2-1 22-23
Office of the Executive Engineer, TWAD Board,
RWS Division, Thiruvannamalai.

TAMILNADU WATER SUPPLY AND DRAINAGE BOARD
TENDER DOCUMENTS

LS PERCENTAGE TENDER SYSTEM

1.	Tender Notice No.	:	2nd Call No. 3/JDO/RWS/TVM/2022-23/dt.08.07.2022
2.	Name of work	:	**Replacement of connecting main, pumping main, pump set and allied works in Outlived CWSS to Umayalpuram and 10 other habitations in Tiruvannamalai District for the year 2021-2022 under Capital Grant Fund (CGF)**.
3.	Eligible Class of contractor	:	II nd & Above
4.	Amount of EMD	:	Rs.35,000/- (Rupees thirty five thousand only)in favour of the Executive Engineer, TWAD Board, RWS Division, Thiruvannamalai.
5.	Last date for submission of Tender	:	26.03.2022 up to 03.00 pm
6.	Date and time of opening of Tender	:	26.03.2022 @ 03.30 pm
7.	Tender validity period	:	90 days
8.	Cost of Tender Schedule	:	Rs. 1000/- + GST@18%
9.	Tender schedule issued to	:	

Contractor

Executive Engineer, TWAD Board,
RWS Division, Tiruvannamalai.

Tamil Nadu Water Supply and Drainage Board

Tender Notice No. 2nd Call No. 3/JDO/RWS/TVM/2022-23/dt.08.07.2022

For and on behalf of Tamil Nadu Water Supply and Drainage Board, sealed Tenders on LS contract "PERCENTAGE TENDER SYSTEM" (single cover system) are invited by the Executive Engineer, TWAD Board, RWS Division, No.912, Indira Nagar East, Vengikkal, Tiruvannamalai 606 604 for the following work at the date and time noted below. Tenders will be opened in the presence of Tenderes or their authorized representatives who choose to be present at the time of opening Tender.

Sl. No.	Name of work	Bid Security in Rs.	Cost of bid document	Period of sale	Last date for submission of bids	Date and time of opening of Tender.	Eligibility class
1	**Replacement of connecting main, pumping main, pumpset and allied works in Outlived CWSS to Umayalpuram and 10 other habitations in Tiruvannamalai District for the year 2021-2022 under Capital Grant Fund (CGF)**	Rs.35,000/-	1000 + GST @ 18%	From 08.07.2022 to 25.07.2022	26.07.2022 up to 3.00 pm	26.07.2022 @ 3.30 pm	II nd & Above
2	Replacement of connecting main, pumping main, pump set and allied works in Outlived CWSS to Menalur H and 10 other habitations in Tiruvannamalai District for the year 2021-2022 under Capital Grant Fund (CGF)	Rs.37,500/-	1000 + GST @ 18%				

Contractor

Executive Engineer, TWAD Board,
RWS Division, Tiruvannamalai.

- If bid documents and required by post an amount of Rs.500/- with GSt to be paid additionally and in such cases the Board will not be responsible for the delay or loss during transit.

- The eligibility criteria and other terms and conditions as per Bid documents will be followed strictly.

- The Bid documents can also be downloaded free of cost from www.tenders.tn.gov.in and www.twadboard.gov.in.

- Eligibility for offering the Tender : Contractor in TWAD Board any other state or central Govt. Department undertaking.

    1. Copy of Contractor Registration / Renewal
    2. GST registration and clearance upto previous month.
    3. Income Tax
    4. Similar works Experience certificate issued by the rank of above the Executive Engineer.

- Validity of Tender : 90 Days

- EMD should be remitted in any one form as detailed below:

- Demand draft drawn in favour of The Executive Engineer, TWAD Board, RWS Division,Tiruvannamalai from any Nationalized Bank payable at Tiruvannamalai.

- In case the date of receipt of tender and opening of tender date happended to be holiday the next successive working days will be the date of receipt of tender and opening of tender respectively.

- The undersigned reserves the right to reject any or all the bid documents without assigning any reasons therefore.

Executive Engineer, TWAD Board,
RWS Division, Tiruvannamalai

Contractor

Executive Engineer, TWAD Board,
RWS Division, Tiruvannamalai.

LETTER OF CONSENT

I / We agree to abide by all the detailed specifications, terms and conditions stipulated by the TWAD Board which I / We have read and understood. I / We agree to execute the work as per the Bill of quantities within the time limit prescribed in the Program Schedule and as per the technical specifications stipulated in the Bid. I / We have not made any additions / alterations in any of the downloaded tender documents. As per TWAD Board circular No: 94260/A2/BKG/2008 Dated 25.3.2008. I also receive my payments through online also (ECS).

Signature of the Bidder

Contractor

Executive Engineer, TWAD Board,
RWS Division, Tiruvannamalai.

TAMILNADU WATER SUPPLY AND DRAINAGE BOARD

LETTER OF TENDER

To

The Executive Engineer,
TWAD Board,
RWS Division,
Tiruvannamalai.

Date :

1. I/We do hereby tender and if this tender be accepted undertake to execute the works covered by this tender as shown in the drawing and described in the specifications deposited in the office of the Executive Engineer, TWAD Board, RWS Division, Tiruvannamalai With such variations by way of alterations or additions to and omission from the said works and in accordance with the Standard Contract Terms and conditions of TWAD Board at …… % Excess/Less over the department value of Rs…… (Rupees …….. only) or such other sums as may be arrived at under the clause of the contract terms and conditions of TWAD Board relating to payment by final measurements at unit prices.

2. I/We have also quoted the tender Excess/Less percentage in the Bill of quantities (Abstract of BOQ annexed) in words and figures for which I/We agree to execute the work and receive payment on measured quantities as per the General conditions of the contract.

3. I/We do hereby distinctly and expressly declare and acknowledge that before the submission of my / our tender. I/We have carefully followed the instructions, in the tender and have read, the Tamilnadu Building practice, the General conditions to contract therein and the Standard contract terms and conditions that I/We have made such examination of the contract documents and of the plan, specifications, quantities and of the location where the said work is to be done and such investigation of the work required to be done and in regard to the materials required to be furnished as to enable me/us to thoroughly understand the intention of same and the requirements, covenants, stipulations and restrictions contained in the contract and in the said plans and specifications and distinctly agree that I / We will not thereafter make any claim or demand upon the TWAD Board upon or arising out of any alleged misunderstanding or misconception of mistake on my / our own part of the said requirements, covenants, stipulations, restrictions and conditions.

Contractor

Executive Engineer, TWAD Board,
RWS Division, Tiruvannamalai.

I/We enclose an Income Tax Verification Certificate and GST Clearance Certificate.

4. ** a. I/We enclose …… the sum of Rs. …… (Rupees …… ……) in the form of …… as prescribed in the Tender Notice towards Bid Security (Earnest Money Deposit) which will not carry any interest.

   ** b. I/We hereby enclose the proof of authority vide the payment of Bid Security …… exempting me/us from the payment of Bid Security.

   Note : ** to be scored out if not applicable.

5. If my/our tender is not accepted, the Bid security shall be returned to me/us on my/our application when intimation is sent to me/us of rejection. If my/our tender is accepted I/we do hereby agree to produce the Performance Security (Security Deposit) in the manner and form prescribed under Clause 23 of the instructions to the bidders for the due fulfillment of contract. If upon intimation being given to me/us by the tender accepting authority of acceptance of tender I/We fail to make the Performance security in the prescribed form then I/We agree to the forfeiture of the bid security. Any notice, required to be served on me/us hereunder shall be sufficient service on me/us if delivered to me/us personally or forwarded to me/us by post to (Registered or ordinary) or left at my/our address given herein, such notice shall, if sent by post be deemed to have been served on me/us at the time when in due course of post it would be delivered at the address to which it is sent.

7. I/We fully understand that on receipt of communication of acceptance of tender from the accepting authority, there emerges a valid contract between me/us and the TWAD Board represented by the officer accepting agreement and Standard Contract and terms and conditions and the Tender documents issued by the Board, i.e. Tender Notice, Tender with schedules, General conditions to the contract and special conditions of the tender, negotiation letters, communication of acceptance of tenders, shall constitute the contract for this purpose and be the foundation of rights of both the parties, as defined in clause of the tender notice, provided that, it shall be open to the acceptance authority to insist on execution of any

written agreement by tenderer, if administratively considered necessary or expedient.

8. I/we have also carefully examined the Detailed Standard Specifications and General Conditions of Contract and Tamilnadu Building practice in acknowledgement of being bound by all conditions of the clauses of the – Detailed Standard Specifications and General Conditions of Contract and all specifications for items of works described by specification number in Bill of quantities (Schedule-A).

9. In consideration of the payment of Rs. …… (Rupees ……) or such other sums as may be arrived at under the clause of the General conditions to the contract relating to payment by final measurement at unit prices. I/We agree subject to said conditions to execute and complete the works shown upon the said drawing serially from No.1 to …… Inclusive (Schedule B) and described in the Technical specification for works and materials and to the extent of probable quantities shown (Schedule-A) with such variations by way of addition to or alterations, deductions from the said work and method of payment thereafter as are provided in the said conditions.

10. I/We agree that time shall be considered as the essence of this contract and commence the work as soon as this tender is accepted by the competent authority and to show progress as defined in the tabular statement (Schedule-C) "Rate of Progress" subject nevertheless to the provisions for extension of time contained in clause 55 of the General conditions to the contract.

11. I/We agree that upon the terms and conditions of this contract being fulfilled and performed to the satisfaction of the Executive Engineer, the security deposited by me/us as herein before recited or such portion thereof as I/we may be entitled to under the said conditions be paid back to me/us provided in clause 8 of the Special conditions of contract.

12. The term Executive Engineer in the said condition shall mean the Executive Engineer, TWAD Board in charge of the Division having jurisdiction for the time being over the work, which shall be competent to exercise all the powers and privileges reserved here in favour of the TWAD Board who has been duly authorised by the TWAD Board.

13. I am / we are professionally qualified and my/our qualifications are follows ……..

    I/We in pursuance of Schedule-E undertake to employ the following technical staff for supervising the work and will see that one of them is always at site during working hours personally checking all items of works and paying extra attention to such work as may require special attention.

    e.g. Renforce cément concret etc.,

Sl. No.	Name of Technical Staff proposed to be employed	Qualification	Experience
1			
2			
3			

14. I / We agree in the event of any dispute arising between the parties hereto in respect of any of the matter comprised in this contract, the same shall be settled by a competent court having jurisdiction, over the place where the contracts is awarded and agreement is concluded and by no other court.

15. I/We undertake to assume full responsibility for the stability and soundness of the works /structures that will be executed by me/us as per this contract.

16. I/We undertake and agree that I/We will not withdraw this tender during the period of validity of my/our tender as indicated in my/our tender and also during such extended period as agreed to by me/us such period to date from the last date by which tenders are due to be submitted and if I/We do so withdraw, I/We agree to forfeit the Bid Security to the TWAD Board.

17. I/We understand that the Board is not bound to accept the lowest or any tender the Board may receive.

    Dated this …… day of …….

    Signature of the Tenderer:

    Address:

INSTRTUCTIONS TO BIDDERS

1. **General:**
   This is a "Turnkey Contract" and the contractor is responsible for the execution of the water supply and sewerage works including the supply and installation of all materials, machineries, equipments etc in accordance with the specifications stipulated in the Bid Document and in conformity with the Quality Parameters laid down in the relevant BIS, TNBP, Bid Documents etc and completing the entire works in all respects satisfactorily and commissioning within the stipulated period and maintaining the scheme for the specified period.

2. **Description of works:**

   (Name of Work)

   The tender is required to examine carefully all instructions, conditions, forms, terms, specifications and drawing in the tender documents and in the Detailed Standard Specifications and General Conditions of Contract. Failure to comply with the requirements of bid will be at tenders own risk. Tenders who are not responsive to the requirements of the tender documents are liable to be rejected.

3. **Qualification Criteria:**
   The Bidder should have registered contractor in TWAD Board/Any other State / Central Government Department/Undertaking. The Bidder who is not registered in the TWAD Board should get Registered his name in the appropriate class of registration before conclusion of Agreement in the event of his tender is accepted.

4. **Method of Tendering:**
   If the tender is made by an individual, the tender documents shall be signed by the individual with his name and address. If the tender is made by a registered firm, it shall be signed by the Managing Partner with full name of the firm and address.

   If the tender is made by a limited company or a limited corporation, it shall be signed by a duly authorized person holding the power of attorney for

signing the tender in which case a certified copy of the power of attorney shall company the tender. Such limited company or corporation may be required to furnish satisfactory evidence of its existence before the contract is awarded.

5. The bids from the contractors / firms shall be accompanied by an attested copy of the valid Income Tax Clearance Certificate and latest Sales Tax verification Certificate. If the firm/Contractor is not liable to the Sales Tax Department, the firm/Contractor should produce a valid certificate issued by the competent authority to this effect.

6. The Bidder is expected to examine carefully all instructions, conditions, Terms, specifications and drawing in the bidding documents. Failure to comply with the requirements of bid submission will be at bidder's own risk. Bids which are not substantively responsible to the requirements of the bidding documents are liable to be rejected.

