor rating shall be 10% continuous by allowing temperature rise upto Class-F limits. If the tenderer feel that the above rated motor is not satisfying stated loading, they may offer their rating of motor.
- 3.05 The motor characteristics shall match the requirements of the driven equipment.
- 3.06 The motor should deliver rated output and accelerate the full speed with 85% of the rated voltage at motor terminal. The accelerating time of the motor should not be more than 3 sec.
- 3.07 With 85% rated voltage at motor terminal, the motor shall be capable of working satisfactorily at full load at least 5 minutes without injurious heating or stalling. For 3% voltage imbalance in power supply, the motor shall not be de-rated by more than 10%.
- 3.08 The locked rotor withstand time under hot condition at 110% rated voltage shall be more than motor starting time by at least 2.5 sec. Hot thermal withstand curve shall have a margin of at least 10% over the full load current of the motor to permit relay setting using motor rated capacity.
- 3.0 The motor shall be TEFC type having protection group of IP 55. Motor shall be suitable for rotation in both the direction.
- 3.10 The insulation of the stator winding of the motor shall be of Class-F but the heat exchanging arrangement shall be such that the temperature rise is limited to that of Class-B as IS:325 over the ambient temperature. The ambient temperature may be considered as 45°C and the relative humidity may vary from 80% to 100%.
- 3.11.00 The rotor of the motor should be sturdy in construction so as at ensure trouble free operation as indicated in relevant clause without any rotor bar fracture inside or outside

the rotor slots or rotor bar end brazing failure or development of cracks in the brazed joint of the rotor bar with shorting ring. The rotor bar of the rotor shall be 99.99% electrolyte grade Cu and shall be well machined, insulated tightly placed and evenly press fitted inside the rotor slots, the later being broached to have smooth finish. The rotor shall be slotted end ring design. The rotor bars in the form of temple bars shall be used. Proper brazing materials shall be used.

The rotor shall be dynamically balanced with all the fans and with key in the shaft extension.

The rotor must carry a guarantee of at least 20,000 starts as per the operations schedule mentioned in relevant clause without any rotor bar failure or any other type of rotor failure.

- 3.12.00 The motor shall be provided with anti-friction bearing, grease lubricated both at driving and non-driving ends.

The bearings shall be provided with seals to prevent leakage of lubricant or entrance of foreign matter like dirt, water etc. into the bearing area.

Grease lubricated bearings shall be pre-lubricated and shall have provision for on-service positive lubrication with drains and grease collectors to guard against over lubrication.

The type and number of bearing the lubricant details (limited to normally available types of IOC or, any standard make). Quantity and frequency of bearing lubrication should be clearly indicated in the offer as well as to be displayed in the rating plate of the motor.

- 3.13.00 The motor should be smooth in operation and the noise level should not exceed 85 db at 1.5M from the motor. The vibration level of the pump and motor should be within the specified the limit of IS:11724 and must be within 75 microns.

The motor should have adequate number of terminal boxes for main power cable, control cable & signal cable. The motor main terminal box shall be rotatable in steps of 90°. **The main terminal box should be suitable for 2 nos. 3 core, 1.1 KV grade, # sq.mm Aluminium conductor, armoured, XLPE Cable.** The terminal boxes shall be with removable cover with access to connection. No compound shall be used in the terminal box for easy handling. The motor terminal boxes shall be furnished with suitable cable lugs and double compression brass glands to match with the cable size. The terminals shall be clearly identified by phase markings and termination indication corresponding to direction of rotation.

The maximum system fault current for a duration of 1.0 sec. shall be considered.

The motor shall be equipped with built-in anti-condensation space heater of adequate rating suitable for operation at 240V AC supply. Separate terminal box for the space heater connection are to be provided.

The frame of each motor shall be provided with two separate and distinct grounding pads suitable for accommodation of grounding conductors of suitable size GI flat. The main cable terminal boxes shall have separate grounding pads.

- 3.14.00 The rating plate of the motor should contain, the minimum information as indicated in the relevant IS. Apart from the same, the information as indicated in relevant clause as well as the temperature rise in °C under rated condition, method of measurement, degree of protection shall be furnished.

- 3.15.00 The successful tenderer should furnish the motor load-efficiency curve, torque-speed curve load-power factor curve, thermal withstand curve (hot and cold), current-speed curve and current-time curve.

- 3.16.00 The dimensional drawing of the offered motor, terminal box drawings, load data, GD2 value of the drive unit and the driven unit shall be furnished to the EIC for approval.
- 3.17.00 Apart from the standard accessories provided by the motor manufacturer and those accessories mentioned in preceding paras, one local lock switch is to be provided with each motor having proper connection with the motor connecting breaker so that the motor breaker cannot be closed when the lock switch is in operation. The motor shall also be provided with suitable lifting lugs eye bolts having adequate provision for lifting installation.
- 3.18.00 The routine tests as per IS:325 shall be conducted on each motor. The motor vibration tests shall be conducted mounting the motor on the shop motor stool. All the above tests are too conducted at the manufacturer's shop. Apart from the shop testing, normal field testing is to be carried out during installation, pre-commissioning and commissioning. All necessary arrangements for the tests are to be made by the contractor.

4.00.00 **TESTS**

- 4.01.00 3 (Three) copies of routine test certificates shall be submitted for approval prior to the despatch of the motors from the manufacture's factory.

5.00.00 **DRAWINGS, DATA & MANUALS**

Drawings, data & manuals for the motors shall be submitted as indicated below:

- 5.01.00 Along with the bid:

Individual motor data as per Check List

- 5.02.00 After Award of the Contract for Approval:

- a) Dimensional General Arrangement Drawing
- b) Foundation Plan & Loading
- c) Cable end box details
- d) Load Vs Efficiency & power factor, Current Vs Time / Speed curves
- e) Thermal withstand curves hot & cold
- f) Speed torque characteristics at 80% & 100% voltage
- g) Complete motor data.

03.00: VALVES AND SPECIALS

03.01.00 SLUICE VALVES (SUCTION SIDE OF PUMP)

The sluice valves shall be manufactured from ductile iron (Gr. GGG 40).conforming to IS-14846 / 2000. Flange ends as per IS 1538 or as per other standards to match with other flanges. The body seat shall be of S.S. AISI-410 stem shall be of S.S. AISI-410 & the stem nut shall be Gun metal conforming to I.S. 305:1981/BS 2874. Other details are to be submitted for approval.

The seat pressure shall be 16 kg/cm² and body pressure shall be 24 kg/cm². The valves should pass through hydrostatics test for duration of 5 minutes.

Body, Cover, Wedge	:	Ductile Iron GGG 40
Shaft	:	S.S. to AISI-410
Body Seat	:	S.S. to AISI-304
Bearing	:	G.M./Teflon
Wedge Sit	:	S.S. to AISI-304
Packing	:	Rubber "O" ring
Internal Fasteners & Clamping Ring	:	S.S. to AISI-304
External Fasteners	:	Carbon Steel to IS:1367 Cl. 4.6 & 03.01
Hand wheel	:	Fabricated Steel
Worm Gear Unit	:	Mfg. Std.
Actuator	:	No

Testing (as per IS : 13095 / 91)				Inspection	
Hydro Body		: 24 Kg / Sq.cm for 5 minutes		Hydro Test	: Test Report
Hydro Seat		: 16 Kg / Sq.cm for 2 minutes		Visual	: Test Report
Disc. Test		: 16 Kg / Sq.cm for 5 minutes		Material Test	: Test Report
Quantity				Note:	
Size (NB)	Qty (Nos.)	Location	Service / Application	1. Valves shall be tight shut-off closures for frequent operation 2. Valve should closed with clock wise rotation of Hand wheel. In case of hand wheel operation) 3. Valves shall be painted with one coat of Red oxide primer & two coats of Black bituminous paints before dispatch. 4. Marking : Brand / Size / PN – Rating / Heat No. & Sl. No.	

Materials of construction test certificates shall be provided during supplies. The sluice valves shall be rising spindle type with gearing arrangement / hand wheel for easy manual operation.

03.02 M.S. DISMANTLING JOINT AT SUCTION SIDE

One M. S. dismantling joint of suitable diameter is to be fixed in each of the individual delivery and one no along with the Flow meter & BFV on the Clear water delivery main for the ease of dismantling and fitting of Flow meter during maintenance and to relieve the pipe line stresses. The expansion range for each of the dismantling joint shall be minimum 40 mm. The M. S. dismantling joint shall be complete with long stud (SS 304) holding arrangements with split flange matching with the site requirement. The hydrostatic test pressure of the DJ shall be 10/16 kg/cm². One leak proof concrete chamber if required as per site condition is to be constructed. The Dimension of the Chamber would however depend on the final alignment and level of the site condition

03.01.01 Delivery side of pumps

03.01.02 Non-Return Valve

The non-return valve as mentioned here in before shall be manufactured conforming to IS: 5312 (Part-I) / equivalent international standard. The valves will be used for handling Clear Water and to maintain unidirectional flow. The valve shall be maintenance free, leak proof and shall have low life cycle cost. The PN rating of valves shall be PN 1.6

The non-return valve shall be single door, Ductile Iron, double flanged, conventional non-slam design. The body, door, cover shall be of ductile iron (Gr. GGG 40). The seat and body shall withstand fluid pressure of 16kg / cm² and 24 kg / cm² respectively. The body seat, door face rings, bearing block, disc shaft, hinge pin, plug and fasteners shall be of SS 316. The bearings shall be suitable for maximum thrust imposed by the shaft during testing and in service.

The end connection shall be drilled flanged type as per IS or BS or equivalent standard. The non-return valve shall have features for quick closing (up to 85%) and slow closing from 85 to 100%. It shall have by pass valve with cock. The valve shall be marked to indicate the direction of flow.

The design and construction of the non-return valve shall be non-slam type and the disc shall be so balanced that the it will not bump against the valve body while the pump is in operation.

The surface protection of the valve shall be done by either epoxy powder coating or epoxy painting (min. paint thickness - 250 micron) for both inside and outside.

All bolts and nuts for flange connection(s) of entire pipe line (delivery & common manifold) where applicable shall be of carbon steel having tensile strength 300 N/ mm².

The valves are subject to satisfactory hydrostatic test at manufacture's works.

The MOC of other accessories to complete the individual delivery piping like Y or T bends, flanged end short piece, flanged end enlarger/ reducer or any other components required to complete the job in all respect shall be MS as per IS 226.

03.02.01 SLUICE VALVES.

The sluice valves shall be manufactured from ductile iron (Gr. GGG 40).conforming to IS-14846 / 2000. Flange ends as per IS 1538 or as per other standards to match with other flanges. The body seat shall be of S.S. AISI-410 stem shall be of S.S. AISI-410 & the stem nut shall be Gun metal conforming to I.S. 305:1981/BS 2874. Other details are to be submitted for approval.

The seat pressure shall be 16 kg/cm² and body pressure shall be 24 kg/cm². The valves should pass through hydrostatics test for duration of 5 minutes.

