IRRIGATION AND WATERWAYS DIRECTORATE
GOVERNMENT OF WEST BENGAL
MECHANICAL& ELECTRICAL DIVISIONDIVISION, MIDNAPORE
Khasjungle, P.O-Abas, District- Paschim Medinipur, Pin: 721102

Memo No: -62/10E-1 **Date: 10.02.2025.**

[Invitation for Expression of Interest for Budgetary Quotation]

EOI No WBIW/EE/MEDM/e-EOI-03/2024-25

Critical Dates of this E.O.I.:

Sl. No.	Particulars	Dates
01.	Start Date of Issuance of EOI Document	*13.02.2025.*
02.	Last date of submission of Queries	*25.02.2025.*
03.	Pre bid meeting	*27.02.2025.*
05.	Last Date of Issuance EOI Document	*17.03.2025.*
06.	Last Date and time for Submission of EOI	*17.03.2025.*
07.	Date of Opening	*19.03.2025.*

NAME OF THE WORK:
"Supply, installation, testing and commissioning including trial run of six (6) nos. dry installed non clog centrifugal submersible (flood proof) pump of capacity 20 Cusec (2040 M3/Hr) with allied electromechanical work, Piping, valves, illumination etc complete at the Ranichak pumping station, P.S: Daspur, Dist. Paschim Medinipur."

EXECUTING DIVISION: Mechanical & Electrical Division, Midnapore.

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SECTION-I

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1.0 drawing of civil structure.

SECTION-I

1.0 Invitation for EOI /Single stage of Bidding

The Executive Engineer, Mechanical & Electrical Division, Midnapore (Nodal officer) invites EOI (for budgetary quote) from prospective bidders for the work **Supply, installation, testing and commissioning including trial run of six (6) nos. dry installed non clog centrifugal submersible (flood proof) pump of capacity 20 Cusec (2040 M3/Hr) with allied electromechanical work, Piping, valves, illumination etc complete at the Ranichak pumping station, P.S: Daspur, Dist. Paschim Medinipur".**

Executive Engineer, Mechanical & Electrical Division, Midnapore seeks EOI for budgetary quotes (estimating purpose) from Bidders of repute for the above work from Bidders whose the pre-qualification criteria specified in this document will be short-listed to have comparison of cost between various prospective bidder.

A tentative BOQ, Scope of work & Technical specification and additional contract information are being included along with this EOI to conceive the work as a whole so that bidders may quote their rate against this EOI (for budgetary quote) on realistic basis. Bidders are requested to go through it carefully as same will be integral part in the formal request for e-NIT documents and subsequent contract agreement which will be brought out by the Superintending Engineer, South West Mechanical & Electrical Circle, Durgapur-2, Burdwan in later stage after obtaining administrative approval of the work.

2.0 Brief Description of the Project:

This pumping station is situated at Ranichak under Block- Daspur-II, P.S- Daspur in the District of Paschim Medinipur. It plays an important role in draining out rain water of upper and lower Block of Daspur-II and water from Ghatal P.S area which cause damage of Amon crops of 12 Sq. Mile area, thereby giving relief to the cultivators& villagers of several Mouzas of the area. This Pumping station has total 12 Nos pumps out of which 06 Nos are of 20 Cusec (100 HP Motor) mixed flow type centrifugal pump and another 06 Nos are of 20 Cusec (100 HP Motor) mixed flow, dry pit submersible centrifugal pump. Each 06 Nos pumps

are installed in parallel and discharged through a common header pipe of 1200 mm diameter to the river Rupnarayan.

During flood period the pump house with adjoining area with all electrical installation are inundated and motors with pump are totally submerged for more than one month. As a result, the pump house remains partially inoperative (06 nos remains inoperative) during this period. Considering this situation and due to lack of effectiveness and operational difficulties, 06 Nos centrifugal pumps has to be replaced by 06 Nos Dry installed, non-clog, centrifugal Submersible Pump (Flood proof) of capacity 20 Cusec each.

3.0 Instructions to Bidders:

3.1 Bidders are advised to study all instructions, B.O.Q, forms, terms, requirements and other information in the EOI documents carefully. Submission of the bid shall be deemed to have been done after careful study and examination of the E.O.I documents with full understanding of its implications. **Rate should be quoted inclusive of all taxes and duties.**

3.2 The response to this E.O.I should be full and complete in all respects. Failure to furnish all information required by the E.O.I documents or submission of a proposal not substantially responsive to the E.O.I documents in every respect will be at the bidder's risk and may result in rejection of its proposal.

3.3 For better understanding of work, scope of work & technical specification and additional contract documents as per our preliminary assessment are given for better understanding of the project. In this stage bidder are requested to propose their work description, with quoting rate, so that in later stage under detailed NIT, complete & revised scope of work & technical specification and additional contract documents may be enclosed, so that bid may be evaluated on equal footing.

3.4 The Bidder shall be deemed to be fully conversant with the site conditions and the nature and complexity of the work to be undertaken and considering all eventualities which can arise before, during and after project execution.

3.5 Bid validity shall be 150 days.

4.0 EOI proposal preparation, costs & related issues:

4.1 The Bidder is responsible for all costs incurred in connection with participation in this process, including, but not limited to, costs incurred in conduct of informative and other diligence activities, participation in meetings/discussions/presentations, preparation of proposal, in providing any additional information required by this office to facilitate the evaluation process, unless explicitly specified to the contrary.

Department will in no case be responsible or liable for those costs, regardless of the conduct or outcome of the bidding process.

4.2 These Expression of Interest (EOI) are purely for estimation purpose and to know the present market rate and under no circumstance, It shall be construed as quotation for placing the supply order. For competitive bidding separate notice inviting Tender will be published.

5.0 Pre-bid Meeting

Superintending Engineer, South-west Mechanical & Electrical Circle, shall hold a pre-bid meeting with the prospective Bidders on 27.02.2025 at 13:00 Hrs at O/O Office of the Superintending Engineer, South-West Mechanical & Electrical Circle, DVC New Colony, Durgapur-2, Paschim Bardhaman, Pin- 713202. The Bidders will ensure that their queries with regard to the EOI to the following address through E-mail on or before 25.02.2025 at 14:00 Hrs.

Office of the Executive Engineer
Mechanical & Electrical Division, Midnapore,
Khasjungle, P.O-Abas, District- Paschim Medinipur.
Pin: 721102
E-mail: ee.midmched-wb@wbiwd.gov.in, medm.midnapur@gmail.com
Mobile: 9475851824

6.0 Responses to pre-bid queries and issue of corrigendum:

EOI issuing authority will endeavour to provide timely response to all queries. However, the department makes no representation or warranty as to the completeness or accuracy of any response made in good faith.

6.1 At any time prior to the last date for receipt of bids, EOI inviting authority may, for any reason, whether at its own initiative or in response to a clarification requested by a prospective Bidder, modify the EOI document by issuing a corrigendum.

6.2 The corrigendum (if any) & clarifications to the queries from all Bidders will be posted on the <https://wbtenders.gov.in>, (www.www.wbiwd.gov.in) and emailed to all participants of the pre -bid conference.

6.3 Any such corrigendum shall be deemed to be incorporated into this EOI.

6.4 In order to afford prospective Bidders reasonable time in which to take the corrigendum into account in preparation of their bids, Purchaser may, at it's discretion, extend the last date for the receipt of EOI Bids.

7.0 Right to terminate the EOI Process:

7.1 EOI issuing authority may terminate the EOI process at any time without assigning any reason. EOI issuing authority makes no commitments, expression or implied that this process will result in a business transaction with anyone.

8.0 Bid Submission Procedure

<Option 1: In case of Online Submission on e-Procurement portal>

Bidders should submit their responses to an e-EOI as per the procedure specified in the designated Government of West Bengal tender website having URL https://wbtenders.gov.in, which is being used for this purpose. The e-tender can be searched by typing WBIW/EE in the search engine provided in the website/s.

The bidder must ensure that the bid is digitally signed by the Authorized Signatory of the bidding firm and has been duly submitted (freezed) within the submission timelines. The Department will in no case be responsible if the bid is not submitted online within the specified timelines.

All documents uploaded by the Tender Inviting Authority forms an integral part of the works contract in the latter stage. Contractors/bidders are required to upload the entire tender documents, bidder's technical proposal/ specification in relation to buyer's requirement along with all other relevant Eligibility & PQ Credential documents as asked for in the e-EOI, electronically, through the above portal within the stipulated date and

time as notified in the e-EOI. Bids are to be submitted in two parts/folders at the same time, one being 'Technical Proposal' and the other 'Financial Proposal'.

The contractor/bidder should carefully go through all the documents of the e-EOI and upload the scanned copies of his/her/their original documents in 'Portable Document Format' (PDF) files in the designated links in the web portal as their 'Technical Bid' in the respective folder as below.

1. EOI-This EOI documents.
2. Forms: Application for e-EOI (Form-1)
3. Technical specification: Bidders' offer of technical specification as sought in 'Guaranteed technical particular sheet' available in this document along with GA drawing, pump curves, motor performance curves, QAP and other documents etc.
4. Drawing: Drawing attached with this EOI
5. My document: Other important Document (OID) for eligibility & pre-qualification credential.

He/she needs to fill up the financial offer/bid price /rates in the downloaded BOQ of the work in the designated cell in 'Excel sheet only', and upload the same in the designated link (BOQ folder) of the portal as their 'Financial Bid'.

Documents uploaded are virus scanned and required to be digitally signed using their 'Digital Signature Certificates' (DSC). Contractors/bidders should especially take note of all the Addenda or Corrigenda notices related to the e-EOI and upload all these documents forming a part of their e-bid as tender document. Documents digitally signed and uploaded in the e-Tender portal by the contractors/bidders containing requisite information & financial bid/rate comprising 'Technical bid' and 'Financial bid' are submitted concurrently, which cannot be changed after end date and time fixed for submission of the e-EOI.

OR

<Option 2: In case of physical submission of bids at office of Executive Engineer >

a. All the documents except BOQ, sought in "Option-1" are required to be downloaded from the e-tender portal.
b. These documents are to be duly filled (wherever applicable) & signed

by bidder or its authorised representative.

c. Technical specification i.e Bidders' offer of technical specification, other important Document (OID) for eligibility & pre-qualification credential are required submitted duly signed.

d. Bids shall be submitted in a single sealed envelope and superscripted<Name of the Work >and<Reference EOI No.>.This envelope should contain two hard copies of EOI proposal marked as "First Copy" and "Second Copy". Bids are to be dropped in tender box kept in the O/O Executive Engineer, Mechanical & Electrical Division, Midnapore.

e. Bidder shall submit their rate item wise (financial proposal) in the BOQ format attached with this document. **This is also to note that there are few items in this attached BOQ, of which rates are already available with the department, are marked as "need not to be quoted." Rates for remaining items are required to be quoted by the bidders for framing the estimate for the work as a whole and placement to the department subsequently for administrative approval.**

f. Envelope should indicate clearly the name, address, telephone number, E-Mail ID and fax number of the Bidder.

g. Each copy of the EOI should be a complete document and all the pages of the Proposal document must be sequentially numbered and must contain the list of contents and shall be initialled by an authorized representative of the Bidder. Any deficiency in the documentation may result in the rejection of the Bidder's Proposal.

h. Different copies must be bound separately.

i. EOI document submitted by the Bidder should be concise and contain only relevant information as required under the EOI.

9.0 My Document [OID Cover]: Eligibility & Pre-qualification (PQ) criteria

Sl. No	Category	Description/Documents

01.	Certificates	1.Latest Professional Tax Payment Certificate (PTPC) or, PT deposits challan for current financial year or Government Order for exemption in other States where ever applicable. 2. Valid PAN Card in the name of bidder/organisation 3. Income Tax Return of current Assessment year or, IT Return of immediate preceding Assessment year whichever latest available. 4. Valid GSTIN under GST Act & Rules
02.	Company Detail	1.For Proprietorship Firms, Partnership Firms, Registered Companies, Registered Cooperative Societies, valid Joint Venture or Consortiums Valid Trade License/ acknowledgement or Receipt of application for Trade License Revalidation. 2. For Partnership Firms: Legally valid Partnership Deed, Form-VIII/ Memorandum of Registration of Registrar of Firms 3. For Companies: Incorporation Certificate, Memorandum of Articles of ROC, List of current owners/ Directors/Board Members 4. For State Registered Co-operative Societies: Society Registration certificate from ARCS of the State, Society by-Laws, latest available Auditor's Report of Directorate of Co-operative Audit within proceeding five years as per Societies Act & Rules 5. For legally constituted Consortiums/ Joint Venture of Firms/ Companies: Registered MoU or Agreement for Consortium /JV, Registration under ACRS/ROC in addition to satisfying requirements stated earlier for individual constituent Firms/Companies forming the Consortium/JV 6. The bidder shall be a repute manufacturer in the related field having experience in design and manufacturing of pump having proprietary right or, Authorised agent or supplier should have to furnish a legally enforceable tender specific authorisation assuring full guarantee & warranty as per general and special condition of contract. 7. An undertaking in plain paper is to be submitted with the bid as a self-declaration by the applicant bidder that it is not debarred from participating in Govt. works/tenders by any State Govt or Govt. of India. 8. Already installed similar pumps of reputed pump manufacturer, have been under successful operation for at least last five years. Documentary proof required.

03	Credential of Work-1	1. Bidder must have successfully completed at least following nos of work of 'similar in nature' under Government Sector within last five FYs on the date of publication of this e-EOI. • One project of similar nature of value is not less than 30% of the quoted value. It is 60 %, in case of Consortium/JV • OR, Two projects of similar nature of value each project is not less than 25 % of the quoted value. It is 50 %, in case of Consortium/JV **"Similar nature of work"** means "Supply installation, testing & commissioning of submersible pump (capacity greater than equal to 15 Cusec) capable of handling storm & flood water. Bidders have to submit documentary proof in support of above-mentioned credential requirement. Such documents generally comprising of 'Award of contract along with BOQ & offered technical specification' and 100% completion certificate.
04	Credential of Work-2	1. For electrical portion work, Electrical contractor license or undertaking that they will either obtain valid electrical licence at the time of execution of work or undertaking that they will engage a electrical contractor having valid electrical license of appropriate class & credential. In that case, bidders shall be required to submit an agreement with such electrical contractor in non-judicial stamp paper of requisite value during participating in formal e-NIT, which will be brought out by the Superintending Engineer, South West Mechanical & Electrical Circle, Durgapur-2, Burdwan in later stage. 2. Pump manufacturer must have Customer service Centre / workshop in West Bengal. Documents along with list of machineries to be submitted. Such service center/ workshop may be subjected to physical verification by Department.
05	Financial Credential	1. Average of Gross Annual Turnover of the bidder except for Consortiums and Joint Ventures for any three FYs within immediate preceding five FY on the date of publishing of EOI should be at least 30% of their quoted price.

		2. The above value for Consortiums or Joint Ventures should be at least 90% of their quoted price. 3. Bidder's Net worth in any three preceding financial years within the zone of preceding five financial years should be positive (determined from Audited Profit & Loss Accounts and corresponding audited balance sheets stated.

(3,4 & 5 stated above should be simultaneously fulfilled as minimum PQ eligibility for qualifying in the Technical Bid Evaluation stage for final selection in financial bid stage based on quoted bid price, and all claims for eligibility are to be substantiated with valid legally authentic documents during submission of online bid itself.

10.0 Short listing criteria:

10.1 Executive Engineer will shortlist Bidders who meet the Eligibility, pre-qualification credential, technical specification criteria mentioned in this EOI.

10.2. Any attempt by a bidder to influence the bid evaluation process may result in the rejection of its EOI proposal.

11.0 Evaluation Process:

11.01 All supporting documents & documentary evidence shall be evaluated. Inability to submit requisite supporting documents or documentary evidence, may lead to rejection of the Bidder's EOI proposal.

11.02 Each of the responses shall be evaluated to validate compliance of the Bidders according to the pre-qualification criteria, forms and the supporting documents specified in this EOI document.

11.03 The decision of the EOI issuing authority in the evaluation of responses to the EOI shall be final. No correspondence will be entertained outside the evaluation process conducted by the EOI issuing Authority.

11.04 The Executive Engineer may ask for meetings with the Bidders to evaluate it's suitability for the assignment

11.05 The Executive Engineer shall have the right to reject any or all proposals.

12.0 Examination of Bids and Determination of Responsiveness:

The Bid will be evaluated whether each Bidder is satisfying the eligibility and qualifying criteria prescribed in the pre-qualification document and declare names of the qualified Bidders.

A substantially responsive bid is one which conforms to all the terms and conditions of the bidding documents without material deviations.

Assessment: The detailed assessment for pre-qualification shall be based on the following information submitted by the Bidder:

1. Data submitted in prescribed format given in tender documents.
2. Bidder’s techno-commercial proposals for carrying out the entire works in accordance with the specifications in this document.
3. The techno-commercial submissions must principally demonstrate the adequacy of bidders' appreciation of the the project.
4. Design and detail engineering.
5. The methods proposed for mobilization and establishment of site installation and for the timely completion, testing and commissioning and O&M of the project.
6. The arrangements for the logistic support for completion, testing and commissioning of all works of the project.
7. Requirements of the Department.

SECTION-II

1.0 Scope of Work:

1.1 Introduction:

Description of item in B.O.Q shall be read in conjunction with this chapter along with drawing and appendices which provide further information and details. The rates to be provided in this B.O.Q. are inclusive of cost of all materials & machineries, transportation and carriage of material up to works site, labour, plant and equipment, tools and tackles, safety gadgets, insurance, incidentals, applicable GST, Excise duty, Custom duty (applicable for imported goods only), other chargeable taxes & labour cess etc., as may be required for execution of a particular item/works or items /works which is/are to be read in conjunction with the specification. The contractor shall confirm of having visited the site to conceive the work in totality and collected & verified the data relating to site conditions. The contractor acknowledges that any failure to acquaint itself with all such data and information shall not relieve its responsibility. Compliances with this specification do not limit the responsibility of the contractor for overall performance of the said system. Contractor can offer changes in design for better performance. Justification of such changes shall be provided by the contractor.

Unless otherwise stated, the rates to be provided in this B.O.Q are inclusive of all type of overhead cost as listed below and no separate claim by the contractor shall be entertained.

i) Items which cover both fabrication and erection shall include conveyance and delivery, handling, unloading, storing, hoisting and all labour for finishing to required shape and size.

ii) to establish, as per requirement, office at site with adequate space for contractor's personnel, inclusive of necessary furniture & furnishing, consumables etc., storage space for equipment, materials etc.

iii) Temporary power connections from electricity board, alternative power arrangement telephones, construction and drinking water etc.

iv) General works such as setting out, clearance of site before setting out and clearance of works after completion.

v) Material testing cost.

vi) Scaffolding charges.

vii) All temporary works, form work and false work.

viii) Cost of labour hutment

ix) Guarding of Material.

x) Cost for implementation of Quality Assurance Plan.

xi) Any other item of work (minor in nature) which could not be specifically provided in the estimate but which is/are necessary for complying the works.

Notwithstanding anything contained in this document, contractor shall be adhered to General specification of USOR (M&E) of I&W Department [USOR(M&E) of I&W Department is available in the departmental website i.e., www.wbiwd.gov.in]

1.2 Hydraulic Data of the proposed pumping station with sluice:

Here the inlet canal will act as inlet pond. The shape and configuration are adopted in such a way that there is streamline flow entry into the Pump House and keeping the:

Pump stop level: (+)2.134 M(GTS)

FDL: (+)5.33 M(GTS)

Max water level: (+)5.94 M(GTS)

Level of CL of Delivery Pipe: (+)5.785 M(GTS)

Sump level: (-)1.37M(GTS)

Pump Floor Level: (+)0.546M(GTS)

Existing Horizontal Pump (Centrifugal) Centre: (+)1.496M(GTS)

Existing pedestal: (+)0.915M(GTS)

Max. Static head= (5.785-2.134) M=3.651MWC

Min Static Head= (5.785- 5.94) M= (-)0.155MWC

Suction pipe dia =600 mm

Delivery pipe dia=500 mm

1.4 Basic Scope of work:

The contractor shall confirm of having visited site and collected and verified the data relating to site condition. The contractor acknowledges that any failure it acquaints itself with all such data and information shall not relieve its responsibility. The contractor shall be responsible for overall verification of equipment under the scope of work i.e., make, Model,

Specification and responsible for details design of mechanical and electrical works of proposed pumping station. Compliances with these specifications do not limit the responsibility of the contractor for the overall performance of the pumping station. Contractor can offer changes in design for better performance. Justification of each change shall be provided by the contractor; such changes are subject to be approved by E.I.C.

Scopes of works are broadly classified into following categories.

a) Design, Supply, installation, testing and commissioning including trial run of Six (6) nos. dry installed centrifugal Submersible pump motor set of capacity 20 Cusec (2040 M^3/Hr) (each).
b) Design, Supply, installation, testing and commissioning Sluice valves & Flap valves, pressure gauge, flow meter & Air release valve etc.
c) Supply, installation, testing and commissioning of Trash rack and its hoisting system.
d) Replacement of common header pipe & delivery pipe.
e) Illumination work of campus & inside of pump house.
f) Allied civil work.
g) Five (05) years (Reckoned from 2^{nd} year after commissioning) comprehensive maintenance cum warranty of Pumps & allied electro-mechanical system.

1.5 Selection of the Electrical System

The HT supply from WBSEDCL at 33 KV (nominal) is there on HT switch Board of I & W. D power supply and distribution. The 20 cusec pump sets shall be fully Automatic Star Delta (FASD) started operated on 415V, TPN AC power supply with MCCB etc. To cater for the above requirements, the pumping station has been provided with a separate Sub-Station complete with outdoor, ONAN type transformers and necessary high voltage control equipment like VCB with incoming and outgoing.

2.0 Technical specification:

A. General specification

1.0 General Information:

1.1 This specification intends to cover Engineering, supply and storage at site, erection, testing, commissioning, and trial run including operation and maintenance as specified elsewhere of various mechanical plant and equipment as per specification, schedule of items, requirements, terms and conditions and finally as per the direction of the Engineer to make different unit perfectly operative and successful in all respect.

1.2 Any plant, equipment or mechanical works which is found to be unsuitable for specific use under the stipulated conditions shall be dismantled and replaced by proper plant, equipment or mechanical works entirely at the cost of the Contractor for successful completion, commissioning and operation of the plant.

1.3 The Contractor shall provide all necessary tools and tackles required for erection of works and equipment and instruments for testing and commissioning including all other items necessary for testing and efficient execution of the contract. The Contractor will also provide all labour, supervising and administrative staff along with transport arrangement during erection and commissioning period.

1.4 The installation work includes supply of all fittings and fixtures, hardware, consumables and sundry items as required for successful installation and commissioning of the plant.

1.5 The scope of work shall not be limited to only supply of items as per schedule but also include all other items not specifically mentioned but required for successful installation and commissioning of the plant/ equipment and to operate properly as per relevant technical specification. The scope will include supply of materials at site in packed and good condition and any damage is to be rectified or the material to be replaced by the Contractor by new one without any extra cost.

1.6 The contractor shall provide and maintain proper secured and covered storage space for storage and protection of tools, materials etc and arrange for trained security personnel for protection of materials and executed works till the time the executed materials and works are handed over to I &W Department.

1.7 All plant and equipment shall be insured against all types of damages, theft etc. during transit, storage, erection and commissioning and insurance coverage will continue till the maintenance period expires and the plant is handed over to the Govt at the cost of the Contractor.