7. **Amendment of Bidding Documents:**
   At any time prior to the deadline for submission of bids, the Employer may, for any reason, whether at his own initiative or in response to a clarification requested by a prospective bidder, modify the bidding documents by the issuance of an Addendum/corrigendum.

   The Addendum / Corrigendum will be sent in writing or by cable to all prospective bidders who have purchased the bidding documents and will be binding upon them. Prospective bidders shall promptly acknowledge the receipt of the communication thereof to the Employer.

   In order to afford prospective bidders reasonable time in which to take an addendum/corrigendum into account in preparing their bids, the Employer may at his discretion, extend the deadline for the submission of the bids.

8. **Language of Bid:**
   The Bid prepared by the bidder and all correspondence and documents relating to the bid exchanged by the bidder and the employer shall be written in English/Tamil Language.

9. Document comprising the Bid:

The bid to be prepared by the bidder shall comprise the entire documents in full, say the Tender documents and Appendix there to the Bid Security, the Bill of Quantities and the rates thereof, the schedules of supplementary information, the information on eligibility criteria supported by relevant documentary evidence and any other material required to be completed and submitted in accordance with the instructions to Bidders embodies in these bidding documents. The forms, Bill of quantities and Schedules shall be used without exception subject to extension of the Schedules in the same format.

10. **Prices:**

The prices offered by the contractor shall remain firm for the entire project period and no variation in price shall be allowed on any account.

11. **Bid Validity:**

The bids shall remain valid and open for acceptance for a period of 90 days after the date of opening of the bids. In exceptional circumstances prior to expiry of the original validity period, the employer request the bidder for a specified extension of the period of validity. The request & responses thereto shall be made in writing or by cable. A bidder may refuse the request without forfeiting his bid security. The bidder agreeing to the request will not be required nor permitted to modify his bid, but will be required to extend the validity of his bid security accordingly. The provisions regarding discharge and forfeiture of bid security shall continue to apply during the extended period of bid validity.

12. Bid Security (Earnest Money Deposit):

The bidder shall furnish as part of his bid, the Bid Security (Earnest Money Deposit) of Rs……../- (Rupees ……) in any one of the following forms duly pledged or drawn in **favour of the Executive Engineer, TWAD Board, RWS Division, Tiruvannamalai.**

1. Demand draft drawn in a Nationalised Bank in favour of the Executive Engineer concerned.

2. Deposits at call receipt of scheduled banks pledged in favour of the Executive Engineer concerned.

3. Government Security and National Savings Certificate pledged in favour Of the Executive Engineer concerned (purchased within the state of Tamilnadu)

4. Post office savings Bank Deposits pledged in favour of the Executive Engineer concerned (purchased within the State of Tamilnadu).

5. Fixed deposit receipts from scheduled bank pledged in favour of the Executive Engineer concerned.

Any bid not accompanied by an acceptable form of Bid Security will be rejected by the Engineers as non responsive.

The Bid Security of unsuccessful bidders will be returned without any interest within 15 days after a decision is taken on the tender.

13. Signing of Bids:

The original bid shall be filled by typing or by writing in indelible ink and shall be signed by the authorized signatory to bind the bidder to the contract. Proof of authorization shall be furnished in the form of Power of Attorney duly signed, executed and this should accompany the bid. All pages of the bid shall be signed and wherever entries or amendments as directed by the employer are made, they should be properly attested by the signatory to the bid.

The complete bid shall be free of alterations, interlineations or erasures except those that were instructed to be carried out by the Employer. In case, necessity arose to correct the errors committed by the bidder, in the abstract of BOQ the same shall be properly attested by the signatory to the bid. Each bidder is entitled to submit only one bid. No bidder will have the option of participating, more than one bid for this contract.

14. **Deadline for submission of Bids:**

The tender shall be received by the The Executive Engineer, RWS Division, TWAD Board, **Door No.912, Indra Nagar East, Vengikkal, Tiruvannamalai - 606 604** not later than 3.00 PM on …… The Engineer may, at his discretion, extend the deadline for submission of bids by issuing an amendment in accordance with clause 7 above, in which case all rights and obligations of the Engineer and the Bidders previously subject to the original deadline shall thereafter be subject to the new deadline as extended.

15. Mode of submission of Bid Documents:

The Bid Documents are to be dropped in the Tender Box or sent by registered mail in the following address before the expiry of the deadline fixed for submission of bid documents.

The Executive Engineer, TWAD Board, RWS Division, Tiruvannamalai under no circumstances shall be responsible for the delay or loss or damage to the Bid Documents in transit.

16. Late Bids:

Any bids received by the Executive Engineer, after the deadline for submission of bids prescribed in accordance with clause 14 above, will not be considered and the same will be returned to the Bidder unopened.

17. Bid Opening:

The tender will be opened by the Executive Engineer at **3.30 PM on** …….… in the premises of the office of the Executive Engineer, TWAD Board, RWS Division, Door No.912, Indra Nagar East, Vengikkal, Tiruvannamalai - 606 604. The bidders or their authorized representative desirous of attending opening of the bids may do so with proper authorization to represent.

The Engineer will examine the bids to determine whether the documents are complete, whether the requisite Bid Security has been remitted to the required value and in the manner prescribed whether the documents have been properly signed / attested and ascertained whether the bids are generally in order.

During the opening of bids, the Engineer will announce the names of the bidders, written notification of bid modifications if any, the compliance with reference to the remittance of Bid Security and such other details as the Employer may consider appropriate.

18. **Clarification of Bids:**

For any clarifications in the bid and for negotiations the bidder shall attend the office of. The Executive Engineer, TWAD Board, RWS Division, Door No.912, Indra Nagar East, Vengikkal, Tiruvannamalai - 606 604 whenever he is called upon to do so.

19. Responsiveness of the Bids:

The bids shall be treated as substantively responsive based on the satisfaction of the required capacity, capability and financial resources. For this purpose, the bid should conform to all terms, conditions and specification of the bidding documents without material deviation or reservation. The Executive Engineer reserves the right to determine and evaluate the bids with regard to their response substantively.

If a bid in the opinion of the Executive Engineer is found to be substantially not responsive, the Executive Engineer reserves the right to reject that bid and may not subsequently be made responsive by the bidder by carrying out corrections or with drawl of the non-conforming deviation or reservation. However, the decision of the employer shall be final and binding in all these matters.

20. Evaluation and Comparison of Bids:

The Executive Engineer will evaluate and compare only the bids which are determined to be substantively responsive with reference to the requirements and parameters fixed for qualification. The value based on the excess / less percentage quoted in the bid will only be taken in to account for deciding the successful bidder.

21. **Right to Accept or Reject the Bid:**

The Executive Engineer reserves the right to accept or reject any or all the bids without assigning any reasons therefore. Under such circumstances, the Engineer will neither be under any obligation to inform the bidder or the bidders of the grounds for the action of the Engineer nor will be responsible for any liability incurred by the bidder on this account.

22. Notification of Award

The Engineer will promptly inform the successful bidder of the award of the contract before the expiry of the validity period and in the case of extended periods, before the expiry of the extended periods. The award of contract will be in writing and in the event of award of contract being informed through cable; the same shall be confirmed through a written communication by the Engineer. The award of contract shall be in the form of work order and shall notify the total value at which the Engineer has accepted the works to be executed. The notification of the award will constitute the formation of the contract.

23. Performance Security (Security Deposit) and Agreement:

The successful bidder on getting the work order from the Executive Engineer shall remit the Performance Security in the form of NSC/Post Office savings Deposit Account pledged in favour of the Executive Engineer, TWAD Board, RWS Division, Door No.912, Indra Nagar East, Vengikkal, Tiruvannamalai - 606 604 within 7 days from the date of work order and promptly enter into an Agreement with the Executive Engineer in the form specified for this purpose. The agreement should be executed within 15 days from the date of work order in the non judicial stamp paper of value not less than Rs.100.00 purchased in the name of the contractor at his cost. The remittance of the required Security Deposit in the proper form and the conclusion of Agreement shall constitute the formal fulfillment of the contract.

As per the BP.Ms.No.3/COM Wing/dated.28.01.2015

a. For Tenders with any plus % & up to minus 5 % of Dept. value minus 2 % of contract value
b. For Tenders with minus 5 % & up to minus 15 % of Dept. value minus 4 % of contract value
c. For Tenders with more than minus 15 % of Dept. value minus 5 % of contract value

24. Forfeiture of Bid Security (Earnest Money Deposit)

In the event of the successful bidder, upon receipt of work order should respond with the remittance of Performance Security and execution of the Agreement within a maximum of 30 days from the date of work order, failure of which will be liable for the forfeiture of the Bid Security remitted by the bidder along with the bid documents.

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Contractor

Executive Engineer, TWAD Board,
RWS Division, Tiruvannamalai.

PRICE BID

1. Bill of quantities shall be read in conjunction with the instructions to bidders and Detailed standard specifications and General conditions of Contract and Drawings.

2. The quantities given in the Bill of quantities are estimated and provisional and are given to provide a common basis for bidding. The basis of payment will be actual quantities of work ordered and carried out, as measured by the Engineer and agreed by the contractor and valued at the rate and prices tendered in the priced bill of quantities, where applicable and otherwise at such rates and price as the Engineer may fix within the terms of the contract.

3. The rates and prices tendered in the priced bill of quantities shall except in so far as it is otherwise provided under the contract, include all constructional plant, labour supervision, materials, erection, maintenance, insurance profit, taxes and duties together with all general risk, liabilities and obligations set out or implied in the contract.

4. All pages in the BOQ should be signed with out omission.

5. All corrections / over writing should be properly attested by the bidder.

6. The total amount arrived based on the excess/less quoted on the "Abstract of BOQ" will only be taken as final value for comparison and finalization of the tender.

7. If there is any variation in the percentage quoted in words and figures, the lesser of the two will only be taken in to consideration.

8. The percentage quoted in the bid should be up to two decimal only.

9. If the tenderer failed to score out the word either of "Excess" or "Less" the word less alone will be taken in to consideration.

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Contractor

Executive Engineer, TWAD Board,
RWS Division, Tiruvannamalai.

SCHEDULE – C

PROGRAMME SCHEDULE

1. The fifteenth day from the date of issue of work order shall be reckoned as the start date of the contract period.

2. Entire project must be completed in all respects within **3 (Three) months** from the start date.

   The rate of progress for each component covered in the contract shall be as in the following schedule:

SL. No	DESCRIPTION	Percentage of Completion After a period of One month
1	(Name of Work)	**100%**

1. **Programme Schedule / Rate of progress / Milestone:**
   The contractor within seven days from the date of signing of the agreement shall submit to the Engineer for approval a programme showing the general methods arrangements, order, and timing for all the activities in the works.

   An update of the programme shall be a programme showing the actual progress achieved on each activity and the progress to be achieved on the remaining work including any changes to the sequence of activities. The contractor shall submit to the Engineer in charge, for approval an updated programme. The employer reserves the right to approve or reject the updated programme without prejudice to levying the penalty for slow progress.

3 **Penalty for Defective Construction:**
If any defect is noticed by the Employer in the construction of any portion of work/component, the Employer shall levy penalty up to 10% of the total value of the defective work as assessed by the Engineer in charge, in addition to rectification of defective works at his cost.

4 **Penalty for Slow progress:**
Provided the firm/contractor fails to maintain the required rate of progress/mile stones stipulated for the project as whole or in any of the component or in the case of works not commenced, the engineer in charge shall have the right to impose penalty of such an amount as he may deem fit for every day of delay caused in the progress of the project as a whole or in part as well as for the portion of the work remaining not commenced, subject to the condition that the total penalty imposed shall not exceed 5% of the total contract value. The penalty levied on the firm/contractor is however subject to modification at the discretion of the Executive Engineer for valid reasons which are to be recorded.

5 **Procedure for Levying of Penalty:**
The programme schedule drawn for the project entrusted on turnkey basis should be kept up by the firm / contractor without any slippage. The Executive Engineer concerned shall monitor properly the execution of the work with reference to the programme schedule stipulated. The Executive Engineer, on identification of any defective construction or any slippage in the programme schedule in any of the component, shall issue a show cause notice either by RPAD or through personal service to the firm / contractor, giving 15 days time for furnishing the reasons therefore by the firm/contractor. In cases, where the reasons adduced by the firm/contractor are not convincing, the penalty contemplated in the agreement conditions shall be invoked.

5. **Liquidated Damages:**
Provided the firm/contractor fails to complete the work as a whole or part thereof within the stipulated period, the firm/contractor shall be liable to pay liquidated damages at 0.10% of the value of the unfinished works per week of delay till the completion of the work in full in all respects and handing over to the department. The amount recoverable towards liquidated damages shall however be restricted to 5% of the total contract value. The imposition of the liquidated damages clause will be without prejudice to the rights of the Employer to terminate the contract as time barred.

For imposing liquidated damages, detailed show cause notice shall be served on the defaulting firm/contractor either by RPAD or through personal service. The first notice shall be served allowing 15 days time to the firm/contractor for furnishing the reply by them. In case of non receipt of reply on expiry of 15 days time from the date of first notice, the second notice shall be served allowing 7 days of time to the firm/contractor for furnishing the reply by them. Again in case of non receipt of reply on expiry of 7 days time from the date of second notice, the third notice shall be served allowing 3 days of time to the firm/contractor for furnishing the reply by them. On receipt of the reply, it shall be verified by the Engineer in charge and liquidated damages clause shall be invoked by issuing an explicit speaking order to the firm / contractor, Similarly, the non receipt of any reply from the firm / contractor shall attract imposing the liquidated damages clause automatically and in this case also, the liquidated damages shall be imposed by issuing an explicit speaking order to the firm/contractor.