Body, Cover, Wedge	:	Ductile Iron GGG 40
Shaft	:	S.S. to AISI-410
Body Seat	:	S.S. to AISI-304
Bearing	:	G.M./Teflon
Wedge Sit	:	S.S. to AISI-304
Packing	:	Rubber "O" ring
Internal Fasteners & Clamping Ring	:	S.S. to AISI-304
External Fasteners	:	Carbon Steel to IS:1367 Cl. 4.6 &03.01
Hand wheel	:	Fabricated Steel
Worm Gear Unit	:	Mfg. Std.
Actuator	:	No

Testing (as per IS : 13095 / 91)				Inspection	
Hydro Body		: 24 Kg / Sq.cm for 5 minutes		Hydro Test	: Test Report
Hydro Seat		: 16 Kg / Sq.cm for 2 minutes		Visual	:Test Report
Disc. Test		: 16 Kg / Sq.cm for 5 minutes		Material Test	: Test Report
Quantity				Note:	
Size (NB)	Qty (Nos.)	Location	Service / Application	1.	Valves shall be tight shut-off closures for frequent operation
				2.	Valve should close with clock wise rotation of Hand wheel. In case of hand wheel operation)
				3.	Valves shall be painted with one coat of Red oxide primer & two coats of Black bituminous paints before dispatch.
				4.	Marking: Brand / Size / PN – Rating / Heat No. & Sl. No.

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Materials of construction test certificates shall be provided during supplies. The sluice valves shall be rising spindle type with gearing arrangement / hand wheel for easy manual operation.

03.04 **M.S. DISMANTLING JOINT ASSEMBLY AT INDIVIDUAL DELIVERY LINE AND MANIFOLD**

One M. S. dismantling joint of suitable diameter is to be fixed in each of the individual delivery and one no along with the Flow meter & BFV on the Clear water delivery main for the ease of dismantling and fitting of Flow meter during maintenance and to relieve the pipe line stresses. The expansion range for each of the dismantling joint shall be minimum 40 mm. The M. S. dismantling joint shall be complete with long stud (SS 304) holding arrangements with split flange matching with the site requirement. The hydrostatic test pressure of the DJ shall be 10/16 kg/cm². One leak proof concrete chamber if required as per site condition is to be constructed. The Dimension of the Chamber would however depend on the final alignment and level of the site condition

04.00 Pressure Gauge (Dial Type) & Compound Gauge.

The individual discharge line and common delivery manifold shall be provided with pressure gauge (6" dial) of bourdon type. The bourdon tube shall be of SS 316. The gauge shall have cast aluminium weather proof case and casing shall be black stove enamelled. The accuracy shall be of ±1%. The full-scale range shall be from 0 -16Kg / Sq.cm. The pressure gauge shall have 3-way cock and fitting.

5.00 **HTPDB**

5.1. The HT PDB shall be multi panel switch board suitable for indoor installation and shall operate at 11 KV ±10%, 3φ, 50 Hz ± 5% AC earthed system. The Switchboard shall comprise of the following

- I) Incomer panel – 1 no
- II) Outgoing transformer feeder panel – 2 nos.

5.2. The switch gear shall be indoor, metal clad, floor mounted, horizontal isolation and horizontal draw out type and shall be suitable for trouble free and continuous operation at 11 KV ± 10%, 3 phases, 3 wire, 50 Hz ± 5%, grounded system. The switch gear will be located in a hot, humid and tropical atmosphere.

Design and construction shall be such so as to allow extension at either ends. The base channel frame of the switch gear along with all hardware shall be within the scope of the contract.

The switch gear enclosure shall conform to the degree of protection IP-4X. The minimum thickness of sheet used shall be 2 mm except the gland plate where the sheet thickness shall be 3 mm.

The switch gear assembly shall comprise a continuous dead front, line up of free standing, vertical cubicles. Each cubical shall have front hinged door with latches and a removable back cover. All covers and doors shall be provided with neoprene gaskets.

Circuit breakers, instrument transformer, bus bars, cable chamber etc. shall be housed in separate compartments.

- 5.3 The Switch gear shall be fully wired at the factory to ensure proper functioning of indications, control, protection, transfer and inter-locking scheme.

Fuse & links shall be provided to permit individual circuit isolation without disturbing other circuits. All spare contacts of relays, switches and other devices shall be wired up-to terminal blocks.

Wiring shall be done with flexible, 1.1KV grade PVC insulated switchboard wires with stranded copper conductors of 2.5 sq. mm for control and current circuits and 1.5 sq. mm for voltage circuits.

Each wire shall be identified with both ends with permanent marker bearing wire number as per contractor's wiring diagram.

Wire termination shall be made with crimping type connectors with insulating sleeves.

Not more than two wires shall be connected to any terminal. At least 25% spare terminal shall be furnished in the terminal block.

- 5.4 Switch gear shall be designed for cable entry from bottom. Sufficient space shall be provided for ease of termination and connection.

Power cables shall be XLPE insulated, armoured, overall PVC sheathed with stranded aluminum conductors.

Control cables shall be XLPE insulated, armoured, overall PVC sheathed with 2.5 sq. mm stranded copper conductors.

All provisions and accessories shall be furnished for termination and connection of cables, including removable gland plates (3 mm thick), cable supports, crimping type tinned copper / aluminum lugs, brass compression glands with washers and terminal blocks.

- 5.5 The main buses and connections shall be of high conductivity electrolyte grade copper, sized for specific current rating with maximum temperature rise limited to 90°C.

Bus-bars and connection shall be fully insulated for working voltage with adequate phase / ground clearance. Insulating sleeves for bus bars and cast resin shrouds for joints shall be provided.

All buses and connections shall be supported and braced to withstand stress due to maximum short circuit current and also to take care of any thermal expansion.

Bus-bars shall be color coded for easy identification and the bus-bar chamber shall be provided with inter panel barrier with epoxy cast seal-off bushings through which the buses will pass through so as to prevent fire from one panel to other.

- 5.6 A copper ground bus, rated to carry maximum fault current for 3 secs., shall extend for full length of the switchgear. The ground bus shall be provided with two bolt drilling with GI bolts, nuts and washers at each end to receive GI flat of adequate sizes to withstand earth fault current.

CT & VT secondary neutrals shall be earthed through removable links so that earth of the one circuit may be removed without disturbing the others.

Each stationery unit shall be directly connected to the ground bus.

- 5.7 The circuit breaker shall be vacuum type triple pole 800 Amps, 25 KA for 3 secs., horizontal draw out, horizontal isolation having Service / Test / Isolated position with positive indication for each position. The V.C.B. shall have 220 V AC motorized spring charged trip free mechanism and mounted on a carriage complete with self-contained manually operated fully interlocked, raising and lowering mechanism with integral earthing /earthing truck. The operating mechanism shall normally be operated from remote electrical control but arrangement should also be made for local electrical control. Mechanical device shall also be provided on the breaker for manually tripping and closing. Each set of the circuit breaker shall have the following features:

- a) 1 set mechanical ON & OFF indicator.
- b) 1 rear entry cable box with glands suitable for 11 KV grade XLPE cable.
- c) 1 set of indicating lamp ON / OFF / TRIP / SPRING CHARGED / TRIP CIRCUITHEALTHY / Service & Test Position Indications for each breaker & in addition DC FAIL / R-Y-B Phase Indications (for Incomer only).
- d) 3 double core current transformers of suitable ratio and accuracy class 5P10 & 1.0 shall be provided for protection & metering
- e) Shunt trip coil and closing coil rated for 110 V DC.
- f) 1 space heater with ON & OFF switch
- g) 15A / 15A 3 Pin Plug Socket
- h) In – panel lighting with control switch
- i) Space heater for each Switchgear panel
- j) 240 V AC Alarm Bell & Buzzar for non – trip fault & trip with provision for alarm cancellation (common)
- k) Auxiliary switches with required contact.
- l) 1 suitable label

In addition, 1 no resin cast and draw out type PT shall be provided suitable for 3 phase, 3 wire 5 limb 50 Hz system with a ratio of 11 KV / 110 / $\sqrt{3}$ / 110 / $\sqrt{3}$ volts, 100 VA, class 1.0 / 3 P. Symmetrical breaking capacity of the circuit breaker shall be 25 KA and making capacity shall be 62KA. The short time rating of the circuit breaker shall be 25 KA for 3 secs.

The circuit breaker shall be capable of carrying rated current at 45°C ambient temperature without derating.

5.8 The feeder details of the Multi panel HT PDB shall be as under:

A) Incoming feeder Panel: 1 No. (800 A)

- i) 96 sq. mm (0 – 12 KV) Voltmeter with Selector Switch - 1 Set
- ii) 96 sq. mm Ammeter suitably dual scaled with Selector Switch - 1 Set
- iii) Local/ Remote selector switch - 1 No.
- iv) TNC Breaker Control switch - 1 No.
- v) Double core Dual Ratio Cast Resin CT of appropriate ratio and 5A Secondary, Class 5 P10 & 1.0, 10VA burden - 1 Set
(3 Nos.)
- vi) Microprocessor based draw out directional combined IDMTL over current & earth fault relay type P127 or equivalent - 1 No.
- viii) Trip Circuit Supervision Relay type VAX 31 or equivalent - 1 No.
- ix) Master Trip Relay type VAJH 13 or equivalent - 1 No.
- x) Multifunction meter (For Amp. Voltage, frequency, power factor etc.) type ELITE 445 or equivalent - 1 No.
- xi) Power Factor Meter - 1 No.

xii)	KW Meter	-	1 No
			.
xiii)	12 Channel alarm annunciator & Indicating Lamps		1 Set
			.
B)	Out going feeder panels for transformers: 2 Nos. (800 A) Each Transformer feeder panel shall be equipped with the following:		
i)	96 sq mm Ammeter suitably scaled with Selector Switch	-	1 Set
ii)	Local / Remote selector switch	-	1 No.
iii)	TNC Breaker Control switch	-	1 No.
iv)	Double core Cast Resin CT of appropriate ratio and 5A Secondary, Class 5 P10 & 1.0, 10VA burden	-	1 Set (3 Nos.)
v)	Microprocessor based draw out type non-directional combined IDMTL over current relay with high set instantaneous element and instantaneous earth fault element type P122 or equivalent	-	1 No.
vi)	Master trip relay type VAJH-13	-	1 No.
vii)	Trip Circuit Supervision Relay type VAX 31 or equivalent	-	1 No.
viii)	Auxiliary relay type VAA -33 or equivalent	-	3 Nos.
ix)	12 Channel alarm annunciator & Indicating Lamps	-	1 Set
			.
C)	Common for all above feeders:		

i) Anti – pumping relay

5.9. Following power supplies shall be arranged to switch-gear.

AC Supply: 220V AC from MCC cum PDB to the switch-gear panels

DC Supply: 110V DC supply in each panel by duplicate feeders shall be made available from the station battery bank / Battery Charger / DCDB stated elsewhere. Hooking up with the station switchgear and other equipments is within the scope of the contractor and shall be done through cables.

5.10. All equipment, accessories and wiring shall have fungus protection. Screens of corrosion resistant material shall be furnished on all ventilating louvers to prevent the entrance of insects. All surfaces shall be sand blasted, pickled and grounded as required to produce a smooth, clean surface free of scale, grease and rust. After cleaning, the surfaces shall be given a phosphate coating followed by two coats of high-quality primer and stove after each coat.

The switch gear shall be finished in RAL 7032 with two coats of epoxy paints

5.11 Notwithstanding whatever mentioned elsewhere in the document, following tests shall include but not necessarily limited to the following:

- (a) Operation under simulated service condition to ensure accuracy of wiring, correctness of control scheme and proper functioning of the equipment.
- (b) All wiring and current carrying part shall be given appropriate high voltage test.
- (c) Primary current and voltage shall be applied to all instrument transformers.
- (d) Routine test shall be carried out on all equipment such as circuit breakers, instruments, transformers, relays and meters.

All tests shall be performed in presence of owner's representative.

Certified copies of all the tests carried out at the manufacturer's premises shall be furnished in three copies.

6.00 TRANSFORMER

There will be total two (2) number of transformers, each having a capacity of 400 KVA.