1.8 For the purpose of design and construction the following data shall be considered:

a) Peak ambient temperature 50^0 C

b) Average ambient temperature 40^0 C

c) Peak relative humidity 100%

d) Average wind pressure 200 kg/m^2

e) Seismic zone as per IS: 1893 (Zone III)

f) Climatic condition Hot, humid & dusty

However, the maximum temperature and humidity shall not occur simultaneously**.**

2.0 MATERIALS AND WORKMANSHIP

2.1 Introduction

This specification intends to cover the general standards of materials to be supplied and the workmanship required to be ensured by the Contractor. All component parts of the works must, unless otherwise specified comply with the provisions of this part and shall subject to the Engineer's approval of Manufacturer's Quality Assurance Plan (QAP).

2.2 Standards

2.2.1 The proposed plant and equipment along with their material of construction must conform to the latest revision of relevant IS/ BS/ DIN/ ASTM/ ANSI/ ISO or to any other equivalent standard. The latest edition of all Indian Standard specifications/ other standards till 30 (thirty) days before the final date of submission of the tender, shall be adopted.

2.2.2 The Contractor may propose the use of any relevant authoritative internationally recognized Reference Standard including Indian Standard at no extra cost to department. The Govt, however, reserves the right to accept such proposal.

2.2.3 The equipment, material of construction and workmanship performed shall comply with these standards. In case any equipment/ item offered to standard other than those mentioned above, the material of construction shall be at least equal to or preferably superior to those specified and details of the superiority shall be furnished.

2.2.4 In the event of any dispute between this specification and the codes of equipment/ item, provisions of this specification shall govern.

2.2.5 All works shall be carried out according to technical specifications; the Indian Standard Code(s) of practice, Indian Electricity Act 1910, Indian Electricity Rule 1956 and Regulations framed there under, The Electricity Act 2003, S.O.R (Electrical) of WBPWD and USOR (M&E), I&WD, WB. Any work not covered in the Indian Standard Code(s) & specification, it shall be carried out as per best practice adopted in this country and /or reference may be made to other appropriate & relevant ASTM, ASME, DIN, JIS or BS according to the direction and satisfaction of the Engineer-in charge. Here are some relevant BIS references are included but not limited to the following:

Standard No.	Title
IS:210	Grey iron castings Specification
IS:318	Specification for leaded tin bronze ingots and castings
Standard No.	**Title**
IS:807	Design, erection and testing (structural portion) of cranes and hoists Code of practice
IS:1239	Steel tubes, tubulars and other wrought steel fittings Specification
IS:1367	Technical supply conditions for threaded steel fasteners
IS:1536	Centrifugally cast (spun) iron pressure pipes for water, gas and sewage
IS:1537	Vertically cast iron pressure pipes for water, gas and sewage
IS:1538	Cast iron fittings for pressure pipes for water, gas and sewage
IS:1710	Specification for pumps - Vertical turbine mixed and axial flow, for clean cold water
IS:2062	Hot rolled low, medium and high tensile structural steel
IS:2266	Steel wire ropes for general engineering purposes Specification
IS:2312	Propeller type AC ventilating fans
IS:2685	Code of practice for selection, installation and maintenance of sluice valves
IS:2974 (Parts 3 & 4)	Code of practice for design and construction of machine foundations: Rotary type machines
IS:3109	Specification for short link chain, Grade M (4)
IS:3177	Code of practice for electric overhead travelling cranes and gantry cranes other than steel work cranes
IS:3618	Specification for phosphate treatment of iron and steel for protection against corrosion
IS:3624	Pressure and vacuum gauges
IS:3938	Specification for electric wire rope hoists
IS:4460 (Parts 1 to 3)	Gears Spur and helical gears : Calculation of load capacity
IS:4736	Specification for hot-dip zinc coatings on mild steel tubes
IS:5120	Technical requirements for rotodynamic special purpose pumps
IS:5312 (Part1)	Specification for swing check type reflux (non return) valves for water

	works purposes : Single door pattern
IS:5312 (Part 2)	Specification for swing check type reflux (non return) valves for water works purpose : Multi door pattern
IS:5382	Specification for rubber sealing rings for gas mains, water mains and sewers
IS:5600	Pumps : Sewage and drainage Specification
IS:6005	Code of practice for phosphating of iron and steel
IS:6280	Specification for sewage screens
IS:8329	Centrifugally cast (spun) ductile iron pressure pipes for water, gas and sewage Specification
IS:9137	Code for acceptance test for centrifugal, mixed flow and axial pumps Class C
IS:9523	Ductile iron fittings for pressure pipes for water, gas and sewage Specification
IS:10981	Class of acceptance test for centrifugal mixed flow and axial pumps Class B
IS:11388	Recommendations for design of trash racks for intakes
IS:11592	Selection and design of belt conveyors Code of practice
IS:13095	Butterfly valves for general purposes
IS:13349	Specification for single faced cast iron thimble mounted sluice gates
IS:14845	Resilient seated cast iron air relief valves for water works purposes Specification
IS:14846	Sluice valve for water work purposes (50 to 1200 mm size) Specification
IS:15310	Hydraulic design of pump sumps and intakes Guidelines
IS:15560	Point hooks with shank upto 160 tonne Specification
IS 13591 (1992):	Criteria for design of lifting beams
IS 11388 (2012):	Recommendations for Design of Trash Racks for Intakes

2.3 Materials General

2.3.1 Each and every equipment/ item covered in the works shall be most suitable for the duty concerned and shall be new and of reputed make/ approved quality, free from any defect and selected for long life and minimum maintenance. Non-destructive tests, if asked for in this specification, shall be carried out.

2.3.2 Any equipment/ item supplied, if proved to be unsatisfactory after installation, the Engineer shall have all the right to operate/ use the same till the rectification/ replacement is carried out by the Contractor. The rectification/ replacement shall be done without interfering with the overall plant operation as far as possible. Unless otherwise specifically agreed upon in advance the maximum allowable period for the above rectification/ replacement shall not **exceed six months.**

2.3.3 All submerged moving parts of the plant e.g. shaft, spindle, rotating element, faces etc. and all parts in direct contact with water shall be completely resistant to corrosion and abrasion and shall maintain their properties without ageing due to the passage of time, operating load, environment, heating due to operation or any other cause.

2.4 Workmanship General

2.4.1 Workmanship and finish in general shall be best of its quality and must be in accordance with latest workshop practice.

2.4.2 Full interchangeability must be maintained among all components of similar type of equipment/ item. Material of construction of the spares shall be same as it is for original component and shall be interchangeable among similar equipment. Machining limits and fits on renewable parts shall be accurate and to specified tolerances so that replacements can be done easily.

2.4.3 Noise and vibration level shall never exceed the allowable limit for particular equipment.

The rotating parts shall be both statically and dynamically balanced so that when running at normal speed at any load up to the maximum, there shall be no vibration beyond permissible limit due to lack of balance.

2.4.4 All parts, which can be worn or damaged by dust, shall be totally enclosed in dust proof enclosure.

2.4.5 All necessary accessories required for satisfactory and safe operation of the plant shall be supplied by the Contractor unless it is specifically excluded from the scope.

2.4.6 Provision of lifting lugs, eye bolts etc. shall be provided to facilitate handling of heavy equipment.

2.4.7 All flanges shall be drilled as per IS:1538.

2.4.8 All flanges shall be full or spot faced at the back and thickness shall be uniform throughout. The periphery of the flange shall be concentric with the bore and finished smooth.

2.4.9 All castings and fabricated items shall be finished smooth all over.

3.0 EQUIPMENT DESIGN

3.1 All the plant and equipment under this specification must be new and of proper grade and quality suitable for prevailing climatic and working conditions at site. They shall be of sound workmanship, robustly designed for long reliable operating life and shall be capable of 24 hours per day continuous operation for prolonged period with minimum maintenance. Special care shall be taken for changes in temperature, stability of paint finish for high temperatures, de-rating of machinery, thermal overload services, cooling systems and the choice of lubricants for anticipated high and prolonged operating temperatures. The manufacturer may be called upon to demonstrate this for any component part either by service records or evidence about similar equipment already installed elsewhere or by relevant type test. As far as possible, routine maintenance and repair should not require the services of highly skilled personnel.

3.2 The material of construction of the equipment/ item shall be so selected that the economic life of the plant is not less than 15 years taking into account their location and service.

3.3 The equipment shall be designed to provide easy access to and replacement of parts which are subject to wear without the need to dismantle/ replace the whole plant. All parts shall have a minimum life of 10 years from new to replacement or repair.

3.4 Design features shall include the protection of plant against any damage caused by vermin, dirt, dust and dampness and to reduce the risk of fire. Plant shall operate without undue noise and vibration and components shall be designed to withstand the maximum stresses under the most severe condition of normal duty. At site installation the magnitude of peak-to-peak vibration shall be limited to 50 microns and noise level shall be limited to 85 dBA at a distance of 1.86m. The materials shall be highly resistive to change their properties due to passage of time, climatic condition and service environment or due to any other cause which may have an adverse effect on the smooth and trouble-free performance or life of the equipment.

3.5 Outdoor installed plant shall have additional features to prevent unauthorized operation or tampering.

4.0 TESTING AT WORKS

4.1 General

4.1.1 Tests by manufacturer of the equipment/item at manufacturer's works shall be carried out in accordance with the specifications and the Engineers approved QAP. All inspections, examination and testing shall be performed conforming to relevant Standards. However, The Engineer shall witness the tests at 'state of art testing facility in India' and inspect important plant and equipment as specified in this specification of relevant equipment/ item. In respect to other equipment, the manufacturer shall carry out the tests and test results to be furnished.

4.1.2 The instruments used for such tests shall be calibrated and certified by an approved independent testing authority not more than 15 days prior the test date in which they will be used. The test results/ certificates shall be furnished to the Inspecting Officer after commencement of the tests. The Engineer reserves the right to impound any instrument immediately after test for independent testing. Manufacturer's test certificate showing the readings obtained, calculations and details of relevant calibration certificates shall be produced prior to every test.

4.1.3 Only defect-free and sound material meeting the technical requirements of this specification and in accordance with a high standard of engineering would be acceptable to the Engineer.

4.1.4 If during or after testing, any equipment/ item fails to achieve the specified duty or otherwise proved to be defective the same shall be modified/ replaced as required, retested and re-inspected, if required, by the Engineer.

4.1.5 At least 21 days advance notice shall be served to the Engineer for witnessing any test.

4.1.6 No material will be accepted without the above-described inspection having been carried out unless officially waived in writing by the Engineer.

4.1.7 The inspection of all Electro-Mechanical items may be carried out by Third Party Agency (TPA), if required, by the Govt, at manufacturer's Test facility situated in India. Pump manufacturer shall have 'state of art test' facility in India. In case of engagement of TPA, the fees as well as cost involved for transportation, boarding and lodging of Third Party shall be borne by the Govt during inspection.

4.2 Test Certificate

4.2.1 Each consignment of plant delivered to site must have been tested at manufacturer's works or at other approved test house in accordance with the relevant IS or approved standard (such tests being referred to herein as Works Tests). The test reports for each such consignment must be furnished to the Engineer before delivery at site.

4.2.2 Certificates shall be clearly identified by reference number to the material being certified and shall include information required by the relevant reference standard/ specification clause.

5.0 WELDING

5.1 General

5.1.1 All welded fabrication shall be done as per the latest revision of BS:5135/ equivalent and the Contractor shall submit the detailed drawings of fabrication showing the sizes of welds, weld preparation together with the details of application codes, electrode specification etc. to the Engineer before the commencement of fabrication for approval. No welding shall be carried out without approval of the Engineer and no alteration shall be made to any approved details of weld preparation or size without prior approval of the authority.

5.2 Welding Requirements

5.2.1 Inspection and quality of surveillance shall not be limited to the examination of finished welds. All aspects of materials, fabrication procedures and tests procedures shall be subject to the approval of the Engineer. The equipment used shall be most suitable for the quality of work specified. The method employed shall produce best results and to be tested at site by actual demonstration.

5.2.2 Haphazard striking of electrodes for checking arc are not permitted. The arc shall be struck either on the joint or a starting tag. The starting tag shall be of the same material or a material compatible with the base metal being welded. In case of any inadvertent strike on place other than the welding, the zone affected should be ground finished and examined by dye penetration test.

5.2.3 Final welds shall be suitable for appropriate fabrication of the non-destructive tests of the weld. While grinding is required, the weld shall be blended into the parent metal without gouging or thinning of the present metal in any way. Uneven and excessive grinding may be a cause for rejection. Fillet weld shall preferably be convex and free from

undercutting and overlap at the toe of weld. The specified leg lengths, convexity and concavity shall not exceed 1.5 mm.

5.2.4 The non-pressure parts e.g. lugs, brackets etc. shall also be done by qualified welders in accordance with the design details and material specifications. Temporary attachments shall be removed in such a way that the parent metal is not damaged. The temporary attachment zone shall be dressed smooth and examined by dye penetration test.

5.2.5 All tack welds shall be made as per specified methods and by qualified welders. The quantity and size of tack welds shall be kept as minimum as possible but shall be of adequate strength to maintain joint alignments. All tack welds shall be visually checked and if found defective, the same shall be completely removed. During final run of weld, tack welds shall either be removed completely or shall be properly prepared by grinding/filling their starting ends so that they may be satisfactorily incorporated in the welds. The defects shall be removed by grinding/ chipping/ gouging.

5.2.6 All welding repairs shall be carried out as per the proper welding methods and by qualified welders. Preparation of weld repair shall have prior approval of the Engineer. Re-welded zones shall be checked as per the procedures followed for original welds and the repair procedures shall be approved by the Engineer.

6.0 CASTINGS

6.1 Cast iron used for various equipment shall be of close grained, gray, standard quality. The homogeneous structure shall be free from non-metallic inclusions and other injurious defects. The un-machined surfaces of castings shall be smooth and free from all foundry irregularities.

6.2 Minor casting defects in depth not exceeding 12.5% of total wall thickness and which will not in any way affect the strength and service of the casting may be repaired by approved welding techniques with prior intimation to the Engineer. The Engineer shall be notified of large defects and no repair welding of such defects shall be carried out without prior written approval from the Engineer. If the removal of metal for repair reduces the stress-resisting cross-section of the casting by more than 25% or to such an extent that the computed stress in the remaining metal exceeds the allowable stress by more than 25%, then the casting shall be rejected. Test pieces cast along with the main casting shall be

marked, if specified or otherwise, by the Manufacturer to check the physical and chemical properties of the casting.

6.3 Any defect considered to be a major defect by the Engineer is not acceptable. Welding repaired castings for minor defects shall be stress relieved.

6.4 All castings subject to hydraulic pressure shall be pressure tested to at least 1.5 times the maximum expected pressure or 2 times the working pressure whichever is higher and certified copies of the test results shall be forwarded to the Engineer for acceptance of the casting. Non-destructive tests as desired by the Engineer would be required for any casting having defects whose extent cannot otherwise be judged, or to determine the soundness of repair welds.

7.0 FORGINGS

7.1 All major stress bearing forgings shall be manufactured to standard specifications. Forgings shall be subjected to either magnetic particle test or dye penetration test at the areas of fillets and change in sections. The testing shall be conducted after proof machining (10 microns). Any defect, which will not be finally machined shall be gouged out fully, inspected either by dye penetration test or by magnetic particle test to ensure that the defect is fully removed and repaired adopting approved repairing procedure. Any indication, which proves to penetrate deeper than 2.5% of the finished thickness of the component, shall be informed to the Engineer giving all details, e.g. location, length, width and depth. For the magnetic particle inspection, the choice of wet or dry particles shall be the manufacturer's discretion. All forging shall be demagnetised after test and shall be heat treated for stress relief. The name of the maker and particulars of the heat treatment proposed for each such forging shall be submitted to the Engineer. The Engineer may inspect such forgings and identify test pieces to check physical and chemical properties and witness such tests at manufacturer's works.

8. FASTENERS AND WASHERS

8.1 All bolts, studs, nuts and washers used in the plant shall conform to the requirements of the relevant standard. The fasteners shall be of the best quality of specified grade and machined as required. Bolts shall be of one-piece construction and shall be of sufficient length so that only one thread shall show through the nut in fully tightened condition.

8.2 Fit bolts shall be of light drive fit in the reamed holes they occupy and shall have the threaded portion of such diameter that it will not be damaged in driving. The fit bolts shall have identification mark to ensure correct assembly at site.

8.3 Washers, locking devices and anti-vibration arrangements shall be provided wherever required. Jointing hardware for the entire plant shall be provided with sufficient spares to cater for 1 year for site losses.

8.4 Bolts for structural members shall be provided with taper washers wherever necessary to ensure that no bending stress is caused on the bolt. Where there is a risk of corrosion, the fastener's design shall take into account the corrosion allowance and the maximum stress shall not exceed half the yield stress of material under any condition.The fasteners subject to frequent adjustment, removal etc. for regular operation and maintenance shall be made of nickel bearing stainless steel.

8.5 The manufacturer shall supply all holding down, alignment and levelling bolts complete with anchorage, nuts, washers, dowel pins, packing etc. required to erect the plant on its foundation along with base plates, frames and other structural parts necessary to spread the loads transmitted by the plant to foundations without exceeding the design stresses.

8.6 The Contractor shall provide to the satisfaction of the Engineer, reasonable excess quantities to cover wastage of those consumable which may be normally subject to waste during erection and commissioning period.

9. LUBRICATION

9.1 The equipment manufacturer shall furnish a complete schedule of recommended oils and other lubricants to the Engineer. The number of different types of lubricants shall be kept to minimum. The details of lubricant such as quantity required, viscosity, make, number etc. to be submitted to the Engineer for approval before incorporating the same in the Maintenance Manual. For grease lubricated roller type bearings lithium base grease is preferred.

9.2 The equipment manufacturer shall also indicate indigenously available equivalent lubricants with complete details to enable the Govt to arrange for regular supply in case of non-availability of specified brand.

9.3 For grease lubrication it is preferred to have pressure system which does not require frequent adjustment or recharging. Frequent, for this purpose, means more than once in a

month and grease systems having shorter periods between greasing shall be avoided. Wherever required for accessibility, grease nipples shall be placed at the end of the extension piping and when a number of such points can be grouped conveniently, the nipples shall be brought to a battery plate mounted in a convenient position. The grease nipples shall be of same type and size for each part of the plant. Arrangements shall be provided to prevent bearings being overfilled with either grease or oil.

9.4 If more than one type of grease is required for particular plant, separate grease gun for each type to be supplied with permanent marking.

9.5 Oil container shall be supplied complete with oil level indicator of sight glass type; where this is not applicable, the container shall be provided with dipstick. The indicator shall show the levels at all temperatures, which may occur during plant operation. The maximum and minimum levels shall be clearly visible in the sight glass type from the operating floor and the same shall be easily dismantled for cleaning. The sight glasses shall be firmly held and encased in metal protection in such a manner that they cannot be accidentally dislodged.

9.6 The lubrication systems shall be designed not to cause any fire and pollution and special protection must be taken to prevent any leakage of lubricant and coming in contact with any electrical equipment, heated surfaces or any other source of fire.

9.7 Initial filling of oil, grease, electrolyte and similar material for relevant plants shall be done by the Contractor.

9.8 All types of lubricants as required for one year operation of entire plant shall be supplied by the Contractor.

10.0 NAME PLATES, RATING PLATES AND LABELS

10.1 Name plate and rating plate made of stainless steel shall be permanently fixed at conspicuous position of each item of the plant. These plates shall incorporate manufacturer's name and address, serial number, type, details of duty at which the equipment has been designed to operate, diagrams, direction of closing/ opening for valves, direction of rotation of pumps etc. as may be required. The operating and indicating devices shall have securely attached to them or engraved the designations of their function and manner of use.

10.2 Details of proposed inscriptions shall be submitted to the Engineer for approval before taking for manufacture.

10.3 Above plates and labels on electric equipment shall be of non-flame propagating materials, either non-hygroscopic or transparent plastic with engraved lettering of contrasting colours. Fixing shall be done by means of non-corrosive screws or drive rivets. Uses of adhesives are not permitted.

10.4 Warning labels shall be provided wherever necessary to warn against risky circumstances or substances. Inscriptions or graphic symbols shall be in black on yellow background and of internationally accepted standards.

10.5 Instruction labels shall be provided where safety procedures to be followed, such as, wearing of protective clothing are essential to protect personnel from hazardous or potentially hazardous situations are inscribed. These labels shall have inscriptions or graphic symbols in white on a blue background.

11.0 OPERATION AND MAINTENANCE MANUAL

11.1 The Contractor shall furnish 6 (six) Hard copies and two Soft copies of operation and maintenance manual specific for the plant equipment and installation, giving detailed description, 'As build' assembly, drawings, parts lists, operating instructions, repairs and periodical maintenance. The said manual shall not merely contain manufacturer's literature and brochures, which shall be in addition to detailed manual prepared for the plant. All records, drawings, wiring diagrams, curves etc. shall also be a part of the manual.

11.2 The Operation and maintenance manual shall include the followings:

11.2.1 Schedule of equipment supplied along with manufacturer's name and address, model number, catalogue number etc.

11.2.2 Schedule of routine, periodic, preventive and breakdown maintenance for all the equipment

11.2.3 Schedule of spares supplied with their part identification numbers

11.2.4 Schedule of tools and tackles supplied

11.2.5 Sectional arrangement drawings of major item e.g. pumps, valves, EOT crane, Monorail crane, lifting beam, sluice gate & hoisting arrangement, Trash rack etc. with part identification list, metallurgy of component and with dismantling procedures

11.2.6 General arrangement drawing of whole plant showing the 'As built' installation.

11.2.7 Schematic diagram showing cooling and lubricating system of bearings

11.2.8 Full and comprehensive operation and maintenance instructions including fault detection for all equipment supplied

11.2.9 Copies of Test Certificates

11.2.10 Pump performance curves as tested

11.2.11 System head curves with superimposed pump curves.

11.2.12 Schedule of recommended lubricants and their equivalents, which must be locally available.

11.2.13 Schematic diagram of Electrical installation (System Panel, Control Panel etc).

12.0 PAINTING

12.1 General

12.1.1 The equipment manufacturer shall clean, prepare the surface and apply primer/protecting coating as per specification at their works.

12.1.2 Parts to be painted may be cleaned but surface defects shall not be filled in before testing at manufacturer's works. The item subject to hydraulic test shall be tested before any surface treatment. After test, all surfaces shall be thoroughly cleaned and dried out, if required, by washing with an approved dewatering fluid prior to surface treatment. Unless otherwise specified, all painting shall be done strictly in accordance with the paint manufacturer's instructions.

12.1.3 All protective coating shall be suitable for use in hot and humid climates and toxic zone.

12.2 Painting at Shop

12.2.1 All stages of painting including cleaning, surface treatment etc. at the manufacturer's works may be inspected by the Engineer at his discretion.

12.2.2 Cast iron and mild steel items shall be sand blasted to near mirror cleaning before painting. Sharp corners, edges etc. shall be broken before sand blasting.

12.2.3 A primer coat of zinc rich epoxy resin base coating of at least 100 microns dry film thickness is to be provided. In addition, the parts are to be provided with adequate number of coats of coal tar epoxy polyamine coating to a dry film thickness of at least 250 microns including primer coating.

12.3 Painting at Site

12.3.1 After site receipt, all items of plant shall be examined for damage of paint and the damaged portions shall be cleaned to the bare metal; rust, if any, to be removed;

procedures as mentioned above to be followed and finally paint coats to be done with similar paint.

12.3.2 Cast iron and mild steel parts received at site shall be provided with adequate number of further coats of coal tar epoxy polyamine coating to a total dry film thickness of 350 microns inclusive of the primer coats. All sharp edges, fasteners and other items difficult to be painted shall receive brush coats of specified paint before application of each coat of epoxy-based coal tar paint giving a total dry film thickness of at least 350 microns. For fabricated steel work the same shall be done after assembly.

