

dia BCIS Pile Foundation. The Top cover slab is designed as a flat slab (uncracked) supported on RCC columns inside the tank. Live load over top cover slab has been considered as per IS: 875 (part II) as 1.5 N/m^2 . Earth Cover of 600mm thick has been considered on top of the cover slab as per NIT requirement. The top earth is provide in slope with 600 mm thick cover at high point and 500 mm thick earth cover at low point. Drain in 115 thk brick work is provided at the low point to drain the water from top of the cover slab and is connected to the storm water drainage of the plant. 230 thk Brick Parapet Wall has been provided all along the periphery of the reservoir to retain the top earth cover and also supporting chain-link fencing of 1200 mm height. 4 Nos Manholes with RC precast cover and MS rungs have been considered for access inside the reservoir. 24 Nos. of CI Cowl type vent pipe of 150 mm dia mosquito mesh has been provided to the top of the reservoir at to locations has been provided. Food Grade Epoxy coating on inside faces of walls and columns has been provided. Bitumen felt roof water proofing on top of the cover slab of the CW Reservoir shall be applied before filling with 600 mm thick earth cover in slope. 20 mm thick Marbunite Flooring on 25 mm thick Cement Mortar bed 1:4 on top of base raft of reservoir and suction sump are provided.

➤ Pump House

The pump house is partly underground RC structure adjacent to the Suction sump of the reservoir. The RC Walls of the dry pit of pump house upto the FFL on three sides are designed as per IS : 456-2000. The base slab of the pump house is designed as a structural slab supported on BCIS Pile Foundation. The super structure of the pump house along with that of HT room is in RC framed construction with RCC roof slab and 230 thick brick side cladding. E.O.T. crane of 10t capacity is to be provided. Architectural finishes shall be provided as per NIT

➤ Dirty Back Wash Water Sump, Sludge Sump & Recycle Pump House

Dirty Backwash Water Sump, Sludge Sump & Recycle Pump House is an underground RCC watertight structure. The RC Walls and the base raft of the tank are designed as liquid retaining structural members. RC partition walls are provided to separate dirty back wash water sump & Sludge Sump. The base raft of the tank is designed as open foundation without piles. The super structure of the pump house is in RC framed construction with RCC roof slab and brick side cladding. Pumps for the Blowers are also placed inside the recycle pump house. Monorail of appropriate capacity is provided. Architectural finishes shall be provided as per Tender Document.

➤ Chemical House including MCC Room, Control Room, Chemical Storage, Laboratory, Chlorinator Facilities, Service Water Overhead Tank and Dosing Tanks

Chemical House is a two-storied RCC framed building with RCC roof slab and brick side cladding. The RC Columns of the building are founded on BCIS Pile Foundation. The Chemical House consist of Chemical storage Area, MCC room, Control Room & Chlorinator facilities of appropriate sizes in the ground floor. First floor consist of Laboratory room, storage room & Dosing tanks. Overhead service water is provided over the roof slab of the chemical house. Internal RC Staircase for access to the first floor and roof top is provided. Monorail of 1.5t capacity is provided. Architectural finishes shall be provided as per as per tender document. Transformer yard is provided adjacent to the chemical house.

➤ Boundary Wall

Boundary wall is provided along the periphery of the plot. The boundary wall of height 2100 mm above FGL is made up of 230 mm thick brick wall. The brick wall is supported on plinth beam at the base. The plinth beam is spanning between the RC columns at suitable intervals. The RC columns is founded on open foundation at 1m below GL as per soil investigation report. No Plastering & Painting is provided on the both exposed faces of the brick wall. Only pointing is provided for the same. Suitable barbed wire fencing of 1000 mm high with three rows of barbed wires has been provided. The total length of boundary wall is to be assessed by the bidders based on the site plan proposed by the bidders. Land area of each plant/site has been uploaded.

Roads and Drains

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6m Wide Road with provision of 4m wide concrete block pavement with one meter wide shoulder on either side has been provided inside the plant boundary as per layout drawing. Also 1.0m wide pathway for access to Flash Mixer & Flocculation tank as per the layout drawing is provided. Storm water drains in brick work shall be provided at suitable location for effective surface drainage.