The voltage rating of the Transformer shall be 11 KV / 433 V

Normally the specification of all the transformers are, 11 / 0.433 KV with neutral brought out, 3 ph, 50 c/s, Dyn 11 vector group, shall be supplied and installed by the contractor. Each of the transformers should be equipped with:

- i) Conservator with drain valves and oil gauge.

- ii) Silica gel breather
- iii) Bidirectional rollers
- iv) PRV with contact.
- v) Oil filter valve
- vi) Transformer tank drain valve, one upper and one lower.
- vii) Earthing terminals – 2 nos.
- viii) Air relieve plugs
- ix) Rating and diagram plate
- x) Bucholz's relay with Alarm and Trip
- xi) OTI with Alarm and Trip contacts
- xii) WTI with Alarm and Trip contacts
- xiii) MOG with contact
- xiv) Marshalling box with contacts of Bucholz, OTI, WTI, MOG & PRV duly wired up to the terminal block

Transformers will be wound with 99.99% electrolytic grade copper wires / flat and the H.T. sides of the transformer will be fitted with OFF circuit tap changing device with a range of +5% to -10% in step of 2½%.

Primary side (H.T.) terminal box shall be suitable for terminating one no. 11 KV grade, 300 sq. mm, Al. conductor 3 core XLPE insulated cable complete with sealing and armour clamping gland.

Secondary (L.T.) terminal box shall be suitable for terminating 1.1 KV grade, 240 sq. Mm as required, Al. conductor 4 core XLPE insulated cable complete with sealing and armour clamping gland.

Transformers shall be supplied in fully oil filled condition. Transformers should be manufactured according to latest I.S.S. Manufacturers' test shall be carried out in presence of the representative of M.E.Dte. and a test certificate to be submitted. Temperature rise of the transformer shall not exceed 50 / 75°C over oil / winding and also comply with IS 1180 & IS 2026 Latest version, as applicable only in so far as they are applicable.

- 6.1 Two nos. 400 KVA 11 KV / 0.433 KV, DYN 11, ONAN, Distribution Transformer to be manufactured, shop tested, supplied, erected, tested & commissioned generally in conformity with latest revision of IS.

- 6.2 The transformers shall be of the latest design & the transformers shall be suitable for indoor installation. The transformer shall be suitable for operation at full rated power on all tapings without exceeding the following temperature rise. Winding temperature rise - 75 ° C over ambient of 45⁰ C.
- 6.3 The transformer shall be double copper wound and having CRGO silicon steel made core built up with class 'A' insulation, designed and constructed with particular reference to tropical conditions.
- 6.4 The transformer shall be designed to be capable of withstanding, without injury, the thermal and mechanical stress of short-circuits between phases or between phase and earth at the terminals of any winding with full voltage applied across the other winding. The transformers shall be capable of withstanding specified through fault currents for 2 seconds.
- 6.5 The transformers shall operate with minimum noise and vibration. The cores, enclosure / protective housings and other structural parts shall be properly constructed and windings properly braced so that the mechanical vibration is kept to the minimum, thus reducing the noise. The core-coil assembly shall be fixed in such a manner that no shifting or deformation occur during shipment or installation.
- 6.6 The transformer shall be designed for minimum losses as per I.S.1180 guidelines. All mechanism shall be of stainless steel, brass, gunmetal or other suitable material to prevent sticking due to rust or corrosion. If any temporary fitting is fixed to the enclosure / protective housing of a transformer for transporting / handling purposes, these shall be identified as well as instructions and illustrated drawings shall be furnished to facilitate their removal at site after erection.
- 6.7 The transformer shall have off-circuit tap changer in H.T. winding in steps of 2.5% for range (+) 5% to (-) 10 %.
- 6.8 Neutral terminal of star connected winding of each transformer shall be designed for the highest over current that can flow through the terminal. The neutral terminal shall in the LV cable terminal
- box. The transformer also shall have one additional brought out neutral which is intended to be directly connected to earth permanently.

6.9 The transformer shall be generally conformity with latest revision of IS: 11171- 1985 (reaffirmed-2001) and IEC: 726 (1982). Ref standard IS 2026 (Part-I to Part II) IS 10028 (PII) IS 1180 etc. shall be applicable only in so far as they are applicable.

6.10 Transformer Fittings

The transformer shall be fitted with all standard and special fittings and accessories as per IS and CBIP Standard and shall include but not being limited to the following:

- a) Rating, diagram and tap connection plates
- b) Terminal marking plate
- c) Earthing terminal - 2 nos.
- d) Lifting lugs, jacking pads and haulage lugs / holes
- e) Winding temperature indicator with Alarm & Trip contacts.
- f) Oil temperature indicator with Alarm & Trip contacts.
- g) Bucholz's relay with Alarm and Trip contacts.
- h) PRV with Trip contact.
- i) MOG with contact
- j) Externally operated Off-circuit tap switch with position indicator
- k) Cable terminal boxes (both HV & LV side)
- l) Bi-directional wheels with locking and bolting devices

6.11 Each transformer shall be provided with a stainless-steel rating plate fitted in a visible position showing the followings.

- a. Kind of transformer
- b. Ref to IS standard
- c. Manufacturer's name
- d. Manufacturer's serial number
- e. Year of manufacture

- f. Number of phases
- g. Rated KVA
- h. Rated frequency
- i. Rated voltage
- j. Rated current
- k. Connection symbol
- l. Percentage impedance voltage at rated current
- m. Type of cooling
- n. Total mass in Kg.
- o. Quantity of Oil.
- p. Percentage Impedance.

6.12 Transformer losses

Transformer losses shall be guided by the I.S.1180 guideline.

6.13 Following shop tests shall be carried out on the transformer along with the other tests in presence of departmental representative –

- a) Measurement of winding resistance.
- b) Measurement of voltage ratio and check on voltage vector relationship.
- c) Measurement of impedance voltage/ short circuit impedance on principal tapping and load loss.
- d) Measurement of no-load loss and current.
- e) Measurement of insulation resistance.

6.14 TECHNICAL PARTICULARS OF THE TRANSFORMER

Type	:	Indoor
Nature of cooling	:	ONAN
No. of phases	:	3 (three)
Winding connection & vector group	:	DYn-11

Rated frequency	:	50 cycles/sec.
Rated KVA	:	400 KVA
Rated primary voltage	:	11 KV
Rated secondary voltage	:	0.433 KV
Method of system earthing	:	Secondary solidly grounded
Tap-Changer 5% to (-) 10%	:	Off-circuit Tap-changer (OCTC) (+)
Tapings	:	in steps of 2.5%
HV side terminal arrangements terminating sq.mm. XLPE cable.	:	Cable end box on HV side suitable for 11 KV grade 3 core 300
LV side terminal arrangements	:	Secondary (L.T.) terminal box shall be suitable for terminating 1.1 KV grade, 240 sq. mm as required, Al. conductor 3.5 core XLPE insulated cable complete with sealing and armour clamping gland.

07.00 Technical Specification OF 415 V, 2 Incomer & 1 Bus Coupler PDB at Substation (CWR-1 Location)

7.1 The PDB is required to provide power to the Pump House MCC cum PDB and auxiliary load at the Sub-station

7.2 The PDB shall be suitable for 415 V \pm 10%, 50 Hz \pm 5%, 3 phase, 4 wire supply system. The incoming power shall be provided from the secondary side of transformers.

7.3 The PDB shall be 2 mm CRCA sheet steel enclosed, floor mounted type, self supporting, fully compartmentalised, dust & vermin proof, cubicle pattern, non-draw out and modular in construction. It shall be finished painted with powder coated paint after necessary chemical treatment for rust free surfaces and application of anti rust chemical coating. The base frame of the panel shall be made of ISMC – 75 channel.

- 7.4 The PDB shall be dead front type with concealed type hinged doors at front and bolted covers at the rear. All hinged doors shall be interlocked with the respective switchgears such that the same cannot be opened while the feeder is ON.
- 7.5 It shall have rear access and the cable termination arrangement shall be provided at the rear of the respective feeder modules. For incomers, extended bus bars shall be installed preferably from the top of the panel as per respective specifications. The vertical dropper bus bars shall be placed in between two vertical aligned feeder modules.
- 7.6 The bus bar of PDB shall be spitted into two sections with one bus coupler in between. Each section will receive power through an incoming ACB connected from the secondary side of transformers.
- 7.7 The bus bar for the PDB shall be TPN, made of E91E grade Aluminium alloy insulated with 1.1KV grade heat shrink type PVC colour coded sleeve. The rating of the bus bar shall be 800 A for phases and 400 A for neutral. The current density of the bus bar shall not exceed 1Amp / sq mm. The bus bars shall be supported on non-hygroscopic type resin moulded insulators and the distance between insulators shall be so designed to make the bus bar system capable of withstanding a short circuit fault current of 50 KA (r.m.s.) for 1 sec. The front bus bar chamber shall be fully shrouded to avoid accidental contact with the live bus bars.
- The minimum clearance between bus bars and bus bar to earth shall be as per IS.
- 7.8 Incoming & Outgoing feeder termination shall be done with extended bus bar arrangement if required. The cable termination chamber shall be provided with cable supporting clamps. Each incoming ACB shall receive power through 1.1 KV grade 4 /3.5core 240 sq. mm XLPE insulated armoured aluminium cable as required. The control wiring of the panel shall be done with 1100 V grade PVC insulated 2.5 sq. mm flexible copper wire with copper lugs and ferrule marking at each end. All hinged door shall be earthed with flexible copper wire.
- 5.9 A continuous earth bus of size 50 x 8 mm and made of aluminium shall run throughout the length of the panel with drilled holes at the end for connecting the same with the station earth bus bar. All the CT should be resin casted.
- 7.10 Feeder details with mounted components

The feeder details are as under:

7.11 800A incoming feeders 2 nos. each comprising of following components:

- i) 415 V, 4 pole, 800A, 50 KA electrically operated draw out type
ACB with microprocessor-based O/L, S/C, E/F & shunt trip release 1 No
- ii) 96 sq. mm, suitably scaled Ammeter with cramped scale and selector switch
1 No.
- iii) 96 sq mm, 0 – 500 V Voltmeter with selector switch 1 No.
- iv) Current Transformer of suitable ratio & 5A secondary, Class: 1.0, 15 VA 3
Nos.
- v) Current Transformer of suitable ratio & 5A secondary, Class: 5P10, 10 VA 3
Nos.
- vi) Red, Yellow, Blue phase indicating lamp as required
- vii) CB ON / OFF / TRIP / Spring Charged Indicating Lamp As required.
- viii) TNC Breaker Control Switch 1 No.
- ix) Local / Remote Selector Switch 1 No.

7.12 800 A Bus coupler feeder one (1) number comprising of following components:

- i) 415 V, 4 Pole, 800 A, 50 KA electrically operated draw out
ACB without release. 1 No.
- ii) TNC Breaker Control Switch 1 No.
- iii) Local / Remote Selector Switch 1 No.
- iv) Bus Coupler ON / OFF / Spring Charged Indicating Lamp 3 Nos.

7.13 Outgoing feeders --- 2 Nos. each equipped with following:

- i) 415 V, 3 pole, 800A, 50 KA electrically operated draw out type ACB with microprocessor-based O/L(Adj.), S/C, E/F & shunt trip release 1 No
- ii) 96 sq. mm, suitably scaled Ammeter with cramped scale and selector switch. 1 No.
- iii) Current Transformer of suitable ratio & 5A secondary, Class: 1.0, 15 VA 3 Nos.
- iv) CB ON / OFF / TRIP / Spring Charged Indicating Lamp 4 Nos.
- v) TNC Breaker Control Switch 1 No.
- vi) Local / Remote Selector Switch 1 No.