12.3.3 Before finalizing the paints, the Contractor/ manufacturer shall submit to the Engineer the full details of paints he proposes to use together with colour charts for gloss finishes for approval.

12.3.4 All paint and coating thickness shall be measured by approved Elcometer or coating thickness guage.

13.0 PACKING AND PROTECTION

13.1 Before despatch from manufacturer's work, the equipment shall be adequately protected and packed so as to reach the site intact and undamaged. The method of protection and packing must be suitable to withstand the conditions, which may be experienced in shipment and delivery to site. It shall also be suitable to withstand long period of storage at outdoor. The Engineer shall be given at least 15 days' notice before packing.

13.2 Any crate/ package should not contain items of plant intended for incorporation in more than one part of the works.

13.3 All items of plant shall be clearly marked for identification as per packing list, which shall be placed in each crate/ package and protected in a waterproof cover.

13.4 All crates and packages shall be clearly marked with water and weatherproof paint to show the weight and position of sling attachment. They shall also be marked to identify the packing lists.

13.5 Bearing surfaces and similar bright parts shall be protected from corrosion by application of rust preventive lacquer, high melting point grease or similar fluid. Sufficient quantity of appropriate solvent shall be provided with the packing for removal of this protection.

13.6 Each crate/ package shall have a clear indelible and as far as possible, indestructible unique identification cypher, also quoted in the packing list inside it. Three copies of packing lists shall be sent separately to the Engineer at the time of shipment.

13.7 All flanges and matching surfaces shall be protected by wooden templates or similar. The fasteners used for securing these templates shall not form part of final installation.

14.0 GUARANTEE

15.1 All equipment/ items shall be guaranteed against defective design, manufacture and/ or workmanship for a period of 18 months from the date of despatch or 12 months from the date of successful commissioning whichever is later. The Contractor shall be responsible for complete operation and routine maintenance as well as breakdown maintenance of the installation including supply of all spares and consumables during the guarantee period and the cost shall be included in the offer, as per details provided in the BOQ. No extra payment will be made on this account.

15.2 In case the electromechanical equipment are installed but cannot be commissioned due to unavailability of sewage/storm water to the pumping station, the following shall be ensured by the Contractor:

(a) The defects liability period of the electromechanical equipment including all works of pumping station shall be one year from the date of the taking over of pumping station as per contract.

(b) In case of non-commissioning of the pumping stations due to reasons cited above, all remedial measures shall be taken up by the Contractor to ensure performance of all electromechanical equipment as per specifications without any additional cost to the Govt.

15.3 In case the electromechanical equipment are not installed in order to match the sequence of completion of drainage network, the supplied electromechanical equipment are to be stored in an covered lockable storage space to avoid any deterioration of the quality of the electromechanical equipment. All remedial measures shall be taken up by the Contractor to ensure performance of all electromechanical equipment as per specifications without any additional cost to the Govt.

15.0 DESIGN AND PERFORMANCE REQUIREMENTS

15.1 The wastewater/ storm water transportation systems described shall be capable of conveying their rated capacity as specified in 'Particular specification'.

15.2 Unless otherwise specified, the Bidder shall provide standard pipes in respect of size, in all services covered under this specification.

15.3 The total dynamic head (TDH) of all pumps shall be obtained by conducting detailed system resistance calculations. The Bidder shall furnish these calculations and system resistance curves superimposed on pump modified characteristic curves along with his bid proposals. The indicative TDH are furnished in 'Particular specification'. However, actual TDH shall be finalised by the bidder and following general guidelines shall be adhered to by the Bidder towards computation of the same.

a) The duty point static head in pumping system shall generally be obtained by considering the average water level, unless specifically mentioned and maximum discharge points elevation.

b) Frictional losses in pipes shall be calculated based on Hazen & Williams Formula considering C value for different pipe materials as given below. For fittings minimum 15% margin shall be provided over and above the calculated frictional losses.

Steel main with inside cement mortar lining: 145

Ductile iron pipes with inside cement mortar lining: 140

Steel main with inside epoxy painting of required DFT: 140

c) The friction coefficient of fittings for calculation of the frictional losses in fittings shall be calculated as per Hydraulic Institute Standard/ BIS.

15.4 All pipes and fittings shall be designed to withstand a pressure not less than 2 (two) times the working pressure of the respective system pumps.

16.0 INFORMATION TO BE FURNISHED WITH THE OFFER

16.1 The following drawings, data, curves and information are to be submitted along with the offer.

16.2 The offer shall comprise of a complete and detailed specification of all the plant offered describing the basis of design, material of construction, method of construction and manner of operation including all duty parameters.

16.3 In addition to the schedule information, the Bidder shall submit all relevant characteristic curves, catalogues, printed descriptive literature etc. to justify the superiority of the plant offered.

16.4 The Bidder shall submit General Arrangement drawing and Sectional Arrangement drawing along with part identification list and dimensions for all the plant and equipment offered. The Bidder shall also submit a layout drawing showing the equipment installation and confirming the overall dimensions.

16.5 Drawings

1) General arrangement drawing should show the major dimensions such as minimum submergence of the suction pipe/ bowl assembly/ pump, bottom clearance of the suction bell mouth, clearance between two pumps, overall height of pump and motor including the height of the column pipe, overall dimensions of pipes & fittings etc. to be accommodated inside the pump house. The general arrangement drawing shall be prepared taking into account all the provisions for future phase, wherever specified.

2) Typical cross-sectional drawing showing various components of equipment i.e Pump motor set, Valves, EOT crane, Monorail crane, lifting beam, sluice gate & hoisting arrangement, Trash rack etc. should be offered.

3) Illustrative literature regarding all of the equipment should be offered.

16.6 Calculations

1) Detailed calculations of frictional head losses, determination of static head and total dynamic head of pump at rated capacity for both present and future phases (if mentioned specifically) to be furnished.

2) Calculations confirming the margin between NPSHA and NPSHR for both LWL and HWL in the sump to be submitted.

16.7 Curves

Performance curves showing the following characteristics and duly stamped and signed by the manufacturer shall be furnished.

a) Capacity vs. Head, Power, Efficiency, NPSHR with actual size of impeller

b) Family curve of the pump showing the above mentioned in (a) with minimum and maximum sizes of impeller

c) Torque vs. Speed curve of the pump(s)

d) System resistance curves for both low water level and high-water level, superimposing pump modified capacity vs. head characteristic curves

17.8 Data Sheets and Testing Facilities

a) Completely filled “data sheet for technical particulars “enclosed must be furnished along with this offer.

b) Details of testing facilities available in the equipment manufacturer’s works to at least cover stipulations mentioned in standard specification to be furnished.

17.0 INFORMATION TO BE FURNISHED AFTER THE AWARD OF CONTRACT

17.1 The successful bidder shall furnish the following drawings/ data/ manual/ calculations within 30 days of issuance of “Letter of Invitation/ Acceptance” to the Govt for approval. All the supplies and inspection shall be carried out as per the approved drawings and specifications:

a) Final versions of all the drawings, documents etc. of the equipment showing all dimensions and major parameters.

b) Cross-sectional drawings of the equipment incorporating part identification list and material of construction.

c) Foundation drawings showing details of fixing, grouting, total weights of equipment, plinth sizes, anchor bolts etc. along with all design loads and their direction and points of application.

d) Piping arrangement drawings for sealing, lubricating, cooling etc. for all equipment.

e) Manufacturer’s certified performance curves of the equipment indicating all parameters along with all relevant technical specification/ particulars.

f) Drive data

g) Water volume and pressure requirements for stuffing box sealing and bearing lubrication etc. with complete details of all ancillary equipment including water pumping system, piping, valves etc. and interface requirements for work by others, if any.

h) Details of grease/ oil lubrication system including the proper quantity of grease/ oil and frequency of bearing lubrication.

i) Equipment/item manufacturer’s QAP to be submitted for approval.

j) All other drawings, data, documents etc., which the supplier feels to be approved by the Govt/ Engineer.

k) Operation and maintenance manual (before commissioning of the plant).

B. Standard Specification:

1. Trash Rack:

2.1 GENERAL SCOPE OF WORK

The Scope of the work covers the following items of works:

(a) Manufacturing and supplying including galvanizing and transport, erection, testing and commissioning of trash rack.

(b) The scope of work also covers manufacture, transport, supply and erection of all the guide channel and anchorages including all embedded parts required to be complete the work as a whole.

(c) The scope of work also covers proper storing of all components, sub-assemblies, electromechanical parts etc. of the items to be furnished under this tender and keeping them in safe custody till they are taken over by the E.I.C. in the final installed form.

(d) The entrusted contractor shall also carry out at his own expense all the preliminary and enabling works and all other incidental works such as establishing a field workshop and stores, furnishing and installing erection aids, cranes if necessary, scaffoldings, ladders, temporary bracings and supports etc. complete as required to facilitate execution of work and shall also carry out at his own expense all other operation covered under the meaning and intent of conditions and specifications in the tender documents. The cost tendered by the Bidder for the above items shall be deemed to be inclusive of all expenses required to be incurred by him for executing the work.

2.2 The effective area of opening of the screen which is the vertical projected area of the screen openings from the invert of the channel to the flow line) shall be such as to produce a velocity through the screen opening not exceeding 0.9 m/sec at maximum expected flow.

Screen size (clear spacing between the flats): 75 mm.

All fasteners/anchor fasteners shall be of stainless steel AISI 304

2.3 Approximate size of screen is 4 M (w) x 7 M (h) in two equal parts like stop log gate.

The flats shall not be less than 10 mm in thickness and not less than 50 mm deep. The flats shall not have any joint. The spacing between the flats shall be uniform and preferably so maintained by adequate number of spacers, which shall be so located as not to interfere

with the raking /cleaning operation. For cleaning operation, any of the screens shall be lifted by motorized operation through 01 Nos Monorail crane through the control panel complete with all control and protection features. 01 Nos lifting beam are also to provided. The control panel shall be located at operating floor level in close proximity to the screen or on the maintenance platform.

2.4 Painting on Trash rack, its allied parts are to be painted as per general specification.

2.5 This shall be inspected and tested in presence of the Engineer as per manufacturer's QAP approved by Engineer.

2. Mono rail Crane & Lifting beam: Scope of work shall consist of

a) Design, manufacture and supply of 5 M.T. capacity straight monorail (1 Nos.) suitable for travel length of 54 mtrs (approx). Both the monorails shall be supported on 15 nos. goal post structure. Both hoist and longitudinal travel shall be electrical and to be operated by 1 Nos. 5 M.T. capacity wire rope type electrical hoist with electrical trolley. The height of lift shall be 6 mtrs. for both the hoist. The top of goal post structure shall be covered by suitable sheet metal to protect the hoist from direct sun and rain. Quantity: 01 set

b) Design, manufacture and supply of 1 sets of Down shop lead arrangement i.e. power feeding arrangement to the hoist along the longitudinal travel comprising of 4-line PVC shrouded type GI conductor with supporting brackets and a set of current collectors for each hoist. One set of DSL with current collector shall be required for each hoist. 1 Nos. isolating switch of suitable rating shall also be provided at two ends for connecting the DSL cable. Quantity: 01 set

c) Hoist Data for Monorail Structure

Type	: Straight monorails supported on 15 Nos. independent goal post structures.
Number of monorail	: 1
Capacity of monorail	: 5000 Kgs. each.
Length of monorail	: 54000 mm
Height of lift	: 000 mm for each hoist.

Width of goal post structure i.e. center Of goal post columns	: 2000 mm approx.
Height of goal post structure	: 7000 mm approx.
Number of rope falls and rope dia	: 4, 12 mm dia.
Operating speeds with motor ratings	
Hoist motion	: 4.5 M/Min, 7.5 H.P motor.
Longitudinal speed	: 15-20 M/Min, 0.75 HP motor.
Power supply	: 415 V +/- 10% 3 phase 50 cycles AC.
Headroom of hoist block	: 1000 mm approx.
Method of control	: Both the hoist shall be controlled from floor by 4 way independent push button switch having an operating voltage of 110 V AC.
Power supply	: Both the hoist shall be provided with power supply by means of 4 line PVC shrouded type GI conductor with supporting brackets and a set of current collector for each hoist.
Top cover	: The top of monorail structure shall be covered with suitable sheet metal to protect the hoist from direct sun and rain.
Motor	: Both the hoist and longitudinal motors for the hoist block shall be high torque Sq. cage type, 40% CDF rating, class F insulated, IP-55 enclosure, S-4 duty conforming to IS:325.
Brake	: Both hoist and longitudinal motion shall be provided with electromagnetic disc type AC brake, fail safe type.

Limit switches	: Both hoist and longitudinal motion shall be provided with suitable limit switches.
Protective device	: The hoist shall be provided with protective devices like air break contactor, overload relays, HRC fuses and step down transformer.
Class & duty	: The monorail structure with electric hoist shall be designed for M-5 (class-II)duty indoor operation conforming to IS:807 and IS:3938 as and where applicable.
Painting	: The monorail structure and goal post structure shall be supplied duly painted with one coat of red lead primer and two coats of synthetic golden yellow enamel paint prior to dispatch from the works.

c) Design, manufacture and supply of 01 nos lifting beam of 5MT capacity for automatic engagement and disengagement purpose as per relevant IS.

d) This shall be inspected and tested in presence of the Engineer as per manufacturer's QAP approved by Engineer.

3. DRY INSTALLED NON CLOG SUBMERSIBLE PUMP & MOTOR

3.1 General

3.1.1 The pump head, inclusive of all loses in the inlet, discharge in Column pipe & outlet pipe of the pump, sluice valve & exit etc including static head shall be calculated by the bidder to arrive TDH at Maximum & Minimum discharge condition and optimum duty point, so as to pump may cover entire static head range successfully. The flow rate and minimum submergence for continuous operation and maximum allowable dry running period of the Pump shall be stated in their offered bid.

The design, manufacture and performance of the pumps shall conform to the latest version of IS/BS/DIN Standards / Specification.

However, based on hydraulic data, TDH (at duty Point) is calculated to be **6 M MWC** (Tentative) with the rated discharge of 2550 M^3/Hr.

Other requirements are:

Acceptable operating (capacity) Range (AOR): 60% to 140%

Acceptable TDH Range: 3.5 M to 8 M

However, bidders are requested to carry out their own calculation to satisfy the system requirement.

3.1.2 The pump shall be vertical, non-clog, dry installed submersible, mixed flow, single stage, bottom suction, column mounted, diffuser type, driven by single speed submersible motor suitable for pumping all kinds of storm water containing plastics and fibrous materials. The pumps shall be suitably designed so that silt, plastics, fibrous and other stringy materials shall not affect the pump performance. The speed of the pump should not be more than 750 rpm (8 pole) and pump efficiency not less than 80%. Maximum efficiency shall occur at duty point. Motor efficiency shall not be less than 92% (IE3 Premium Efficiency) and shall have non-overloading characteristic. The pump performance must be stable from zero discharge to run out condition. The bidder shall furnish characteristic curves of pump. The bidder shall furnish with the tender the characteristic curve so prepared and superimposed on system head curve. The pump shall be capable of developing the required total head at rated capacity for continuous operation. The head discharge curve shall be continuously rising towards the shut off with highest shut off point. Impeller shall preferably be non- overloading type. Pump shall run smooth without undue noise and vibration.

3.1.3 NPSH requirements

The pump will be operated over a range of capacities and not a fixed duty point and driven by a constant speed motor. It is most important that the pump can function properly over the full operating range of the system curve. For this NPSH margin of minimum 2 meter is required to avoid any damage to the pumps in entire operating range. For calculation purpose following data may be used.

(i) Atmospheric Pressure: 10 MWC

(ii) Vapor pressure of water: 0.3MWC

3.1.4 Class of Operation

The pumps shall be suitable for non- stop continuous 24 hours operations without interruptions.

3.1.5 The motor shall be of 8 pole construction with adequate kW rating with the usual 20% (at least) safety margin to drive the pumps. Starting frequency in emergency shall be maximum 6 hot starts per hour and the motor starting method will be Auto Star Delta Starting as per standard norms.

3.1.6 The design, manufacture and performance of the submersible pump-motor sets shall comply with the latest applicable Indian/ International standards. In particular, the equipment must conform to the latest revision of applicable specification. The pump shall be capable of developing the required total dynamic head at rated capacity The head-capacity curve of the pump shall be continuously rising towards the shut-off with highest head at shut-off. The pump shall be designed to be protected against reverse direction of rotation due to sewage returning through the pump. The set rotor assembly weight and unbalanced hydraulic thrust of the impeller shall be carried by the thrust bearings provided in pump assembly. The pump shall operate trouble free, smooth and without any undue noise and vibration. Pump vibration at shop and at site installation shall be limited to Gr 6.3 ofISO: 1940 or Eq. International Std.

3.1.7 The pump installation design shall be such as to facilitate installation and removal of pumps without having entry into the pump column or sump.

3.1.8 CFD Analysis / Sump Model study of sump

It is obligatory on the part of the contractor to carry out sump model tests at C.W.P.R.S., Pune or Indian Institute of Science, Bangalore, or any such reputed laboratory with prior approval of the Engineer, at his own cost and at the earliest after issue of the work order. The contractor must fully satisfy himself about the suitability of the proposed design and layout of the sump, to ensure vortex free and Cavitation free operations of the pumps. Two representatives of the Department. will be deputed for inspection of this test, if so desired by the Department. The contractor will have to bear the expenses towards their traveling, boarding and lodging, etc. for attending the above test. Minor modifications to the sumps as are acceptable to Department and as are possible considering the then stage of civil works, will be carried out at the cost of Department, and as per contractors' proposal in writing.

Test results in triplicate of the contractor's sump model testing, should immediately be sent to the Engineer - in change, along with proposals by the contractor for his consideration. If the changes proposed by the contractor in the design of the civil works construction is not viable, it is obligatory on the part of the contractor, to modify the design of his equipment to the extent possible, which would suit the sump finalized by the Department and to ensure hydraulically smooth operation. Arrangement of flow guides, baffles, splitters etc at the sump to achieve smooth pump operation free from vortex, pre-rotation, swirl etc are acceptable. Such modification in the design of the equipment is deemed to be covered under the agreement rate for the item.

3.1.9 Characteristic curve & Parallel operation.

System resistance data in lieu of system resistance curve have been calculated by the department. Same are being given below. However, contractor shall verify the same after collecting data from the site and make their own calculation.

NO OF PUMP IN OPERATION	WHEN WATER LEVEL AT	STATIC HEAD	DYNAMIC HEAD	TOTAL DYNAMIC HEAD
SINGLE	**2.134**	**3.651**	**0.813**	**4.464**
DOUBLE	**2.134**	**3.651**	**0.848**	**4.499**
TRIPPLE	**2.134**	**3.651**	**0.905**	**4.556**
QUADRUPLE	**2.134**	**3.651**	**0.980**	**4.631**
QUINTRIPLE	**2.134**	**3.651**	**1.084**	**4.735**
HEX	**2.134**	**3.651**	**1.211**	**4.862**
SINGLE	**5.940**	**-0.155**	**4.421**	**4.266**
DOUBLE	**5.940**	**-0.155**	**4.610**	**4.455**
TRIPPLE	**5.940**	**-0.155**	**4.923**	**4.768**
QUADRUPLE	**5.940**	**-0.155**	**5.330**	**5.175**
QUINTRIPLE	**5.940**	**-0.155**	**5.895**	**5.740**
HEX	**5.940**	**-0.155**	**6.585**	**6.430**

Curve for the system is to be furnished along with the tender. The bidder shall furnish with the tender the characteristic curve so prepared and superimposed on system head curve for single and multi-pump operations (in parallel operation). The pump shall have stable characteristic over the entire range of working head. The pump shall be suitable for closed sluice valve i.e., shut off condition. The pumps will satisfy the Head requirement as per the System Resistance Curves, while operating in combination of minimum 02(Two) nos. pump in parallel. The Pumps shall be suitable for operation in Head range as specified in B.O.Q. **The system-resistance & parallel operation curves are to be enclosed along with their bid documents.**

3.2 Constructional Features

3.2.1 Casing

The pump diffuser casing, made of cast iron, shall be hydrostatically tested at 1.5 times the shut-off head with maximum impeller size or 2 times the pump duty pressure whichever is higher. The diffuser shall be of robust construction and the internal liquid passage shall be finished smooth.

3.2.2 Impeller

The non-clog, semi-open/ open/ skew type impeller of stainless steel and will be both statically and dynamically balanced. This will be keyed and positively held on the shaft. The impeller will also be secured against damages, in case the direction of rotation reverses due to liquid flowing backward through the pump. **The impeller shall be capable of handling soft solids up to 50 mm x 50 mm size.** The leading edge of the vanes shall be rounded and cut back to prevent rags, stringy materials etc. from impinging on the vanes.

3.2.3 Shaft

The shaft, made of stainless steel shall be finished to close tolerance at the impeller and bearing diameters. The impeller shall firmly be secured to the shaft by key and/ or nuts. The size of the shaft shall be calculated on the basis of maximum combined stresses. While designing the shaft, the critical speed of the shaft must be taken into account which shall be at least 20% above/ below the operating speed. The rotor shall be dynamically balanced to avoid any vibration during operation.

3.2.4 Seal

The pump shall have two mechanical seals in tandem arrangement. The lower mechanical seal shall have SiC/ SiC face combination. Upper mechanical seal shall have Sic/Sic face combination.

3.2.5 Bearing

Maintenance free antifriction deep grooved, permanently grease filled ball / roller bearings should be provided and this should take care of axial and radial thrust at any point of operation and life of minimum 1 lakh hours.

3.2.6 Submersible Motor

The motor shall be dry, squirrel cage, non-overloading type, suitable for 3 ph, 415 ±10% V, 50 Hz supply, designed, manufactured and tested conforming to IE3-Premium Efficiency as

per IEC60034-2-1 with latest revision equivalent international standard. The Motor should be Rated for continuous duty with **IP 68 protection and Class-F insulation or better**. However, the motor frame size shall be liberally designed to restrict temperature rise as per Class-B insulation. All squirrel cage induction motors shall be provided with electrolytic grade Copper winding for stator. The cable from the submersible motor shall be rubber insulated copper core water proof cables of adequate core and size, which shall be brought through water sealed terminals from the stator body to enable the motor to be connected with the switch on the pump floor. The submersible cable (Power and Control) of the pump sets shall be **50 m** length to avoid any joint or break in the route from the submersible motor to the junction box.

The motor shall be capable of delivering rated output with the terminal voltage differing from this rated value by not more than +/- 6 percentage and the frequency differing from its rated value by not more than +/- 3 percentage.

Induction Motor (submerged) design the motor shall be of squirrel cage, Induction type, air Filled yet capable of water Immersion up to 20 MWC for S1 duty- Motors with Oil or water filled windings shall not be allowed

Motor shall be capable of starting and accelerating the load with the applicable method of starting without exceeding the acceptable winding temperature, when the supply voltage is in the range of 10% above of the rated motor voltage.

Motor shall be designed to withstand 120% of the rated speed for two minutes without any mechanical damage in either direction of rotation.

Motor should be wound using Dual Coated, Super Enameled, copper wire with high temperature index as per I.S. 4800 Part-13, PVC/Poly propylene- poly ethylene insulation for winding wires shall not be allowed. Motor's Insulation should be Vacuum Varnish Impregnated & Oven Baked to ensure Moisture Impervious & Mechanically Robust insulation. Dip or Pour type Air Dry Varnishing shall not be allowed.