5. **Foreclosure of Works:**
   The Employer shall have the right to issue notice to the firm/contractor, for any reason whatsoever does not require the whole or part of the works to be carried out after the award of the contract. The contractor shall not have any claim towards compensation or whatsoever, on account of any profit or advantage, which he might have derived from the execution of such works. For the works executed which could not be utilised in view of the foreclosure, the firm/contractor shall be paid an eligible amount as certified by the Engineer in charge.

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SCHEDULE – D

MATERIALS

All the materials required for the work should be arranged by the contractor himself at his cost. He shall be responsible for transport of all materials to site of work, storing properly at site of work and for the safe custody of all materials including all incidental and handling charges.

The Contractor shall ensure that the materials procured conform to the relevant BIS Specification set out in the bid documents and also of good quality. If the materials are not covered by BIS they should conform to the departmental specifications and departmental requirements.

The contractor shall arrange at his cost for the inspection of the materials at the manufacturing place or at other places by the departmental officer wherever necessary. The contractor shall provide all the assistance necessary including instruments, machineries and materials that are normally required for carrying out the testing/measuring the Quality / Quantity of the materials and workmanship. Any materials rejected after testing by the Engineer in-charge or his representative should not be used on the works.

The Engineer in charge shall have the right to order the removal of such materials which in his opinion are substandard stipulating a time for the removal of the same and replacement with quality material.

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SCHEDULE – E
TECHNICAL STAFF TO BE EMPLOYED

The Contractor shall employ the following technical staff as per the prescribed rules.

Name of the member of Technical Staff to be employed:

Qualification:

The details of value, scale and minimum qualification prescribed for the employment of technical staff, the rate of penalty for the failure on the part of the contractor to employ the technical staff for the work etc. are as follows:

The details of value, scale and minimum qualification prescribed for the employment of technical staff, the rate of penalty for the failure on the part of the contractor to employ the technical staff for the work etc. are as follows.

Sl. No.	Value of Contract	Scale & Minimum Qualification prescribed for the employment of technical staff	Rate of penalty
1	Above Rs. 1.00 Lakh & upto Rs. 5.00 Lakh	One LCE / DCE / LSE or retired JE / LSE (Civil) of TWAD (or) other Engineering Department	Rs. 2,000/- per month
2.	Above Rs. 5.00 Lakhs & upto Rs. 10.00 Lakhs	One B.E., (Civil) or equivalent degree holder with at least one year experience (or) other Engg. Dept.	Rs. 5,000/- per month
3.	Above Rs. 10.00 Lakhs & upto Rs. 25.00 Lakhs	One B.E., (Civil) or equivalent Engineering Department holder with at least three years experience (or) retired AEE of TWAD or other Engg. Dept. in addition to one LCE / DCE / LSE holder	Rs. 7,000/- per month (Degree Rs. 5,000/- Diploma Rs. 2,000/-)
4	Above Rs. 25.00 Lakhs	One B.E., (Civil) or equivalent Engineering Degree holder with at least three years experience (or) retired AEE to TWAD or other Engg. Dept. in addition to two LCE / DCE / LSE holder	Rs. 9,000/- per month (Degree Rs. 5,000/-, Diploma Rs. 2,000/-)

If the Contractor fails to employ the technical staff to the departmental requirements, the contractor is liable to pay the penalty as indicated above during the period of such non employment of technical staff.

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Contractor

Executive Engineer, TWAD Board,
RWS Division, Tiruvannamalai.

SCHEDULE – F
PAYMENTS AND RECOVERIES

1. Payment Schedule:

Payment shall be made in stages for each component as envisaged under:

Civil Works:

Payment may be released up to 90% of the measured and Check measured quantity and balance 5% on Commissioning of the Scheme and balance 5% on Completion of maintenance period subject to the condition in para 4 to and of bid documents.

Pumping Main, Connecting Main, Branch Pumping Main and Distribution Main for AC pipes, CI Pipes and PVC Pipes and Fittings:

A. After supply at site	:	Up to 70%
B. After laying jointing and testing of pipes	:	Upto 90%
C. After commissioning of the entire length of main	:	Upto 95%
D. After completion of the maintenance period of the scheme as a whole.	:	Balance 5%

Payment will be made as above for first consignment and payment for subsequent consignments will be released as above only after 50% of previous consignment is laid jointed and tested.

Mechanical items in pumping plant and treatment plant:

For pumpsets up to 25 H.P:

A. After receipt of Materials at site	:	Up to 75%
B. After erection	:	15%
C. After Commissioning	:	5%
D. After Completion of maintenance period	:	5%

For pumpsets above 25 H.P.

A. After receipt of Materials at site	:	Up to 75%
B. After erection, commissioning and post installation, inspection by third party agency	:	20%
C. After Completion of maintenance period	:	5%

Note:

- The payment shall be made for each component as per the actual measurement up to the percentages mentioned above for the stage of progress of each component. In the case of actual value of works carried out becoming lesser than the percentage limits prescribed for the stages, the payments shall be restricted to the actual.

- Payments shall become eligible only for finished items of works in all respects.

- Payment shall be made for supply of materials alone except in the case of treatment works and pumping plant.

2 **Preparation of bills:**

All Contractors shall submit bills for agreement in the M. Book format for the Quantity only of the relevant running bill duly signed. This will be treated as claim of the Contractor to consider payment. The Contractor shall submit their bills to the Sub Division office. The Asst. Executive Engineer is responsible for complying the claim lodged by the Contractor in time.

3 **Release of performance security & Retention Amount:**

3.1 In addition to the withheld amount, 5% of the amount of each bill of the contract shall be deducted and will be retained till the date of receipt of certificate of water tightness from the Executive Engineer, TWAD Board.

The whole of the above sum of together with any recovery from the payments already made to the contractor as may be assessed by the Executive Engineer shall be forfeited to the TWAD Board if the RCC reservoir develops structural defects or leaks. The above recovery shall be exclusive of the amount deposited towards security deposit. The fact of carrying out water tightness test should be recorded in the M.Book. The last part bill should be passed only after above certificate is issued. However, the contractor shall be permitted to execute an indemnity bond in lieu of the recovery of 5% in each bill in prescribed form in non judicial stamp paper for a value of Rs.22.50 towards water tightness and structural stability of the reservoir/water retaining structure. The period of guarantee required by the contract shall be two years from the date of completion and commissioning (with filling of water up to maximum water level in the case of service reservoir/over head tanks/water retaining structure). If defects are noticed within the stipulated period of 24 months of satisfactory performance, the defects should be rectified by the

contractor at his own cost and the performance period again shall be reckoned from the date of completion of the rectification of defects by the contractor. In the case of service reservoir/over head tanks and other water retaining structures during this period, structure under full working head of water should show no sign of leakage. The test for water tightness should be arranged to be carried out and completed within 30 days from the date of intimation by the Engineer in charge. The testing of the service reservoir/over head tank and other water retaining structures should be done by the contractor at his own cost inclusive of all necessary equipment, water etc., complete.

The test for water tightness of the structure as well as materials of construction used shall be conducted in conformity with the standard specifications as per I.S.3370 (Part-I) – 1965 as amended from time to time and the other specifications as mentioned in the Bid Document.

3.2. The security deposit less any amount due to the Board and 2 ½ % out of the total 5% of the retention amount made in every running bill shall be released in final bill which shall be prepared after the works are completed in all respects and after completion of maintenance period.

3.3 In respect of building works, RCC reservoir and other works where water tightness and soundness are to be watched for more than 6 months notwithstanding above clause, the balance 2 ½ % out of the total 5% retention amount from final bill in respect of contract for original construction or original building works, construction of RCC reservoir work etc., will be retained by Engineer in charge and paid to then contractor after a period of 24 months of satisfactory performance of entire civil works including maintenance period and on production of an indemnity bond for the above amount for a further period of 3 years beyond the above said 2 years to ensure structural stability.

4. **Recovery of money payable to the TWAD board:**

All losses, costs, damages and expenses and other money payable to the Board by the contractor under any stipulation in the contract, may be retained out of any money due or which may subsequently become due from the Board to the contractor under any contract or otherwise whatsoever and in case such money then due or to become due to the contractor by the Board shall be insufficient to pay such losses, costs, damages, and other money payable to the TWAD Board by the contractor, it shall be lawful for the Engineer in charge without any further consent on the part of the

contractor to sell or dispose of any or all the government promissory notes for the securities deposited in the Board by the contractor as aforesaid and with and out of the proceeds of such sale, after payment of all expenses connected therewith or reimburse and pay to the Board all such losses, cost, damages and expenses and other money payable to the contractor. And in case such proceeds of sale of the said government promissory notes or securities shall be insufficient for such purpose then and in that case it shall be lawful for the Board to recover the residue thereof, if necessary by legal proceedings and or by resorting to revenue recovery act against the contractor.

1. **Income Tax**

   During the course of the contract period, deduction of income tax shall be made at the prevailing rates from every payment as may be specified by the Income Tax Department.

2. **Fund Contribution for Manual Workers:**

   (Under V. Payments and Recoveries)

   Towards contribution of fun for the benefit of manual workers employed in the construction works employed. In the construction works an amount equipment to 1% of total estimated cost of the construction work proposed will be paid by the employer direct to the respective welfare Board, as per G.O. Ms.No. 295/ Labour and Employment (I2) department / dt. 17.12.2013. subject to issue of amendments from time to time by the respective department of Government of Tamil Nadu. (Lump sum Provision for this contribution may be appropriately made in the Estimate sanctioned for the schemes and the amount would be remitted at the end of the financial year to the labour welfare Board, as per G.O.Ms. 263, MAWS Dept, dated. 2010.

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SPECIAL CONDITIONS OF CONTRACT

Royalty Charges:

Except where otherwise stated, the contractor shall pay all signora and other royalties, rent and other payments or compensation, if any, for getting stone, sand, gravel clay or other materials required for the works. The Contractor is not eligible for any payment in this regard from the Board.

Earthwork Excavation:

The bidder should carefully inspect the site to access the prevalence of differing soil classifications and quote his rate for trench excavations that are likely to be encountered and no extra rate will be paid for excavation of trench on account of any variations in the classification of soil met with during actual execution.

Extension of time:

Where the entire Work as per schedule –A is not completed within the schedule period of 30 days, extension of time may if so required by the Contractor / Firm be granted on the genuine reasons the part of the Contractor / Firm at the discretion of the Executive Engineer as deems fit.

Execution of work by the contractor:

The contractor shall execute the whole and every part of the work in the most substantial and work man like manner and both as regards materials and every other respect in strict accordance with specification. The contractor shall also confirm exactly fully and faithfully to the designs drawing and instructions in writing relating to the work signed by the Engineer in charge. And completion of the entire work as per the specifications, drawing, terms and conditions of the contract and to the satisfaction of the Engineer in charge, the contractor shall obtain the completion certificate from the Executive Engineer.

Alteration to specification and Design:

The Engineer in charge shall have the power to make any alteration or additions to the original specification, drawing, design and instruction that may appear to him to be necessary during the progress of work and the contractor shall bound to carry out the work in accordance with the instruction in this connection which may be given to him in writing signed by the Engineer in charge and such alteration shall not invalidate the contract and such works shall be carried out by the contractor on the same condition in all respects on which he agreed to do the main work. The rates for such additional works will be fixed by the Executive Engineer as per rules in force.

Contractor liability:

During guarantee period of 12 months from the date of completion as certified by the Assistant Executive Engineer, the said work is found to be defective in any manner what so ever, the contractor shall forthwith, on receipt of notice in that behalf from the Assistant Executive Engineer duly rectifying and setting right the defect specified there in strictly in accordance and in the manner prescribed and under the supervision of the Engineer in-charge at his own risk and cost. In the event of the contractor failing or neglecting to carry out the rectification work within the period prescribed therefore, in the said notice, the Engineer in charge will get the same executed and carried out departmentally or by any other agency at the risk and cost of the contractor. The contractor shall forth with on demand, pay to the Board the amount of such costs, charges and expenses sustained or incurred by the Board of which the certificate of the Executive Engineer shall be final and binding on the contractor. If the contractor fails to pay the same on demand, the Board shall be entitled to deduct the same from any amount which may then be payable or become payable by the Board to the contractor, either in respect of the said work or any other work whatsoever or from the amount of security deposit.

With held amount in Running Bills:

In addition to the initial security, an amount of 5% of the total value of each bill will be recovered as additional security deposit. The security deposit less any amount due to the Board and $2\frac{1}{2}$% out of the withheld amount shall be released in final bill which shall be prepared after the works are completed in all respect and after completion of twelve month guarantee period from the date of commissioning the equipment / machinery.

Payments and Retention:

(a)The amount withheld from the final bill will be retained under 'Deposits' and paid to the contractor together with security deposit after 6 months reckoned from the date of completion of work or as soon after the expiration of such period of 6 months as all defects shall have been made good according to true intent and meaning hereof whichever shall last happen. In the event the final bill remains unpaid.