7.14 MCCB / MCB feeder of following rating

a) 32A TPN MCCB with Microprocessor based O/C & E/F releases (Adjustable O/L) rated up to 50⁰ C without duration 3 Nos.

b) 63A TPN MCCB with Microprocessor based O/C & E/F releases 3 Nos.
(Adjustable O/L) rated up to 50⁰ C without duration

c) ON / OFF / Trip Indicating Lamp (For each feeder) As
required.

d) 16 A DP MCB 6 Nos.

7.15 Technical Specification of Air Circuit Breaker (ACB)

The ACB should have minimum mechanical and electrical life with regular ordinary

maintenance prescribed by the manufacturer as 20,000 operation cycles. The ACB should be compatible to the following forms of communications if required.

Modbus RTU

Profibus-DP

Modbus TCP/IP

Profinet

EtherNet/IP™

IEC61850

The ACB should have the following characteristics, to enable a rapid analysis in the event of maintenance:

Maximum and average current values per phase.

Date, time, fault current per phase and type of protection tripped over the last 30 trips;

Date, time and type of operation of the last 200 events.

Number of mechanical and electric operations of the circuit breaker

Total operating time.

Contact wear alarm.

The ACB should have self-protection against abnormal temperature (OT) inside the protection

trip unit. The user can set it to open the circuit breaker or to merely indicate an alarm

The ACB shall be rated as specified elsewhere at 50⁰ C without duration and 50 KA for 1 Sec. The ACB shall be electrically operated draw out type with shunt trip release. The neutral conductor shall be 100% of the phase conductor. The ACB shall be provided with built-in LCD display. Over current releases, if specified, shall have on-line functional testing facility and trip indicators shall be provided to display the nature of fault without any external power supply. Earth fault protection shall have adjustable settings upto 10% of Nominal current. The CTs provided shall be air-core. The ACB shall have position indication with padlocking facility for all positions including door interlock and padlocking facility of the shutters in closed position. The ACB shall be provided with the following features in the front panel.

- Contact position indicator (ON / OFF)
- Stored energy status indicator
- Connected / Test / Disconnected position
- Trip indication on fault

- OK indicator (Mechanical) on the front panel when the trip or OFF conditions are cleared and the circuit breaker can be closed on "ON" command (Manual or Electrical)
- All the accessories viz. shunt, motor and under voltage coils shall be accessible from the front without removing the breaker from its panel for replacement any

08.00 415 V Multi panel MCC cum PDB at Pump House (CWR-1 Location)

8.1 The MCC cum PDB is required to provide power to the Pump Motors, auxiliary load and Main Lighting Distribution Board at Pump House.

8.2 The MCC cum PDB shall be suitable for 415 V \pm 10%, 50 Hz \pm 5%, 3 phase, 4 wire supply system. The incoming power shall be provided from the outgoing feeder & PDB at substation.

8.3 The MCC cum PDB shall be 2 mm CRCA sheet steel enclosed, floor mounted type, self-supporting, fully compartmentalised, dust & vermin proof, cubicle pattern, non-draw out and modular in construction. It shall be finished painted with powder coated paint after necessary chemical treatment for rust free surfaces and application of anti-rust chemical coating. The base frame of the panel shall be made of ISMC – 75 channels.

8.4 The MCC cum PDB shall be dead front type with concealed type hinged doors at front and bolted covers at the rear. All hinged doors shall be interlocked with the respective switchgears such that the same cannot be opened while the feeder is ON.

8.5 It shall have rear access and the cable termination arrangement shall be provided at the rear of the respective feeder modules. For incomers, extended bus bars shall be installed preferably from the top of the panel as per respective specifications. The vertical dropper bus bars shall be placed in between two vertical aligned feeder modules.

8.6 The bus bar for the MCC cum PDB shall be TPN, made of E91E grade Aluminium alloy insulated with 1.1KV grade heat shrink type PVC colour coded sleeve. The rating of the bus bar shall be 800A for phases and 400A for neutral. The current density of the bus bar shall not exceed 1Amp / sq. mm. The bus bars shall be supported on non-hygroscopic type resin moulded insulators and the distance between insulators shall be so designed to make the bus bar system capable of withstanding a short circuit fault current of 50 KA (r.m.s.) for 1 sec. The front bus bar chamber shall be fully shrouded to avoid accidental contact with the live bus bars.

The minimum clearance between bus bars and bus bar to earth shall be as per IS.

8.7 Incoming & Outgoing feeder termination shall be done with extended bus bar arrangement if required. The cable termination chamber shall be provided with cable supporting clamps. Each incoming MCCB shall receive 1.1 KV grade 4/3.5 core 240 sq mm XLPE insulated armoured aluminium cable. The control wiring of the panel shall be done with 1100 V grade PVC insulated 2.5 sq mm flexible copper wire with copper lugs and ferrule marking at each end.

All hinged door shall be earthed with flexible copper wire.

8.8 A continuous earth bus of size 50 x 8 mm and made of aluminium shall run throughout the length of the panel with drilled holes at the end for connecting the same with the station earth bus bar.

8.9 Feeder details with mounted components

The feeder details are as under:

8.10 A incoming feeder 2 nos. comprising of following components:

- i) 4145 V ,4 Pole ACB with microprocessor-based O/L(Adj.), S/C, E/F & shunt trip release 96 sq. mm, suitably scaled Ammeter with cramped scale & selector switch. 1 No.
- ii) 96 sq. mm, 0 – 500 V Voltmeter with selector switch 1 No.
- iii) Current Transformer of suitable ratio & 5A secondary, Class: 1.0, 15 VA 3 Nos.
- iv) Current Transformer of suitable ratio & 5A secondary, Class: 5P10, 10 VA 3 Nos.
- v) Red, Yellow, Blue phase indicating lamp as required
- vi) MCCB ON / OFF / TRIP / Earth Fault Trip Indicating Lamp 4 Nos.
- vii) TNC Breaker Control Switch 1 No.
- viii) Local / Remote Selector Switch 1 No.

8.11 800 A Bus coupler feeder one (1) number comprising of following components:

- i) 415 V, 4 Pole, 800 A, 50 KA electrically operated draw out ACB without release. 1 No.
- ii) TNC Breaker Control Switch 1 No.
- iii) Local / Remote Selector Switch 1 No.
- iv) Bus Coupler ON / OFF / Spring Charged Indicating Lamp 3 Nos.

8.12 110KW Star – Delta Starter Motor feeders, each comprising of following components: Type 2 coordination should have to be followed.

(Number of feeders shall be no. of Pump sets installed plus one spare)

- a) *Not less than reqd. A, 50 KA MCCB with microprocessor-based trip unit with adjustable overload, short circuit & earth fault rated upto 50⁰ C without deration* - 1 No.
- b) *Not less than reqd. A Air Breaker Contactor with 240 V AC Coil arrangement* - 3 Nos.
- c) *Clustered LED type indicating lamp for ON / OFF / TRIP / EARTH FAULT TRIP* - 4 Nos.
- d) *Start / Stop Push Button* - 1 Set
- e) *96 Sq mm suitably scaled including cramped scale Ammeter with selector switch* - 1 No.
- f) *True Digital Microprocessor based Motor Protection relay suitable for 5A CT secondary and having thermal overload protection, instantaneous short circuit protection, inverse and definite time negative sequence current protection, instantaneous and definite time earth fault protection, locked rotor protection, loss of load protection and reverse phase sequence protection (Type P225 or equivalent)* - 1 No.
- g) *High speed master trip relay type VAJH 13 or equivalent* - 1 No.
- h) *CT of appropriate rating and 5A Secondary, Class 1.0, 10 VA* - 3 Nos.

- i) CT of appropriate rating and 5A Secondary, Class 5 P - 3
10, 15 VA Nos.

8.12 75KW Star – Delta Starter Motor feeders, each comprising of following components: Type 2 coordination should have to be followed.

(Number of feeders shall be no. of Pump sets installed plus one spare)

- a) Not less than reqd. A, 50 KA MCCB with microprocessor-based trip unit with adjustable overload, short circuit & earth fault rated upto 50⁰ C without deration - 1 No.
- b) Not less than reqd. A. Air Breaker Contactor with 240 V AC Coil arrangement - 3 Nos.
- c) Clustered LED type indicating lamp for ON / OFF / TRIP / EARTH FAULT TRIP - 4 Nos.
- d) Start / Stop Push Button - 1 Set
- e) 96 Sq. mm suitably scaled including cramped scale Ammeter with selector switch - 1 No.
- f) True Digital Microprocessor based Motor Protection relay suitable for 5A CT secondary and having thermal overload protection, instantaneous short circuit protection, inverse and definite time negative sequence current protection, instantaneous and definite time earth fault protection, locked rotor protection, loss of load protection and reverse phase sequence protection (Type P211 or equivalent) - 1 No.
- g) High speed master trip relay type VAJH 13 or equivalent - 1 No.
- h) CT of appropriate rating and 5A Secondary, Class 1.0, 10 VA - 3 Nos.
- i) CT of appropriate rating and 5A Secondary, Class 5 P 10, 15 VA - 3 Nos.

8.13 MCCB / MCB feeder of following rating

- a) 32 A TPN MCCB (50KA) with Microprocessor based O/C & E/F releases
(Adjustable O/L) rated up to 50⁰ C without duration 4 Nos
- b) 63 A TPN MCCB (50KA) with Microprocessor based O/C & E/F releases
(Adjustable O/L) rated up to 50⁰ C without deration 3 Nos
- c) Not less than #A MPCB for actuator feeder 9 Nos
- d) ON / OFF / Trip Indicating Lamp (For each feeder) as required.
- e) 16 A DP MCB 3 Nos.

09.00 LT DB at WBSEDCL Room For Receiving Power.

09.01 The LTIC/OG is required to Receiving Power from WBSEDCL And provide power to the Pump Houses MCC cum PDB and auxiliary loads for desired locations.

09.02 The LTDB shall be suitable for 415 V \pm 10%, 50 Hz \pm 5%, 3 phase, 4 wire supply system. The incoming power shall be provided from the WBSEDCL supply.

09.03 Incoming feeder termination shall be done with XLPE insulated armoured aluminium cable as required.

The LTIC/OG panel details are as under:

Incomer & Outgoing: 415 V, 3 phase 4 wire, 50 HZ, 400A MCCB for receiving & delivering power

The panel shall be side entry and rear out type single panel MCCB feeder with micro-processor base adjustable O/L, E/F and Short Circuit.

10.00 415 V Multi panel MCC cum PDB (400A) at Pump House

10.1 The MCC cum PDB is required to provide power to the Pump Motors, auxiliary load and Main Lighting Distribution Board at Pump House.

10.2 The MCC cum PDB shall be suitable for 415 V \pm 10%, 50 Hz \pm 5%, 3 phase, 4 wire supply system. The incoming power shall be provided from the outgoing feeder & PDB at at substation

10.3 The MCC cum PDB shall be 2 mm CRCA sheet steel enclosed, floor mounted type, self-supporting, fully compartmentalised, dust & vermin proof, cubicle pattern, non-draw out and modular in construction. It shall be finished painted with powder coated paint after necessary chemical treatment for rust free surfaces and application of anti rust chemical coating. The base frame of the panel shall be made of ISMC – 75 channel.

10.4 The MCC cum PDB shall be dead front type with concealed type hinged doors at front and bolted covers at the rear. All hinged doors shall be interlocked with the respective switchgears such that the same cannot be opened while the feeder is ON.

10.5 It shall have rear access and the cable termination arrangement shall be provided at the rear of the respective feeder modules. For incomers, extended bus bars shall be installed preferably from the top of the panel as per respective specifications. The vertical dropper bus bars shall be placed in between two vertical aligned feeder modules.