➤ **Site Development for WTP Site**

The entire area (5.0 ha including future provision and open space) of the proposed WTP site is a low lying marshy land and full of water hyacinth, which is to be developed. The existing ground level of the area is about 2.0 m below the nearby PWD Road. Before filling the area, the area to be cleaned from the water hyacinth. Filling is to be done by river silt upto about a minimum height of 60 cm above the nearest road level.

- **Shore Protection by RCC Retaining Wall:** Retaining wall is to be provided for shore protection of proposed Intake Structure with M25 grade concrete.

Details for micro tunneling & jack pushing works:

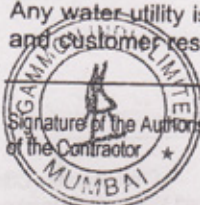
Micro Tunneling	
Dia of pipe (mm)	Length (m)
900	200
1400	100
1400	100
1400	350
Total	750
Jack Pushing	
dia of pipe (mm)	Length (m)
350	100
350	300
400	100
400	400
500	50
600	50
700	200
900	100
900	200
Total	1500
Note: Subject to variation due to local condition	

PROTECTION OF UNDERGROUND RCC STRUCTURES AGAINST SULPHATE AND CHLORIDE PRESENT IN SOIL & GROUND WATER

Where chemical test on soil and ground water indicates presence of sulphates and chlorides are more than permissible limits, the type of cement to be used for underground structures should be sulphate resistant cement apart from other measures prescribed.

Computerised Distribution Management Plan

Any water utility is required to be managed professionally and economically. It is to be transparent and customer responsive in delivering the services. From operation side each component must be



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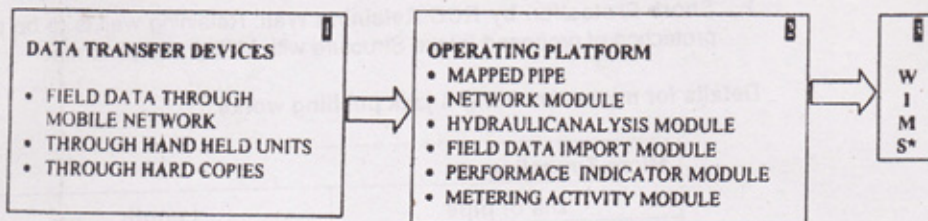


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reliable and at the same time sustainable. It is also because of constraints on financial support water utility needs. So one needs a data base which is to be made available at any time and to the managers, administrators and to the customers. Technical side of operation needs regular (routine) measurement of parameters and that must be made available at the click of the mouse of the system computer. So one has to organize the entire management & operation side on a strong but flexible format. It, therefore, simplifies to -

Installation of measuring devices spread over the city for automatic data transfer, at a central location having network facility with main server of the administrative system of the utility.

Creation of operative platform for analysis, reporting, inclusion of modifications, development of any component of the water supply distribution system.



* Water Supply Information Management system (WIMS) – new software to be developed

The water supply system will be gradually updated to a 24 x 7 supply system. So intermittent supply system will continue for at least 5 years or so. The methodology for calculation of UFW and leakage in environment of intermittent supply is fundamentally different to that where the supply is permanent. So a new software is to be developed may be called WIMS, which is the acronym for water Infrastructure Management System. The WIMS water management software will be used to analyse data collected in the system regarding pressure and flows, thus allowing water balance to be set up to relate flows, pressure and Consumption, with regard to billing.

The main role of WIMS will be to gather, analyse and present data from various software packages and will provide a data connectivity link that will enable the operations engineers to make informed decisions on improving the operating efficiency of the network.

Use of the software will enable engineers to make informed decisions on operating strategies, to improve the level of service and equability of supplies in all the areas and will provide:

Concise reporting to the management of supplies and pressures both globally and by zone, thus allowing a comparison of available supplies with expected consumption to be made.

A tool to compare billing information with actual flow in each zone.

Reliable information to improve the capacity and operating strategy of the network to distribute the available supplies.

The basis or planning future capacity strengthening and modeling a more towards 24-hour continuity of supplies.