Even after the period of 6 months aforesaid the Engineer shall refund the security deposit and also the withheld amount on a separate bill if requested for by the contractor in writing. No certificate of Engineer shall be considered conclusive evidence as to the sufficiency of any work or materials or correctness of measurements to which it does not relate nor shall it relieve the

contractor from his liability to make good defects as provided by the contract. The contractor when applying for a certificate shall prepare a sufficient detailed bill based on the original figures of quantities and rates in the contract schedule to the satisfaction of the Engineer to enable the Engineer to check the claims and issue the certificate. The certificate as to such of the claims mentioned in the application as are allowed by the Engineer shall be issued within (14) fourteen days of the application. No application for a certificate shall be made within (14) fourteen days of a previous application. The amount to be withheld in each bill is 5%.

(b) If defects are noticed within the stipulated period of 12 months guarantee period, the defects should be rectified by the contractor at his own cost and the performance period again shall be reckoned from the date of completion of the rectification of defects by the contractor. The tenderer shall be solely responsible for the accuracy and performance of the equipments / machinery repaired by him, the test certificate of the structure as well as materials used shall be conducted in conformity with the standard specification and as per I.E. rules. As amended from time to time and the other specifications as mentioned in the technical specifications schedule.

(c) Income Tax shall be deducted at two (2) percent of the gross amount of each bill or at the ruling rates fixed by the Government of India from time to time

(d) In the event of the death or insanity or insolvency or imprisonment of the contractor or where the contractor being a partnership firm becomes dissolved or being a corporation goes into liquidation voluntary or otherwise, the contractor may at the option of the Engineer, be terminated by notice in writing posted at the site of the works and all accepted and acceptable works shall forth3ith be measured up and paid for at the rates provided in the contract schedule where such apply or otherwise, by the most recent schedule of rate approved by the competent authority to the person or person entitled to receive and give a discharge for the payment.

Prices:

The prices offered by the contractor shall remain firm for the entire project period and no variation in price shall be allowed on any account.

Risk Insurance:

The contractor may take risk insurance at his cost against loss or damages to the construction against unprecedented floods and other acts of god. The contractor will not be eligible for any payment by the Board on this account.

Forfeiture of Performance Security (Security Deposit):

In the case of the contractor, after award of work, failing to carry out the work in accordance with the specifications, terms and conditions of the contract leading to termination of contract, the Performance Security will be forfeited to the Board.

Jurisdiction of Court:

In the event of any dispute arising between parties here to in respect of any of the matter comprised in this contract, the same shall be settled by a competent court having jurisdiction over the place where contract is awarded and agreement is concluded and by no other court.

GST:

The GST will be applicable as per the Government and Board directions then and there.

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GENERAL CONDITIONS OF CONTRACT

1. DEFINITIONS

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

"Board" means the Tamil Nadu Water Supply and Drainage Board, a statutory body constituted under the Tamil Nadu Water Supply and Drainage Board Act 1971 having its office at No.31,Kamarajar Salai, Chepauk, Chennai – 600 005 and any officer authorised to act on its behalf

"Employer" means the Tamil Nadu Water Supply and Drainage Board and shall include the officers duly authorised to act on its behalf

"Contractor" means the person or persons, firm or company whose tender has been accepted by the Employer and includes the authorised representatives, successors, heirs, executors, administrators

"Subcontractor" means any person or persons, firm or company named in the Contract as a Subcontractor for a part of the Works or any person or persons, firm or company to whom a part of the Works has been subcontracted with the consent of the Engineer and includes the authorised representatives, successors, heirs, executors, administrators of such Subcontractors

"Engineer" means the Executive Engineer or any other Engineer appointed from time to time by the Employer to act as Engineer for the purposes of the works brought under this contract

"Engineer in charges" means the Executive Engineer or any other Engineer authorised by him.

"Engineer's representative" means any Resident Engineer or assistant of the Engineer or any clerk of works appointed from time to time by the Employer or/the Engineer to perform the duties set forth in respect of this Contract.

"Contract" means the Invitation for Bids and amendment made thereof, Letter of Acceptance, the formal Agreement executed between the Employer and the Contractor together with the documents referred to therein, General Conditions of the Contract, Special Conditions, Specifications, Minutes of the

pre Bid conference, Design, Drawings, Schedule of Rates and Prices, Bill of quantities, Rate of Progress etc., All these documents taken together shall be deemed to form one contract and shall be complementary to one another

"Turnkey Contract" means execution of the water supply and sewerage works lincluding the supply and installation of all materials, machineries, equipments etc in accordance with specifications stipulated in the Bid Document and in conformity with

the quality parameters laid down in relevant BIS, TNBP, Bid Documents etc and competing the entire works in all respects satisfactorily and commissioning within the stipulated period and maintaining the scheme for the specified period.

"Contract Price" means the sum stated in the Letter of Acceptance as payable to the contractor for the execution, completion and maintenance of the works, subject to such additions thereto or deductions therefrom as may be provided under this Contract and the remedying of any defects therein in accordance with the provisions of the contract.

"Constructional Plant" means all appliances or things of whatsoever nature required in or about the execution, completion or maintenance of the works but do not include materials or other things included to form or forming part of the permanent works.

"Works" shall include both permanent works and temporary works. "Permanent works' means the works of permanent nature to be executed, completed and maintained (including Plant) in accordance with the contract. 'Temporary works' means all temporary works of every kind required in or about the execution, completion or maintenance of the works and remedying of the defects therein

Specification" means the schedules, detailed designs, technical data, performance Characteristics and all such particulars referred to in the bid/contract and any modification thereof or addition thereto as may from time to time be furnished or approved by the Employer.

Drawings" means the drawings, calculations and technical information referred to in specification and any modification of such drawings approved in writing by the Engineer and such other drawings, calculations and technical information as may to time be furnished or approved in writing by the Engineer.

"Site" means the land and other places on, under, in or through which the Permanent works and/or Temporary Works are to be executed and any other lands and places provided by the Employer for working space or any other purpose as may be specifically designated in the Contract as forming part of the site.

Approved means approval in writing including subsequent written confirmation of previous verbal approval.

"Test" means such test or tests as are prescribed in the specifications or considered necessary by the Engineer.

'ISS" means Indian Standard Specifications.

"BIS" means Bureau of Indian Standards.

"TNBP" means Tamil Nadu Building Practice.

"Day" means a Calendar day from midnight to midnight.

"Week" means seven consecutive days.

"Month" means from the beginning date of a given date of a calendar month to the end the preceding date of the next calendar month.

"Quarter" means a period of three months reckoning from the 1st date of January April, July and October and counted to the last date of March, June, September and December respectively.

Rupees means Rupees in Indian Currency.

"Bill of Quantities" means the priced and completed bill of quantities forming part of the tender.

"Tender" means the Contractor's priced offer to the Employer for the execution, completion and maintenance of the Works and the remedying of any defects therein in accordance with the provisions of the Contract, as accepted by the Letter of acceptance.

Letter of Acceptance" means the formal acceptance by the Employer of the Tender.

"Contractor Agreement" means the contract agreement referred to in clause. Appendix to Tender" means the appendix comprised in the form of Tender annexed in these conditions.

"Commencement Date" means the fifteenth from the date of issue of work order shall be reckoned as the start date of the project.

"Time of Completion" means the time for completing the execution of and passing the Tests on Completion of the Works of any section or part thereof as stated in the Contract (or as extended under Clause...) calculated from the Commencement Date.

"Maintenance" means the successful maintenance of the completed and commissioned project as a whole or in parts as the case may be for the stipulated period.

"Joint Venture" mean two or more firms/contractors aspiring to take up the contract jointly with the lead partner and other partner/partners possessing the required qualifications.

2. INTERPRETATION

In interpretation of these Conditions of Contract, headings shall not be deemed part thereof or be taken into consideration. Words importing persons or parties shall include firms and corporations and any organization having legal capacity. Words importing the singular only also include plural and vice versa where the context requires.

The Employer will provide instructions clarifying the queries about the contract.

3. Authority of Engineer in Charge:

It shall be accepted that the authority of the Engineer in charge shall be an integral part of the contract in all matters regarding the quality of materials, workmanship, removal of improper work, interpretation of the contract drawings and specifications, mode and procedure of carrying out the works where the decision of the Engineer in charge shall be final and binding on the contractor. The Engineer in charge shall have absolute authority on all technical matters and payment considerations.

4. Sufficiency of Bid:

The Contractor shall be deemed to have satisfied himself as to the correctness and sufficiency of the bid and of the rates and prices stated in the Bill of Quantities, all of which shall, except insofar as it is otherwise provided in the contract, cover all his obligations under the Contract (including those in respect of the supply of goods, materials, Plant or services or of contingencies for which there is a Provisional Sum) and all matters and things necessary for the proper execution and completion of the Works and the remedying of any defects therein.

5. Priority of Contract Documents

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 Engineer who shall thereupon issue to the Contractor instructions thereon and in such event, unless otherwise provided in the Contract. The prioritity of the documents forming the Contract shall be as follows:

- The Contract Agreement
- The Letter of Acceptance
- The Tender
- Conditions of the Contract
- Technical specifications
- Any other document forming part of the Contract
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6. Secrecy of the contract document:

The Contractor shall treat all documents, correspondence, direction and orders concerning the contract as confidential and restricted in nature by the contractor and shall not divulge or allow access to these matters to any unauthorized person.

7. Instruction in Writing:

Instructions given by the Engineer or Engineer's Representative shall be in writing, provided that if for any reason, the Engineer or the Engineer's Representative considers it necessary to give any such instruction orally, the Contractor shall comply with such instruction. Confirmation in writing of such oral instruction given by the Engineer or Engineer's Representative, whether before or after the carrying out of the instructions given by the Engineer or Engineer's Representative, shall be deemed to be an instruction.

8. Commencement of Works:

The Contractor shall commence preliminary works after the receipt by him of the LOA to this effect from the Engineer in charge. Thereafter, the contractor shall proceed with the Works with due expedition and without delay and in accordance with the programme schedule set out in the Contract.

9. Reference Marks

The basic center lines, reference points and bench marks shall be fixed by the Engineer in charge of the works. The contractor shall establish additional reference points and bench marks as may be necessary at his cost. The contractor shall remain responsible for the accuracy and sufficiency of the reference and bench marks. The contractor shall take proper precautionary steps to ensure that the reference lines and bench marks established for the works are not disturbed and shall make good any damages caused.

10. Supervision

The Contractor shall provide all necessary superintendence during the execution of the works and thereafter as may be necessary for the proper fulfillment of the obligations under this contract. The contractor shall arrange for the deployment of proper qualified personnel at the site of work constantly, such supervising staff, apart from those separately set out as the requirements of the contract, shall be skilled and experienced technical assistants, foremen and others competent enough to produce proper supervision.

The Contractor shall employ the technical staff as per the prescribed rules. The details of value, scale and minimum qualification prescribed for the employment of technical staff, the rate of penalty for the failure on the part of the contractor to employ the technical staff for the work etc.,

If the contractor fails to employ the technical staff to the departmental requirements, the contractor is liable to pay the penalty as indicated above during the period of such non employment of technical staff. In the event of any staff of the contractor being non co-operative, negligent, incompetent of misconduct, the Engineer in charge shall have the liberty to object to the placement of such staff at the site or other place of works and will promptly issue notice in writing to the contractor for the removal of such staff members. It will be obligatory on the part of the contractor to remove/change such persons in the larger interests of the works.

11. Subletting of Contract:
Assignment of the contract is not permissible.

Transfer of the contract is not permissible on any grounds.

The contractor shall sublet any portion of the contract only with the written consent of the Engineer in charge. It should be clearly understood that any subletting shall in no way absolve the contractor of his responsibilities and obligations under this contract.

12. Specifications and Checks:
Stated dimensions in the drawings are to be taken for consideration and no measurements based on scaling of the drawings shall be considered. In case of discrepancy between the description of items in the schedule of quantities and the specifications, the later shall prevail. In case of the description, any work having not fully described or doubts prevail, the contractor shall forthwith write to the Engineer in charge and clarify himself before executing that portion of the work. However, this cannot be a cause for any delay in the progress and the contractor should take advance action in this regard ensuring timely completion of the works.

Before commencement of the work, it will be obligatory on the part of the contractor to furnish a detailed plan of action along with layouts showing the position of the construction plants and other facilities required and proposed to be provided for this contract.

The contractor shall execute the works true to alignment, grade and levels as set out in the drawings and as directed by the Engineer in charge from time to time. The Engineer in charge or his representative is at liberty to check the correctness of the works, the suitability of the materials used, design mix etc., The contractor will raise no objections for such checks land shall provide necessary labour and instruments to carry out such check to the Engineer in charge as well as his representative and co-operate in the checks. However, such checks will not absolve the contractor of his responsibility of maintaining the accuracy of the work.

13. Custody and Supply of Drawings and documents:
The drawings shall remain in the sole custody of the Engineer in charge, but two copies thereof shall be provided to the contractor free of charge. The contractor shall make at his own cost any further copies required by him. Unless it is strictly necessary for the purposes of the contract, the drawings

specifications and other documents provided by the Employer or the Engineer in charge shall not, without the consent of the Engineer in charge, be used or communicated to a third party by the contractor. One copy of the Drawings, provided to or supplied to the Contractor as aforesaid, shall be kept by the Contractor at the site and the same shall be made available for inspection and use by the Engineer and by any other person authorized by the Engineer.