10.6 The bus bar for the MCC cum PDB shall be TPN, made of E91E grade Aluminium alloy insulated with 1.1KV grade heat shrink type PVC colour coded sleeve. The rating of the bus bar shall be 400A for phases and 200 A for neutral. The current density of the bus bar shall not exceed 1Amp / sq mm. The bus bars shall be supported on non-hygroscopic type resin moulded insulators and the distance between insulators shall be so designed to make the bus bar system capable of withstanding a short circuit fault current of 50 KA (r.m.s.) for 1 sec. The front bus bar chamber shall be fully shrouded to avoid accidental contact with the live bus bars.

The minimum clearance between bus bars and bus bar to earth shall be as per IS.

10.7 Incoming & Outgoing feeder termination shall be done with extended bus bar arrangement if required. The cable termination chamber shall be provided with cable supporting clamps. Each incoming ACB shall receive 2X 185 sq.mm., 1.1 KV grade 3.5 core XLPE insulated armoured aluminium cable. The control wiring of the panel shall be done with 1100 V grade PVC insulated 2.5 sq mm flexible copper wire with copper lugs and ferrule marking at each end.

All hinged door shall be earthed with flexible copper wire.

10.8 A continuous earth bus of size 50 x 8 mm and made of aluminium shall run throughout the length of the panel with drilled holes at the end for connecting the same with the station earth bus bar.

10.9 Feeder details with mounted components

The feeder details are as under:

10.10 400A incoming feeder **1 no.** comprising of following components:

- i) 415 V, 4 pole, 400A, 50 KA MCCB9MP with adjustable O/L, S/C, E/F 1 No
- ii) 96 sq mm, suitably scaled Ammeter with cramped scale & selector switch 1 No.
- iii) 96 sq mm, 0 – 500 V Voltmeter with selector switch 1 No.
- iv) Current Transformer of suitable ratio & 5A secondary, Class: 1.0, 15 VA 3 Nos.
- v) Current Transformer of suitable ratio & 5A secondary, Class: 5P10, 10 VA 3 Nos.
- vi) Red, Yellow, Blue phase indicating lamp 3 Nos.
- vii) ACB ON / OFF / TRIP / Earth Fault Trip Indicating Lamp 4 Nos.

10.12 45KW Star – Delta Starter Motor feeders, each comprising of following components:

(Number of feeders shall be no. of Pump sets installed plus one spare)

- a) *Adequate rating (Min one size higher than the selection as per Type-II Coordination), 50 KA MCCB with microprocessor-based trip unit with adjustable overload, short circuit & earth fault rated upto 50⁰ C without deration* - 1 No.
- b) *Adequate rating (Min one size higher than the selection as per Type-II Coordination Air Breaker Contactor with 240 V AC Coil arrangement* - 3 Nos.
- c) *Clustered LED type indicating lamp for ON / OFF / TRIP / EARTH FAULT TRIP* - 4 Nos.
- d) *Start / Stop Push Button* - 1 Set
- e) *96 Sq. mm suitably scaled including cramped scale Ammeter with selector switch* - 1 No.
- f) *True Digital Microprocessor based Motor Protection relay suitable for 5A CT secondary and having thermal*

overload protection, instantaneous short circuit protection, inverse and definite time negative sequence current protection, instantaneous and definite time earth fault protection, locked rotor protection, loss of load protection and reverse phase sequence protection (Type BOCR/EOCR equivalent) - 1 No.

g) High speed master trip relay type VAJH 13 or equivalent - 1 No.

h) CT of appropriate rating and 5A Secondary, Class 1.0, 10 VA - 3 Nos.

i) CT of appropriate rating and 5A Secondary, Class 5 P 10, 15 VA - 3 Nos.

j) Local /Remote selector switch 1 No.

10.13 MCCB / MCB feeder of following rating

i) a) 32 A TPN MCCB with Microprocessor based O/C & E/F releases 3 Nos.

(Adjustable O/L) rated upto 50⁰ C without duration

b) # A TPN MPCB for Actuator. 4 Nos

c) 63 A TPN MCCB with Microprocessor based O/C & E/F releases 3 Nos.

(Adjustable O/L) rated up to 50⁰ C without deration

d) ON / OFF / Trip Indicating Lamp (For each feeder) As per requirement

ii) 16 A DP MCB 3 Nos.

11.00 Battery & Battery Charging Equipment

There shall be one battery bank along with float and boost charger. The battery bank shall be Exide make 110 V Sealed Maintenance free VRLA battery with UPST type 55 nos. 2-volt 100Ah cells.

Inter row connectors / inter tier connectors shall be provided where necessary. Suitable battery stand complete with cell number plate shall be provided.

The three-phase float and boost battery charger with integral DCDB shall be housed in a floor mounting type steel enclosure with adequate ventilation for natural air cooling. The broad specification of the float and boost charger with DCDB is as under:

Battery: 110 V, 100 AH SMF VRLA (2 V x 55 Nos.)

Load: 10 A DC, Boost: 15 A DC

11.1 A.C. Input

- a) Voltage : 415 V, $\pm 10\%$
- b) Phase : 3 Phase, 4 Wire

- c) Frequency : 50 Hz $\pm 6\%$
- d) Combined voltage & frequency variation within : $\pm 10\%$
- e) System earthing : Solidly earthed

11.2 Float and Boost Battery Charger

11.2.1 Charger – I (Float Charger – SCR Control)

- a) Output Voltage : 110 – 125 V DC [steplessly adjustable]
- b) Output current : 10 A D.C. + trickle charging current
- c) Rectifier Configuration : Full wave fully controlled SCR bridge
- d) Control mode : Constant voltage current limiting
- e) Regulation : $\pm 1\%$
- f) Ripple voltage : 1% RMS

11.2.2 Charger – II (Boost cum Float Charger – SCR Control)

- a) Output Voltage Boost : 110 – 127 V DC [steplessly adjustable]
Em. Float: 110 V – 125 V DC [steplessly adjustable]
- b) Output current Boost: 15 A D.C.
Em. Float: 10 A DC + Trickle charging current
- c) Rectifier Configuration Full wave fully controlled SCR bridge
- d) Control mode Constant voltage current limiting
- e) Regulation $\pm 1\%$
- f) Ripple voltage 1% RMS
- g) Commencement & termination Automatic / Manual
of boost charging

11.3 Protection

- a) Snubber across each device
- b) Phase failure / sequence reversal
- c) Soft start with current limiting (intrinsic feature of trigger PCB)

11.4 Annunciation

- a) Mains fail
- b) Phase fail & sequence reversal
- c) Float under voltage
- d) Float over voltage
- e) Battery fuse blown
- f) Battery under voltage

11.5 Indicating LEDs / Lamps

- a) AC supply healthy - 3 Nos.

- b) Float Charger ON - 1 No.
- c) Boost charger ON in Auto mode - 1 No.
- d) Boost charger ON in Manual mode - 1 No.
- e) Boost charger ON in Em. Float mode - 1 No.

11.6 Metering

- a) AC Voltmeter with Selector Switch at input
- b) DC Voltmeter with Selector Switch at output
- c) DC Ammeter at output
- d) Centre zero Ammeter at battery path

11.7 DCDB Outgoing Feeder

- a) 2 P, 16 A DC MCB - 6 Nos.

11.8 Enclosure

- a) Material - Mild Steel Sheet (2 mm thick)
- b) Painting - Powder coated (Shade RAL7032)
- c) Doors - Front – 1, Rear – 2
- d) Cable entry - From Bottom
- e) Ventilation - Air natural through louvers backed by fine wire mesh

12.00 CABLE:

All HT and M.V. power cables shall be with XLPE insulation, stranded aluminium / copper conductor and armoured

12.01 HT & M.V. Cables and Jointing

All HT and M.V. Cables shall be 11 KV (E) / 1.1 KV grade XLPE insulated and armoured of Al / Cu. conductor 3 core / 3½ core / 4 core as required. The core

shall be stranded and the installation shall be suitable for the working condition. The cable wherever laid in underground trenches shall be of minimum 800 mm width x 1000mm average depth or with cable tray arrangement where necessary and in suitable size cable tray in the pump floor / Sub-station building / between Pump House & Substation Building. Where cable is laid in masonry trench, the cable trenches (where applicable) shall be filled up with sand or covered with chequered plate/RCC slab according to the direction of Engineer-in-Charge. Where necessary cables shall be supported on clamps of approved type and shall be properly protected with G.I. conduit or other protective covering as per direction of Engineer-in-Charge.

All Jointings should be of 'dry type' to be done with hydraulic crimping machine where applicable & done in accordance with the provision of I.E. rules. All jointing materials and other accessories shall be included in the quoted price.

13.02 Control cable and jointing

All Control cables shall be XLPE insulated of 1100 volts grade multi strand copper conductor and armoured of suitable size. The control cable should be terminated with proper sockets, glands etc. At least 2 cores shall be kept as spare in all control circuits.

14.00 FLOW SENSOR

There shall be one number of Full-bore Electromagnetic flow meter on the common delivery manifold. The flow meters are to be installed and commissioned for measuring the instant flow rates as well as the total flow for a period of time of the station passing throughout the common manifold. The flow rates shall be indicated in m³/hr & total flow in cubic meter. The flow sensor shall be suitable to measure Raw water. The flow meter shall be electromagnetic inline type to provide indication, totalization and signal transmission of the liquid. The display is required at the Control Desk around 50 mtr. away from the transmitter installation point on the pipe line. Amplification of signals, if necessary, are to be incorporated. The flow meter must be capable of measuring velocity of water upto 3 m / sec with accuracy of $\pm 0.5\%$. Flow sensitivity must be ± 0.3 m/s at any flow rate. The linearity of the instrument shall be 0.1% of scale. The sensor must have enclosure of class IP-68. The tenderer shall clearly indicate the position of flow sensor. The data sheet for flow sensor is as follows.

The flow meter will be full bore electromagnetic type should be capable to handle flow of Raw Water.

Type:- Pulsed DC electromagnetic.

Accuracy:- $\pm 0.5\%$ of measure value.

Repeatability:- $\pm 0.2\%$

Size of flow meter:- As per designed diameter of the common delivery manifold.

Sensor type:- In line full bore electromagnetic.

Process connection:- Flanged type.

Weather protection class:- IP68 NEMA 6 P or as per the specified by EIC.

Minimum conductivity:- 20 us/cm

Full scale velocity:- 1 to 5 m/sec.

Process temperature:- 50 °C max.

Process pressure:- 10 Bar max.

Electrodes:- SS 316 L/ SS 316.

Coil housing :- SS304

Flange MOC:- Carbon steel .

Flow sensor tube:- SS304

Cable between sensor and transmitter:- Copper cable of single Length as required as per site condition between sensor and transmitter.

Flow transmitter:- Microprocessor based, wall mounted.

Type of display of transmitter:- Display should be LCD or LED type and the size should be suitable for making it visible from at least 6m distance.

Out put:- 4-20 mA DC

Power supply :- 240 V AC 50 Hz and shall be supplied from the MCC cum PDB at a approximate distance of 50 m.

Input:- From flow tube

Web server:- The flow meter should be compatible for connection with web server for remote facility display facility.

Protection class :- IP 68.

Calibration shall be accredited according to ISO/IEC 17025.

14.01 Flow meter/ Flow sensor or Flow Tube fixing chamber

For fixing of Flow Tube at the delivery manifold, leak proof chamber of adequate dimension is to be constructed if required as per site condition with a rung-ladder of suitable length for getting down if necessary.