3.2.6.1 Operational requirement

The motors shall be designed to operate continuously (S1 duty) at its rated output over the entire range of the output of the driven equipment. It shall be also have at least 15% margin over the input power requirement of the driven equipment at rated output duty point. The motor characteristic shall match with the requirements of the driven equipment so that adequate starting torque, pull up, pull out and full load torques is available for the intended

service. The motor GD^2 value must be greater than the GD^2 value of the driven equipment and shall be so designed as to give smooth and uniform starting and running of the driven equipment at all load conditions.

The motors shall be designed to run continuously at rated output over the entire range of voltage and frequency variations. The motors shall be capable of operating satisfactorily at its full load for 15 minutes without injurious heating with 75% rated voltage at motor terminals.

Motors shall be designed for operations with Fully Automatic Start Delta (FASD) starter with starting current not exceeding 3 times. All the stator winding terminals and other items like space heaters, embedded temperature detectors bearing temperature detectors (DE & NDE) etc. shall be brought out to separate terminal boxes as per IS as per requirement. All motors shall be suitable for bi-directional rotation unless otherwise specified.

All motor driving pump units shall be protected against dry running of the pumps through suitable sensing devices like float/level sensing switches/probe and total sensing device along with all the relevant control apparatus and wiring and cabling shall be included in the scope of work.

The motor shall be capable of withstanding the stresses imposed if started at 110% rated voltage, Motor shall start with rated load and accelerate to full speed with 80% rated voltage at motor terminals. Motor shall be capable of six equally spread starts per hour, three starts in quick successions from cold conditions and three restart from hot conditions.

Motors subject to reverse rotation shall be designed to withstand the stresses encountered when starting the non-energized shaft rotating at 125% rated speed in reverse direction. Provision for LT Capacitor Banks across motor terminals should be provided as per specification.

3.2.6.2 Provision for Earthing

Earthing of the motor shall be done as per IS 9283 in accordance with the relevant provisions of IS 3043, For satisfactory purpose it shall be ensured during installation that the earthing is capable of taking care of leakage current. In case of PVC pipe used as discharge pipe, a separate non corrosive, low resistance conductor from earth terminal to control panel shall be provided for earthing. In case of non-corrosive GI pipes and clamps are used

for the purpose of earthing the motor, earthing connection may be made to the discharge pipe clamp and to control panel earth terminal.

3.2.6.3 Terminal marking and direction of rotation

Terminal making shall be in accordance with IS 9283. The direction of rotation of pump set is designated clockwise or anti-clockwise as observed when looking at the pump shaft from the driving end. The direction of rotation shall be clearly and securely marked by incorporating an arrow on the pump set.

3.2.6.4 Cable

A watertight cable junction Box sealed from the motor shall be provided for motor power and signaling cables. The cable shall be of minimum 50 m to be terminated in MCC (Minimum 50 mtr. Length without any joint). It should be Copper Cored, Dual sheathed EPRS/PVC type.

A water tight cable junction box sealed from the motor shall be provided for the motor power and signaling cables complete with all external corrosion resistant cable glands. The cable shall be brought directly out of the submersible motor without joints, and shall be of sufficient length, minimum 30 m to be terminated in an IP 68 junction box outside adjacent to the wet well. They shall be sized in accordance with the electrically utility regulations and BS 7671.

The size of the conductor shall be adequate and suitable for continuous use under water and air.If four core cables are used, the fourth core is to be used for earthing.

3.2.6.5 Stuffing box/oil chamber

1. The pressurized entry of water into the motor (From the pump's volute casing) should be prevented by two separate mechanical seals in mounted in a tandem mode within an oil chamber.

2. The primary (In board) seal should be of silicon carbide or tungsten carbide faces to withstand erosive wear due to any silt particles. The secondary (Out board) seal should be of carbon v/s cast chrome Molybdenum steel or silicon carbide or tungsten carbide – i.e., thermally unstable materials like Alumina/ Aluminum Oxide shall not be allowed.

4. Seals must be capable of withstanding rotation in either direction.

5. A detector shall indicate when moisture is leaking past the first seal.

6. These mechanical seals should be of bi-directional mechanical seals permitting reverse running due to accidental back flow.

3.3 Internal Protection Features

4.3.1 The pump sets shall at the minimum be provided with the following internal protections. The leads of all the protecting sensors shall be brought out from the motor with Separate control cables.

3.3.2 Winding Temperature

The motors shall be provided with 3 sets of PTC temperature sensors embedded in the winding for monitoring the winding temperature, protection, and annunciation.

3.3.3 Bearing Temperature

For detection of mechanical faults, both bearings, at drive end and non-drive end shall be provided with PTC type temperature sensors for monitoring the bearing temperature, protection and annunciation.

3.3.4 Moisture Sensors

The motors shall be provided with DI moisture sensor to sense moisture contamination in the motor housing & connection chamber. The sensor shall generate alarm/ trip signals at the annunciator panel.

3.3.5 Monitoring Seal Leakage Chamber

The pump sets shall be provided with a DI moisture sensor assembled in the seal leakage collection chamber. In the event of any leakage, this sensor will give the tripping signal. The contacts of the DI moisture sensor shall be rated for operation on 110-230V AC supply.

3.4 Material of Construction

casing: Cast Iron IS:210, FG 260/ EN-GJL-250/ BS:1452, FG 260

Impeller: EN 10213-4-1-1.4470 (Duplex stainless steel)

Shaft: SS ASTM A276 Type 420/ SS 420

Motor housing: Cast Iron IS:210, FG 260/ EN- GJL-250/ BS:1452, FG 260

Stator winding: Electrolytic grade copper/bar

Rotor: Copper / Die Cast Aluminium

Fasteners: SS ASTM A276 Type 316

Mechanical seal: Silicon carbide/ Silicon carbide

Material of Construction of any other International Standard may also be considered.

3.5 Acceptable Makes

The equipment offered shall be of reputed make (like KBL, KSB, GRUNDFOS, SULZER, Willo Mather and Platt, XYLEM (FLYGT) or equivalent approved by E.I.C. with proven performance and ISO:9000/ 14000 organization. The manufacturer must have supplied equipment of similar types and duties as indicated in the specifications. The Govt reserves the right of selecting the make of the pumps and other major items envisaged for the bid. The Contractor shall take prior approval from the govt before placement of order to their vendors/ suppliers

3.6 Painting

The pump set shall be painted with two coats of high-quality epoxy primer (lead and chromium free) plus two coats of epoxy paint. Total DFT of paint shall not be less than 350 microns. The paint shall be spray applied and dried in a painting booth to avoid ingress of foreign particles especially when the painted surface is not completely dry.

3.7 Inspection & Testing at manufacturer's Work

The manufacturer shall submit their QAP for Engineer's Approval including the following inspections and testing which will be carried out at the manufacturer's work.

3.7.1 Hydrostatic Test

The pump diffuser assembly will be hydrostatically tested for any leakage, with water at a pressure 1.5 times of closed valve pressure with maximum impeller size or 2 (two) times of pump duty point pressure whichever is higher. Unless otherwise stated the minimum duration of testing will be 30 minutes.

3.7.2 Statical Balancing

All major rotating components must be statically balanced individually.

3.7.3 Dynamic Balancing

In addition to static balancing of individual component, the whole rotor assembly of pump must be dynamically balanced at rated operational speed to VDI 2060-Q6.3/Gr 6.3 of ISO.

3.7.4 Performance Test

3.7.4.1 Each assembled pump shall be shop tested at manufacturer's work by the manufacturer in presence of Employer/ Engineer to determine the following characteristics as furnished in the characteristics curve.

i) Capacity vs. Total Dynamic Head curve

ii) Capacity vs. Brake Power (BkW) curve

iii) Capacity vs. Efficiency (%) curve

iv) Capacity vs. NPSHR curve

3.7.4.2 While testing the following are also to be recorded:

i) Vibration level

ii) Bearing temperature

3.7.4.3 The above tests for each pump for its full operating range at rated speed shall be conducted in accordance with the latest revision of IS 5120/ISO 9906 Gr. 2/HIS standards.

3.7.4.4 During pump testing, reading to the extent possible shall be taken corresponding to its full working range.

3.7.4.5 Each pump performance shall be documented by obtaining concurrent readings showing motor voltage and amperage, pump suction head, pump discharge head, pump discharge etc. Such readings shall be documented for at least ten pumping conditions including one at the shut-off head and each power load shall be checked for proper current balance.

3.7.4.6 The curves produced from the above readings shall be used to determine the capability of pump sets to meet the guaranteed performance at site.

3.7.4.7 Bearing temperatures shall be determined by PTC type temperature detector. A running time of at least 30 minutes shall be maintained for this test at shut off head if sufficient water is not available for a complete test.

3.7.4.8 After the test runs have been performed to the satisfaction of the Employer/ Engineer that the pumping equipment complies with the stipulated specifications, the Engineer shall be provided with manufacturer test certificate.

3.7.4.9 All instruments and equipment required for such test shall be provided by the manufacturer and the instruments shall be calibrated and certified by an approved independent testing authority which they will be used. Calibration certificates as per international practice shall be provided.

3.7.4.10 In the event of any pump failing to meet the specified test requirements, it shall be modified and retested until the requirements are attained.

3.7.4.11 For motor following test certificates shall be provided-

(a) Motor type test certificate as per IEC 60034.3.31 (one per motor type)

(b) IP-68 leakage test after assembly.

(c) Insulation test (Class-F) & High Voltage test as per VDE 0530

3.7.5 Raw Material Tests

3.7.5.1 Physical and chemical tests of raw materials for major components of each pump shall be done. These tests shall be conducted in accordance with relevant IS/ BS/ DIN/ISO/DIN ENI 0204:2665-01 standards. All material test certificates shall be submitted, with proper correlation with the pump components, to the Employer/ Engineer for review and approval. Approved test certificates shall be produced during pump performance tests.

3.7.6 Visual Inspection

Pumps shall be offered for visual inspection to the Employer/ Engineer before despatch. The pump assembly/ any component shall not be painted before inspection.

3.8 Testing at Site

All the pump sets shall be tested at site in the presence of manufacturer's expert. The QH Parameters shall be measured with the electromagnetic flowmeter installed at the rising main for. The testing shall be arranged by the contractor at no extra cost.

3.9 Comprehensive Maintenance contract

Submersible Pump Motor set shall be placed under comprehensive maintenance contract for Five (05) calendar year after completion of one (01) year of defect liability period. Pump Motor set along with its allied system shall be maintained as per maintenance manual provided by the manufacturer.

In the event of Defects of components/ sub- components/ Assemblies/ Sub-Assemblies is surfaced, same to be repaired. If, not repairable, same to be replaced free of cost under this clause.

Separate items are provided in the BOQ for Comprehensive Maintenance contract Contractor shall have to quote their rate per year basis.

A Service level agreement in respect of this item will be executed in due course of time separately after successful commissioning of the project.

4. Valves

4.1 Air relief valve

4.1.1 Double acting automatic air relief valve of nominal size 100mm as per IS 14845 with isolating mitre bevel geared sluice valve as per IS 14846 complete, shall be provided and installed on the delivery pipe coming out from each pump.

Working Pressure Body/seat - 12 / 5 kg/cm^2

Design Pressure Body/seat - 24 / 10 kg/cm²

Testing as per IS 14846

4.1.2 Material of Construction

Material body & top cover- CI, IS 210 FG 260,

Internal fittings- bronze IS 318 LTB 2,

Hardware in contact with water- SS 304

4.1.3 Acceptable Makes

Any reputed make approved by Engineer in charge.

4.2 Sluice Valve

4.2.1 Unless otherwise specified all the sluice valves shall be rising spindle type, flat face, bolted bonnet with solid wedge disc and manually operated by hand wheel. The valves above and including 400 DN shall be provided with spur/ bevel gear arrangement for ease in operation and be fitted with by-pass arrangement.

4.2.2 The sluice valve shall be as per IS: 14846/ BS:5150/ DIN:3352 at their latest revision. The pressure rating of the valve shall be as per the specific standard followed taking into account the operating pressure. Wherever specifically mentioned, the valve shall be fitted with extended spindle, head stock along with hand wheel for easy operation from the operating platform. There will be no play in the XX & YY axis of the valve gate within the guide channel of the valve.

Design Pressure - 20 MWC

4.2.3 Material of Construction

Body, bonnet, wedge, stuffing box gland: Cast iron (IS:210, FG 260)

Spindle: Stainless steel (AISI410)

Body seat and disc seat: Stainless steel (SS 304)

Packing: Greasy jute packing

Fasteners: IS:1367, Class 4/ 4.6

Extended spindle: Mild steel (BS: 970, EN8)

Head stock: Cast iron (IS: 210, FG 260)

Hand wheel: Cast iron (IS: 210, FG 260)

4.2.4 Acceptable Makes

IVC/ Fouress/ Audco/ Sigma Flow/ Kirloskar / Fouress / Durga / AVK/ Venus/Kalpana Valves/ equivalent

4.3 Flap valve

4.3.1 Each pump will be provided with flap valve in its delivery pipe end. The flap valve will be of 600 mm dia. C.I. Single flange, swing type double hung flap valve with pressure rating as per specific standard and following specification.

For Rated flow - 2550 M^3/Hr,

Velocity at rated flow - 2.5m/sec

Design Pressure - 20 MWC

Leakage as per IS 13349 class 3

Testing as per IS 14858

4.3.2 Material of Construction

Body, flap Cast iron, IS: 210, FG: 260,

Body & disc set: stainless steel, AISI 304,

Hinge pin: Stainless steel AISI 410,

Flange standard IS 1538,

4.3.3 Acceptable Makes

Any reputed make approved by Engineer in charge.

4.4 Painting

All the valves shall be painted with zinc rich epoxy primer plus two coats of epoxy paint. The paint shall be spray applied and dried in a painting booth to avoid ingress of foreign particles especially when the painted surface is not completely dry.

4.5 Inspection and Testing

The valve shall be subjected to seat and body test in accordance with relevant IS at the manufacturers works in presence of Engineer or his representative, before delivery. The test certificates shall be furnished in triplicate.

All the major components of each valve shall be physically and chemically tested by approved independent testing authority to confirm the material quality. The manufacturer shall intimate the Client, the relevant Standard to be followed for testing. All components subject to testing shall be identified, and only those which are tested successfully shall be used for the manufacture of final product. All test results shall be submitted for Engineer's approval.

Hydrostatic Test

The pressure retaining components of all valves shall be tested at the pressure stipulated in the relevant standard followed. The manufacturer should inform the Client regarding the pressure ratings of the valves and all the test certificates to be submitted before dispatch of the materials.

5. Pressure gauges

All the pumps shall be provided with dial type pressure gauges of suitable range at delivery flanges complete with copper tubing and control cocks. The gauges shall be of direct mounted stainless steel diaphragm sealed type. The dial size of each pressure gauge shall not be less than 150 mm. The material of construction shall be suitable for sewage/ drainage pumping station installations. Each pressure gauge shall be complete with pressure snubber and of suitable class of enclosure. Accuracy shall be ±1.0% of full-scale range or better. Scale range shall be selected so that normal system pressure is approximately 50% of full scale. The Gauges should conform to the latest revision of IS:3624/ BS:1780/ equivalent.

Testing as per IS 3624.

6. Flow measuring system

6.1 General

6.1.1 Flow measuring system shall consist of flow sensor, flow transmitter, digital flow indicator and integrator and any other items required to complete the flow measuring system in totality.

6.1.2 Flow sensor shall be rugged in construction and shall be suitable for continuous operation. Flow sensor shall have waterproof construction and shall be suitable for installation on underground/ above ground pipelines.

6.1.3 To avoid the effects of disturbances in the velocity profile, a straight and uninterrupted run, upstream as well as downstream from the location of the flow sensor shall be provided, as required by the flow meter manufacturer and in line with applicable standards.

Contractor shall finalize the exact location of flow transducers in consultation with Employer/ Engineer.

6.1.4 The flow transmitter shall be suitable for remote mounting (at pumping station) and shall accept input from the flow transducer. It shall process the input signal and provide 4 - 20 mA DC output proportional to flow rate. Flow transmitters shall have LCD display to indicate instantaneous flow rate.

6.2 Design Criteria for Design/ Selection of Instruments

6.2.1 The design/ selection criteria to be applied for flow and pressure measuring/transmitting instruments shall be as follows:

a) All instruments shall be suitable for continuous operation

b) All transmitting instruments shall have a 4 - 20 mA linear output

c) All digital outputs shall be potential free

d) All instruments shall be designed for the ambient conditions of temperature and humidity

e) All wetted parts of instruments sensors shall be non-corrosive and suitable for use with potable water containing residual chlorine

f) All instrumentation systems for outdoor application shall be protected to IP 65/ IP68

g) All analogue displays shall be of the digital type with no moving parts

h) Instrumentation shall utilize solid state electronic microprocessor technology and avoid the use where practical of any moving parts

i) Instruments shall resume operation automatically on application of power following a power failure

6.3 General Requirements of Flow Measuring Instruments

6.3.1 Flow measuring system shall consist of flow sensor/ transducers, flow integrator & flow

transmitter, digital flow indicator & integrator and any other item required to complete the system.

6.3.2 Flow transducers shall be rugged in construction and shall be suitable for continuous operation. Flow transducers shall have waterproof construction and shall be suitable for installation on underground/ above ground pipe lines.

6.3.3 To avoid the effects of disturbances in the velocity profile, a straight and uninterrupted

run in the upstream as well as downstream from the location of the flow sensor shall be provided, as required by the flow meter manufacturer.

6.3.4 The flow transmitter shall be suitable for field mounting and shall accept input from the

flow transducer. It shall process the input signal and provide 4 - 20 mA DC output proportional to flow rate. Flow transmitters shall have LCD display to indicate instantaneous flow rate. The flow range shall be adjustable. The flow meters shall be suitable for measuring flow at velocities of water from 0 to 4 m/sec.

6.3.5 The flow computer shall be microprocessor based and shall have self-diagnosis facilities.

6.3.6 The scope shall include supply of all related fittings, fixtures at site including counter flanges, masonry chamber etc. as required for the flow meters. The scope shall also include supply of hardwares and softwares required for the data logging/monitoring system.

6.4 Description of Flow Measuring Equipment

6.4.1 Electromagnetic Full Bore Type Flow Meter

6.4.1.1 The full-bore electromagnetic flow meter shall consist of flow sensor (i.e. flow tube) equal to the diameter of the pipeline and shall be provided with remote mounted flow transmitter and flow indicator and integrator and any other item required for completing the flow measuring system. Flow measurement shall not be affected by physical properties of water viz., temperature, pressure etc., within given limits. The flow meter shall be suitable for by directional flow.

6.4.1.2 The flow computer and transmitter shall be a single unit suitable for remote mounting. It shall accept inputs from flow tube, process the signals and shall provide an output proportional to the flow rate. The output shall be suitable for transmitting over a long distance.

6.4.1.3 Calibration

The electromagnetic flow sensor shall be wet calibrated and the calibration information and factory settings matching the sensor shall be stored in an integral mounted memory unit. Such memory unit shall store the sensor calibration data and signal converter settings for the life time of the product.

6.4.1.4 Digital Panel Meters

Digital panel meters (DPM) shall be microprocessor based and modular in design. They shall accept 4 - 20 mA DC signals from transmitters. The DPM's shall provide an output of 4 - 20 mA DC proportional to input signal for re-transmitting. The DPM'S shall have back-lit LED display. Digital panel meters shall provide excitation voltage to the respective transmitters.

6.4.1.5 Acceptable Makes

Krohne / Siemens/ Endress Hauser/ ABB/ equivalent

C. Particular specification:

1. Mechanical work

1.1 LIQUID DATA: -

Sl no	Parameter	Unit	Ghatal Pump House-1
01	Liquid to be handled	-	Drainage/Storm water
02	Ambient temperature	^{0}C	Peak=50

			Avg=40
03	Total dissolved solids	(mg/lit)	50-150
04	Total suspended solids	(mg/lit)	200-1200
05	Sp. Gravity		1.04
06	Total BOD_5	(mg/lit)	25-50

1.2 CIVIL AND HYDRAULIC DATA:-

Sl No	Particulars	Data
01	Sump level	(-)1.37M(GTS)
02	F.D.L.	(+)5.33 M(GTS)
03	Pump Floor Level	(+)0.546M(GTS)
04	MWL/ Pump Stop Level	(+)2.134 M(GTS)
05	H.W. L	(+) 5.94 M(GTS)
06	Level of CL of Delivery Pipe	(+)5.785 M(GTS)
07	Existing Horizontal Pump (Centrifugal) Centre	(+)1.496M(GTS)
08	Existing pedestal Top	(+)0.915M(GTS)
09	Max. Static head	3.651MWC
10	Min Static Head	(-)0.155MWC

1.3 REMOVABLE SCREEN/TRASH RACK: -

Sl No	Particulars	Data
01	Type	Manually cleaned
02	Size, mm x mm in approx.	4000 mm x 10500 mm in three equal parts.
03	Nos. required	8 nos.
05	Operating Floor Level	+11.50 M(GTS)
06	Design & Constructional feature	As per Standard Specification
07	Material of Construction	As per Standard Specification
08	Supply of accessories and service	As per Standard Specification
09	Hoisting	As per Standard Specification

1.4 PUMPS

Sl No	Particulars	Data
01	Service	Drainage/ storm water
02	Type	Dry pit installed submersible centrifugal pump with motor
03	Designation	SWF Pumps
04	Duty	Continuous
05	Location	Indoor
06	Design Capacity	20 Cusec
07	Nos. Required	6 nos..
08	Minimum Static Head in Mtr	(-)0.155MWC
09	Maximum Static Head in Mtr	3.651 MWC
10	Speed	Less than equal 750 r.p.m. (Synchronous)
11a	Minimum efficiency of pump required	80
11b	Maximum pump efficiency	Shall occur at duty point
12	Motor capacity	75 KW
13	Minimum efficiency of motor required at design capacity (%)	92(IE-3)
14	Min & Max Nos. of pumps working in parallel	02 & 06
15	Range of Operation	Between 60% and 140% of rated capacity
16	Design & Constructional feature	As per Standard Specification
17	Material of Construction	As per Standard Specification
18	Supply of accessories and service	As per Standard Specification
19	Tests and Inspection	As per Standard Specification
11	Suction pipe dia (OD)	600 mm, 10 mm thick
12	Delivery pipe dia (OD)	500 mm, 10 mm thick
13	Common header pipe Dia (OD)	1200 mm, 10 mm thick

1.5 VALVES

Sl.no	particulars	Data
(A) FLAP VALVES		
01	Type	Single flange, swing type double hung flap valve
02	Design pressure	20 MWC
03	Size, Dia in mm	600 mm

04	Nos. required	1 Nos.
	Velocity at rated flow	2.5 m/sec
(B) SLUICE VALVES		
01	Design & Constructional feature	As per Standard Specification
02	Material of Construction	As per Standard Specification
03	Supply of accessories and service	As per Standard Specification
04	Tests and Inspection	As per Standard Specification
05	Nos. required	500 mm dia -06 Nos & 600 mm dia -06 Nos.
(C)AUTOMATIC AIR REALESE VALVE		
01	Type	Double acting
02	Design pressure	As per Standard Specification
03	Size, Dia in mm	100 mm
04	Nos. required	2 nos.

1.6 GAUGES: -

Sl No	Particulars	Range(kg/cm2)	Qty
01	Pr. Gauge at delivery side	20 MWC	6
02	Construction & features	As per Standard Specification	

1.7 FLOW METER: -

Sl No	Particulars	Data
01	Type	Electromagnetic Full Bore Type Flow Meter
02	Construction & features	As per Standard Specification
03	Nos. required	6 nos.