14. Bill of Quantities:

The bill of Quantities shall contain items of works relating to each component of the scheme to be carried out by the contactor. The bill of quantities will be used to calculate the contract price. The contractor shall be paid for the quantum of work done at the rate mentioned for each item in the bill of quantities. (Including tender premium in case of Percentage tender system).

15. CHANGE IN THE QUANTITIES:

IF THE final quantity of the work done differs from the quantity in the Bill of Quantities for the particular item/items, the rates as in the agreement for the relevant items shall be paid as per the actual quantity.

16. Additional items

If additional items that are not contemplated in the contract are to be executed, the Engineer in charge will execute the works either through the main contractor/firm or through any other agency. Payment for such works shall be made based on the rates derived by the Engineer in charge as per rules in force.

17. Order Book

An order book will be kept by the Officer in charge of the site (Junior Engineer/Assistant Engineer) of the particular component of the works. Orders entered in this book by the Engineer in charge or any higher authority shall be held to have been formally communicated to the contractor/firm. The Officer in charge of the site will sign each order as it is entered and will hand over the duplicate to the contractor/firm or his agent, who shall sign the original in acknowledgement of having received the order.

18. Independent Inspection

The Engineer shall delegate inspection and testing of materials or Plant to an independent inspector/Agency. Any such delegation shall be considered as prerogative of the Engineer. In addition to third party inspection, wherever felt necessary, the engineer shall be empowered to test the PVC Pipes for its quality

such as specific gravity, diameter, thickness etc in the TWAD Board laboratory. The inspection charges/fees shall be payable by the contractor.

19. Covering and Opening of Works.

No work shall be covered or put out of view without the approval of the engineer in charge. The contractor shall give due notice to the Engineer in charge whenever such works are ready for examination and the Engineer in charge within a reasonable period, arrange for the inspection and measuring of the work as may be necessary. No portions of the work shall be covered up without the consent of the Engineer in charge. The cost of opening any portion of the works that was covered without the consent of the Engineer in charge and the cost of covering thereafter shall be borne by the contractor.

The contractor shall open the covered portion of the works for inspection by the Engineer in charge on a request and the inspection or examination shall be carried out promptly by the Engineer in charge. In the case of defects notified by the Engineer in charge, the contractor shall rectify the same as may be instructed by the Engineer in charge. All costs of opening, covering and rectification shall be on to the account of the contractor. Should the contractor refuse to open such portions of works the Engineer in charge shall open such portions with other persons and inspect the part of the works as he may feel necessary. On inspection, the works being not in accordance with the requirements of the contract documents, the Engineer in charge shall carry out necessary rectification and the entire cost of opening, rectification and closing shall be on to the contractor's account.

20. Temporary Diversion of Roads and Commencement of Work:

During execution of the works, the contractor/firm shall make at his cost all necessary provision for the temporary diversion of roads, car tracks, footpaths, drains, water courses, channels etc., Should the contractor/firm fail to do these arrangements, the same shall be done by the Engineer in charge and the cost thereof shall be recovered from the contractor/firm.

21. Notice to Telephone, Railway and Electric Supply Undertaking:

The Contractor/firm shall give all notices required by any law or custom or as directed by the Engineer in charge and irrespective of whether notice be so required so directed or not, shall in all cases give due and sufficient notices to all persons and authorities having charge of the telegraph, water and other pipes, sewers, culverts drains, water courses, railway, telephone, highways, roads, streets, foot and carriage highways, payment and other works, prior to commencements and at the completion of any work under this contract in order

to enable the proper bodies or persons in respect of the matters aforesaid to attend and see the works within their jurisdiction and all matters and things incidental and pertaining thereto are secured, re-laid or reinstated in a proper and satisfactory manner. The notices by the contractor/firm shall also serve the purpose of enabling such bodies and persons to attend and secure, shore up, alter the position or remove, relay and reinstate the works and things belonging to them notwithstanding the notices given as aforesaid the Contractor/firm shall be chargeable and responsible for the proper protection and restoration of all matters and things herein referred to.

21. Watching and Lighting

The Contractor/firm shall at his expense provide at the site of works sufficient fencing, barricading, watching and lighting during day and night. The contractor/firm shall in every respect conform to the police regulations in these matters and shall free and relieve the Board on all such matters. Should the contractor/firm fail/neglect to do these arrangements, the same shall be carried out by the Engineer in charge and the costs thereof shall be recovered from the contractor/firm.

22. Measurement of Work

The work will be measured by the site engineer (Junior Engineer/ Assistant Engineer) and recorded in the measurement book. The contractor/firm will be at liberty to accompany the site engineer in order that they may agree on the measurements but should they neglect to do so, the measurements as recorded by the site engineer shall be taken as final and conclusive. The measurements of works will be recorded as prescribed in the TNBP and as amended from time to time.

23. Tools and Plants

All tools, plants and equipments required for this contract will be arranged by the Contractor at his own expense. The Contractor shall erect necessary construction plant as may be necessary and shall use such methods and applicances for the proper performance of all the operations connected with the work brought under the contract ensuring satisfactory quality of work and maintenance of the programme schedule. The non availability of any tool, plant or equipment shall not be relied upon as a reason for non functioning or slow progress.

24. Information and Data

The information and data made available to the contractor in respect of the works and site conditions are only general and the contractor is advised to get

himself fully acquainted with the nature of the location of the works and the surroundings, quarries, local conditions and such other aspects that are relevant to the works.

25. Coexistence with other Contractors.

Where two or more contractors are engaged on work in the same vicinity, they shall work together harmoniously with the spirit of cooperation and accommodation. The contractor shall not disrupt or disturb the works or labour arrangements of the neighboring contractors. In case of disputes and difficulties arising between the contractors in the execution of the respective works, the Engineer in charge shall interfere and give directions for the smooth functioning of the entire works and it shall be the bounden duty of the contractors to abide by these instructions.

26. General Responsibilities and Obligations of the Contractor

The contractor shall, subject to the provisions of the contract, execute and maintain the works with proper care and diligence and provide all labour including the supervision thereof, materials, constructional plant and all other things, whether of a temporary or permanent nature required for such execution and maintenance.

The contractor shall take full responsibility for the adequacy, stability and safety of all site operation and methods of construction.

The contractor shall promptly inform the Employer and the Engineer in charge if any error omission, fault and other defects in the specification or design of the works which are identified at the time of reviewing the contract documents or during the execution for proper rectification thereof.

All notices, certificates connected with the work served by the employer relating to the contract shall be sent by post or by hand to the contractor' principal place of business as mentioned in the document or at other places as may nominated by the contractor in writing for this purpose. Any change in the address of the contractor should be promptly intimated to the Employer in writing then and there.

The contractor shall visit the spots of work and ascertain the site conditions. The contractor shall satisfy himself of the conditions prevailing in the spots where the work is actually to be executed and its environs and the precise offered by him shall be treated as those which were worked out taking fully into consideration the prevailing site conditions, hydrological conditions, extent

and nature of work to be executed, the material availability, etc., Any claim on this ground at a later date shall be summarily rejected.

However during the execution of the works, if the contractor has to encounter artificial obstructions, which in his opinion could not have been reasonably foreseen, then the contractor shall write forthwith to the Engineer in charge of such obstruction and remedial measures needed. The Engineer in charge, if opined that the conditions cannot be possibly foreseen by an experienced contractor, he shall extend possible assistance to the contractor to overcome such obstructions. The opinion of the Engineer in charge shall be final and binding and the contractor is not entitled to advance these as reasons for any delay that may be caused to the completion of the project.

The contractor shall execute and maintain all works in accordance with the specification and to the satisfaction of the Employer. The contractor shall strictly adhere to the instructions and directions of the engineer in charge, whether included in the contract agreement or not but concerning the safe and proper execution of the works.

27. Labour

The contractor shall not employ any person who has not completed fifteen years of age in connection with the works under this contract.

The contractor shall furnish the information on various categories of labour employed by him to the Engineer in charge in the form prescribed for this purpose.

The contractor shall in respect of labour employed by him comply with or cause to be complied with the provisions of various labour laws, rules and regulations as applicable to them in regard to all matters provided therein and shall indemnify the Employer in respect of all claims that may be made against the Employer for non compliance thereof by the contractor.

Now withstanding anything contained herein, the Employer reserves the right to take such action as may be deemed fit and proper for the compliance of various labour laws and recover the costs thereof from the contractor.

28. Restriction of Working Hours

Subject to any provisions contained in the Contract, none of the works shall, save as hereinafter provided, be carried on during the night or on locally recognised days of rest without the consent of the Engineer, except when work

is unavoidable or absolutely necessary for the saving of life or property or for the safety of the Works, in which case the Contractor shall immediately advise the Engineer, Provided that the provisions of this clause shall not be applicable in the case of any work which is customary to carry out by multiple shifts.

29. Right of Way and Facilities

The Contractor shall bear all costs and charges for special or temporary rights of way required by him in connection with access to site. The Contractor shall also provide at his own cost any additional facilities outside the Site required by him for the purposes of the Works.

30. Removal of Improper Work, Material and Plant

The contractor shall make his own arrangements for the procurement, supply and use of the construction materials and shall ensure that the materials either procured within the country or abroad conform to the relevant specifications set out in the bid documents. In case of alternatives being used, they should be of equal or higher quality than those specified subject to the review and written approval of the Engineer in charge. Differences between the standards specified and the proposed alternatives must be described in writing to the Engineer in charge at least 30 days in advance from the date on which the approval of the Engineer in charge is needed. The disapproval of the proposal by the Engineer in charge shall result in the contractor confining to the standards set forth in the contract documents. The contractor shall arrange for the inspection of the material at the manufacturing place or other places by the department personnel

All materials and workmanship shall be in accordance with the specifications set out in the contract document and as directed by the Engineer in charge and shall be subjected to tests by the Engineer in charge or his representative at the place of manufacture or at the site of work or places wherever felt necessary. The contractor shall provide all the assistance necessary including instruments, machines and materials that are normally required for carrying out the testing/measuring the quality/quantity of the materials and workmanship. Any material rejected after testing by the Engineer in charge or his representative will not be used on the works. The contractor shall without claiming any extra cost, shall arrange for the testing of materials and supervision of the works. The Engineer in charge or his authorized representative will have access at all ties to the places of manufacture, storage to ascertain as to whether the manufacturing process wherever mentioned is in accordance with the drawings and specifications.

The Engineer in charge shall have the right to order the removal of such materials which in his opinion are substandard stipulating a time limit for the removal of the same and replacement with quality material.

Notwithstanding the previous tests of the materials by the Engineer in charge or his representative, if any portion of the work, in the opinion of the Engineer in charge is not in order, the contractor shall redo such work to the satisfaction of the Employer at no extra cost. In case of default on the part of the contractor in carrying out such orders, then the Employer shall have the right to carry out such works through some other persons and the expenses thereon or incidental thereto shall be recoverable from the contractor.

31. Default of Contractor in Compliance

In case of default on the part of the Contractor in carrying out such instruction within the time specified therein, if none, within a reasonable time, the Employer shall be entitled to employ and pay other persons to carry out the same and all costs consequent thereon or incidental thereto shall after due consultation with the Employer and the Contractor, be determined by the Engineer and shall be recoverable from the Contractor by the Employer, and shall be deducted by the Employer from any monies due or to become due to the Contractor and the Engineer shall notify the Contractor accordingly, with a copy to the Employer.

32. Default by Contractor

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

a) Has abandoned the contractor or

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

c) Has failed tore move materials from the site or to pull down and replace work for twenty eight days after receiving the written notice from the engineer incharge stating that the said materials or work stands condemned and rejected under these conditions, or

d) Despite previous warnings in writing by the Engineer in charge, not executing the works and achieving the progress as stipulated in the programmed schedule drawn for the contractor is persistently or flagrantly neglecting to carry out the obligations under this contractor.

e) Has, to the detriment of good workmanship, or in defiance of the instructions of the Engineer in charge or in contrary sublet any part of the contract then the Employer, may at his option, after giving two weeks' notice in writing to the contractor, enter upon the site and the works and expert the contractor there from without thereby voiding.

f) The contract, or recasting the contractor from any of his obligation or liabilities under this contract, and may himself complete the works or may employ any other contractor to complete the work. The employer or such other contractor may use the construction plant, temporary works and materials which have been deemed to be reserved exclusively for the execution of the works under the provisions of the contract as may be thought fit and proper for the completion of the work. The employer may, at anytime, sell any of the said constructional plant, temporary works and materials which have been deemed to be reserved exclusively for the execution of the works under the provisions of the contract as may be thought fit and proper for the completion of the work. The employer may, at any time, sell any of the said constructional plant, temporary works and unused materials and apply the proceeds of sale in or towards the satisfaction of any sums due or which may become due to him from the contractor under this contract.

h) has carried out the work in a defective manner.

i) has not made payment of labour dues.

j) has become eligible for maximum compensation under the "Liquidated damages clause" leading to Termination of the contract.

The Engineer in charge shall as soon as may be practicable after any such entry or expulsion by the employer, fix and determine expert or by after reference to the parties, or after such investigation or enquires as maybe thought fit to make or institute, and shall clarify what amount, if any had at the time of such entry and expulsion been reasonably occurred to the contractor in respect of work then actually done by him under this contract and the value of any of the said unused or partially used materials, any constructional plant and any temporary woks.