15.00 EARTHING

The total installation shall be effectively earthed by providing a ring main earthing. Each earthing set shall consist of one G.I. pipe of not less than 2" dia and 10' length. The electrode shall be buried below the ground upto the depth of moist earth which shall not be less than 8'-0" from ground level and must be 6'-0" away from any building structure. The bottom portion of the electrodes shall be properly perforated and one cast iron cap properly screwed of approved type and design and shall be fitted on the top of the electrode, connection leads to the earth bus inside the station. After fixing and drawing out of the earth leads, the top portion of the earth, electrode upto 1 ft. shall be properly brick pitched and shall be fitted with water proof bituminous compound. The connecting lead shall be GI strip 75 x 8 mm and shall be laid at a depth of not less than 600 mm from ground level. The leads shall be connected to GI earth bus bar inside the pumping station by means of proper welds. The nos. of individual earthing connected to the Earth bus should be such that after installation the earth resistance of the system must be well below one ohm.

One GI bus bar 75mm wide and 8 mm thick shall be provided so that the frames of all electric motors, switch gears, transformers and other electrical accessories and installation shall be connected to this station earth bus by two separate GI strip of adequate dimension. All metallic cover frames, equipments, installation etc. shall be earthed to the full satisfaction of Engineer-in-charge and the Govt. Electrical Inspector.

The earthing and bonding shall be according to the I.E. Rules 1956 with ammendment of 1990. All non current carrying metal parts associated with H.V. installation shall be effectively earthed to the grounding system to achieve:

- a) Limit the touch and step potential to tolerable values;
- b) Limit the ground potential rise to tolerable values so as to prevent danger due to transfer of potential through ground, earth wires, cable sheath etc.
- c) Maintain the resistance of the earth connection to such a value as to make operation of the protective device effective.

The same must be approved by the Govt. Electrical Inspector and shall pass the statutory tests.

The successful tenderer shall have to submit the detailed and fully dimensioned drawing of the whole electrical system showing the proper earthing duly approved by the Govt. Electrical Inspector before commencement of the actual installation work.

The distance between each individual Earth Pits should not be less than 3 meters.

16.00 LIGHTING SYSTEM

16.01 Luminaries

The scope includes indoor lighting of pump house, substation building, Annex area and reasonable area lighting around the Pump House and Substation Building. Industrial Medium bay luminaries with LED 150W lamps are to be provided in a row alternatively in the beams at each of the pump house ceiling. Motor/ Operating floor lighting should be provided with LED T/L industrial type fixtures and to be fixed on the wall at a level above the lintel. The positions are to be finalized as per requirement and direction of the E.I.C. The illumination level would be 150 Lux.

The Substation Room lighting should be provided with LED T/L type fixtures with reflectors tentatively 2X18W with watt cool day light type (Brilliant White). Illumination level would be 200-250 Lux.

In the corridors, toilet, LED T/L with are to be provided to generate an illumination level of 150 Lux.

Area illumination/access bridge level 100 LUX with suitable LED fittings.

All the entrance/exists of pump house shall be provided with LED down lighter or bracket mounted fittings with LED lamps of minimum 45 W as per site condition (minimum 90W for unloading bay entrance).

16.02 WIRING

All wiring installation work must be as per relevant I.S. with proper distribution network, M.C.B. are to be used in distribution boxes and there must be colour segregation for power/netural/ground wires.

16.03 In strategic locations of the substation building / pump house, adequate number of 415 / 240 volt TPN / SPN MCB Distribution board shall be placed with multiple ways of different current rating (MCB) along with a incoming switch from where power to be fed to different switch board.

16.04. Individual switch board shall comprise of multiple number of switch (6/10 Amps rated) as the case may be, which shall be used for switching 'ON' and "OFF" operation of the lights / fans / receptacles etc. The individual switch board shall be double door design so as to cover up the switch / regulator etc i.e. switches / regulator etc shall be accessible on opening the door cover.

16.05 The above stated distribution board shall be fed from independent switch fuse unit / MCB / MCCB located in the PDB.

16.06 440 volt, 15 Amps and 240 volts/15 Amps socket outlet shall be provided where ever required and power shall be taken from the individual way of the distribution board.

16.07 The minimum required size of the conductor for internal distribution point wiring shall be as follows:

Sl. No	Type of fitting /wiring	Minimum size of wire
1.	LED Fluorescent	2 nos. 1 core -1.5 mm ² copper & 1 no. Earth wire of 1.0 mm ² copper
2.	LED Flood light fitting	2 nos. 1 core -2.5 mm ² copper & 1 no. Earth wire of 1.0 mm ² copper
3.	Receptacle-5A	2 nos. 1 core -2.5 mm ² copper & 1 no. Earth wire of 1.0 mm ² copper
4.	Receptacle-15A	2 nos – 1 core-4 mm ² copper & 1 no Earth wire of 1.0 mm ² copper

17.00 Ventilation & Fire fighting System:

- 17.01 Ventilation: The entire pump house including all electrical rooms and the Sub Station Rooms shall have proper ventilation arrangement. The scope shall include the supply and fixing of following equipments complete with GI conduit wiring / armoured cable including all other accessories as required.
- 3 - phase suitable Exhaust fans including proper louvers, duct work, rain cowl and bird protection screen ----- As required for the Pump House to ensure 10 Air changes/Hr..
 - Single phase suitable Exhaust fans including proper louvers, duct work, rain cowl and bird protection screen ----- As required for all the rooms of Sub Station as per the direction of EIC.
 - Wall mounting type control panel for exhaust fan and others ----- 2 Sets, one each for pump House and substation.
 - 18" Pedestal fan with regulator and all other accessories --- 3 Nos.
- 17.02 Fire Extinguisher
- ABC type Portable type fire extinguisher consisting of welded cylinder, squeeze lever discharge valve, internal discharge tube, discharge nozzle suspension bracket, duly charged and pressurized with ISI marked.
 - ABC stored pressure type fire extinguisher 5 Kg capacity with discharge hose and nozzle and consisting of welded cylinder, squeeze lever

discharge valve,internal discharge tube, discharge nozzle suspension bracket, duly charged and pressurized with ISI marked.

c) Dry type fire extinguisher 5 Kg capacity with discharge hose and nozzle and consisting of welded cylinder, squeeze lever discharge valve, internal discharge tube, discharge nozzle suspension bracket, duly charged and pressurized with ISI marked.

d) Fire buckets (9 litre capacity) made from 24 SWG GI Sheet including wall mounting bracket and filling of sand.

18.00 MECHANICAL TYPE LEVEL INDICATOR

The Mechanical level Indicator shall be equipped with for continuous monitoring of sump level.

The level indicator shall be securely mounted on the pump floor platform. It shall be capable to monitor the sump level continuously. Range of measurement from LWL to HWL shall be around 05Mtr.

TECHNICAL SPECIFICATION

DEEP TUBE WELL IN ZONE

This is indicative not exhaustive, will be finalized in detail engineering.

01.00 Submersible pump motor set

Discharge Q=40m³/hr (Tentative),Head= Not less than 50 Mt.

01.00 Submersible pump motor set

01.01 Pump MOC

Multi Stage,

Impeller-SS

Diffuser-CI

Pump Shaft-SS

Casing-CI

Column Pipe

Adaptor

Make- Texmo/KSB/MBH

01.02 MOTOR (Squirrel cage)

Stator-SS

Speed-2900 r.p.m

Voltage-415 ,3ph 50Hz

OD-196mm

Stating- Star-Delta

Cable-2x3 core 6 Sq.mm

02.00 VALVES AND SPECIALS

2.01.01 Delivery side of pumps

The delivery side of each pump shall be provided with 1 no Sluice Valve, 1 no. non-return valve, 1 no. Dismantling joint & short pieces wherever required. The diameter of the valves and joints shall select based on velocity of 2.0 m/sec with nearest sizes as per IS.

2.01.02 Non-Return Valve

The non-return valve as mentioned here in before shall be manufactured conforming to IS: 5312 (Part-I) / equivalent international standard. The valves will be used for handling Raw water and to maintain unidirectional flow. The valve shall be maintenance free, leak proof and shall have low life cycle cost. The PN rating of valves shall be PN 1.0. /1.6

The non-return valve shall be single door, Ductile Iron, double flanged, conventional non-slam design. The body, door, cover shall be of ductile iron (Gr. GGG 40). The seat and body shall withstand fluid pressure of 10/16kg / cm² and 16/24 kg / cm² respectively. The body seat, door face rings, bearing block, disc shaft, hinge pin, plug and fasteners shall be of SS 316. The bearings shall be suitable for maximum thrust imposed by the shaft during testing and in service.

The end connection shall be drilled flanged type as per IS or BS or equivalent standard. The non-return valve shall have features for quick closing (up to 85%) and slow closing from 85 to 100%. It shall have by pass valve with cock. The valve shall be marked to indicate the direction of flow.

The design and construction of the non-return valve shall be non-slam type and the disc shall be so balanced that the it will not bump against the valve body while the pump is in operation.

The surface protection of the valve shall be done by either epoxy powder coating or epoxy painting (min. paint thickness - 250 micron) for both inside and outside.

All bolts and nuts for flange connection(s) of entire pipe line (delivery & common manifold) where applicable shall be of carbon steel having tensile strength 300 N/ mm².

The MOC of other accessories to complete the individual delivery piping like Y or T bends, flanged end short piece, flanged end enlarger/ reducer or any other components required to complete the job in all respect shall be MS as per IS 226.

3.0 SLUICE VALVES

The sluice valves shall be manufactured from closed grain grey cast iron (FG 260) conforming to IS-14846 of the year 2000. Flange ends as per IS 1538 or as per other standards to match with other flanges. The body seat shall be of S.S. AISI-410 stem shall be of S.S. AISI-410 & the stem nut shall be of 9% Al-Bronze conforming to I.S. 305:1981/BS 2874. Body shall be of **Q**. Other details are to be submitted for approval.

The seat pressure shall be 10/16 kg/cm² and body pressure shall be 16/24 kg/cm². The valves should pass through hydrostatics test for duration of 5 minutes. Materials of construction test certificates shall be provided during supplies. The sluice valves shall be rising spindle type with gearing arrangement / hand wheel for easy manual operation.

04.00 LT DB at WBSEDCL Room for Receiving Power for tube well area

04.01 The LTIC/OG is required to Receiving Power from WBSEDCL and provide power to the Pump Houses MCC cum PDB and auxiliary loads for desired locations.

04.02 The LTDB shall be suitable for 415 V \pm 10%, 50 Hz \pm 5%, 3 phase, 4 wire supply system. The incoming power shall be provided from the WBSEDCL supply.

04.03 Incoming feeder termination shall be done with XLPE insulated armoured aluminium cable as required.

The LTIC/OG panel details are as under:

Incomer & Outgoing: 415 V, 3 phase 4 wire, 50 HZ, 400A MCCB for receiving & delivering power

The panel shall be side entry and rear out type single panel MCCB feeder with micro-processor base adjustable O/L, E/F and Short Circuit.

5.0 415 V Multi panel MCC cum PDB FOR TUBE-WELL

5.1 The MCC cum PDB is required to provide power to the Pump Motors, auxiliary load and Main Lighting Distribution Board at Pump House.

5.2 The MCC cum PDB shall be suitable for 415 V \pm 10%, 50 Hz \pm 5%, 3 phase, 4 wire supply system. The incoming power shall be provided from the outgoing feeder & PDB at at substation

5.3 The MCC cum PDB shall be 2 mm CRCA sheet steel enclosed, floor mounted type, self-supporting, fully compartmentalised, dust & vermin proof, cubicle pattern, non-draw out and modular in construction. It shall be finished painted with powder coated paint after necessary chemical treatment for rust free surfaces and application of anti-rust chemical coating. The base frame of the panel shall be made of ISMC – 75 channel.