1.9 MONORAIL CRANE WITH CHAIN PULLEY BLOCK

Sl No	Particulars	Data
01	Nos. Required	One
02	Capacity	5 Ton
03	Lift, mm(approx)	9 Mtr
04	Design & Constructional feature	As per Standard Specification
05	Material of Construction	As per Standard Specification
06	Supply of accessories and service	As per Standard Specification
07	Tests and Inspection	As per Standard Specification

SECTION-III

Additional contract Information

1.0 Additional Information to the bidder

1.1 Time of Completion

Project Engineering, procurement of equipment and construction works shall be completed in its entirely within **8 Months (Eight months)** (including rainy or any other disruptive or non-working seasons up to commissioning) from the date of issue of Letter of award and up to commissioning, successful trial run and handing over the pumping station.

1.2 Disqualification

Even though the bidder satisfies the above requirements, they are subject to be disqualified if they have

(a) Made untrue or false representations in the forms, statements and attachments required in the pre-qualification documents and/or.

(b) Record of proof of performance such as abandoning the work, not properly completing contracts etc. or financial failures.

1.3 OEM/Authorized Dealer/Agents of Supplier

When a bidder is other than O.E.M of pump, the bidder is also required to attach, in its bid, the manufacturer's authorization certificate and also manufacturer's confirmation of extending the required warranty for that product. This is necessary to ensure bid from a responsible party offering genuine product, also backed by a warranty obligation from the concerned manufacturer.

1.4 Deviation from bid documents / additional clauses

All bidders shall note that the bids in response to e-NIT, containing any deviation whatsoever from the basic parameters in respect of General and special Terms and conditions and technical specifications shall be judged by the High Value Tender Evaluation Committee, herein after termed as HTEC. The HTEC shall be sole judge for assessment of acceptability/ non acceptability of deviations / additional clauses. The decision of the tender accepting authority in this respect shall be final.

1.5 Fraudulent Practice

"Fraudulent Practice" means a misrepresentation of facts in order to influence a procurement process or the execution of a contract to the detriment of the Purchaser and includes collusive practice among Bidders (prior to and after Bid submission) designed to establish bid prices at artificial non-competitive levels and to deprive the Govt. of the benefit of free and open competition.

The Govt. will reject a proposal for award if it determines that the Bidder recommended for award has engaged in fraudulent practices in competing for the contract in question.

The Govt. will declare the bidder ineligible, either indefinitely or for stated period of time, if at any time it determines that the firm has engaged in fraudulent practices in competing for, or in executing the contract.

Failure of successful bidder to comply with requirements of different clauses of tender documents shall constitute sufficient grounds for the annulment of award and forfeiture of Earnest Money.

1.6 Site Visit

The Bidder is advised to visit and examine on his own and the site of works and its' surrounding and obtain for its' own responsibility all information that may be necessary for preparing the Bid and entering into a contract for the design-build and completion and commissioning of the works. The costs of visiting the Site and investigation etc. shall be at the bidders (or tenderers) own expense.

1.7 Clarification of tender documents and pre-bid meeting

(a) A prospective Bidder requiring any clarification of the tender documents may notify the tender inviting authority in writing or by e-mail or by fax at the mailing address preferably within 15 (fifteen) days of start tender document download. The tender inviting authority will respond in writing to any request for clarification or modification of the tender documents that it receives prior to the deadline for submission of bids prescribed by the purchaser. Written copies of tender inviting authority's response (including an explanation of the query but not identification of its source) will be uploaded in the portal.

(b) The Bidder and any of its personnel pr agents will be granted permission by the authority to enter upon its premises and lands for the purpose of such inspection.

(c) The bidder's designated representative is invited to attend a pre-bid meeting which, if convened, will take place at the venue and time stipulated in the NIT. The purpose of the meeting will be to clarify issues and to answer questions on any matter that may be raise at that stage. The bidder is requested for as possible, to submit any questions in

writing or by e-mail or by fax, to reach the tender inviting authority before the meeting. It may not be practicable at the meeting to answer questions received late, but questions and responses will be transmitted as indicated hereafter. Any modification of the tender documents which may become necessary as a result of the pre-bid meeting shall be made by the tender inviting authority exclusively through the issue of an addendum and through the minutes of the pre bid meeting.

1.8 Amendment of bidding document

At any time prior to the deadline for submission of bids, the tender inviting authority may, for any reason, whether at its own initiative or in response to a clarification requested by a prospective bidder, or as a result of pre-bid meeting modify the tender documents by issuing and amendment, any amendment thus issued shall be part of the tender documents and shall be uploaded in the tender portal. To give prospective bidders reasonable time to take an amendment into account in preparing their bids, the purchaser may extend, if necessary, the last date for submission of bids.

1.9 Payment terms

The tendered percentage as accepted while entering into contract will be made for arriving of item wise tendered rates (Only for purpose of making payments for item or complete part of the time of B.O.Q.) for item wise payment will be governed as below. The tendered rates will be treated as inclusive of all taxes, duties, excise etc.

1) Delivery of item of accepted quality in full at work site – 60% of item price.
2) Completion of erection of all at the items. -15% of item price.
3) Commission and trial run including 72 hrs. Continuous operation as detailed in the item description. -15% of item price.

Deduction of Income Tax (IT), GST and Security Deposit will be done as per the existing law in force during contract period

2.0 GENERAL CONDITIONS OF CONTRACTS

2.1 Interpretation

In this General Conditions of Contract, unless the whole context requires otherwise.

(i) Words shall have their normal meaning under the language of the Agreement unless specifically denied.

(ii) The title of the Agreement and descriptive heading of sections are used solely for convenience of reference and are not interpret the provisions of this Agreement.

(iii) Any reference to any law shall be deemed to include a reference to such law as is re-enacted, modified or amended from time to time.

(iv) Unless that context otherwise requires, (a) words importing the masculine gender shall also include the feminine gender and vice versa, and (b) the use of the singular shall include the plural and vice-versa.

2.2 Interpreting Specification

In interpreting specification, the following order of decreasing importance shall be followed in case contradictions.

(a) B.O.Q.

(b) Technical Specification.

(c) Drawing (if any).

(d) Relevant BIS or other international code, in the case of BIS code is not available.

2.3 Documents on Site

The Contractor shall keep on the site one complete set of the documents forming the Contract, the Construction Documents, other communications giver or issued and the documents mentioned in Sub-clause (Technical Standards and Regulations). The EIC and his Representative and assistants shall have the right to use such documents at all reasonable times.

2.4 Communications

Whenever provision is made for the giving or issue of any notice, instruction, consent, approval, certificate, determination by any person, unless otherwise specified such communication shall be in writing and shall not be unreasonably withheld or delayed.

Wherever provision is made for a communication to be “written” or “writing”, this means any hand or printed communication, including the agreed systems of electronic transmission.

All certificates, notices or written orders to be given to the Contractor by the Engineer-in-charge and all notices to be given to the Engineer-in-charge by the Contractor, shall either be delivered by hand against written acknowledgement of receipt, or by sent by registered post or one of the agreed systems of electronic transmission to Engineer-in-charge.

2.5 General Obligation of the Contractor

The works as completed by the Contractor shall be wholly in accordance with the Contract and fit for the purpose for which they are intended, as define in the Contract. The works shall include any work which is necessary to satisfy the Contract, Contractor's proposal and schedule, or is implied by the contract, or arises from any obligation of the contractor, and all works not mentioned in the Contract but which may be inferred tom be necessary for stability or completion or the safe, reliable and efficient operation of the works. The Contractor shall carry out detailed engineering design (to the extent as per scope of work), execute and complete the works, providing completion Documents, within the Time for Completion, and shall provide all superintendence, labour, materials. Contractor's Equipment, Temporary works and all other things, whether of a temporary or permanent nature, required in and for such design, execution, completion and remedying of defects. Before commencing design, the Contractor shall satisfy himself regarding the design criteria and parameters. The Contractor shall bring to notice of the Engineer-in-charge of any error, fault or other defect in the design criteria and parameter.

The Contractor shall carry out and be responsible for the design of the works. Design shall be prepared by qualified designers who comply with the criteria (if any) stated in the technical schedules. The Contractor holds himself, his designers and design Sub Contractors as having the experience and capability necessary for the design. The Contractor undertakes that the designers shall be available to attend discussions with the Engineer-in-charge at all reasonable times during the Contract Period.

The Contractor shall take full responsibility for the adequacy, stability and safety of all methods of construction and of all the works, irrespective of any approval or consent by the Engineer-in-charge.

2.6 Co-ordination of the works

The Contractor shall be responsible for the co-ordination and proper execution of the work. The Contractor shall, as specified elsewhere in the document afford all reasonable opportunities for carrying out their work to:

i. The workmen and Engineer-in-charge or his authorized representative, and

ii. The workmen and any legally constituted public authorities who may be employed in the execution on or near the site of any work not included in the contractor, which the Engineer-in-charge may require.

The Contractor shall obtain, co-ordinate and submit to the Engineer-in-charge for his information all details (including details of work to be carried out off the site) from Sub-contractors. The Contractor shall ensure that there is no conflict with the work of other Sub-contractors, the contractor or other contractors.

The contractor shall coordinate his work and cooperate with other agencies by exchange of all technical information like details of foundation, if required, weight, overall dimension, clearance other technical data required for successful and proper completion of work of his portion of work in relation to the works of other contractor without any reservation.

2.7 Extent of work

The work comprises of entire labour including supervision and all materials necessary to make a complete Installation and such tests and adjustments and commissioning, as may be required by the department. The term complete installation shall not only mean major items of the plant and equipment's covered by the specifications but all incidental sundry components necessary for complete execution and satisfactory performance of installation with all layout charts whether or not those have been mentioned in details in the tender document in connection with which this contract as this is a turnkey job.

2.8 Contractor's Risks

The Contractor shall be responsible for all risks of loss or damage to physical property and of personal injury and death which arise during and in consequence of its performance of the Contract.

2.9.1 Insurance against Injury to Persons and Damage to Property

The Contractor shall insure against liability to third parties, in the joint names of the Engineer-in-charge, the Contractor and Sub-Contractor, for any loss, damage, death or bodily injury which may occur to any physical property or to any person, which may arise out of the performance of the Contract and occurring before the issue of the Performance Certificate.

2.9.2 Insurance for Workers:

The Contractor shall affect and maintain insurance against losses and claims arising from the death or injury to any person complied by the Contractor or any Sub-contractor, in such manner that the Engineer-in-charge and his Representatives are indemnified under the policy of insurance. For a Sub-

contractor's employees, such insurance may be affected by the Sub-contractor, but the Contractor shall be responsible for compliance with this Clause.

2.9.3 Inland Transit Insurance

The agency should be asked well in advance for insurance. In case of loss or damage to store in transit where the store has been insured by the supplier against such risk, he/she will take up the matter with insurer which should invariably be a nationalized insurance company/ corporation and recover the loss from them.

2.9 Quality Control of works

2.9.1 Identifying Defects.

The Engineer-in-charge or his representative shall check the Contractor's work and notify the Contractor of any Defects which are found. Such checking does not affect the Contractors responsibilities. The Engineer-in-charge may instruct the Contractor to search for a defect and to uncover and test any part of the works, which the Purchaser considers, may have a Defect.

2.10.2 Quality Assurance

Unless otherwise indicated elsewhere in this Contract, the Quality Assurance and Quality Control (QA/QC) documents for each element of work/equipment shall be prepared by the Contractor along with its Engineering documents and three copies of the same shall be supplied to Engineer-in-charge for his approval. Engineer-in-charge's hold point shall be clearly marked against critical check points for witnessing test/inspection by Purchaser's representative. The Engineer-in-charge shall mark his comments or give his approval on one copy and return the same to Contractor. The Contractor shall implement the comments and send three copies of revised documents again to the Engineer-in-charge. After getting approval of Engineer-in-charge, three copies of approved QA/QC documents shall be supplied to purchaser for inspection of works/equipment at site manufacturer's works.

The Contractor shall institute a quality assurance system to demonstrate compliance with the requirement of the Contract. Such system shall be in accordance with the details stated in the contract. Compliance with the quality assurance system shall not relieve the Contractor of his duties, obligations or responsibilities.

Details of all procedures and compliance documents shall be submitted to the Engineer-in-charge for his information before each design and execution stage is commenced. When any document is issued to the Engineer-in-charge, it shall be accompanied by the signed quality statements for such document, in accordance with the stated in the Contract. The Engineer-in-charge shall be entitled to audit any aspect of the system and require corrective action to be taken. Contractor shall allow any authorized persons by Engineer-in-charge or his authorized representative to inspect and check the test and quality control for the work.

2.10.3 Correction of Defects

The Engineer-in-charge shall give notice to the Contractor of any Defects before the end of the Defect Liability period, which begins at Completion.

Every time notice of a Defect is given, a Defect Correction period for the notified Defect begins. The contractor shall correct the notified defect within the Defect Correction period at free of cost. The length of the Defects Correction Period is the length specified by Engineer-in-charge of his representative's notice.

The Contractor shall correct Defects which he notices himself before the end of the Defect Liability Period. If the defect or damage is such that it cannot be remedied expeditiously on the site, the Contractor may, with the consent of Engineer-in-charge, remove from the site for the purpose of repair any part of the works which is defective or damaged.

The Contract period shall be extended by a period equal to the sum of any periods, after the works are taken-over, during which the works or any section or item of plant cannot be used, for purposes for which they are intended, by reason of a defect or damage.

2.10 Delivery and Documents

Delivery of the Civil, Electro & Hydro-mechanical works shall be made by the Contractor in accordance with the terms specified by the Engineer-in-charge in its schedule of requirements and the special conditions of Contract. In case spare parts and tools are also ordered with the Civil, Electro-mechanical works, bidder will undertake to offer spare parts and tools for delivery along with the main Civil, Electro- mechanical works only and not before.

2.11 Prices

It is a firm percentage rate price contract. Prices charged by the contractor for Civil, Electro-mechanical works delivered and services performed under the contract, shall not very from the contract agreement prices mentioned in Contract Agreement.

The taxes and duties viz., GST and other levies, cost for packaging & forwarding, insurance, freight, import duty shall be deemed to have included in the bid of the contractor as applicable for supplies and works will be borne by Contractor as per actual.

2.11.1 Security of site

The Contractor shall be responsible for keeping unauthorized persons off the site and authorized persons shall be limited to the employees of his sub-contractors and persons authorized by the Engineer-in-charge.

2.11.2 Contractor's personnel

The contractor shall employ (or cause to be employed) only persons who are careful and appropriately qualified, skilled and experienced in their respective trades or occupations. The Engineer-in-charge may require the contractor to remove (or cause to be removed) any person employed on the site or works, including the contractor's Representative, who in the opinion of the Engineer-in-charge.

(a) Persists in any misconduct,
(b) Is incompetent or negligent in the performance of his duties,
(c) Fails to conform with any provisions of the Contract, or
(d) Persists in any conduct which is prejudicial to safety, health, or the protection of the environment. If appropriate, the contractor shall then appoint (or cause to be appointed) a suitable replacement person.

3.0 SPECIAL CONDITION OF CONTRACT (S.C.C.)

3.1 General

The data and information given in the Tender Documents are based on the investigations, planning and designs carried out so far. The data considered for the project planning have been included in the bid documents. The contractor shall, therefore, satisfy himself about the adequacy and accuracy of the said data/information and interpretation hereof and collect fresh data/additional data/information and carry out/conduct further investigations and studies. The Purchaser shall not be responsible for the accuracy/adequacy of the data/information and interpretation thereof by the Contractor.

The following special conditions of Contract shall supplement the General Conditions of Contract. Whenever there is a conflict, the provisions herein shall prevail over those in the General condition of Contract.

3.2 Work Schedule / Re- Scheduling & Progress of work

The Contractor shall submit a detailed BAR CHART and PERT network within 15 days of award of contract. The PERT network shall consist of adequate number of activities covering key phases of the works such as design, procurement, manufacturing, shipment, installation of equipment, assembly and commissioning of units. This network shall also clearly indicate the interlinking/interdependence of relative activities of civil works, Electro-Mechanical Works. The Contractor shall also make the PERT network in computer aided project management software to generate Bar Chart based on

network technique. Contractor shall discuss the network so submitted with the Engineer and the agreed network shall form part of the Contract to be signed within 30 (thirty) days from the date of receipt of Letter of Award of contract.

The Works shall be executed and performed in accordance with the agreed Master Control Network. The program shall be received jointly by the Engineer-in-charge and the Contractor, at least once in a month where in the hold ups/delay, if any, in the progress of works, with reference to the agreed schedule shall be given special Attention. Necessary modifications (updating/Revisions) of the program, within the overall time for Completion, shall be carried out by mutual agreement between the Engineer-in-charge and the Contract.

If for any reason, any parts of the works of the Project are delayed, then the total program may be re-scheduled by mutual agreement between the Engineer-in-charge and the contractor, if necessary, keeping the overall completion schedule of the project unaltered, no extra cost whatsoever, on account of such re-schedule shall be payable to the Contractor.

Progress Report: Monthly progress reports for execution of the Project shall be prepared by the Contract and submitted to the Engineer in four copies. The first report shall cover the period up to the end of the calendar month, in which the commencement date occurred. Report shall be submitted monthly thereafter, within 5 days of the following month, Report continue until the contractor has completed all work, which known to be outstanding at the completion date, stated in the taking-over Certificate for the works. Each report shall include:

(a) Photographs and detailed descriptions of progress, including each stage of design, procurement, manufacture, delivery to site, construction, erection, testing and commissioning;
(b) Chart showing the status of Construction document, purchase orders, manufacture and construction;
(c) For the manufacture of each main item of plant and Materials, the name of manufacturer, manufacture's location, percentage progress.

3.3 Replacement of Defective Materials

If during the progress of manufacture or supply of the plant, the Engineer decides and notify in writing to the Contractor that the Contractor has manufactured any plant or part of plant unsound or imperfect or has supplied any plant inferior in quality, the Contractor, on receiving details of such defect or deficiency, shall alter, reconstruct or remove such plant or part of plant or supply fresh materials up to the standard of the specification at his own expenses. In case the contractor fails to do so, the owner may on giving the Contractor 7 (seven) days' notice in writing of his intention to do

so, proceed to alter, reconstruct or remove such plant or part or supply all such material at the Contractor's cost provided that nothing in this clause shall, be deemed to deprive the owner or affect any rights of the Contractor which he may otherwise have in respect of such defects or deficiencies and provided that such replacement shall be carried out by the owner within a reasonable time and at a reasonable price and when reasonable possible to the same specifications and under competitive conditions.

3.4 After Sales Service

The equipment supplied against this specification shall be attended to by the contractor when referred to by the E.I.C. at contractors' price remain within guarantee period and at Govt. price beyond that immediately so that the equipment does not remain idle on account of Contractors service.

Necessary spare parts shall be made available till the life of the equipment. Before going out of the production of the spare parts, the contractor shall give advance notice to the Govt. so that the Govt. may procure his requirements then. Necessary drawings and materials specification of such spare in such circumstances shall be made available by the contractor to the Owner enabling him to fabricate the same or procure from elsewhere.

3.5 Work to be executed in Accordance with Specifications, Drawing, and Orders etc.

The contractor shall executive the whole and every part of the work in the most substantial and workmen like manner and both as regards materials and otherwise in every respect in strict accordance with specifications. The contractor shall also confirm exactly, fully and faithfully to the designs, drawings and instructions in writing relating to the work signed by the purchaser and lodged in his office, and to which the Contractor shall be entitled to have access at such office or on the site of the work for the purpose of inspection during office hours, and the specifications and of all such designs, drawings and instructions as aforesaid.

3.6 Negligence

If the Contractor shall neglect to executive the work with due diligence and expedition or shall refuse or neglect to comply with any reasonable orders given to him in writing by the Engineer-in-charge in connection with the works or shall contravene the provisions of the contract, the owner may give notice in writing to the contractor calling upon him to make good the failure, neglect or contravention complained of. Should the Contractor fail to comply with such notice within a period considered reasonable by the owner from the date of service thereof, in the case of failure, neglect or contravention capable necessary for making it good, then and in such case

of Owner shall have the option and be liberty to make the work wholly, or in part, out of the Contractors hand may carry on the work necessary to complete the work envisaged in the contract either by himself or his agents or may reconstruct at reasonable price with any other person or persons to execute the same or any part thereof and provide any other materials tool, tackle or labour for the purpose of completing the works of any part thereof.

3.7 Trial Run and Commissioning

On the completion of work, the whole system shall be tested and commissioned as envisaged in Technical Specification. All the tests as specified in technical specification part should be completed. The unit shall be put to 72 hrs. continuous run. After completing 72 hours test run, pump will be declared suitable for operation.

3.8 Commissioning Report

The Executive Engineer and Contractor shall properly maintain in the agreed format their respective records of all observations and measurement taken in respect of all tests and operations. Joint protocol shall be signed on completion of each and every test/check till the commissioning. During commissioning all reading shall be jointly maintained and signed. On successful completion of the commissioning, a report shall be jointly prepared and signed indicating results of all the tests/checks.

3.9 Training of Departmental personnel

The Contractor shall arrange for training of Engineering-in-charge's personnel in operation and maintenance of the pump. The Contractor shall provide a detailed training plan for all operation and maintenance procedures and submit maintenance manual after completion of the project.

3.10 Documents for Payment of domestic product

The Contractor submits the requisite documents to the paying Authority to enable effecting the payment.

(a) Indigenous items (Manufactured in India): Payment of bills will be made on submission of the following documents by the Seller to the Paying Authority along with the bill:

(i) Ink-signed copy of Contractor bill/Commercial Invoice.

(ii) Inspection Note (and User Acceptance, if applicable).

(iii) Time extension letter. If applicable.

(iv) Claim for statutory and other levies to be supported with requisite documents/proof of payment. Like GST Invoice, Excise Duty Challan (wherever applicable), Customs Duty

Clearance Certificate, proof of payment for EPF/ESIC contribution with nominal roll of beneficiaries, etc., as applicable.

(v) Exemption Certificate, if applicable.

(vi) Bank Guarantee for advance, if any paid.

(vii) Guarantee/Warranty certificate.

(viii) Name and address, Account type, Account number, IFSC code, MICR code.

(ix) Any other document/certificate that may be provided for in the consequent supply order/Contract.

(x) Inspection certificate by Quality Management Department of Equipment Manufacture countersigned by Owner's Engineer as per agreed Quality plan in 3 copies.

3.11 Documents for payment for imported Goods

The documents, which are needed from the supplier for release of payment, are to be clearly specified in the contract. The paying authority is also to verify the documents received from the supplier with corresponding stipulations made in the contract before releasing the payment. Documents, which the supplier is to furnish while claiming payment, are specified in the Letter of Credit, but usually are:

(i) Supplier's original invoice giving full details of the goods including quantity, value, and so on;

(ii) Packing list;

(iii) Certificate of country of origin of the goods to be given by the seller or a recognized chamber of commerce or another agency designated by the local Government for this purpose;

(iv) Certificate of pre-dispatch inspection by the purchaser's representative;

(v) Manufacturer's test certificate and guarantee;

(vi) Certificate of insurance;

(vii) Bill of lading/airway bill/rail receipt or any other dispatch document, issued by a government agency (like the Department of Posts) or an agency duly authorized by the concerned Ministry/Department, indicating;

(a) Name of the vessel/carrier;

(b) Bill of loading/airway bill;

(c) Port of loading;

(d) Date of shipment;

(e) Port of discharge and expected date of arrival of goods; and any other document(s) as and if required in terms of the contract.

3.12 Taxes, Duty and Levies

(a) GST: Rate of GST or any other Tax chargeable shall be inclusive in their quoted rate.

(b) Whenever Excise Duty is applicable and payable, bidder will assume that the rates quoted are inclusive of taxes.