If the employer shall enter and expel the contractor under this clause, the employer shall not be liable to pay to the contractor any money on account of the contract until the expiration of the period of maintenance and thereafter until the costs of execution and maintenance, damages for delay in completion, if any and all other expenses incurred by the Employer have been ascertained and the amount thereof certified by the engineer. The contractor shall then be entitled to receive only such sum or sums, if any as the engineer in charge may certify would have payable to him upon due completion by him after deducting the said amount. If such amount shall exceed the sum which would have been payable to the contractor on due completion by him, then the contractor shall, upon demand, pay to the employer the amount of such excess and it shall be deemed a debt due by the contractor to the Employer and shall be recoverable accordingly.

If, by reason of any accident, or failure, or other event occurring to or in connection with the work, or any part thereof, either during the execution of the works, or during the period of maintenance, any remedial or other work or repair shall in the opinion of the Engineer incharge or his authorized representative, be urgently necessary for the safety of the works and the contractor is unable or unwilling at once to do such work or repair as the Engineer in charge or his representative may consider necessary, such works shall be carried out by the Engineer incharge.

If the work or repair so done, which in the opinion of the Engineer in charge, liable to have been done by the contractor at his expense under this contract, all expenses incurred by the Employer in carrying out such works shall be recoverable from the contractor or shall be deducted by the Employer from the money due to the contractor. Provided always that the Engineer in charge or his representative, as the case may be, shall as soon after the occurrence of any such emergency as may be reasonably practicable, notify the contractor thereof in writing.

33. Power to vary work

The description of the works required to be executed by the contractor/firm are set out in the specifications, schedules and drawings, but the Engineer in charge reserves the power to vary, extend or diminish the quantities of work, to alter the line, level or position of any work, to increase, change or decrease the size, quality, description, character or kind of any work, to order the contractor/firm to execute the works or any part thereof, by day or night work, or to add or take from the work included in the contract as he may deem fit and proper without violating the contract and the contractor/firm shall not have any claim upon the Employer for any such variation, extension, diminution, alteration, increase, change or decrease other than for the work actually done, calculated according to the prices tendered and accepted in this contract.

34. Extra for Varied Works

Any unforeseen additional work that may become necessary and is accordingly carried out under this contract based on proper written orders shall be measured and valued by the Engineer in charge at the rates contained in the contractor's/firm's original bill of quantities. If these rates do not apply to the additional works ordered to be carried out, then prior to execution of the additional work, a rate for such work shall ordinarily be agreed upon and entered in a supplemental schedule and signed by both the Engineer in charge and the contractor/firm.

35. Omissions

In the event of anything reasonably necessary or proper to the due and complete performance of the work (Engineer in charge will be the sole judge on these things) being omitted to be shown or described in the drawings, specifications and schedules, the contractor/firm shall notwithstanding execute and provide at the rates noted in the bill of quantities all such omitted works and things as if they have been severally shown and described and the execution should be according to the directions of the Engineer in charge and to his satisfaction.

36. Notices Regarding Shoring etc.,

Wherever shoring or other works for the protection or security of the buildings/structures are necessary, the contractor/firm shall within a reasonable period before the execution of such works, shall serve notices upon the occupiers of the buildings/structures to be shored up or otherwise secured and upon all other parties entitled to notice, apprising them respectively that such works are necessary, that the contractor/ firm about to execute the

same and will, at a time to be specified in such notice, enter upon the premises for the purpose of executing such works.

37. Cost of Repairs

Loss or damage to the Works or materials to be incorporated in the works between the Start Date and the end of the Defects Liability periods shall be remedied by the Contractor at the Contractor's cost if the loss or damage arises from the Contractor's acts or omissions.

38. Suspension of Work

The Contractor shall, on the instructions of the engineer, suspend the progress of the Works or any part thereof for such time and in such manner as the Engineer may consider necessary and shall, during such suspension, properly protect and secure the Works or such part thereof so far as is necessary in the opinion of the Engineer in charge.

39. Suspension of Progress

The contractor/firm shall, without recompense, claim or demand, delay or suspend the progress of works as a whole or any part thereof, if and when or so often as directed by the Engineer in charge and for such time or times, as may be in the judgment of the Engineer in charge be necessary for the purposes or advantages of the undertaking. Upon all such occasions, whether directed or not, the contractor/firm at his/their expense, properly cover down and secure so much of the work as may be liable to sustain damage from whether or any other cause and shall at all times and forthwith when required properly make good all the damage or injury which such works or any part thereof may gave sustained and these should be done to the entire satisfaction of the Engineer in charge.

40. Termination

The Employer may terminate the Contract for any reason that is regarded as breach of the Contract. If the contract is terminated, the contractor shall stop work immediately, make the site safe and secure and leave the site as soon as reasonably possible.

On termination of the contract, the Engineer shall issue a certificate for the value of work done less payments received up to the date of the issue of certificates, less other recoveries due in terms of the contract, less taxes due to be deducted at source as per applicable law and less the percentage to apply to the work not completed. If the total amount due to the Employer exceeds any payment due to the Contractor the difference shall be treated as debt

payable to the Employer and can be recovered from any amount due or may become due to the contractor.

In the case of termination, works that are pending for the proper completion of the project shall be carried out by the Employer either by themselves or through any other agency.

Any additional expenditure over the value finalized in the contract for any component or for the whole project, incurred by the Employer by the Employer due to such termination, shall become recoverable from the contractor/firm whose contract stands terminated, from the money due or may become due to him/them.

All materials on the Site, Plant, Equipment, Temporary Works and Works are deemed to be the property of the Employer, if the Contract is terminated because of Contractor's default

41. Plant etc not to be removed

The plant, tools and materials provided by the contractor/firm shall, from the time they are brought to the site of the works, during the construction and until the satisfactory completion of the contract, shall become and continue to be the property intended for the proper fulfillment of the contract and the contractor/firm shall not remove the same or part thereof without the consent of the Engineer in charge in writing.

42. Contractor not to occupy Land etc

In no case shall the contractor/firm continue to use or occupy or allow to be used or occupied any land or property either for the deposit of materials or plant or for any purpose whatever, after written notice from the Engineer in charge served on the contractor/ firm to the effect requiring the contractor/firm to remove or cause to be removed all such materials from any such land or property as aforesaid and to give vacant possession of such land or property to the Engineer in charge. All such notices shall be served through post office or other modes of delivery to the contractor/firm at his/their usual or last known place of business, It is enough for the Engineer in charge to send the notice through any mode of delivery as he may prefer and implement this clause irrespective of the receipt of the notice by the contractor/firm. Should any materials or plant remain upon any such property or land or should any such land or property continue to be occupied or be used after such notice for any purpose whatsoever as aforesaid, then and in every such case and as often as the same shall happen, the contractor/firm shall forfeit and on demand pay to

the Employer the charges fixed by the Engineer in charge as and for liquidated and ascertained damages for each and every day during which the said lands or property are so used and occupied as aforesaid from the time of such notice shall have been served.

43. Power Supply

The power supply connection from the TNEB has to be obtained by the contractor himself and the charges thereon shall be borne by the contractor. However, necessary vouchers in original for the payment made to the TNEB shall be produced to the Employer by the contractor which will be reimbursed by the Employer.

44. Completion and Delivery of the Works

The completion and delivery of the works shall be deemed to be full, complete and sufficient only when the Engineer in charge accepts the same and issues a certificate in writing viz. " Certificate of Completion" under the hand of the Engineer in charge to the effect that all the works contracted for and directed to be executed have been completed and are in a sound, water tight, workmanlike and complete and usable condition and the contractor has in the opinion of the Engineer in charge reasonably fulfilled and completed his contract and undertaking except so far as it relates to the maintenance of the works as hereinafter provided. Provided always and notwithstanding anything contained in the contract, it shall be lawful for the Employer to undertaker and execute either departmentally or through other parties at any period during the continuance of this contract, any kind of work, matter or thing whatsoever, which they may consider necessary or proper to be performed and executed for the purpose of any in connection with any or all of the works under this contract and that without in any way relieving the contractor/firm from any of his/their liabilities and responsibilities under this contract or in any way vitiating or voiding this contract.

45. Final Certificate

When the works covered under this contract are completed in all respects, the contractor/firm shall submit a request to the Engineer in charge to make a final measurement of the works and take over the whole of the works on behalf of the Employer and issue a final certificate to enable him/them to submit a final bill for payment. The Engineer in charge shall thereupon, unless he records reasons in writing to the contrary, make a final measurement of the works and take them over on behalf of the Employer and sign a certificate purporting to be a last certificate. Nothing in this clause or in the agreement

shall prohibit the Employer taking over and using any portion of the works which may be completed prior to the completion of the whole works of this contract.

46. **Completion Certificate**

The Contractor shall request the Engineer to issue a certificate of Completion of the Works and the Engineer shall issue certificate of completion after satisfactory completion of the works in all respects.

48. Taking Over

The Employer shall take over the Site with the works within thirty days after satisfactory completion of the maintenance of the entire project for the stipulated period as contemplated in this contract.

49. Performance Guarantee

The period of guarantee for the entire works shall be 24 months from the date of completion and commissioning of the project to the satisfaction of the Engineer incharge of the work. This will include the maintenance of the entire project by the firm/contractor for a period of 12 months. If defects are noticed during the guarantee period, the firm/contractor shall rectify/replace wherever necessary at its/his own cost within 30 days of such intimation. If the contractor/firm fails to carry out rectification within the stipulated time, the rectification works shall be carried out by the Employer at the risk and cost of the contractor/firm and contractor/firm will become ineligible for the payment of the retention amount for the said purpose.

50. Maintenance of the Project

The contractor/from shall successfully maintain the project for the stipulated period from the successful commissioning of the project. During the period of maintenance, all costs towards labour, spares, consumables, chemicals, repairs and renewals shall be borne by the firm/contractor. The electrical energy charges payable to the TNEB during the maintenance period shall be borne by the Employer.

51. Operating and Maintenance Manual

"As built" drawings and operating and maintenance manuals shall be supplied by the contractor/firm at the time of handing over the completed works at his/their cost

52. **Work on Private Property**

The contractor/firm shall not commence any work in or upon, under, across of through any land, house building, shed, yard, area, roadway, ground, garden or any other place being private property until authorised in writing by the Engineer in charge to do so.

53. Protection

It will be the responsibility of the contractor to take adequate precautions and protect the adjoining sites against structural, decorative and other damages. The contractor shall be responsible for the safety of the public properties wherever the works are executed. Whenever damages are caused to the adjoining structures, roads, bridges etc due to the execution of this contract, it will be the responsibility of the contractor to restore them to their original level at his cost.

54. Accident or Injury to Workmen

The Employer shall not be liable for or in respect of any damages or compensation payable to any workman or other person in the employment of the Contractor or any Subcontractor. The Contractor shall indemnify and keep indemnified the Employer against all such damages and compensation and against all claims, proceedings, damages, costs, charges and expenses whatsoever in respect thereof or in relation thereto.

55. Risk Insurance

The firm/Contractor shall provide risk insurance at their/his cost against loss or damages to the construction to cover from the start date to the end of the Defects Liability Period, for the following events.

Loss of or damage to the Works, Plant and Materials

- Loss of or damage to Equipment
- Loss of or damage of property (except the Works, Plant, Materials and Equipment) in connection with the Contract and
- Personal injury or death

Policies and certificates for insurance shall be delivered by the Contractor to the Engineer for the Engineer's approval before the Start Date. All such insurance shall provide for compensation to be payable in the types and proportions of currencies required to rectify the loss or damage incurred. The contractor will not be eligible for any payment on this account.

If the Contractor does not provide any of the policies and certificates required, the Employer shall effect the insurance which the Contractor should have provided land recover the premiums the Employer has paid from payments otherwise due to the Contractor or, if no payment is due, the payment of the premiums shall be a debt due.

Alterations to the terms of insurance shall not be made without the approval of the Engineer.

56. **Care and Risk**

From the date of commencement to the date of completion of the work and during the period of maintenance, the contractor shall take full responsibility and care thereof for the safety of the installation connected with the works. Any damage or loss are to be made good at the risk and cost of the contractor and shall ensure conformity in every respect with the requirements of the contract. The contractor shall be liable for any damage to the works occasioned by him in the course of any operation carried out by him for the purpose of completing any outstanding work and the damage so occurred shall be rectified at the cost of the contractor.

57. **Safety Provisions**

The contractor shall arrange for the safety provisions in his operation as required including the provisions in the safety manual published by the central water and power commission. New Delhi (January 1962 edition). In case the contractor fails to make such arrangements the Engineer in charge shall be entitled to cause them to be provided and to recover the cost there of from the contractor.

For failure to comply with the provision of Safety Manual, the contractor shall without prejudice to any other liability, pay the Employer a sum for each day of default at the rates that will be fixed by the Employer.

58. **Provision of Health and Sanitary Arrangements**

The contractor/firm, shall provide at his/their own expenses, first aid appliances and medicines including an adequate supply of sterilised dressing and sterilised cotton wool kept in good order under the charge of a responsible person who shall be readily available during working hours.