5.4 The MCC cum PDB shall be dead front type with concealed type hinged doors at front and bolted covers at the rear. All hinged doors shall be interlocked with the respective switchgears such that the same cannot be opened while the feeder is ON.

5.5 It shall have rear access and the cable termination arrangement shall be provided at the rear of the respective feeder modules. For incomers, extended bus bars shall be installed preferably from the top of the panel as per respective specifications. The vertical dropper bus bars shall be placed in between two vertical aligned feeder modules.

5.6 The bus bar for the MCC cum PDB shall be TPN, made of E91E grade Aluminium alloy insulated with 1.1KV grade heat shrink type PVC colour coded sleeve. The rating of the bus bar shall be 400A for phases and 200 A for neutral. The current density of the bus bar shall not exceed 1Amp / sq. mm. The bus bars shall be supported on non-hygroscopic type resin moulded insulators and the distance between insulators shall be so designed to make the bus bar system capable of withstanding a short circuit fault current of 50 KA (r.m.s.) for 1 sec. The front bus bar chamber shall be fully shrouded to avoid accidental contact with the live bus bars.

The minimum clearance between bus bars and bus bar to earth shall be as per IS.

5.7 Incoming & Outgoing feeder termination shall be done with extended bus bar arrangement if required. The cable termination chamber shall be provided with cable supporting clamps. Each incoming ACB/MCCB shall receive 2X 240 sq.mm., 1.1 KV grade 3.5 core XLPE insulated armoured aluminium cable. The control wiring of the panel shall be done with 1100 V grade PVC insulated 2.5 sq. mm flexible copper wire with copper lugs and ferrule marking at each end.

All hinged door shall be earthed with flexible copper wire.

5.8 A continuous earth bus of size 50 x 8 mm and made of aluminium shall run throughout the length of the panel with drilled holes at the end for connecting the same with the station earth bus bar.

5.9 Feeder details with mounted components

The feeder details are as under:

5.10 400A incoming feeder 1 no. comprising of following components:

- i) 415 V, 4 pole, 400A, 50 KA MCCB with adjustable O/L, S/C, E/F 1 No
- ii) 96 sq. mm, suitably scaled Ammeter with cramped scale & selector switch 1 No.
- iii) 96 sq. mm, 0 – 500 V Voltmeter with selector switch 1 No.
- iv) Current Transformer of suitable ratio & 5A secondary, Class: 1.0, 15 VA 3 Nos.
- v) Current Transformer of suitable ratio & 5A secondary, Class: 5P10, 10 VA 3 Nos.
- vi) Red, Yellow, Blue phase indicating lamp 3 Nos.
- vii) ON / OFF / TRIP / Earth Fault Trip Indicating Lamp 4 Nos.
- viii) Auto phase corrector with SPP relay, electromagnetic relay, indication lamp - as required.
- ix) Microprocessor based draw out type non-directional combined IDMTL over current relay with high set instantaneous element and instantaneous earth fault element type P111 or equivalent with VAJH-13 Relay.

5.12 20KW Star – Delta Starter Motor feeders, each comprising of following components:

- a) *Adequate rating (Min one size higher than the selection as per Type-II Coordination), 50 KA MCCB with microprocessor-based trip unit with adjustable overload,* - 1 No.

short circuit & earth fault rated up to 50⁰ C without deration

- b) *Adequate rating (Min one size higher than the selection as per Type-II Coordination Air Breaker Contactor with 240 V AC Coil arrangement* - 3 Nos.
- c) *Clustered LED type indicating lamp for ON / OFF / TRIP / EARTH FAULT TRIP* - 4 Nos.
Start / Stop Push Button - 1 Set
- d) *96 Sq. mm suitably scaled including cramped scale Ammeter with selector switch* - 1 No.
- e) *True Digital Microprocessor based Motor Protection relay suitable for 5A CT secondary and having thermal overload protection, instantaneous short circuit protection, inverse and definite time negative sequence current protection, instantaneous and definite time earth fault protection, locked rotor protection, loss of load protection and reverse phase sequence protection (EOCR with digital display or equivalent)* - 1 No.
- f) *Capacitor normal duty with on delay timer, star-delta timer, illuminated push buttons, auto manual selector switch UV/OV/SPP relay.*
- g) *CT of appropriate rating and 5A Secondary, Class 1.0, 10 VA* - 3 Nos.
- i) *CT of appropriate rating and 5A Secondary, Class 5 P 10, 15 VA* - 3 Nos.
- j) *Local /Remote selector switch* 1 No.

5.13 MCCB / MCB feeder of following rating

- a) 32A TPN MCCB with Microprocessor based O/C & E/F releases 2 Nos.

(Adjustable O/L) rated upto 50⁰ C without deration

- b) ON / OFF / Trip Indicating Lamp (For each feeder) As per requirement

- c) 10 A DP MCB 6 Nos.

- d) 6ASP MCB 12 Nos.

SECTION - H
List of Vendors

Sl. No.	Equipment	Make
01.00	Pump	Kirloskar / Mather & Platt / WPIL Ltd.
02.00	Motor	Siemens / ABB / Marathon/ Crompton
03.00	Control Desk/ MV Switchboard / MCC cum PDB	Sellwin / / RNR /AC Power/ROYCCO
04.00	ACB/MCCB	L&T / Siemens / ABB / Schneider
05.00	Fuse Switch Unit	L&T / Siemens / ABB / Schneider
06.00	Breaker control switch	Kaycee / Recom / Alstom
07.00	Relays	Schneider / ABB / ER/ Siemens / BCH
08.00	Contactors	L&T/ Siemens / ABB / Schneider
09.00	Meters	AE / IMP / Enercon/ Secure
10.00	Cable:	
10.01	HT & LT Cable	Gloster / Polycab / Havells / UCL
10.02	Control / Signal Cable	Gloster / Polycab / Havells/ UCL
11.00	Pressure Transmitters	Siemens / ABB / Honeywell / Micro System
12.00	Digital Indicators	Micro System /Meco
13.00	Temperature Scanner	Pecon/ Micro System /Laxon / Chino / Masuka Instruments Pvt. Ltd.
14.00	Radar type Level Monitoring System	Siemens / Khrono / Rosemount
14.01	Mechanical Level Indicator	NGM/JoydevEngg. /Star Enterprise
15.00	Flow meter, Indicator, Totaliser	Krohne / Endress Hauser/ABB/Siemens
16.00	Control Fuses	GE/Siemens
17.00	Current Transformer	Kappa /JAWS / Schneider
18.00	Capacitor	Unistar / L&T / Epcos
19.00	Butterfly Valves, Non-Return Valve & Sluice Valve	VAG/ IVC / Kirloskar/ / Fluidtech/IVI
20.00	Valve Actuators	Rotork / Auma

21.00	Gauges	Bell / Taylors / H. Guru /Bell/Baumer
22.00	Fire Extinguishers	Surex / Minimax / Cease Fire / Fire Shield
23.00	Submersible Sump Pump	KSB / Calama / Kirloskar
24.00	Air Conditioner	Carrier / LG / Voltas
25.00	Lighting system	
26.01	Light Fitting	Philips / Bajaj/C.G/KLITE
26.02	Wire	Finolex / KDK / Havells
26.03	Switches	Anchor / Havells / Cab
27.00	Ventilation System / System /	P.N. Chakraborty & Co. / Universal Air PASCO
28.00	Exhaust Fan / Ventilation Fan	Alstom / EPC / Pasco / Marathon
29.00	Crane	Surekha / Pilcare / India Engineering & Implements Co.
30.00	H.T. Switchgear	Siemens / Schneider / ABB/CG
31.00	Power Transformer	Schneider / KEC/ Voltamp (Vadodara)/CG
32.00	Battery	Exide/Aamron
33.00	Battery Charger	Caldyne / Electro Service /Live Line

Technical Specification /Scope of Work for Major E/M Equipment for CWR-I

This is indicative not exhaustive, will be finalized in detail engineering.

SI No.	Brief Description of Item	Qty	Unit
1	Supply, delivery at site with necessary packing, receiving, unloading, shifting, storing, installation, testing and commissioning of 250 cu.m/hr& Head Approx. 95 m, Horizontal Pump - Motor set with all req. accessories with suitable motor, 415 V, 50 Hz.	2	Nos.
2	Supply, Fabrication, installation, testing & Commissioning of flanged/ plain ended MS pipe made from MS sheet of relevant IS specification (bends, Enlarger, reducers, fittings, specials, flanges, bolts, nuts, gaskets, etc as required to complete the installation) for Delivery & Common Manifold and Jointing the MS to DI Lines (Minimum 10 mm thickness sheet.)	1	Lot

3	Supply, delivery, Installation, Testing and Commissioning of suitable DI Valves & Joints (i.e Sluice Valve, Butterfly Valve, NRV, DJ, EJ, MJ, Air Valve, etc.) for Delivery & Common Manifold.	1	Lot
4	Providing, Installation, Testing and Commissioning Compound gauge & Pressure gauges.	1	Lot
5	Providing, Installation, Testing and Commissioning of Electromagnetic Flow Meter of 250 mm dia.	1	Nos.
6	Supply, delivery, Installation, Testing & Commissioning of Mechanical Level Indicator for CWR/Sump/Well.	1	Nos.
7	Providing, Installation, testing & Commissioning of metering pump including metering arrangement for direct pumping of bleaching solution in the delivery line of Tube well (only Chlorination part considered).	1	Lot
8	Supply, installation, testing & commissioning of 110Volts Automatic Float cum Boost (20 Amps) Battery Charging Equipment suitable for 110 Volts, 100 AH VRLA batteries; strictly conforming to our technical specification.	1	Set
9	Supply, Installation, Testing & Commissioning of 400 kVA, 11 kV/0.433 kV, 3 phase, 50 Hz, ONAN type transformer as per specifications and NIT.	2	Nos
10	Supply , installation , testing & commissioning of Float cum boost charger suitable for 415V with variation 10% , 50 HZ , single phase/3-phase input & 24/48/110 Volt DC. and Battery Bank of minimum 100 AH capacity comprising SMF/VRLA batteries, MS stand, interconnect wiring etc as required complete in all respect	1	Set
11	415 V, 3 phase 4 wire, 50 HZ, LT PDB Panel as per specification	1	No
12	415 V, 3 phase 4 wire, 50 HZ, LT PMCC Panel as per specification.	1	No
13	Supply, delivery, Installation, Testing & Commissioning of suitable Earthing Systems, etc	1	Job
14	Supply, delivery, Laying, Testing & Commissioning of suitable Cable (H.T Cables).	1	Job
15	Supply, delivery, Laying, Testing & Commissioning of suitable Cable (L.T Cables).	1	Job
16	Supply, delivery, Laying, Testing & Commissioning of suitable Cable (Control & Instruments Cables).	1	Job
17	Supply, delivery and Installation of safety equipment.	1	Job
18	Supply, delivery and Installation of Perforated and Ladder type Cable tray, Panel base support, with all accessories & cable tray supports.	1	Job
19	SITC of Ventilation System for Pump House & Panel Room	1	Job
20	Illumination of Pump room & Panel room incl. supplying fitting, fixing all complete.	1	Job
21	Dehydration & Filtration of Transformer Oil to raise the dielectric strength to the value specified in IS including submission of test result	1	Job
22	Commissioning of whole system & Performance test for (72 hours) including DOE clearance.	1	Job
23	Trial Run for (three) months after successful commissioning of the whole installation as per specification and direction of the EIC.	1	Job

**Technical Specification /Scope of Work for Major E/M Equipment for
CWR-II**

This is indicative not exhaustive, will be finalized in detail engineering.