SYSTEM CONFIGURATION:

- RADCOM software / similar – this will control and receive data from GSM telemetry system for pressure and flows.
- A Graphical Information Software (GIS) will be used to organize and present all graphical information relating to the water network.
- WIMS water management software – to store analyse and present data from the telemetry system and billing register to provide reporting for engineering decisions for operations of the water supply system.
- Linking to billing system – the above elements will be interfaced with the utility's billing system through an ASCII file data exchange.

SOFTWARE ELEMENTS:

- Windows NT client server operating system

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- ORACLE database, configuration, MS applications.
- GIS software.
- RADCOM / or Equivalent software
- EPANET 2 / or Equivalent software

MAPPING OF WATER PIPES:

Topographical maps are to be produced from base maps or available GIS maps showing sufficient detail to position pipes and appurtenances in plan relative to permanent surrounding features. This includes -

- Position of roads including kerbs and centerlines.
- Position of building frontage, including address.
- Position of key features - major landmarks, buildings, road junctions, Traffic Island etc.

The topographical survey will provide these features in plan and level to be digitized on the GIS package that will form the basis of the water management software. Road name and features will be named and included on the background maps for case of reference in the field.

Underground Asset Survey - identify and locate all visible assets and appurtenances. Location of buried assets through use of electronic pipe and valve locators. Full coverage and accuracy cannot be achieved by EPL mechanics, which can only identify metallic pipes and confusion may arise with underground metallic presence.

The shortcomings of earlier stages can be addressed through ground penetrating radar (GPR) survey. This survey builds up any asset that may have been missed in congested areas or due to being non-ferrous to be picked up and added to the maps. Approximate depth and diameter can be appraised though not guaranteed. GPR cannot detect details of fittings and connections for which forth stage survey by actual excavation in typical areas can complete the process.

Installation of Flow & Pressure Monitoring Equipment

Following the mapping of the existing underground assets, a major programme is to be undertaken to equip the ~~water supply and distribution system~~ with permanent monitoring stations that will record and transmit flows and pressures from strategic locations to a Central Control Center, enabling an analysis of performance of operations and detection of any anomalies. For example if we put to such monitoring unit one each at inlet & outlet pipes of a pumping system. We may find a difference, which shall definitely conclude the leakage loss in the reservoir (storage tank, UGR) present in the system.

Flow and pressure sites will cover key strategic production and pumping location and strategic nodes of network.

In addition, pressure only monitoring stations are installed throughout the network to gain a thorough understanding of network condition, where appropriate to key domestic and commercial consumer locations.

This installation is central to the philosophy of O & M of any water supply service delivery system. To get an idea description of monitoring site is give below.

SUPPORT SERVICE (SOFTWARES)

WIMS software:

This package is used for assembling, storing and organizing information. The analysis facilities are customized to suit the assessment and reports. The facilities will include -

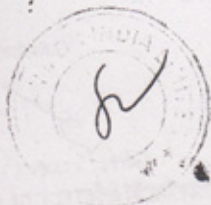
- Information and organization of domestic and commercial billing records into their wards.
- Setting up structural database for each ward used for calculation of the components of each hydraulic area which includes.
- Commercial Connections by ferrule size / code
- Public stand posts



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- Length of distribution mains
- Length of service mains
- Records of flow & pressure monitoring locations.
- Records of important connections

Characterized of parameters (no. & type of connections, pipe lengths etc):

The import, digitizing and / or drawing of principal elements of the distribution system as a result of mapping are viewed in WIMS as background maps and features in layers include –

- Primary, secondary & other pipes including transmission mains.
- Valves (air, sluice, control) and connections.
- Public service stand posts, hand tube wells.
- Location of pumping stations, reservoirs etc.
- Important tube wells.
- Location of monitoring sites.
- Ward boundaries.

These are marked as entities on maps to retain geographical relationships in the database.

- Simulate extended supply hours and increasing system pressure.
- To identify infrastructure capacity requirement necessary to meet increasing levels of service demand in the system.
- The setting up meaningful and practical models is possible with the data gathered and available.

Data Communication Software:

Monitoring data are collected from

- Combined flow and pressure monitoring sites.
- Pressure only monitoring sites
- Commercial & important monitoring sites.