Water of good quality fit for drinking purposes shall be provided for the work people on a scale of not less than 15 liters per head per day. Each water supply storage shall be at a distance of not less than 15 meters from any latrine, drain

or other source of pollution. Where water has to be drawn from an existing well which is within such proximity of latrine, drain or other sources of pollution, the well shall be properly chlorinated before water is drawn from it for drinking.

Adequate washing and bathing places shall be provided separately for men and women and such places shall be kept in clean and drained condition. Latrines and urinals shall be provided within the precincts of work place and the accommodation separately for each of them shall be at the rate of 2 seats upto 50 persons, 3 seats above 50 persons but not exceeding 100 persons, and 3 seats for every additional 100 persons. The contractor/firm shall employ adequate number of scavengers and conservancy staff to maintain the latrines and urinals in a clean condition.

Two sheds one for meals and the other for rest shall be provided separately for the use of men and women workers and properly maintained.

All the above amenities shall be provided at the contractor's/firm's own expenses besides providing sheds for his/their workmen.

59. **Patent Rights**

The Contractor shall save harmless and indemnify the Employer from and against all claims and proceedings for or on account of infringement of any patent rights, design trademark or name or other protected rights in respect of any Contractor's Equipment, material or Plant used for or in connection with or for incorporation in the Works and from and against all damages, costs, charges and expenses whatsoever in respect thereof or in relation thereto

60.**Royalties**

Except where otherwise stated, the Contractor shall pay all signora and other royalties, rent and other payments or compensation, if any, for getting stone, sand, gravel, clay or other materials required for the Works.

61. **Old Curiosities**

All old curiosities, relics, coins, minerals and any other item of archeological importance found at the site shall be the property of the Government and shall be handed over to the Engineer in charge for depositing to the Government exchequer. Should any structure be uncovered, the instruction of the Engineer incharge shall be provided before demolition or removal of the structure.

62.**Contractor Dying, becoming Insolvent or Insane**

In the event of death or insanity of the contractor, the contract may be terminated by notice in writing, pasted at the site and advertised in the issue of the local newspaper. All acceptable works shall thereafter, be paid at appropriate rates after recovering all the contractor's dues to Employer, to the persons entitled to receive and give a discharge for such payments.

In the contractor is imprisoned because insolvent compound with his creditors has a receiving order made against him or carriers on business under receiver for the benefit of the creditors of any of them or being a corporation goes into liquidation or commences to be wound up not being a voluntary winding up for the purpose only of amalgamation or reconstruction, the employer shall be at liberty.

a) To give such liquidator, receiver or other persons in whom the contract may become vested the option of carrying out the contract or a portion there of to be determined by the employer, subject to his providing an appropriate guarantee for the performance of such contractor.

b) To terminate the contract forthwith by notice in writing to the contractor the liquidator, the receiver or person in whom the contract may become vested and take further actions as provided in the clause pertaining to default by contractor, treating as if this termination is ordered under the respective clause.

63.**Force Majeure**

Neither party shall be liable to the other for any loss or damage occasioned by or arising out of Acts of God such as unprecedented flood, volcanic corruptions, earthquake or other special risks referred above which prevent the performance of the contract and which could not have been foreseen or prevented by the prudent person.

If a Force Majeure situation arises, the contractor shall promptly notify the Employer in writing of such condition and the cause thereof, unless otherwise directed by the Employer in writing, the contractor shall continue to perform the obligations as far as it is reasonably practical and shall seek all reasonable alternative means for performing those not prevented by Force Majeure.

64.**Payment out of Public Funds**

The payments to the contractor/firm shall be made out of the funds under the control of the Employer in their public capacity and no member or officer of the Employer shall be personally responsible to the contractor/firm.

65.**Bribery and Collusion**

In the event of the contractor offering or giving any official of the employer, any gift or consideration of any kind as an inducement or regard for doing, or for bearing to do, any action in relation to obtaining or in the execution of the contract or any other contract with the employer, or for showing favour to any person in relation to the contract or any other contract with the employer, or if any of the such acts shall have been done by any person employed by the contractor or acting on his behalf, either with the knowledge of the contractor or not which are all grounds for the employer to terminate the contract awarded to the contractor. Similarly if the contractor colludes with another contractor or number of contractors whereby an agreed quotation or estimate shall be offered as a bid that will also form the basis for the employer to terminate the contract.

66.**Technical audit**

It is a term of this contract that department shall have the right to carry out post payment audit and technical Audit by the Engineers of Technical audit cell (or by an approved consultant of repute). The Technical audit officer shall have the powers to inspect the work or supply running account bill, final bill and other vouchers, measurement books, test reports and other documents either during progress of work or after completion of the same and order recoveries from the contractor for recorded reasons even though the contractor might have been paid earlier. These recoveries are enforceable against the contractor from any amount due to him, from performance security or withheld amounts or any amounts due to the contractor or may become due to him from the department in any work or supply.

67. **Jurisdiction of Court**

In the event of any dispute arising between the parties hereto in respect of any matter comprised in the contract, the same shall be settled by a competent court having jurisdiction over the place where the contract is awarded and agreement is concluded and by no other court.

68. **Reservation of Right**

The Employer reserves the right to accept or reject any or all the bids and to annul the entire process of bidding at any time. Under such circumstances, the Employer will neither be under any obligation to inform the bidders of the grounds for the action of the Employer on the Employer will be responsible for any liability incurred by the bidder on this account.

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CIVIL WORKS

1. General.

1.1. Tamil nadu Building Practice (TNBP) shall be strictly followed for carrying out different items of the work for which no standard specifications are available and no alternate specification have been given under the description of works.

1.2. Where any provision of the TNBP is repugnant to or at variance with any provision under BIS or description of work, technical specifications and conditions of contract, the provisions of the later shall be deemed to supercede the provision of the TNBP.

2. **Earth work:**

2.1. Specification:

Tamilnadu Detailed Building Practice (specification No.23 to the extent applicable) shall be followed for earthwork excavation.

2.2. Conveyance:

The excavated earth, blasted rubble etc., shall be conveyed and deposited in the departmental lands within 150m of plant site and as directed by the Engineer in charge.

2.3. Stacking:

Where the location of the work is such and does not permit the deposition of excavated earth while digging trenches for laying pipes, the excavated earth should be conveyed to a convenient place and deposited there temporarily, as directed by the Engineer-in-charge. Such deposited soil shall be reconveyed to the site of work for the purpose of refilling of trenches, if it is suitable for refilling. The unit rate for trench work of excavated and refilling shall include the cost of such operation.

2.4. **Disposal of surplus Earth:**

The excavated soil which is surplus to that required for filling and after allowing for settlement will have to be removed, spread and sectioned at places shown on the site during excavation for purpose of widening or leveling the road. Sectioning is to be done as detailed in TNBP, It is to be understood that no extra payment, will be made for t his and the unit rate for trench work of excavation and refilling shall made for this and the unit rate for trench work of excavation and refilling shall include the cost

removal of surplus earth to disposal site approved by the Engineer in charge, its spreading and sectioning at the bidder's expense.

2.5 Shoring, Strutting and Baling out water:

The rate for excavation of trench work shall include charges of shoring, strutting, bailing out water wherever necessary and no extra payment will be made for any of these contingent works. While baling out water, care should be taken to see that the bailed out water is properly channelized to flow away without stagnation or inundating the adjoining road surfaces and properties.

3. Concrete:

3.1. Specification:

Concrete for use in the works shall generally comply with TNBP (specification No.30) and the relevant BIS. The concrete mix shall be in specified proportions satisfying the maximum aggregate size, water cement ratio and required cube strength and workability as per IS 456- 2000. Such concrete must be adequately vibrated to form solid mass without voids. The entire concreting works should be done only with the prior approval and in the presence of Engineer-in-charge.

3.2. Mixing Concrete:

The concrete shall be proportioned as far as cement and aggregates are considered by volume. The amount of water required being measured either by weight or volume the adjustments must be made to frequent intervals at the discretion of the Engineer or his assistant to account for the moisture content of the aggregates. The mixing operation shall be performed only in a mechanical concrete mixer and shall continue until the whole batch of uniform consistency and color. The mixing of concrete shall be done in accordance with clause 8 and 9 of IS 456-2000.

3.3. Transporting, Placing and Compacting Concrete.

3.3.1. Transportation, placing and compaction of concrete mix by mechanical vibrators shall be done in accordance with clause 12 of IS 456-2000. It is imperative that all concreting operations be done rapidly and efficiently with minimum rechanneling and adequate manpower shall therefore be employed to ensure this.

3.3.2. The forms shall be first cleaned and moistened before placing concrete.

3.3.3. The mix should not be dropped from such a height as it may cause segregation and air entrainment. When the mix is placed in position, no further water shall be added to provide easier workability.

3.3.4. No concrete mix shall be used for the work if it has been left for a period exceeding its initial setting time before being deposited and vibrated into its final position in the member.

3.3.5. While one concrete is being placed in position it shall be immediately spreaded and ramped sufficiently and suitable to attain dense and complete filling of all spaces between and around the reinforcement and in to the corners of form work for ensuring a solid mass entirely free from voids.

3.3.6. Construction joints required in any of the structural members shall be provided generally complying with clause 12.4 of IS 456 - 2000 and as directed by the Engineer-in-charge. The efficiency of tempering and consolidation will be judged by complete absence of air pockets, voids and honey combing after removal of form works.

3.4 Curing:

3.4.1. Curing shall be done to avoid excess shrinkage or harmful effort to the members generally complying with clause 12.5 of IS 456 - 2000

3.4.2. The method adopted shall be effective and any special method used must be approved by the Engineer and be subject to complete supervision.

3.4.3. Any deficiency in concreting such as cracking, excessive honey combing exposure of reinforcement or other fault which entail replacement of the defective part by fresh concrete and whatsoever remedy reasonable required without hampering the structural safety and architectural concept, all at the cost of contractor.

3.5. Removal of Form Work.

3.5.1. Removal of form work shall be done as per TNBP and BIS and as directed by the engineer in such a manner that no damage is caused to the structures. The striping time shall not be less than that indicated in clause 10.3 of IS 456 -2000.

3.6. Testing of Concrete:

3.6.1. During the course of construction works, preparation of test specimens, curing and casting of concrete shall be done in accordance with IS 1199 / 1959 and IS 516 / 1959 to ascertain the strength requirements and acceptance criteria indicated in IS 456 - 2000. The contractor shall provide all apparatus, labour and arrange to test the cubes at his own cost at the test laboratory decided by the Engineer.

3.6.2. In addition to the above tests, any other test which may if desired by the Engineer-in-charge be carried out from time to time as per relevant specifications at the cost of contractor. In case the concrete does out meet the strength required, all corrective measures shall be taken at once at the contractor's cost.

3.6.3. The inspection and testing of structures shall be done in accordance with clause 16 of IS 456/2000

4. Masonry:

4.1. All masonry works such as Random Rubble/Brick work must be done as per TNBP Specification and Bid schedule specification.

5. Plastering:

5.1. Plastering would be 12mm, 20mm and 25mm thick cement plaster, either plain or waterproof as may be specified.

5.2. The plastering items shall be executed in thickness and cement mortar of proportion as detailed in respective items in the BOQ. Similarly the plastering shall be either ordinary or waterproof as specified in respective item in the BOQ.

5.3. In case of water proof plaster standard approved water proofing compound shall be mixed in cement mortar in required percentage as directed and then the plaster is applied.

5.4. The finishing shall be either smooth or rough as may be directed by the Engineer unless otherwise specifically mentioned in the BOQ.

5.5. Neat finish wherever directed by the Engineer shall be done at no extra cost.

5.6. Curing and watering shall be one as directed and plaster shall be in alignment and level. Any sub standard work is liable to be rejected and shall have to be re-done at contractors cost. Sand to be used shall be of approved quality only. Cost of all scaffolding shall be included in the rates quoted in the BOQ.

6. Flooring:

6.1. 40mm thick cement concrete 1:2:4 shall be provided for flooring, the size of metal shall not be more than 12mm and it shall be properly graded. A thin coat of very fine plaster shall be provided on top to give a smooth finish. The marking of false grooves to surfaces as directed includes the cost of labour.

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PIPE LAYING WORKS

1. General

1.1 The earthwork for the pipe laying work shall generally conform to the details given below.

Sl. No.	Dia of Pipe In millimeter	Depth of bottom of pipe below ground level in centimeter	Width of trench at bottom in centimeter
1	PVC Pipe Up to 140	105	60
2	For other Pipes Up to 150	105	75
3	200	110	80
4	250	120	80
5	300	135	80
6	350	145	90
7	400	155	90
8	450	170	100

1.2 Wherever necessary, sand cushioning for the bed shall be given as per IS Standards and as directed by the Engineer in charge. The pipe should be laid true to the alignment line and grade wherever necessary, appropriate bends should be used. The pipes laid must be jointed properly and carefully by using approved type of jointing materials.

1.3 After the pipes are laid and jointed, the pipelines are to be subjected to hydraulic pressure test as detailed in the relevant BIS Specification for various types as indicated below.

DI Pipes: Clause 5 of IS 8329 / 2000

In portion of pipeline, where the pipes have developed cracks or sweating, such pipes with jointing materials shall be removed and re laid with new pipes at the contractor's cost and the pipe line shall be re tested to the entire satisfaction of the Engineer in charge. No extra payment will be made on this account. The bidder has to make his own arrangements for the procurement of the required equipments for testing of pipes which shall be subjected to such test as the Engineer-in-charge deems fit to ensure the accuracy of the gauge.