SI No.	Brief Description of Item	Qty	Unit
1	Supply, delivery at site with necessary packing, receiving, unloading, shifting, storing, installation, testing and commissioning of 140 cu.m/hr& Head not less than 60 m, Horizontal Pump - Motor set with all req. accessories with suitable motor, 415 V, 50 Hz.	2	Nos.

2	Supply, Fabrication, installation, testing & Commissioning of flanged/ plain ended MS pipe made from MS sheet of relevant IS specification (bends, Enlarger, reducers, fittings, specials, flanges, bolts, nuts, gaskets, etc as required to complete the installation) for Delivery & Common Manifold and Jointing the MS to DI Lines (Minimum 10 mm thickness sheet.)	1	Lot
3	Supply, delivery, Installation, Testing and Commissioning of suitable DI Valves & Joints (i.e Sluice Valve, Butterfly Valve, NRV, DJ, EJ, MJ, Air Valve, etc.) for Delivery & Common Manifold.	1	Lot
4	Providing, Installation, Testing and Commissioning Pressure gauges.	1	Lot
5	Providing, Installation, Testing and Commissioning of Electromagnetic Flow Meter of 200 mm dia.	1	Nos.
6	415 V, 3 phase 4 wire, 50 HZ, LT DB Panel for receiving power as per specification	1	No
7	415 V, 3 phase 4 wire, 50 HZ, LT PMCC Panel as per specification.	1	No
8	Supply, delivery, Installation, Testing & Commissioning of suitable Earthing Systems, etc	1	Job
9	Supply, delivery, Laying, Testing & Commissioning of suitable Cable (L.T Cables).	1	Job
10	Supply, delivery and Installation of safety equipment.	1	Job
11	Supply, delivery and Installation of Perforated and Ladder type Cable tray, Panel base support, with all accessories & cable tray supports.	1	Job
12	Repairing of Illumination of Pump room & Panel room incl. supplying fitting, fixing all complete.	1	Job
13	Commissioning of whole system & Performance test for (72 hours) including DOE clearance.	1	Job
14	Trial Run for (three) months after successful commissioning of the whole installation as per specification and direction of the EIC.	1	Job

Technical Specification /Scope of Work for Major E/M Equipment.

This is indicative not exhaustive, will be finalized in detail engineering.

SI.No	Description of items	Qty	Unit
1	Supply & delivery of pumping machinery submersible pump excluding panel for unmanned operation, MK-Texmo/KSB/MBH c) 11HP to 15HP inclusive of column pipe, valves special submersible cable connection from motor to starter.	11	No

2	Supply & delivery of clear water vertical wet type submersible pump suitable for bore well conforming to IS: 8034 (and as amended thereafter) with standard MOC for potable clear cold water and BEE 3 star rated capable of discharging 40 m ³ /hr against 45 mtr head of water column. The pump shall be directly coupled with a continuous rated 2 pole suitable wet type vertical squirrel cage induction motor conforming to IS : 9283 (and as amended thereafter), suitable for operation in AC three phase 415 V, 50 hz (category B motor).	4	No
3	415 V, 3 phase 4 wire, 50 HZ, LT PDB Panel as per specification. IC / OG.	4	No
4	415 V, 3 phase 4 wire, 50 HZ, LT PMCC Panel as per specification	4	No
5	Supply, Delivery at site 1.1 KV grade Al armoured cable of size 3.1/2 core 35 sq mm conforming to 1554/7098(PT) 1988 Mk-Havel or equivalent. Ref - Same as above.	500	Mtr
6	Supply of Insulating rubber mat of size 3' x 6'.Ref - Same as above.	60	Sq.ft
7	Supply & delivery of 1200 mm sweep AC Ceiling Fan (Orient PSPO, Summer cool/ New bridge) without regulator with all accessories. Ref - Same as above.	11	No
8	S & F MS top clamp 12 x 80 mm section for Submersible P/M Set in two halves. Ref - Same as above.	22	Sets
9	S & F of safety clamp for the P/M Set 6 mm x 40 mm section. Ref - Same as above.	11	No
10	S & F of pressure gauge of range 0-10 kg/cm ² with cock and allied accessories. Ref - Same as above.	11	no
11	S&F of Split type M.S fabricated suitable tube well cover for the tube well with necessary clamping arrangement including holes for column pipe, air pipe & cable entry. Ref - Same as above.	11	item
12	Construction of supporting pillar supporting platform for the resting of valves for easy operation with neat cement finish as per direction of EIC.Ref - Same as above.	22	No
13	Supply, painting of best quality weather thermal resistance paint of approved quality with two coats with necessary smoothing of surface and application primer incl. material, labour and hire charge of tools & paints etc all complete. Ref - Same as above.	33	Sq M
14	S & F of protecting device comprising of wire rope clamps etc. Ref - Same as above.	11	No
15	Flange joint to CI/DI/MS pipes and specials incl supply of rubber gasket, nuts, bolts, washers etc of quality to make the joint water tight as req. for hydraulic pressure and direction of EIC. Ref - Same as above.	88	No
16	Installation of pumping machinery with valves, pipe & pipe specials short piece, depth gauge, pressure gauge including hoisting of column pipe. making all electrical and water line inter- connection complete as per direction including supply of necessary materials as req.for the work. Ref - Same as above.	11	No
19	Supplying and fixing compression type gland complete with brass gland, brass ring & rubber ring for dust & moisture proof entry of XLPE/PVC cable for 3 1/2 core upto 35 sq mm. Ref - Same as above.	66	No
20	Finishing end of XLPE/PVC armoured cables by crimping method incl. Supplying fixing solderless socket(dowels make), tapes, anti corrosive paste & jointing materials 35 sq mm 3.1/2 core. Ref - Same as above.	66	Sets
21	Supply, delivery, Laying, Testing & Commissioning of suitable Cable (L.T Cables).	4	Lot

22	Supply & Fixing bulkhead light fitting (Make:Havells/Philips/Crompton/Bajaj) with die cast aluminium housing & frosted glass on wall/ceiling incl. 8 Watt CFL/100watts GLS lamp complete set. Ref - Same as above.	22	Sets
23	Supplying & fixing of 250 V, 4' long 40 W single/double FL Tube light fittings complete with all accessories incl. FL. Tube (Make: Havells/ Philips/ Crompton/ Bajaj/ Wipro). TMC 055 2 x TL-D 36 W LED.Ref - Same as above.	11	No
24	S&F at site of TW single board size 14" x 16".	22	No
25	Supply & Fixing 240 V 6 A Piano key type switch (Brand approved by EIC) on existing sheet metal switch board having bakelite/perspex top cover by screws after making using for switch by cutting bakelite/perspex cover and making necessary connections as required. Ref - Same as above.(Make: Havells/ Legrand/North-East/ L & T/ Wipro)	44	No
26	Supply & Fixing 240 V 16/20 A Piano key type switch (Brand approved by EIC) on existing sheet metal switch board having bakelite/perspex top cover by screws after making housing for switch by cutting bakelite/perspex cover and making necessary connections as required. Ref - Same as above. (Make: Havells/ Legrand/North-East/ L & T/ Wipro)	44	No
27	Supply & Fixing 240 V, 20 A Plug Socket (Brand approved by EIC) without plug top and switch on existing sheet metal switch board having bakelite/perspex top cover by screws after making housing for combined plug switch by cutting bakelite/perspex cover and making necessary connections with PVC wire and earth continuity wire etc.Ref - Same as above. (Make: Havells/ Legrand/North-East/ L & T/ Wipro)	11	No
28	Supply, delivery, testing and commissioning of LED type 60 W street light luminaries including LED lamp etc all complete. (Make: Havells/ Philips/ Crompton/ Bajaj/ Wipro) or any reputed make as per direction of EIC. Ref - Same as above.	22	No
29	Supplying & Fixing Out door type CFL luminaire (Make: Havells/ Philips/ Crompton/ Bajaj/ Wipro)with deep drawn aluminium housing anodised inside & clear acrylic cover and accessories incl. for 85 watts CFL lamp incl. S&F 32mm dia GI pipe bracket, clamp, nut & bolts etc. Ref - Same as above.	11	No
30	Distribution wiring in 1.1 KV grade 2x22/0.3 (1.5 sqmm) single core stranded 'FR' PVC insulated & unsheathed copper wire (Brand approved by EIC) in suitable size PVC casing-capping (Precision make) with 1x22/0.3 (1.5 sqmm) single core stranded 'FR PVC insulated & unsheathed copper wire for ECC, incl. necy. PVC clips, fittings etc. to bell point with piano key type switch (Anchor make) fixed on sheet steel fabricated switch board with Perspex/ bakelite top cover on wall incl. necy, connections and making earthing attachment and mending good damages to building works. [PVC casing-capping and Switch board both on surface). Average run 6 mtr. Ref - Same as above.	88	Pnt
31	Supply of fabricated MS Kiosk made from 14 SWG MS Angle incl. Providing Al busbar of 60 A rating for main supply transmission with proper stamping and to be fixed on pedestal as per direction of EIC. Ref - Same as above.	11	No
32	Earthing with 50 mm diaGI pipe 3.64 mm thick x 3.04 Mts. long and 1 x 4 SWG GI (Hot Dip) wire (4 Mts. long), 13 mm dia x 80 mm long GI bolts. double nuts, double washers incl. S & F 15 mm dia GI pipe protection (1 Mts. long) to be filled with bitumen partly under the ground level and partly above ground level driven to an average depth of 3.65 Mts. below the ground level By TATA- Medium GI pipe. Ref - Same as above.	33	Sets

33	Supplying & fixing earth busbar of galvanized (Hot Dip) MS flat 25 mm x 6 mm on wall having clearance of 6 mm from wall including providing drilled holes on the busbar complete with GI bolts, nuts, washers, spacing insulators etc. as required. Ref - Same as above.	22	Mtr
34	Connecting the equipments to earth busbar including S & F GI (Hot Dip) wire of size No. 4 SWG on wall/floor with staples buried inside wall/floor as required and making connection to equipments with bolts, nuts, washers, cable lugs etc. as required and mending good damages. Ref - Same as above.	110	Mtr
35	Supply, delivery at site and storage of glowing plastic sign board for identification mark as per direction of EIC. Ref - Same as above.	132	Sq. ft
36	Erection of glowing plastic sign board for identification mark as per direction of EIC. Ref - Same as above.	132	Sq. ft
37	Supply & fixing, fitting of lightning arrestor/conductor of G.I stick of size 1x5 Mtr long x 25 mm dia with G.I flange at bottom of size 75 X 75 x 5 mm thk. with copper discharge points including grouting by cement mortar 1:4 as per direction of EIC. Ref - Same as above.	11	Job
38	Connecting the equipments/body to earth busbar including S&F 25 mmx6mm galvanized (Hot Dip) M.S flat on wall/ floor with GI shaddles as required and making connection to equipments with bolts, nuts and washers etc. Ref - Same as above.	165	Mtr
39	Operation & Maintenance of the whole Installation for the period of five Years (after trial run) deploying adquate number of working personnel for round the clock operation as per requiremnt, specification &direction of E.I.C.	60	/ month

**SUPERINTENDING ENGINEER
WEST CIRCLE
MUNICIPAL ENGINEERING DIRECTORATE**

Signature Not Verified

Digitally signed by ASIM KUMAR DAS
Date: 2025.11.28 16:44:11 IST
Location: West Bengal-WB