(c) Customs Duty:

(i) In case of imported stores offered against forward delivery, the Bidders shall quote prices inclusive of customs duty. (CIF price along with installation, testing and commissioning).

3.13 Insurance

The equipment/machinery supplied under the contract shall be fully insured in a freely convertible currency against loss or damage incidental to manufacture or acquisition, transportation, storage and delivery in the manner specified in the contract. If considered necessary, the insurance may be done for coverage on an "all risks" basis including war risks and strike clauses. The amount to be covered under insurance should be sufficient to take care of the overall expenditure to be insured by the purchaser for receiving the goods of the destination.

The contractor shall take the policy in the name of the consignee of the Department, the insurance policy they will be assigned to the contractor for further operation. The insurance shall be full and shall cover any loss or damage in accordance with what is said above. The damaged materials will be set right or replaced by the contractor, free of cost. The claim arising out of composite insurance policy shall be dealt with or handled by the contractor at his own cost after receipt of preliminary damage/loss intimation given by the Department of damage/loss noticed by the contractor himself.

The insurance of plant up to a period of satisfactory commissioning and operations and satisfactory performance and guarantee test shall be on the account of contractor.

3.14 Acceptance of Stores against Supplier's Inspection Report and Warranty

In case of store to be imported from abroad, pre-dispatch inspection of goods at supplier's premises may be waived and substituted by the pre-dispatch inspection by the purchaser's inspector with the manufacturer's house inspection report and warranty. However, Manufacturing Company of foreign origin, having facility in India, may conduct pre-dispatch inspection in their own factory in India.

3.15 Purpose of Drawing and Specification and confirmation thereto and error, omission, discrepancies etc.

The contractor drawing read together with the contract specification and intended to show and explain the manner of executing the works and to indicate the type of class of the material to be used. The work shall be carried out in accordance with direction of Engineer-in-charge and in accordance with the drawing and specification which from part of the contract and in accordance with such further drawing, details and inspection as may from time to time to given by the Engineer-in-charge.

It shall be responsibility of the contractor to promptly bring to the notice of the Engineer any error or discrepancy in the contract documents and obtaining his order thereon.

(a) In case of error omission and / or disagreement between written and scaled dimensions on between the drawings and specifications, the following orders or preference shall apply.
   - Between actual scaled and written dimensions or description or drawings and corresponding one in the specification, the latter shall be adopted.
   - Between other quantities in the schedule of the quantities and those arrived at from the drawing, the former shall apply.
   - Between the written description of the item in the schedule of the quantities and the detailed specifications of the same item the latter shall be adopted.

(b) The information in connection with the work and work site as well as specification are contained in this book of contract in general and in particular in two parts viz. special condition and specification for item of work. In case of any discrepancy or repugnancy in the clauses in these sections the specifications will prevail over special condition.

(c) The special condition of contract and the specification shall prevail over various clause of EPC contract agreement.

In all cases on omissions and/or doubts or discrepancies in the dimensions or description of any item reference shall be made to the Engineer-in-charge whose Elucidation, Elaboration or Decision shall be considered as authentic and final. The contractor shall be held responsible for any error that may occur in the work through lack or such reference and precaution.

3.16 Standard of acceptance of branch tests

Acceptance of bench test to be conducted at manufacturing works shall be governed as below. The acceptance of performance test for verification of guarantee of head and discharge shall be governed by Para 9.4 of IS 10981 of 1983, similarly the acceptance of test for verification of guaranteed sufficiency should be governed by Para no. 9.4.2 of IS 10981 i.e., **combined efficiency of the pump/motor at the point of intersection shall be at least 0.975 of that guaranteed.**

If during the test it is found that the pump sets do not meet the required guaranteed performance, the pump sets will be out rightly rejected. The same pump sets may be accepted only after making necessary modifications alternations and retesting to meet the guaranteed performance at the contractor's cost.

3.17 Standard of acceptance of field tests

Acceptance of the field tests to be conducted at the work site shall be governed as below. The acceptance of performance test for verification of guarantee of head and discharge shall be governed by Para 9.4 of IS, 9137 of 1978, similarly the acceptance of test of guaranteed efficiency shall be governed by Para 9.4.2 of IS 9137 of 1978 (i.e., the combined motor pump units i.e., overall efficiency at the point of intersection shall be as per specified in schedule B). If during the test it is found that the pump set does not meet the required guaranteed performance, the pump set will be dismantled, transported to manufacture work for modification, alteration, etc. and re-transported to site re-assembled, re-installed and re-commissioned to the satisfaction of the Engineer by the contractor at his cost.

3.18 Errors in Submission

The contractor shall be responsible for any error or omission in the drawing and the other particulars supplied by him, whether such drawing/particular have been approved by the E.I.C. or not.

3.19 Departure from Technical specification

If the tenderer wishes to depart from the provision of the technical specification, he shall clearly mention such. Departure giving his reason there of unless this is done, the installation offered should be deemed to comply in every respect with this specification and all terms and conditions of the specification shall apply into.

3.20 Tools and Plants for Erection, Testing etc.

The contractor shall provide all types of tools, lifting, tackles, erection appliances or any other machine that may be required for installation of complete equipment under this contract.

3.21 Quality Assurance, monitoring and supervision

The contractor shall establish a quality control mechanism to ensure compliance with the provision or this agreement.

The contractor shall, within 15 (fifteen) days of agreement, submit to the E.I.C. its quality assurance plan which shall include the follows:

(a) Organization, duties and responsibilities procedure, inspections and documentations.

(b) Quality control mechanism including sampling and testing of materials, test frequencies standards, acceptance criteria, testing facilities, reporting, recording and interpretation of test results, approvals, check list for site activities, and proforma for testing and calibration in accordance with the specification and good industry practice.

(c) Internal quality Audit system.

The E.I.C. shall convey its comments to the Contractor within a period of 15 days of receipt of the QAP stating the modification, if any, required and the Contractor shall incorporate those in the QAP to the extent required for conform with the provisions under this Clause.

3.22 Third Party Inspection

Inspection may also be entrusted to a third-party inspection authority (like C.W.P.R.S, Pune).

If it becomes necessary to conduct a type test, acceptance test or special test at external laboratories, (National Accredited Laboratory) when facilities of these test are not available in house of the supplier or carrying out of confirmatory test is considered desirable before accept the good.

Normally unless otherwise intended in the contract, charge for routing testing, testing of material, and charges of special test to be borne by the contractor.

SECTION-IV

GUARANTEED PERFORMANCE AND TECHNICAL PARTICULARS.
VERTICAL DRY PIT SUBMERSIBLE CENTRIFUGAL PUMP

(Technical Data sheet to be submitted along with the tender by bidder)

ITEM -01 **PART-A**

Sr. No.	Description	Data (to be filled by the bidder)
(1)	Pump type.	
(2)	Manufacturer & his type designation.	
(3)	Standard to which manufactured.	
(4)	Design capacity	
(5)a	Design head (meters)	
(5)b	Shut off head (meters)	
(6)	Number of stages.	
(7)	Speed (RPM).	
(8)a	Pump efficiency (%) at duty point	
(8)b	Maximum Pump efficiency (%) in operating range	
(9)a	Power absorbed (KW).	
(9)b	Max Power absorbed (KW) in entire operating range	
(10)	Type of impeller (Radial /Mised/ Axial flow).	
(11)	Diameter of impeller (millimeter).	
(12)	Minimum submergence required, measured from bottom of floor level in mm.	
(13)a	Operating Range (Capacity)	
(13)b	Operating Range (TDH)	
(14)	Thrust bearing make and manufacture number.	
(15)	Life of bearing (hours).	
(16)	Type & Capacity of thrust bearing (Kg.).	
(17)	(i) Hydraulic thrust at normal head.	
	(ii) Hydraulic thrust at shut off.	
	(iii) Weight of rotating element (Kg.).	
	(iv) Total design thrust.	
	(a) Normal head.	
	(b) Shut off.	
	(v) (a) Total static load acting at motor floor.	
	(b) Total vertical dynamic load acting at motor floor.	
	(c) Total horizontal dynamic load acting at motor floor.	
	(vi) (a) Total static loads at floor.	
	(b) Total dynamic load vertical /horizontal acting at floor.	

ITEM -01 **PART-A**

Sr. No.	Description	Data (to be filled by the bidder)
(19)	Type and make of shaft bearings.	
(20)	Time required for accelerating the pump from Zero to full speed, with proposed driver (seconds).	
(21)	Whether pump is suitable for starting against a closed delivery valve (Yes/No).	
(22)	Weight of pump (Kg).	
(23)	Weight of largest single part to be handled at a time of erection/ dismantling of the pump.	
(24)	Capacity of E.O.T. Crane suggested considering all the loading factors/ water column, etc under extreme conditions.	
(25)	Materials for: Pumps.	
	Impeller	
	Casing	
	Bell mouth	
	Strainer	
	Pump shaft	
	Shaft bearings	
	Sole Plate	
	Column Pipe	
	Bolts, nuts and washers	
	Mechanical seal	
	Lifting chain	
(26)	Diameter of column Pipe	
(27)	Diameter of delivery pipe	

ITEM -01 **PART-A**

Sr. No.	Description	Data (to be filled by the bidder)
(28)	Other particulars.	
	shaft diameter	
	First critical speed (RPM)	
	Length of Delivery, m	
	Thickness of column pipe walls	
	Flange thickness for column pipes (mm)	
	Length of each a) Column pipe (meters) b) Lifting Chain	
	Bell mouth diameter and length (mm)	
	Cavitations free operation zone of the pump in percentage of rated discharge	
	Overall size of the pump (Length x width x Height) (Meter)	
	Impeller shaft diameter in mm	
	Combined shear stress Kg/cm²	
	Axial trust of the line shafts including hydraulic thrust and weight of shafts and all rotating parts.	
	Ultimate tensile strength of the shafts used	
(29)	Solid passage capacity (mm)	
(30)	Minimum vane opening (mm)	
31	Details of Internal protection features	
	Winding Temperature	
	Bearing temperature	
	Moisture sensor	
	Seal leakage chamber	

PART B

VERTICAL DRY PIT SUBMERSIBLE CENTRIFUGAL PUMP

Sr. No.	Description	Data (to be filled by the bidder)
(1)	Rated Discharge (Q)	
(2)	Rated head (Effective) (h)	
(3)	Water Horse Power (Qxh)/102	
(4)	Pump Efficiency at Rated Head & Discharge	
(5)	Input to pump	
(6)	Loss in shaft bearing	
(7)	Loss in thrust bearing	
(8)	Input to Bowl Assembly	
(9)	Head loss in column assy & discharge head (hc)	
(10)	Head loss at Bowl wntrance, strainer Bell mouth and Suction Casing (hs).	
(11)	Bowl assembly Head (H=h+hdc=hs) Pump Head.	
(12)	Bowl Efficiency (HQ/102 x Sr.No.3).	
	Recommended Motor Rating	
(13)	Motor Efficiency at Rated condition and steady state temperature.	
(14)	Input to Motor Sr.No./5/Sr.No.13	
(15)	Overall Efficiency of Pump Motor set (i) Sr.No. 3/ Sr.No. 14 (ii) Sr.No. 4 x Sr.No. 13	
(16)	Maximum NPSH required under operation at: Normal Water Level (meter) Lowest Water Level (meter)	
	Pump specific speed (as per IS 5120)	
	Pump suction specific speed	
(17)	Location of eye of lowest impeller from bottom floor level (Either firm or range should be stated)	

GUARANTEED PERFORMANCE AND TECHNICAL PARTICULARS

MOTORS

(Technical Data sheet to be submitted along with the tender by bidder)

ITEM - 02

Sr. No.	Description	Data (to be filled by the bidder)
(1)	Type	
(2)a	R.P.M. (Rated)	
(2)b	IP protection	
(3)	Percentage slip	
(4)	Details and make of bearings Bottom Top Thrust Type of Lubrication	
(5)	Capacity (H.P./KW.) 1) Output Power	
	2) Input Power	
(6)	Coupling details	
(7)	Dimensions Height (meters) Diameter (meters)	
(8)	Details of non-reverse rotation arrangement	
(9)	Starting current (Amps.)	
(10)	Full load current (Amps.)	
(11)	Operating voltage with tolerance limit % connection starting/ running.	
(12)	Locked Rotor current of the Motor expressed in % of full load current.	
(13)	Minimum voltage expressed in % of rated voltage at which motor shall be capable of developing, rated full load torque and the pull out torque to meet this requirement.	
(14)	Time for which motor shall be capable of operating satisfactorily at full load when the supply voltage is 80% of the Rated voltage.	
(15)	Continuous / intermittent	

ITEM -02 **MOTORS (continue)**

Sr. No.	Description	Data (to be filled by the bidder)
(16)	Break away torque	
(17)	Pull out torque	
(18)	Moment of Inertia	
(19)	Power factor (without capacitors) At full load At 75% load At 50% load	
(20)	Power factor (with capacitors connected) a) At full load b) At 75% load c) At 50% load	
(21)	Total Losses a) At full load b) At 75% load c) At 50% load d) At 10% overload	
(22)	Efficiency with capacitors a) At full load b) At 75% load c) At 50% load d) At 10% overload	
(23)	Characteristics curves (Enclose the characteristic curves) a) Efficiency b) Speed torque	
(24)	Class of insulation	
(25)	Temperature rise a) At full load b) At 75% load c) At 10% overload	
(26)	Starting time for electric Motors a) Under no load b) Under full load	
(27)	Over load capacity	
(28)	Short Circuit	
(29)	Gross Weight of motor (Kg)	

GUARANTEED PERFORMANCE AND TECHNICAL PARTICULARS

FLAP VALVE.

(Technical Data sheet to be submitted along with the tender by bidder)

ITEM - 03

Sr. No.	Description	Data (to be filled by the bidder)
(1)	Manufactured by	
(2)	Type	
(3)	Standard to which manufactured	
(4)	Class	
(5)	Rating	
(6)	Size	
(7)	No. of Doors	
(8)	Material of construction a) Body b) Disc c) Disc facing d) Seating in body	
(9)	Weight Kg.	
(10)	Working pressure bar	
(11)	Maximum working pressure Kg/cm²	
(12)	Test Pressure (a) Body (bars) (b) Seating (bars)	
(13)	Arrangement drawing No.	
(14)	Maximum permissible velocity as per manufacturer (m/sec.)	
(15)	Maximum velocity on site (m/sec.)	
(16)	Closing time required to close the valve completely (in seconds).	

GUARANTEED PERFORMANCE AND TECHNICAL PARTICULARS

SLUICE VALVE

(Technical Data sheet to be submitted along with the tender by bidder)

ITEM - 04

Sr. No.	Description	Data (to be filled by the bidder)
(1)	Make	
(2)	Type	
(3)	Size of valve (mm)	
(4)	Class	
(5)	Rating	
(6)	Standard to which manufactured	
(7)	Materials of construction	
	(a) Body, bonnet, wedge, stuffing box gland	
	(b) Spindle	
	(c) Body seat & Disc seat	
	(d) Packing	
	(e) fasner	
	f)Head stock	
	g)hand wheel	
	h) Extended spindle	
(8)	Working pressure (Kg/cm²)	
(9)	Test Pressure (a) Body (Kg/cm²)	

GUARANTEED PERFORMANCE AND TECHNICAL PARTICULARS

AIR RELEASE VALVE

(Technical Data sheet to be submitted along with the tender by bidder)

ITEM -05

Sr. No.	Description	Data (to be filled by the bidder)
(1)	Make of air valve	
(2)	Type of air valve	
(3)	Size of air valve (mm)	
(4)	Class	
(5)	Rating	
(6)	Standard to which manufactured	
(7)	Materials of construction	
	(a) Float chamber, bowl, cove	
	(b) Small orifice float	
	(c) Large orifice float	
	(d) Orifices, guide	
	(e) Sealing rings	
(8)	Working pressure (Kg/cm²)	
(9)	Test Pressure (a) Body (Kg/cm²)	

GUARANTEED PERFORMANCE AND TECHNICAL PARTICULARS

SECONDARY GRATINGS

(Technical Data sheet to be submitted along with the tender by bidder)

Item- 06

Sl.No.	Description	**Data (to be filled by the bidder)**
	SECONDARY GRATINGS	
(1)	Manufacturer	
(2)	Manufacturing standard	
(3)	Numbers offered	
(4)	Materials of screen	
(5)	Overall dimensions, mm x mm.	
(6)	Size of flat, mm X mm	
(7)	Clear space between flats, mm	
(8)	Total effective area of screen	
	At lowest water level, m^2	
	At highest water level, m^2	
(9)	Water velocity through screen	
	At lowest water level, m/sec.	
	At highest water level, m/sec.	
(10)	Pressure drop across 100% clean screen	
	At lowest water level, MWC	
	At highest water level, MWC	
(11)	Pressure drop across 50% clean screen	
	At lowest water level, MWC	
	At highest water level, MWC	
(12)	Frame angle size, mm x mm x mm	
(13)	Section and length of guide channels, mm	
(14)	Single piece to be handled by Monorail crane.	

FORM 1

(To be submitted in plain paper/letter head as per specimen, duly filled up and uploaded with digital signature which shall be treated as the self declaration of the bidder)

APPLICATION FOR e-EOI

To

The Executive Engineer
Mechanical & Electrical Division, Midnapore,
Khasjungle, P.O-Abas, District- Paschim Medinipur.

Sub: - RESPONSE TO – EOI

Dear Sir,

We, the undersigned, offer the following information in response to the Expression of Interest sought by you vide your EOI No. ……. Dated ….

1. We are duly authorized to represent and act on behalf of _____ _____(hereinafter the "respondent")
2. We have examined and have no reservations to the EOI Document including Addenda No(s) _____
3. I/We understand that
   a) This EOI is intended for the work "Supply, installation, testing and commissioning including trial run of six (6) nos. dry installed non clog centrifugal submersible (flood proof) pump of capacity 20 Cusec (2040 M3/Hr) with allied electromechanical work, Piping, valves, illumination etc complete at the Ranichak pumping station, P.S: Daspur, Dist. Paschim Medinipur." by Irrigation and waterways Department, Govt. of West Bengal.
   b) Irrigation and waterways Department, Govt. of West Bengal may float a separate Tender (based on their requirement), with all conditions like Eligibility Criteria, and our participation in this EOI doesn't guarantee any qualification to that tender.
4. We are attaching with this letter, the photo-copies of all documents sought in this EOI.
5. We shall assist Irrigation and waterways Department, Govt. of West Bengal or its authorized representatives to obtain further clarification from us, if needed.

a) Executive Engineer of Mechanical & Electrical Division, Midnapore or his/her authorized representative, may contact the following nodal persons for further information on any aspects of the Response :

Sl No.	Contact Name	Address	Telephone	E-mail

6. This application is made in the full understanding that:
   a) Department Reserves the right to reject or accept any or all applications, cancel the EOI and subsequent bidding process without any obligations to inform the respondent about the grounds of same .
   b) We confirm that we are interested in participating in the selection process through this EOI.
7. We certify that our turnover and net worth in the last three years is as under :

Financial Year	Turn over	Net worth

8. The undersigned declare that the statements made ad the information provided in the duly completed application are complete, true, and correct in every detail. We also understand that in the event of any information furnished by us being found later on to be incorrect or any material information having been suppressed , may delete our name from the list of potential bidders. We further understand that Irrigation and waterways Department, Govt. of West Bengal will give first preference to the applicants considered relevant for the purpose.

Yours sincerely,

(sign)

Name

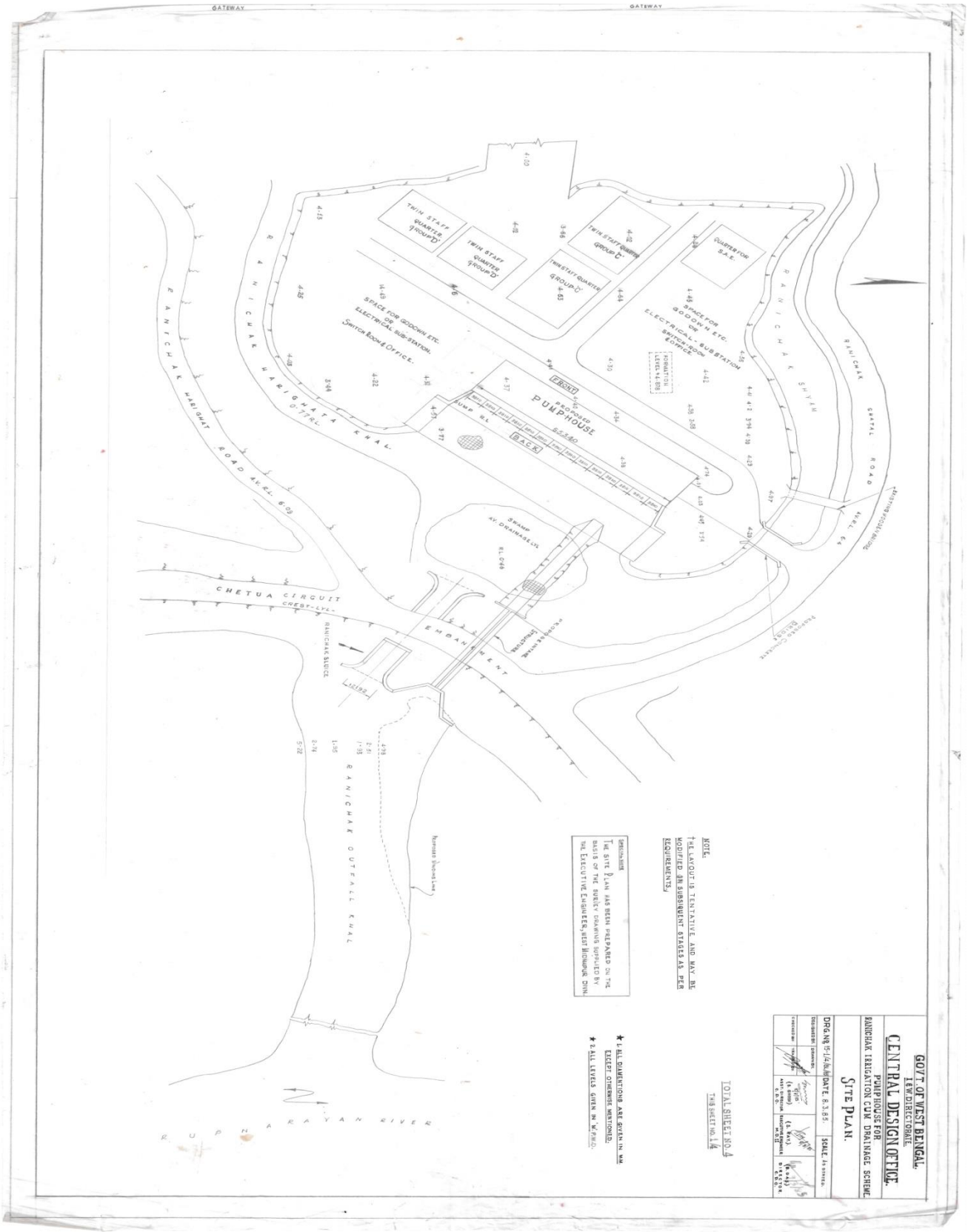
In the Capacity of

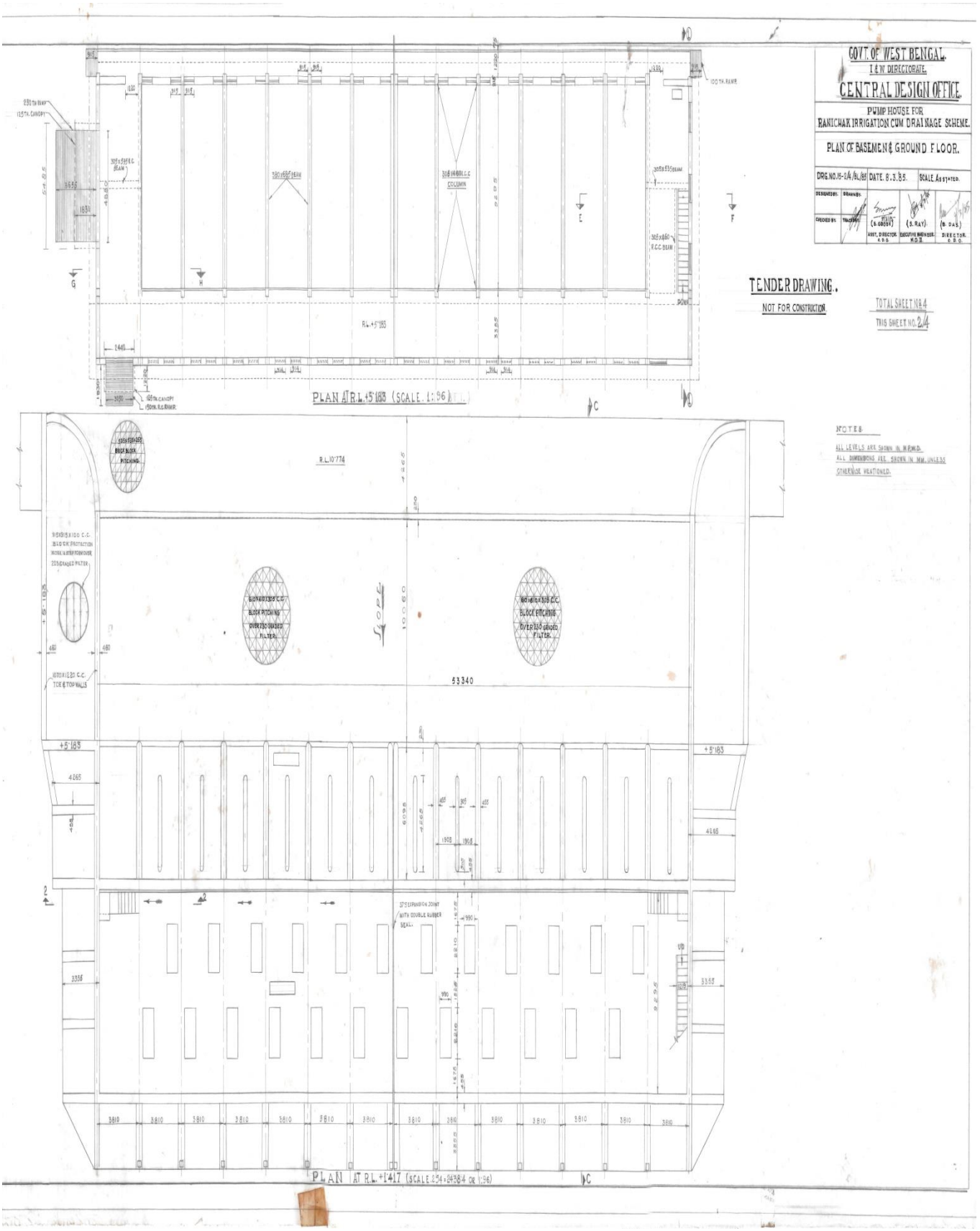
Duly authorized to sign

the response for and on behalf of

SECTION-V

Drawing of Civil structure.