This consists of manufacturer's propriety software of data logger & meter manufacturers. Pressure only data are downloaded manually on to laptop computers.

Modeling Software:

Network model is created through this software. This can access other data held within various software packages through WIMS.

The purpose of simulating the hydraulic behaviour of the system is –

- Simulate extended supply hours and increasing system pressure.
- To identify infrastructure capacity requirement necessary to meet increasing levels of service demand in the system.
- The setting up meaningful and practical models is possible with the data gathered and available. These models are used to identify system deficiency solutions. Development of hydraulic model enables potential improvement in operation of water supply system.

General Software:

General software applications as spreadsheets ward, processors and graphics packages used for producing reports.



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SECTION - C

General Conditions of Contract

1. DEFINITIONS AND INTERPRETATION

In the Contract, as hereinafter defined, the following words and expressions shall have the meanings hereby assigned to them, except where the context otherwise requires :

- (a) **'Approved'** means approved in writing, including subsequent written confirmation of previous verbal approval and **'Approval'** means approval in writing, including as aforesaid.
- (b) **'Bank'** means the "State Bank of India" or any other Nationalized Bank.
- (c) **'Calendar Day'** means a period of twenty four hours extending from midnight to midnight.
- (d) The **'Contract'** shall mean the tender and acceptance thereof and the formal agreement if any, executed between the Contractor, and the Development Authority together with the documents referred to therein including these conditions and appendices and any special conditions, the specifications, designs, drawings, price schedules, bills of quantities and schedule of rates. All these documents taken together shall be deemed to form one Contract and shall be complementary to one another.

The order of precedence in case of discrepancies shall be as under,

1. Contract Agreements
2. The letter of Acceptance
3. Notice inviting Tender & Instructions to Bidder
4. Special Conditions of Contract
5. The General Conditions of Contract
6. Schedule of Rates & Quantities
7. The Technical Specifications
8. The Drawings
9. Schedules & Annexure

- (e) **'Contract Sum'** means the sum named in the letter of acceptance including physical contingencies subject to such addition thereto or deduction there-from as may be made under the provisions hereinafter contained.

Note: The contract sum shall include the following:-

1. In case of lump sum contract, the sum for which tender is accepted.
2. Special discount/ Rebate/ Trade discount offered by the Bidder if any and accepted by the Development Authority.
3. Additions or deletions that are accepted after opening of the tenders.
4. Physical contingencies, if any accepted by the Development Authority.

- (f) **'Cash'** includes cheque, bank drafts and any other payment voucher authorizing payment from any bank or treasury.
- (g) **'Constructional Plant'** means all appliances or things of whatsoever nature required in or about the execution or maintenance of the works.

- (h) **'Commencement Date'** means the date upon which the Contractor receives the notice to commence the work issued by the Development Authority.

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st' - The word 'cost' shall be deemed to include overhead costs whether on or off the