GOVT. OF WEST BENGAL.
I & W DIRECTORATE.
CENTRAL DESIGN OFFICE.
PUMP HOUSE FOR
RANICHAK IRRIGATION CUM DRAINAGE SCHEME.
PLAN OF BASEMENT & GROUND FLOOR.
DRG. NO. I/5-2/4/BL/85
DATE. 8.3.85.
SCALE. As STATED.
DESIGNED BY.
DRAWN BY.
CHECKED BY.
TRACED BY.
(S. GHOSH)
ASST. DIRECTOR C.D.O.
(S. RAY)
EXECUTIVE ENGINEER. M.D.II.
(B. DAS)
DIRECTOR. C.D.O.
TENDER DRAWING.
NOT FOR CONSTRUCTION.
TOTAL SHEET NO. 4
THIS SHEET NO. 2/4
NOTES.
ALL LEVELS ARE SHOWN IN M.P.W.D.
ALL DIMENSIONS ARE SHOWN IN MM. UNLESS OTHERWISE MENTIONED.
PLAN AT R.L. +5'183 (SCALE 1:96)
PLAN AT R.L. +1'417 (SCALE 0.54+0.4384 OR 1:96)
SLOPE
53340
R.L. 10'774

GOVT. OF WEST BENGAL
I & W. DIRECTORATE.
CENTRAL DESIGN OFF

PUMP HOUSE FOR
RANICHAR IRRIGATION CUM DRAINAGE SC

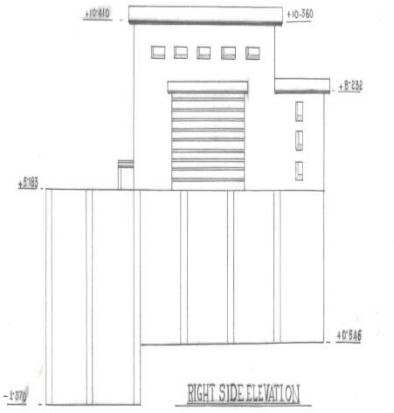
FRONT, BACK & SIDE ELEVATIO

DRG.NO.13-3/4/84/85 DATE. 8.3.85 SCALE. A

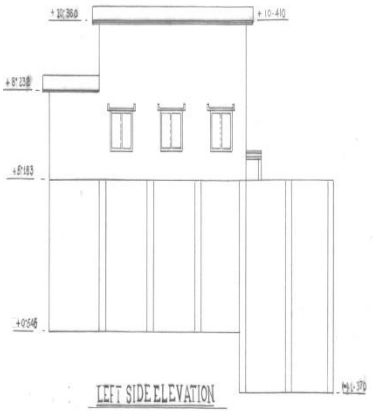
DESIGNED BY	DRAWN BY		
CHECKED BY	TRACED BY	ASST. DIRECTOR (S.K.GHOSH)	EXECUTIVE ENGINEER (S.RAY)

TENDER DRAWING
NOT FOR CONSTRUCTION

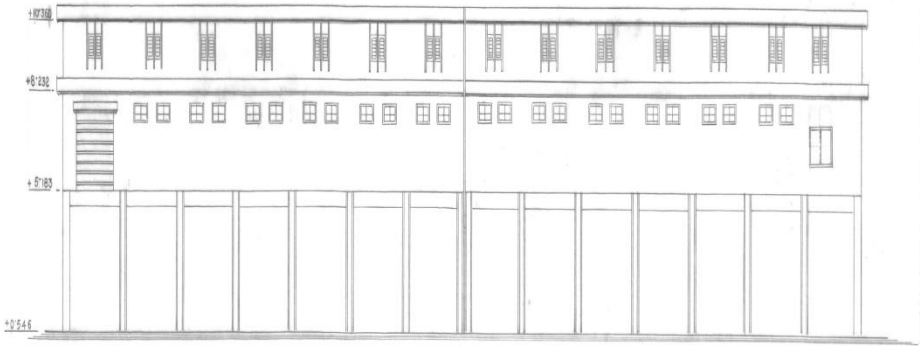
TOTAL SHEETS 4
THIS SHEET NO. 3/4



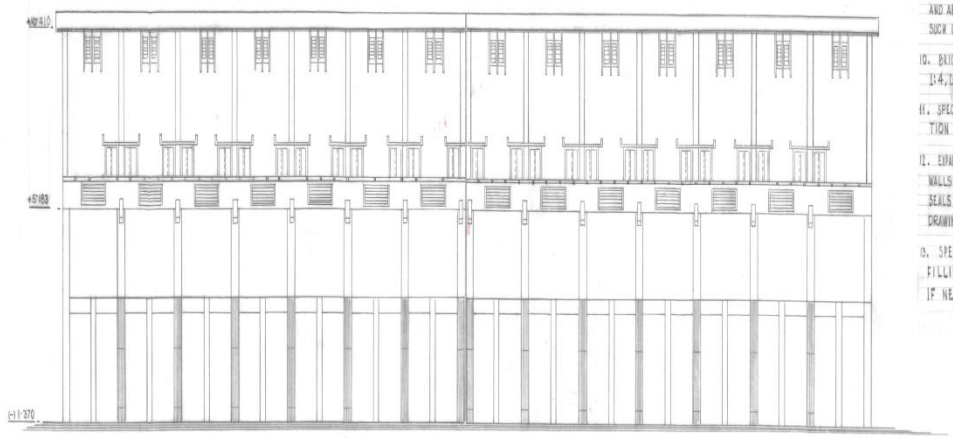
RIGHT SIDE ELEVATION



LEFT SIDE ELEVATION



FRONT ELEVATION



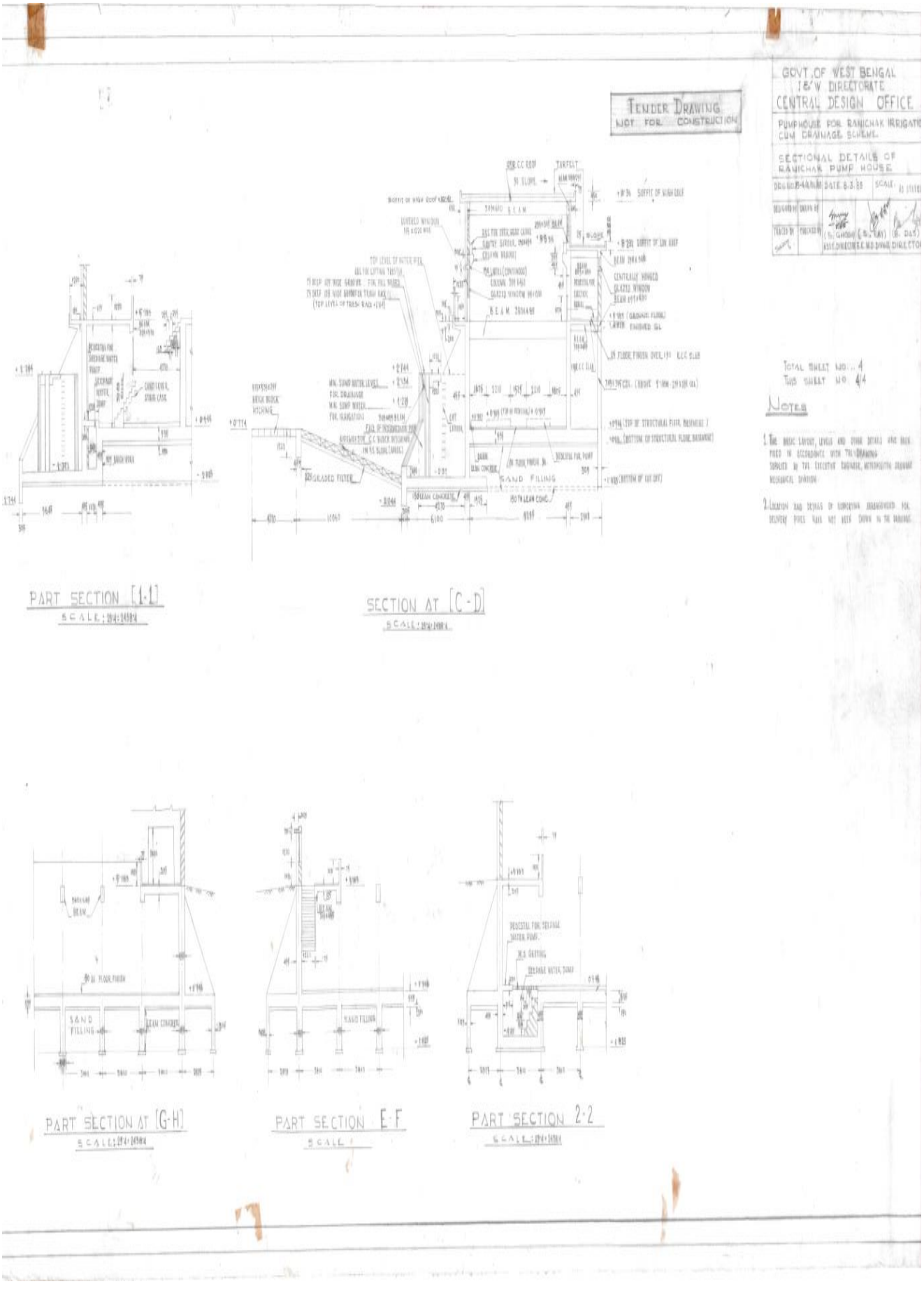
BACK SIDE ELEVATION

SPECIAL NOTE

TENDER DRAWINGS HAVE BEEN PREPARED WITHOUT THE FOUNDATION SOIL REPORT. NECESSARY MODIFICATIONS TO BE DONE IN THE CONSTRUCTION DRAWINGS ON THE BASIS OF SOIL INVESTIGATION REPORT MADE AVAILABLE BY THE EXECUTIVE ENGINEER WEST MIDNAPUR DIVISION.

GENERAL NOTES

1. CEMENT CONCRETE IN R.C.C. WORK SHALL BE OF GRADE M15 AND SHALL CONFORM TO I.S.456 (LATEST).
2. TOR-STEEL REINFORCEMENTS GRADE I AND TESTED SHALL BE USED CONFOMING TO I.S. 1139-1966.
3. ALL DIMENSIONS ARE IN M.M. UNLESS OTHERWISE SHOWN.
4. ALL LEVELS ARE IN G.T.S.M. UNLESS OTHERWISE STATED.
5. COVER TO REINFORCEMENTS SHALL CONFORM TO RELEVANT I.S. CODES.
6. IF FULL LENGTH OF BARS ARE NOT AVAILABLE JOINTS IN BAR TO BE PROVIDED BUT THE JOINTS SHALL BE SUITABLY STAGGARED AND DECIDED BY ENGINEER-IN-CHARGE SUCH THAT NO JOINTS FALL AT THE SECTION OF MAXIMUM STRESS.
7. PRECAST MORTAR BLOCKS OF STRENGTH NOT LESS THAN THAT OF THE CEMENT CONCRETE SHALL BE USED TO ENSURE THE REQUISITE CLEAR COVER FOR REINFORCEMENT.
8. 12 MM OR HIGHER DIAMETER STEEL CHAIRS SHALL BE USED TO MAINTAIN THE REQUIRED DISTANCE BETWEEN THE TOP AND BOTTOM LAYER OF STEEL.
9. CEMENT SAND PLASTER BELOW R.L. 5'18 M SHALL BE DONE IN 1:4 PROPORTION WITH WATER PROOFING COMPOUND OF APPROVED TYPE AND ABOVE R.L. 5'18 M SHALL BE DONE IN 1:6 PROPORTION WITHOUT ANY SUCH COMPOUND UNLESS MENTIONED OTHERWISE.
10. BRICK WORK SHALL BE DONE WITH CEMENT SAND MORTAR IN PROPORTION 1:4 UNLESS STATED OTHERWISE.
11. SPECIAL CARE SHALL BE TAKEN REGARDING COMPACTION OF THE FOUNDATION SOIL FOR THE FILLING ZONES TO ACHIEVE PROPER BEARING CAPACITY
12. EXPANSION JOINTS IN THE FOUNDATION RAFT AND IN THE VERTICAL WALLS UP TO R.L. 5'18 M SHALL BE PROVIDED WITH DOUBLE RUBBER SEALS THE DETAILS OF WHICH WILL BE SUPPLIED WITH THE CONSTRUCTION DRAWING.
13. SPECIAL CARE SHALL BE TAKEN IN RESPECT OF SAND FILLING IN FOUNDATION TO ATTAIN PROPER BEARING CAPACITY IF NECESSARY BY SPRAYING WATER TO SATURATION.


TENDER DRAWING
NOT FOR CONSTRUCTION
GOVT. OF WEST BENGAL
I & W DIRECTORATE
CENTRAL DESIGN OFFICE
PUMPHOUSE FOR RAMICHAK IRRIGATION CUM DRAINAGE SCHEME.
SECTIONAL DETAILS OF RAMICHAK PUMP HOUSE
TOTAL SHEET NO... 4
THIS SHEET NO. 4/4
NOTES
1. THE BASIC LAYOUT, LEVELS AND OTHER DETAILS ARE MADE FIXED IN ACCORDANCE WITH THE DRAWINGS SUPPLIED BY THE EXECUTIVE ENGINEER, METROPOLITAN DRAINAGE MECHANICAL DIVISION
2. LOCATION AND DETAILS OF SUBSIDIARY ARRANGEMENTS FOR DELIVERY PIPES HAVE NOT BEEN SHOWN IN THE DRAWINGS
PART SECTION [1-1]
SCALE : 3/4"=1'-0"
SECTION AT [C-D]
SCALE : 3/4"=1'-0"
PART SECTION AT [G-H]
SCALE : 3/4"=1'-0"
PART SECTION E-F
SCALE 1
PART SECTION 2-2
SCALE : 3/4"=1'-0"

Enclo: BOQ

Sd/-
Executive Engineer
Mechanical & Electrical Division, Midnapore,
Khasjungle, P.O-Abas, District- Paschim Medinipur.

Memo No: 62/4/10E-1 **Date: 10.02.2025**

Copy forwarded for information and taking necessary action please for wide publication to: -

1. The Chief Engineer, Mech & Elect, I&W Directorate, 2nd Floor, Jalasampad Bhawan, Govt of West Bengal.
2. The Superintending Engineer, South-West Mechanical & Electrical Circle, DVC New Colony, Durgapur-2, Paschim Bardhaman, Pin- 713202.
3. The Executive Engineer, West Midnapore Division, Sekhpura Irrigation Colony, I&W Dte.
4. Office Notice board.

Sd/-
Executive Engineer
Mechanical & Electrical Division, Midnapore,
Khasjungle, P.O-Abas, District- Paschim Medinipur.

Enclosure to e-E.O.I. No. WBIW/EE/MEDM/e-E.O.I.-03 /2024-25

Quote Bid Price in this BOQ

Supply, installation, testing and commissioning including trial run of six (6) nos. dry installed non clog centrifugal submersible (flood proof) pump of capacity 20 Cusec (2040 M3/Hr) with allied electromechanical work, Piping, valves, illumination etc complete at the Ranichak pumping station, P.S: Daspur, Dist. Paschim Medinipur".

Sl. No.	Description of item	Quantity	Unit	Description of work proposed by the bidder (for budget quotes)	Unit (for budget quotes)	Rate of GST	Rate (Rs., Incl of all taxes) (budget quotes)	Total Amount (Rs). (budget quotes)
1	Supply, delivery, storing at site, installation, testing and commissioning including trial run of vertical non clog dry installed submersible (flood proof) pump coupled with motor alongwith SITC of suction Bowl, Puddle pipe , Bend and concrete work (for padestal) related with installation work as per following specification and as per direction of EIC. Pump should be suitable for pumping solid bearing liquid such as wastewater, industrial discharge, storm or canal drainage etc. in both dry and submerged condition. Rated discharge - 2040 M^3/Hr (each) TDH (Range)= 3.5 to 8 MWC AOR (Capacity)= 60% -140% TDH (rated) = 6 MWC Motor: 75 KW, 3ph squirrel cage induction motor, IE3 type as per Standard IEC 6003450Hz, 415V, IP-68 protection, S-1 duty, insulation class- F, temp. rise class-B, motor will be oil cooled or ethylene glycol water mixture through cooling jacket. Motor rpm </= 750 Motor efficiency - 92% (minimum) Pump efficiency -minimum 80% (at Duty point) Grease lubricated ball and roller type bearing, life- 100000 hr. Casing- FG 260, Shaft- SS 420 Impeller- Duplex stainless steel / SS 316L Solid handling size- 50mm (minimum), Sp. Gr. Of liquid to be handled - 1.04 (approx.), Along with submersible cable of 50 m length. (Acceptable Make: KBL, KSB, GRUNDFOS, SULZER, Wilo Mather and Platt, XYLEM (FLYGT), WPIL or any approved Make)	6	Each					

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2	Electrically operated monorail crane with supporting MS structure for trashrack lifting lowering. Design, supply, delivery, storing at site, installation, testing & commissioning of 5 M.T. capacity straight monorail placed for travel length of 54 mtr.(approx).The monorails shall be supported on goal post steel structure and top of goal post structure shall be covered by suitable sheet metal to protect the hoist from direct sun and rain. Both hoisting and LT motion electrical and to be operated by 1nos 5MT capacity wire rope type electrical hoist with electrical trolley and lift 9 mtr. The crane shall be suitable for outdoor operation of M-5 (Class II) duty, indoor operation as per IS: 807, IS: 3177or equivalent at its latest revision. This work also includes design, manufacture supply & fixing of 1sets of DSL arrengement and isolating switch for feeding power to the crane along longitudinal travel comprising of 4 line PVC shrouded type GI conductor with supporting brackets and a set of current collector for each hoist. The crane should be marked with safe working load (SWL). The whole work must be completed in all respect including painting as per direction of E.I.C.	1	set					
3	Design, supply, delivery, storing at site, installation, testing & commissioning of 5 MT capacity MS lifting beam as per IS IS 13591 (1992) for automatic engagement and disengagement of trash rack with all necessary accessaries including painting and as per direction.	1	set					
4	Fabrication, supply, storing at site, installation & commissioning of trashrack/ bar screen/ grating conformong to relevent IS codes (IS:11388, IS:800, IS:2062) fabricated with structural steel sections such as ms flat, channels, angles etc. including cost of materials, machinary, labour, cutting, aliging, welding as per approved drawing including transportation charges as per direction.	31015.00	Kg	ITEM RATE NOT TO BE QUOTED				

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5	Supply, delivery, storing at site, installation, testing & commissioning of Electromagnetic Full Bore Type Flow Meter comprising of flow sensor (i.e. flow tube), remote mounted flow transmitter, flow indicator (LED display of suitable size) and integrator and any other item required for completing the flow measuring system in single unit.Acceptable Makes Krohne / Siemens/ Endress Hauser/ ABB/ equivalent	6	Each					
6	Cost iron double flanged, non rising type, manually operated sluice valves generally conforming to IS 14846 : 2000, IS 1367. Nomoinal Diameter in mm =500 Material: Body, bonnet, wedge, stuffing box gland: Cast iron (IS:210, FG 260) Spindle: Stainless steel (AISI410) Body seat and disc seat: Stainless steel (SS 304) Packing: Greasy jute packing Fasteners: IS:1367, Class 4/ 4.6 Extended spindle: Mild steel (BS: 970, EN8) Head stock: Cast iron (IS: 210, FG 260) Hand wheel: Cast iron (IS: 210, FG 260) (Make: IVC/ Fouress/ Audco/ Sigma Flow/ Kirloskar / Fouress / Durga / AVK/ Venus/Kalpana Valves/ equivalent)	6	Each					
7	Cost iron double flanged, non rising type, manually operated sluice valves generally conforming to IS 14846 : 2000, IS 1367. Nomoinal Diameter in mm =600 Material: Body, bonnet, wedge, stuffing box gland: Cast iron (IS:210, FG 260) Spindle: Stainless steel (AISI410) Body seat and disc seat: Stainless steel (SS 304) Packing: Greasy jute packing Fasteners: IS:1367, Class 4/ 4.6 Extended spindle: Mild steel (BS: 970, EN8) Head stock: Cast iron (IS: 210, FG 260) Hand wheel: Cast iron (IS: 210, FG 260) (Make: IVC/ Fouress/ Audco/ Sigma Flow/ Kirloskar / Fouress / Durga / AVK/ Venus/Kalpana Valves/ equivalent)	6	Each					