- (j) **'Drawings'** means the drawings referred to in the tender documents and any modification of such drawings approved in writing by the Engineer and such other drawings as may from time to time be furnished or approved in writing by the Engineer.
- (k) **'Development Authority'** shall mean Guwahati Metropolitan Development Authority (GMDA) as incorporated in the year 1992 under the GMDA Act, 1985. **'Corporation'** shall mean Guwahati Municipal Corporation as incorporated in the year 1974 under the GMC Act, 1971.
- (l) **'Employer/ Client'** means the Guwahati Metropolitan Development Authority acting through the Chief Executive Officer who enters into contract with the Contractor.
- (m) The **'Engineer'** shall mean the City Engineer appointed for the time being or any other officer or officers of the Corporation/ Development Authority representing 'State Level Nodal Agency' who may be authorized by the Municipal Commissioner to carry out the functions of the Engineer.
- (n) **'Engineer's Representative'** shall mean Executive Engineer/ Deputy Engineer/ Sectional Engineer /Junior Engineer or Project Management Consultants appointed from time to time by the 'Engineer' to perform the duties and generally to assist the Engineer for the purpose of the contract and whose authority shall be notified in writing to the contractor by the Engineer.
- (o) **'Excepted Risks'** are risks due to riots (otherwise than among Contractors' employees) and civil commotion (in so far as both these are uninsurable), war (whether declared or not), invasion, act of foreign enemies, hostilities, civil war, rebellion, revolution, insurrection, military or usurped power, any act of government.
- (p) **'Ground Level'** means the level of the referred point of the exposed surface of the ground, road or pavement free from extraneous materials.
- (q) **'Gender'** Words importing the masculine gender shall also include the feminine gender.
- (r) **'Holidays'** means a public holiday for the purpose of Section 25 of the Negotiable Instruments Act, 1881 or such other day on which the office of the Development Authority remains closed for the day.
- (s) **'Headings or Notes'** - The headings and marginal notes in these Conditions of Contract shall be deemed to be part thereof or be taken into consideration in the interpretation or construction thereof or of the Contract.
- (t) **'Local Authority'** not only means a Municipal Corporation or Municipality or other authority legally entitled to the control or manage local funds but also includes other utility service providers.
- (u) **'Letter of Acceptance'** means the formal acceptance by the Development Authority.
- (v) **'Month'** means English calendar month.
- (w) The **'Municipal Commissioner'** shall mean the Municipal Commissioner of the Guwahati Municipal Corporation, for the time being holding that office and also his successor and shall include any officer authorized by him. The **'Chief Executive Officer'**

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shall mean the Chief Executive Officer of Guwahati Metropolitan Development Authority and also his successor and shall include any officer authorized by him.

- (x) **'Period of Completion'** – The period of completion shall be 30 months from the date of work order.
- (y) **'Permanent Works'** means the permanent works including equipment to be supplied, executed, erected and maintained in accordance with the Contract.
- (z) **'Road'** shall include a street, avenue, lane, by-lane or any other access routes over which a person authorised by a Local Authority has a right of way.
- (z-i) **'Rupees'** (or **'Rs.'** in abbreviation) shall mean Rupees in Indian Currency.
- (z-ii) **'Site'** means the land and other placed on, under in or through which the Permanent works or Temporary Works are to be executed and any other lands and places provided or arranged by the employer for working space or any other purpose as may be specifically designated in the Contract as forming part of the Site.
- (z-iii) **'Specifications'** means the specifications referred to in the Tender and any modification thereof or addition thereto as may from time to time be furnished or approved in writing by the Engineer.
- (z-iv) **'Store'** means such storage areas including depot, godown, stockyard, dumping yard etc. maintained by the Development Authority or where supply of any material for the construction or any work has been undertaken by any authorised agent, by such agent within the District.
- (z-v) **'Singular and Plural'** – Works importing the singular only also include the plural and vice versa where the context demands.
- (z-vi) **'Temporary Works'** means all temporary works of every kind required in or about the execution or maintenance of the Permanent Works.
- (z-vii) **'Tender Date'** means the closing date fixed for receipt of tenders as per Notice Inviting Tenders or as extended by subsequent notification(s).
- (z-viii) **'Tender'** means the Contractor's priced offer to the Development Authority for the execution and completion of the Works and the remedying of any defects therein in accordance with the provision of the Contract, as accepted by the Letter of Acceptance.
- (z-ix) **'Tenderer'** means the person, or persons, firm or corporation or partners in Joint venture submitting a tender for the work contemplated either directly or through a duly authorised representative.
- (z-x) **'The Act'** means the Guwahati Metropolitan Development Authority Act.
- (z-xi) **'Time'** expressed by hours of the clock shall be according to the Indian Standard Time.
- (z-xii) **'Time for Completion'** means the time for completing the execution of and passing the Tests on Completion of the Works or any Section or part thereof as stated in the Contract (or as extended) calculated from the Commencement Date.
- (z-xiii) **'Urgent Works'** shall mean any measures which in the opinion of the Engineer become necessary during the progress of the Work to obviate any risk of accident or failure or which become necessary for security.

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(z-xiv) **'Water Main'** means any pipe or conduit of cast iron, steel or of any other material intended to convey or distribute water;

(z-xv) The **'Works'** shall mean the tasks to be executed in accordance with the contract or part(s) thereof, as the case may be, and shall include all extra or additional, altered or substituted Works as required for performance of the contract.