Sl. No.	Description of item	Quantity	Unit	Description of work proposed by the bidder (for budget quotes)	Unit (for budget quotes)	Rate of GST	Rate (Rs., Incl of all taxes) (budget quotes)	Total Amount (Rs). (budget quotes)
8	Supply, delivery, storing at site, installation, testing & commissioning of double acting automatic air relief valve of nominal size 100mm as per IS 14845 with isolating mitre bevel geared sluice valve as per IS 14846 complete of material body & top cover- CI, IS 210 FG 260, internal fittings- bronze IS 318 LTB 2, hardware in contact with water- SS 304 and as per following specification. Working Pressure Body/seat - 7 / 5 kg/cm² Design Pressure Body/seat - 18 / 12 kg/cm² Testing as per IS 14846	4	set					
9	Core Cutting of existing concrete wall with help of necessary Tools and Tackles & Labours. for Changing of Suction pipe Size:- 500 mm to 600 mm, Cutting Dia- 900mm X 500 mm thick.	12	Each					
10	Dismantling or removing existing Suction Pipe , Bend and Bell Mounth including carrying. Loading, unloading and stacking and removal of material from work site to the departmental store or another site as directed excluding excavation and refilling including gas cutting (for Changing of Suction pipe Size:- 500 mm to 600 mm) as per specification and direction of Engineer-in-charge including hire charges of suitable capacity hydra.	6	Job					
11	Dismantling or removing existing pipeline , jointing materials, including carrying. Loading, unloading and stacking and removal of material from work site to the departmental store or another site as directed excluding excavation and refilling including gas cutting as per specification and direction of Engineer-in-charge including hire charges of suitable capacity hydra and crane. a) Outer Dia. of pipe : 1220 mm, Thickness -10mm	150	m					

Sl. No.	Description of item	Quantity	Unit	Description of work proposed by the bidder (for budget quotes)	Unit (for budget quotes)	Rate of GST	Rate (Rs., Incl of all taxes) (budget quotes)	Total Amount (Rs). (budget quotes)
12	Manufacturing, , supplying installation of spirally welded/ERW/ SAW/fabricated MS pipe (commercial quality) including procurement of plates, gas cutting to required size, welding, assembling in suitable length to form pipes welded on automatic welding machine and forming V edge on both ends of pipe including freight, unloading transport to store/site, unloading, stacking etc. complete as per IS-3689 and IS 5504 as applicable as per specifications (No negative tolerance in thickness is permissible). a) Outer Dia. of pipe : 1220 mm, Thickness -10mm	150	m					
13	Supplying and fabricating MS plate flange, properly ribbed one face machined, including drilling holes as per standard table, conforming to IS:1538 (Table-IV &VI) cutting & fixing are same with M.S. Pipe by electric arc welding, using standard electrodes as per IS specification and direction of E.I.C. shall approve the electrodes for arc welding before use. a) Outer Dia. of pipe : 1220 mm, Thickness -10mm	56	Nos					
14	Lowering, laying in position to correct line and level MS pipe line with flange joint with necessary gasket with / with out any cut coating on pedestal or chairs upon prepared formation for interconnection with newly laid pipeline. The rate to include loading, unloading, hoisting, marginal cutting wherever required, assembling, tack welding and transportation up to 500M etc. complete as specified including hire charges of suitable capacity hydra and crane. a) Outer Dia. of pipe : 1220 mm, Thickness -10mm	150	m					

Sl. No.	Description of item	Quantity	Unit	Description of work proposed by the bidder (for budget quotes)	Unit (for budget quotes)	Rate of GST	Rate (Rs., Incl of all taxes) (budget quotes)	Total Amount (Rs). (budget quotes)
15	Supply, delivery, storing at site, installation, testing & commissioning of 1200 mm. dia. C.I. Single flange, swing type, double hung flap valve with pressure rating as per specific standard (Body, flap Cast iron, IS:210, FG:260, Body & disc set: stainless steel, AISI 304, Hinge pin: Stainless steel AISI 410), flange standard IS 1538, leakage as per IS 13349 class 3 and as per specificaton - Rated flow - 2550 M^3/Hr, Velocity at rated flow - 2.5 m/sec Design Pressure - 20 MWC Testing as per IS 14858 Make: any reputed make approved by Engineer in charge	2	Each					
16	Comprehensive maintenance contract of Submersible Pump Motor set for Five (05) calendar year after completion of one (01) year of defect liability period. Pump Motor set along with its allied system shall be maintained as per maintenance manual provided by the manufacturer.							
16.1	i) 1st Year	1	Per Job					
16.2	ii) 2 nd year	1	Per Job					
16.3	iii) 3rd year	1	Per Job					
16.4	iv) 4th year	1	Per Job					
16.5	v) 5th year	1	Per Job					
17	Construction of cross bandth of overall length of 40 m, height 3 m of required trapizoidal section by dumping of cement polythene bag(50 Kg) filled & sewed with all kinds of earth (wet or dry), sand or agregates alongwith dewatering by suitable pump during the replacement work of suction pipe/valve of pump house. and dismantling & removing the cross bandth after completion of pump house work up to the satisfaction of EIC. Earth/ sand filled poly bag to be stacked at the location within 150 meter of sump pond bank or as desired by EIC.	1	Per Job					

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18	Surface cleaning of metal surfaces by chemical cleaners and then by hand with emary paper, wire brush and power tool cleaners and removing dust and preparation o f surface including cost of all materials, labour, machinery, scaffolding, etc., complete.	2000.00	sq.m.	ITEM RATE NOT TO BE QUOTED				
19	Painting of embedded parts, all types of gates, stoplogs and barscreen/gratings etc on prepared surfaces with one coat of inorganic zinc silicate primer (airless s p r a y preferred)70+/ - 5 micron and two super coats with a total thickness of 300 microns (each 150+/- 5) of solventless coaltar epoxy paint each coat 150 microns (total 300 microns) including cost of all materials, labour, scaffolding etc., complete with all leads and all lifts.	2000.00	Sq.m	ITEM RATE NOT TO BE QUOTED				
20	Dismantling steel tubular/Rail/Strut embedded in CC foundationincl. excavation, filling of holes, restoring surface, loading at siteand delivering, unloading, sorting, stacking properly at any placeas per direction upto a lead of 1.6 km	7.00	Per pole	ITEM RATE NOT TO BE QUOTED				
21	Engagement of Electrical personnel for Dismantling all the existing wiring & related electrical accessories inside of the office & keep the same in a suitable position as per deirection of EIC.			ITEM RATE NOT TO BE QUOTED				
21.1	a) Electrician (Including CP@10%)	4.00	Nos					
21.2	b) Helper for Electrician (Including CP@10%)	8.00	Nos					
22	SUPPLYING OF FOLLOWING XLPE INSULATED ALUMINUM CONDUCTOR ARMORED CABLES OF 1.1KV GRADE AS PER IS 7098 (PART 1) 1988 WITH UP TO DATE AMENDMENTS.			ITEM RATE NOT TO BE QUOTED				
22.1	4 core 50 sq.mm	15.00	RM					
22.2	4 core 25 sq.mm	73.00	RM					
22.3	4 core 16 sq.mm	372.00	RM					
22.4	2 core 16 sq.mm	136.00	RM					
23	Laying of cable from 3/3½ core 35 sqmm to 50 sqmm on wall/surface incl. S & F MS saddles with earthing attachment in 2 x 10 SWG GI (Hot Dip) Wire, making holes etc. as necy., mending good damages and painting.	15.00	RM	ITEM RATE NOT TO BE QUOTED				

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24	Laying of cable upto 3/4 core 25 sqmm on wall/surface incl. S & F MS saddles with earthing attachment in 10 SWG GI (Hot Dip) Wire, making holes etc. as necy. mending good damages and painting	40	RM	ITEM RATE NOT TO BE QUOTED				
25	Laying of cable upto 2 core 25 sqmm on wall/surface incl. S & F MS saddles with earthing attachment in 10 SWG GI (Hot Dip) Wire, making holes etc. as necy. mending good damages and painting	75.00	RM	ITEM RATE NOT TO BE QUOTED				
26	Laying of one No. cable upto 35 sqmm in underground trench 460 mm wide x 760 mm average depth, with brick protection on the top of the cable with 8 (eight) Nos. bricks per metre, including filling the space between the brick & cable and also the trenchwith shifted soil, leveling up and restoring surface duly rammed	466	RM	ITEM RATE NOT TO BE QUOTED				
27	Supplying and fixing compression type gland complete with brass gland, brass ring & rubber ring for dust & moisture-proof entry of XLPE/PVC armoured cables.			ITEM RATE NOT TO BE QUOTED				
27.1	4 core 50 sq.mm	6.00	Each					
27.2	4 core 25 sq.mm	6.00	Each					
27.3	4 core 16 sq.mm	25.00	Each					
27.4	2 core 16 sq.mm	16.00	Each					
28	Finishing the end of following XLPE/PVC armoured cables by crimping method incl. supplying and fixing solderless socket (Dowels make), tapes, anticorrosive paste & jointing materials for 4 core 50 sqmm cable			ITEM RATE NOT TO BE QUOTED				
28.1	4 core 50 sq.mm	6.00	Set					
28.2	4 core 25 sq.mm	6.00	Set					
28.3	4 core 16 sq.mm	25.00	Set					
28.4	2 core 16 sq.mm	16.00	Set					
29	Supplying and fixing Sheet steel Main Switches on flat iron frame on wall 60/ 63A, Havells,415 v.TPN with fuse on L & N	1.00	Each	ITEM RATE NOT TO BE QUOTED				

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30	Supplying and fixing MCB SS enclosure with IP-20/30 protection, powder coated provision for two/four pole MCB, concealed in wall after cutting the wall & mending good the damages to original finish incl. painting, connection & provision for earthing attachment. 4+Way	1.00	Each	ITEM RATE NOT TO BE QUOTED				
31	Distribution wiring in 1.1 KV single core stranded 'FR' PVC insulated & unsheathed copper wire (Brand approved by EIC) in 20mm size PVC rigid conduit 'FR' (Precision make) incl. necy. fittings as required			ITEM RATE NOT TO BE QUOTED				
31.1	2x 36/0.3 (2.5 sqmm) + 1 x 22/0.3 (1.5 sqmm) ECC	100.00	RM					
31.2	2x 56/0.3 (4 sqmm) + 1 x 36/0.3 (2.5 sqmm) ECC	20.00	RM					
32	Distribution wiring in 1.1 KV single core stranded 'FR' PVC insulated & unsheathed copper wire (Brand approved by EIC) in 25mm size PVC rigid conduit 'FR' (Precision make) incl. necy. fittings as required			ITEM RATE NOT TO BE QUOTED				
32.1	4x 84/0.3 (6 sqmm) + 2 x 56/0.3 (4 sqmm) ECC	70.00	RM					
33	Distribution wiring in 2 x 22/0.3 (1.5 sqmm) single core stranded 'FR' PVC insulated & unsheathed copper wire (Brand approved by EIC) in 20mm size PVC rigid conduit 'FR' (Precision make), with 1x22/0.3 (1.5 sqmm) single core stranded 'FR' PVC insulated & unsheathed copper wire for ECC, to light/fan/call bell points with Piano Key type switch fixed on MS CRC sheet metal (16 SWG) switch board cum JB on wall complete with 2 no. suitable size "Ph & N" copper bar incl. bakelite/Perspex (wall matching color) top cover 3 mm thick and incl. 175mmx100mmx65mm inspection box, making earthing attachment, painting the MS box and mending good the damages to original finish. Average run 6 meter	10.00	point	ITEM RATE NOT TO BE QUOTED				

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34	Supplying & fixing sheet metal (16 SWG) Iron Clad Busbar chambers on angle iron frame on wall, incl. earthing attachment and painting as required – (As per Drawing no. 470 of PWD Specification Book – May 1991) 4 bar,415 V200 A Dimension of Al. bars [85mm long] 415 v, 200A 4x50x5 mm. Dimension of Sheet Metal Box 500x150 mm	1.50	Rate / Mt. of complete chamber	ITEM RATE NOT TO BE QUOTED				
35	Supply, fixing, testing & commissioning wall/floor mounted LT panel primer coated with powder coated paint &provided with required gasket for dust/vermin proof with degree of protection IP42 suitable for 415Volt 3phase, 50 Hz, 4 wire system fabricated out of CRCA sheet up to 2 mm thick (1.6mm for doors) duly compartmentalized for incomer, bus section, outgoings, cable alleys & CT, PT Ampere , Volt , selector switches, frequency , phase indicating lamp, Energy complete including cost of busbar supports, detachable cable gland plates,2 earthing terminals, internal wiring &fixing of separately supplied MCBs, MCCBs, ACB, panel mounted changeover switch/SFUs, etc. as required but excluding cost of busbar strips, Ampere , Volt , selector switch as per approved design & specification	47	kg	ITEM RATE NOT TO BE QUOTED				
36	Supply and fixing of LT panel accessories of approved make in existing LT panel including connections etc. as required as per specification.			ITEM RATE NOT TO BE QUOTED				
36.1	Supply of 22.5 mm dia LED indicating lamps	3	Each	ITEM RATE NOT TO BE QUOTED				
36.2	Supplying and fixing 415 V Four Pole MCCB ofBreaking capacity 25kA/35kA with fixed thermaland fixed magnetic / adjustable thermal and fixedmagnetic setting in existing DBs / enclosure andnecessary connection. 100 A FP Legrand	1	Each					
37	Supplying and fixing 240/415V MCB of Breaking capacity 10kA & C characteristics on din rail of existing DBs and necessary connection							
37.1	6-32A, FP,	3	NOS					
37.2	6-32A, DP,	3	NOS					

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37.3	63A, FP,	1	NOS					
37.4	Supply of 240VAC analog time switch for ON-OFF control of street light	1	Each					
37.5	Supply of 3 pole power contactor type ML 2, 40A current rating	1	Each					
38	Supplying swaged and welded steel tubular pole of following specifications as per IS 2317: 1980)			ITEM RATE NOT TO BE QUOTED				
38.1	9m length, 108Kg, 410-SP-27 (make-calcutta pole)	10	Each					
38.2	Supply of CI base plate for overhead MS pole	10	Each					
38.3	Supply of CI pole CAP for overhead MS pole	10	Each					
39	Erection of Single Steel tubular pole of length as given below with/without sole plate & Cap etc. in CC foundation (Proportion and dimension indicated below), having 600x600x150 mm thick CC (4:2:1) base block below sole plate/pole with hard jhama metal including CC (6:3:1) muffing 0.30 mts. dia and 0.30 mts. above ground level including 3 mm thick neat cemented finish and GI earth bolt after making drilled holes etc. on pole & carriage of pole upto 1.6 Km from Store to work-site including filling up the excavated earth pit with shifted soil and ramming properly			ITEM RATE NOT TO BE QUOTED				
39.1	(a) Upto 9.0 mtr. Size 0.6x0.6x1.70 mts	10	Set					
40	Extra on items 1& 2 above, for providing CC (6:3:1) base block (around the pole) dimension 0.60x0.60x0.76 mt. above ground level, neatly cemented finish (3 mm thick), at the base pole (in lieu of CC muffing) incl. drilled hole in pole suitable for alkathene/polythene pipe entry, for street light wiring, without Loop Box	10	Item	ITEM RATE NOT TO BE QUOTED				

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41	Supplying and Fixing GI water proof looping cable box having hinged GI Top Cover having 4 mm thick with rubber gasket lining, railway type mechanical locking arrangement, earthing terminal with lug etc. of the following sizes as indicated below, Comprising of one 250 V, 15 A Kit-Kat fuse unit, one NL on porcelain insulator etc. and housing the same in pole muffing incl. addition and alteration to the existing CC muffing (6:3:1) after dismantling the damaged looping cable box etc. where necy. incl. painting.(250x250x100mm)	16	Each	ITEM RATE NOT TO BE QUOTED				
42	Supplying & fixing medium gauge GI Pipe (ISI-Medium) Protection with necessary fittings and jointing metarials as required 40 mm dia	78	RM	ITEM RATE NOT TO BE QUOTED				
43	Supplying & fixing medium gauge GI Pipe (ISI-Medium) Protection with necessary fittings and jointing metarials as required 80 mm dia	18	RM	ITEM RATE NOT TO BE QUOTED				
44	Painting of Steel Tubular Pole of lengths and no. of coats of paint, as given below with ready mixed paint/primer of approved make, and brand incl. preparation of surface by sand paper/emery Upto 9.0 mtr. long pole paper, cleaning etc. for receiving fresh coat of paint.			ITEM RATE NOT TO BE QUOTED				
44.1	(i) 1st coat of aluminium paint over 1 coat of RO priming	10	Per pole					
44.2	(ii) 2nd coat of aluminium paint over 1st coat	10	Per pole					
45	Supply and fixing of smart bright essential street light (70 Watt) complete with all accessories to be fixed /projected from the wall of the building or on pole incl. making holes/providing clamping arrangement & necy. GI reducer as required. S&F 40 mm GI pipe (ISI-Medium) quality 1.5 mts. average length having suitable bend S&F necy. length of 1.5 sqmm PVC insulated single core stranded annealed copper wire and making connections as required and mending good damages to wall incl. painting etc.			ITEM RATE NOT TO BE QUOTED				

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45.1	Make : Crompton, 72 watt	20	Each					
46	Excavation of soil for installation of Earth Electrode and filling & ramming.	26.40	Cu-Mtr	ITEM RATE NOT TO BE QUOTED				
47	Earthing with 50 mm dia GI 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 as below: (a) By ISI-Medium GI pipe	15.00	Set	ITEM RATE NOT TO BE QUOTED				
48	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.	1.00	Mtr.	ITEM RATE NOT TO BE QUOTED				
49	Connecting the equipments body to earth busbar including S & F 25 mm x 6 mm galvanised (Hot Dip) MS flat on wall/floor with GI saddles as required and connection to equipments incl. drilling holes, with bolts, nuts, washers etc.	20.00	Mtr	ITEM RATE NOT TO BE QUOTED				
50	Connecting the equipments to earth busbar including S & F GI (Hot Dip) wire of size as below 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. (a) Solid GI wire (ii) No. 6 SWG	50.00	Mtr	ITEM RATE NOT TO BE QUOTED				
51	Wiring in 1.1 KV grade single core stranded 'FR' PVC insulated & unsheathed copper wire (Brand approved by EIC) of following sizes in 25mm PVC casing-capping (Precision make) incl. necy. PVC clips, fittings etc. 2X56/0.3 (4 sqmm.) +1X36/0.3(2.5 sqmm)	16.00	RM	ITEM RATE NOT TO BE QUOTED				

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52	Supplying and fixing Sheet steel Main Switches on flat iron frame on wall30/ 32A, Havells,240 v.DP with fuse on L & N	4.00	Each	ITEM RATE NOT TO BE QUOTED				
53	Supplying and fixing Sheet steel Main Switches on flat iron frame on wall30/ 16A, Havells,240 v.DP with fuse on L & N	2.00	Each	ITEM RATE NOT TO BE QUOTED				
54	Supplying and fixing double-door SPN MCB Distribution Board with IP-42/43 protection, concealed in wall after cutting the wall & mending good the damages to original finish incl. Inter connection with suitable size of copper wire and neutral link & provision for earthing attachment. 2+6 way Enclosure(LTSD08N) Make-L & T	3.00	Each	ITEM RATE NOT TO BE QUOTED				
55	Supplying and fixing 240/415 V SPMCB of Breaking capacity 10kA & characteristics on din rail of existing DBs and necessary connection(make- L& T, 6-32 A)	18.00	Each	ITEM RATE NOT TO BE QUOTED				
56	Supplying and fixing 240/415 V MCB Isolator on din rail of existing DBs and necessary connection. 40 A, DP make-L&T	3.00	each	ITEM RATE NOT TO BE QUOTED				
57	Wiring in 1.1 KV grade single core stranded 'FR' PVC insulated & unsheathed copper wire (Brand approved by EIC) of following sizes in 25mm PVC casing-capping (Precision make) incl. necy. PVC clips, fittings etc. 2X36/0.3 (2.5 sqmm.) +1X22/0.3(1.5 sqmm)	50.00	RM	ITEM RATE NOT TO BE QUOTED				
58	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 light/fan/call 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	12.00	Point	ITEM RATE NOT TO BE QUOTED				

Sl. No.	Description of item	Quantity	Unit	Description of work proposed by the bidder (for budget quotes)	Unit (for budget quotes)	Rate of GST	Rate (Rs., Incl of all taxes) (budget quotes)	Total Amount (Rs). (budget quotes)
59	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 5A 3 pin flush type plug socket with piano key type switch (Anchor make) fixed on sheet steel fabricated CRC MS switch board with bakelite/perspex (wall matching color) top cover of 3 mm thick flushed in wall by housing the board after cutting brick wall incl. necy. connection making earthing attachment, painting and mending good damages to building works [PVC casing-capping and plug box both on surface] On board	4.00	Point	ITEM RATE NOT TO BE QUOTED				
60	Supply & Fixing 240 V, 20A, plug socket with separate 20 A Piano key type switch (Brand approved by EIC) on sheet metal switch board embedded in wall incl. S & F 150x100x65mm MS (16SWG) switch board and bakelite/perspex top cover of 3mm thick by Brass screws after making housing for switch by cutting bakelite/perspex cover and making necessary connections as required.	2.00	Each	ITEM RATE NOT TO BE QUOTED				
61	Supply TMC501 Conventional industrial batten Philips LEDtube, model no : TMC 501 P 1xT-LED 22 W P3241	22.00	Each	ITEM RATE NOT TO BE QUOTED				
62	Fixing only single/twin florescent light fitting complete with all accessories Directly on wall/ceiling with HW block and suitable size MS fastener, Ceiling plate, nipples etc. as required	22.00	Each	ITEM RATE NOT TO BE QUOTED				
63	S&F of 350 W, IP 66 Protection, 38500 ml, 10 KV SPD, Flood light Fitting with suitable tie clamps and MS plate for mounting on pole/ Tower or similar structure, Flood light for proper illumination. Crompton/ any approved make.	7.00	Nos	ITEM RATE NOT TO BE QUOTED				

Sl. No.	Description of item	Quantity	Unit	Description of work proposed by the bidder (for budget quotes)	Unit (for budget quotes)	Rate of GST	Rate (Rs., Incl of all taxes) (budget quotes)	Total Amount (Rs). (budget quotes)
64	Supply and fixing of EnduraLED Bulkhead Pressure Die cast housing LED bulkhead with IP66 Protection and IK09 impact resistance suitable for surface and wall mounting applications on ceiling fitting on wall /ceiling by screws etc.			ITEM RATE NOT TO BE QUOTED				
64.1	Make: Crompton, 10 watt LED	2.00	Each					
65	Supplying and fixing of PARABOLA NEO(200 W) Industrial light Uniquely designed circular highbay with150 lm/W efficacy and 10 kV SPD as standard making it a robust solution for various industrial application. Ingress protection of IP66 with additional safety chain, fixing on ceiling with anchor/fastener etc, and other accessories as required and mending good damages to building works (Cat. no.- CIP-325-200-57-60D-HL5-LM-NSG) make:Crompton)	10	Each					
66	Brick work with 1st class bricks in lime and surki mortar (1:3) (1 lime putty/paste: 3 surki) lime to be slaked at site and the mortar to be prepared with such lime putty and first class surki made from kiln burnt bricks having its fineness modulus between 2 and 2.5 and which passes through B.S. sieve No 8 with correspondes to I.S sieve No 200 with considerable grinding and pugging it complete. b) In Super structure, Ground Floor	5.00	Cu. M	ITEM RATE NOT TO BE QUOTED				
	Total amount including GST and Cess (A)							
	In words:							