(z-xvi) The **'Annexure'** referred to in these conditions shall mean the relevant annexure appended to the tender papers issued by the Development Authority.

2. ASSIGNMENT AND SUBLETTING

2.1 ASSIGNMENT

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

2.2 SUB-LETTING

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

3. CONTRACT DOCUMENTS

- (i) (a) **Language** – The Contract documents shall be drawn up in the English language. All correspondence, orders, notices etc. shall also be in English.
(b) **Law** – The law of India and of the State of Assam shall apply to the Contract and the Contract is to be construed accordingly.

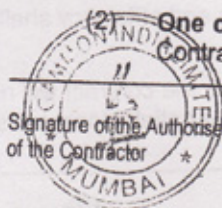
- (ii) **Documents Mutually Explanatory** – The several documents forming the Contract are to be taken as mutually explanatory of one another, but in case of ambiguities or discrepancies the same shall be explained and adjusted by the Employer, in terms of the provisions made in Conditions and Requirements for Tendering, who shall thereafter issue to the Contractor instructions thereon. Provided always that if, in the opinion of the Engineer, compliance with any such instructions shall involve the Contractor in any cost, which by reason of such ambiguity or discrepancy could not reasonably have been foreseen by the Contractor, the Engineer may certify and the Employer may consider such additional sum as may be reasonable to cover such costs. But disputes and differences arising out of it may be referred to arbitration if required.

4. (1) **Custody of drawing** – All the approved Drawings shall remain in the sole custody of the Engineer, but two copies thereof shall be furnished to the Contractor free of charge. The Contractor shall provide and make at his own expenses any further copies required by him. At the Completion of the Contract, the Contractor shall return to the Engineer all drawings as provided under the Contract.

- (2) **One copy of drawings to be kept on site** – One copy of the Drawings furnished to the Contractor as aforesaid, shall be kept by the Contractor on the site and the same shall at

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all reasonable times be available for inspection and use by the Engineer and the Engineer's Representative and by any other persons authorised by the Engineer in writing.

- (3) **Disruption of progress** – The Contractor shall give written notice to the Engineer whenever planning or progress of the works is likely to be delayed or disrupted unless any further approval of drawing or order, including a direction instruction or approval, is issued by the Engineer within a reasonable time (preferably 15 days). The notice shall include details of the drawing or order required, and of why and by whom it is required and of any delay or disruption likely to be suffered if it is further delayed.

5. FURTHER DRAWINGS

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

6. GENERAL OBLIGATION

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

The Contractor shall take full responsibility for the adequacy, stability and safety of all site operations and methods of construction, erection etc. provided that the Contractor shall not be responsible, except as may be expressly provided in the Contract, for the design or specification of the Permanent Works, or for the design or specification of any Temporary Works prepared by the Engineer.

7. CONTRACT AGREEMENT

The Contractor shall, when called upon to do so, enter into and execute a Contract Agreement, to be prepared and completed in the form to be prepared by the employer.

8. **Execution of Contract Document:** The successful Bidder after furnishing Initial Security Deposit is required to execute an Agreement in duplicate on a stamp paper of proper value. The proper value at present is Rs. 100/-. The agreement should be signed within 30 days from the date of acceptance of the tender.

9. GUARANTEE

The contractor shall stand guarantee for 12 months from the date of commissioning and within the said period remove/rectify/make good any such deficiency forthwith at his own cost (treated as defect liability period). During the guarantee period (after the trial run period) the firm's representative shall visit the site and inform in writing the Engineer-in-Charge about the condition, state of health, and the remedial measures taken or about to take by them, as and when required during one year defect liability period.

The successful tenderer shall also give the following guarantee in respect of the equipment supplied by him.

- i) All equipment shall be free from any defects due to faulty design of the components, materials and/or workmanship
- ii) The equipment shall operate satisfactory. The performance and efficiency shall not be less than guaranteed values.

Formal acceptance of the work or equipment covered under the contract will not be made by the Engineer until all the work done by the contractor has satisfactorily passed all tests

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