1.4 Refilling shall be done with proper compaction with excavated earth. In no case the contractor shall be allowed to refill the trenches in hard excavated portion to be refilled by the boulders or excavated stuffs. This portion of trench shall be refilled by the soft strata from excavated stuff from distance place at no extra cost. The refilling shall be done in 15 cm thick layers duly watering and compacting each layer. The refilling may be done up to a height of 20 to 30 cm than the natural ground level to allow that sinking afterwards. If the refilling gets sunk below the natural ground level at any time till the completion of the work, the contractor at his cost should make good the refilling to the required level as may be directed by the Engineer in charge.

1.5 In case of pipe trenches, the Engineer may reduce the width of trench wherever a hard stratum is met with, if he feels adequate and just sufficient to lay the pipe line in order to reduce the hard rock quantity. In such case the contractor will be paid as per the actual measurement.

1.6 If the work is in a residential area, the contractor should carry out the excavation carefully to avoid collapse of any structure.

1.7 Valves shall be provided with valve pits with proper cover to bear the loads coming on it as per bid documents and departmental drawings and specification Public fountains, Fire hydrants shall be provided as per type design and specification.

1.8 Adequate protective measures should be taken against surge pressure. Zero velocity valves and air cushion valves should be provided at the appropriate places Thrust blocks and anchor blocks should be provided at all bends and appropriate places.

1.9 Water required for testing the pipeline shall be arranged by the contractor at his cost.

2. Laying of Cast Iron / M S Pipes

2.1 The laying and jointing of cast iron M S pipes shall be carried out as follows:

Before laying the pipes, the contractor shall carefully brush them to remove any soil, stones or other materials which may be therein. An even and regular bed having been prepared and joint pit excavated to form a recess under the socket of each pipe of no greater depth and width than

to enable the pipe jointing to be property done. Each pipe shall then be carefully lowered and placed singly in the trench and shall rest in the solid ground for a distance of not less than two thirds of its entire length. In places where the soil is not hard, cement concrete bed blocks or timber piles have to be provided under the pipes if directed by the Engineer in charge.

2.2 Pipes not Truly Laid:

Any pipe or pipes lay, which on inspection are found to diverge from the true lines and levels shall be removed and re laid to the true lines and levels and the old jointing properly cleared off the pipes and fresh joints made by the contractor at his expense. Any pipes damaged in removal shall be replaced by the contractor at his cost.

2.2 Cutting of C.I. / DI Pipes:

Where necessary and as ordered by the Engineer in charge, the Contractor shall cut the pipes and fix and joint common collars for jointing spigot ends. The cut ends of the pipe shall be made truly at right angles with the axis of the pipe.

2.3 Covering up Open Ends:

The Contractor shall take particular care to ensure that the apertures and open ends of pipes are carefully covered whenever the workmen are not actually employed therein.

2.4 Jointing of C.I. / DI Pipes:

The trench must be kept quite dry during jointing unless in any particular case the Engineer permits laying of the pipe in wet conditions. Plain spigot and socket pipes shall be joined as follows.

a) Lead Joints:

Generally lead joints shall be used for all sizes. In the case of 100 mm pipes, Cement joints may be used if specified in which case for every ten cement joints; one lead joint shall be used. Provision of lead joints shall also be made at street crossings, at closing joints and for all specials and as determined by the Engineer depending upon the site condition.

The spigot of the pipe must be forced well home into its socket and must be centered, so that the joint may be of even thickness all rounded. As many laps of white hemp spun yarn as may be needed to leave the space required for the lead shall be driven to the bottom of the socket without

being forced through the joint into the pipe but carefully driven home with a caulking tool. The proper depth of each joint shall be tested before running the lead by passing completely round it a wooden gauge, notched out to the correct depth of lead, the notch being held close against the face of the socket. The joints shall then be run with molten lead insufficient quantity so that after being caulked solid, the lead may project 3 mm beyond the face of the socket against the outside of the spigot but must be flush with outside edge of the socket.

For pouring lead in the joints, a ring of hemp rope covered with clay shall be wrapped around the pipe at the end of the socket leaving an opening at the top of the socket into which the lead can be poured. The hemp rope shall be supported by clay packing so as to withstand the operation of lead pouring.

The lead used shall be carefully skimmed of all scale, when melted in a cast iron pot or patent melting machine. Sufficient lead shall then be taken by a ladle and run hot into the joint, and the joint filled at one running. The joint shall then be caulked when cool by a suitable caulking tool and a 2 kg hammer and the joint left neat and smooth.

The weight of lead and hemp which shall be used in each joint shall be in conformity with the table given below or as specified by the Engineer.

Quantity of lead and spun yarn for different sizes of pipes:

Nominal size of pipe (in mm)	**Lead / Joint (in Kg.)**	**Depth of Lead joint (in mm)**	**Spun yarn per joint (in Kg.)**
80	1.8	45	0.10
100	2.2	45	0.18
125	2.6	45	0.20
150	3.4	50	0.20
200	5.0	50	0.30
250	6.1	50	0.35
300	7.2	55	0.48
350	8.4	55	0.60
400	9.5	55	0.75
450	14.0	55	0.95
500	15.0	60	1.00
600	19.0	60	1.20

700	22.0	60	1.35
750	25.0	60	1.45
800	31.5	65	1.53
900	35.0	65	1.88
1000	41.0	65	2.05
1100	46.0	65	2.40
1200	50.0	70	2.60
1500	66.5	75	2.80
8 Inches	4.54	2.00 Inches	0.29
9 "	5.10	2.00 "	0.31
10"	5.67	2.00 "	0.34
12 "	6.58	2.00 "	0.48
14 "	9.30	2.50 "	0.63
15 "	9.98	2.50 "	0.68
16 "	10.66	2.50 "	0.74
18 "	14.06	2.50 "	0.95
20 "	16.33	2.50 "	1.04
21 "	17.92	2.50 "	1.08
24 "	20.41	2.50 "	1.21
27 "	23.13	2.50 "	1.33
30 "	25.86	2.50 "	1.46
33 "	28.35	2.50 "	1.65
36 "	31.58	2.50 "	2.40

Note:
The quantities of lead and spun yarn given in the table are provisions and variation of 20 percent is permissible.

b) **Flanged Joints:**
Flanged joint should be made by painting the facing of the flange with white lead freely and bolting up evenly on all sides. A thin fiber of lead wool may be very useful in making the joints water tight where facing of the pipes is not true.

When packing must be used, it should be of rubber insertion of approved thickness. The packing should be of the full diameter of the flange with proper pipe hole and bolt holes cut out evenly on both the inner and outer edges. Where the flange is not fully faced, the packing may be of the diameter of the packing strip only. Proper placing of the packing should be checked before another pipe is joined on.

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Making the joints:

When new pipes are laid close ahead of a newly made cement joint, the disturbance caused during the forcing home of the pipe ends into the sockets during the adjustment of the pipe to proper alignment may damage the new joint. To avoid this damage, jointing shall be done only when there are at least six pipes laid to the final grade and alignment ahead of the joint to be made. Starting at the bottom of the joint space shall be filled with wetted cement and caulked. The remaining joint space shall than be refilled with cement and caulked until the joint is practically flush with the face of the socket. The mixture shall be thoroughly compacted to make a water tight joint.

No water shall be allowed to touch the joint until the initial set had taken place. Immediately after initial set has taken place, the joint shall be covered with wet burlap, or other approved wet materials to ensure complete hydration of the cement. No water shall be allowed into the pipe until the elapse of 12 hours after the last joint in the line is made. Filling the pipe with water without pressure after this interval will be beneficial to curing of the joint.

2.5 **Fixing Air Valve:**

Air valves shall be fixed at the summits of pipe lines or at places as may be directed by the Engineer. The air valve connections etc., shall be carried out as per drawing.

2.6 **Interconnection Work:**

The Interconnection Work between the existing main and proposed main to be laid under this contract shall proceed from the new main to the existing main. Before actually proceeding with the interconnection work, the Contractor shall make ready necessary tools and plants required for the work at site, such as pumpsets, shoring materials etc., He shall also keep ready at site necessary pipes, specials, valves if any required for the work. The Contractor shall keep necessary skilled workmen of sufficient strength at site and once the work is commenced, the entire interconnection works shall proceed without interruption by engaging labour for carrying out the work on a continuous basis both day and night till the work is completed. The work shall be executed as per programme drawn up by the Engineer and shall be completed within the time ordered by the Engineer, for each individual linter connection.

The work shall be carried out under the direction of the Engineer from the beginning to end. Laying of Specials, valves (except straight pipes from the branch of the new main to the connecting point in the existing main) including conveying specials etc., from the stores or site of stacking, excavation, timbering, pumping out water from the trenches, lowering, aligning, jointing specials and valves cutting the existing mains, baling out water, inserting the necessary branches, jointing, testing, refilling etc ., shall comprise as one unit of work and will be paid at the lump sum rate quoted in the schedule for interconnections.

2.7 Works to be left Water tight:

The Contractor shall construct the pipes chambers and all other Works so that they shall be water tight. Should any leakage appear, it shall be made good by him at his expense by removing and reconstructing the portions of the Work so affected or by other method which will render the Work thoroughly water tight to the satisfaction of the Engineer.

2.8 Cleaning of Mains:

During the execution of the work the contractor shall keep the interior surface of the mains free from cement, brick, soil or other superfluous matter and shall hand over the mains perfectly clean and free from deposit on completion.

2.9 Testing of Main-Hydrostatic Test:

After laying and jointing the pipes and specials, the pipe lines shall be tested for hydrostatic pressure in such length as may be specified by the Engineer.

The test pressure shall be equal to 50% or such other higher percent as may be specified in excess of the pressure the pipe will have to withstand subsequently subject to a minimum test pressure of 7 kg/sq.cm. in the case of lead joints. However in the case of cement joints, the joints may be tested to a minimum test pressure 3.5 kg/sq.cm.

If cement joints show seepage or slight leakage, such joints shall be cut out and replaced as directed by the Engineer and the test repeated.

The contractor shall make his own arrangements to procure, necessary equipments, apparatus etc., required for testing and shall provide necessary labour for filling with water the length of pipes to be tested, fixing all apparatus and for carrying on the testing operations until the length of pipes specials and connections are finally passed by the Engineer.

The length to be tested shall be provided with two blank flanges fastened on in the usual manner by collar bands and bolts to the end pipes or if the length to be tested shall have a sluice value at each end, such blank flanges may be dispensed with.

The length of pipes to be tested shall first be filled in with water from a higher section of pipes already laid or with clean water shall be arranged at the contractor's expense with the approval of the Engineer.

Before the actual testing pressure is applied any air which has lodged in the length of pipes to be tested shall be got rid of, by screwing on at the highest part of the length of pipes or temporary air valve, or, by opening a temporary stop-cock or by other mean as the Engineer may direct.

The test pressure shall then be applied to the length of pipes under test by a hand or powered hydraulic test pump. The connection of the test pump to the length of pipes shall either be at the union connection provided at a blank flange or shall be at a temporary stop cock or fountain connections as the Engineer may in the circumstances direct.

The actual test shall be made by pumping water into the length of pipes under test, until the test pressure as specified above has been reached on the pressure gauge.

The test pressure shall be maintained for one hour or for such other period of time as may set by the Engineer and each joint will be inspected. While the pressure is on, the pipes should be struck smartly with a 2 kg hammer.

When a flange joint is found to be leaking, care shall be taken that while tightening up the flanges, the neighboring joints are not affected.

If the length of pipe line under test is found to be satisfactory and no leaks or sweatiness are found at the pipe joints or at the joints of specials and connections then this length of pipe line will be passed by the Engineer.

But should any pipe, joint, special or connection be found to sweat or leak, the contractor shall make good at his cost such defective joint and the length of pipe line shall be re tested by the Engineer until all pipes, joints, specials and connection are found to be satisfactory.

If any pipe or special leaks or bursts, the damaged portion shall be removed and new pipes or specials shall be laid and jointed at the contractor's cost.

2.11 Restoring Road Surface:

The surface of the road or ground shall be finished off to the proper level with the same kind of materials the surface consisted of before the excavation commenced, except in the case of superior roads and tarred roads in which case the surfaces should be finished off with water bound macadam surface. Should any settlement occur after refilling is completed, and up to the end of the period of maintenance, it shall be made good at once and the surface restored to the satisfaction of the authority under whose jurisdiction such road or ground may be, all at the cost of the contractor.

2.12 Collection of Rubbish:

The Contractor shall, at his cost, on the completion of the Work remove all water and all materials or rubbish of every description which may have been collected in the works find a deposit thereof and anything which my have collected within the works, during the period of maintenance shall also be removed before the Works are finally accepted by the Employer.

3. <u>Earth work Excavation (Linear Measurement)</u>

The Bidder should carefully inspect the site to assess the prevalence of different soil classifications and quote the rate for trench excavation for laying pipe line taking into account of all soil classifications that are likely to be encountered and no extra rate will be paid for excavation of trench on account of any variation in the classification of soil met with during actual execution.

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LAYING AND JOINTING OF DUCTILE IRON PIPES

A Ductile Iron pipes

The Ductile Iron pressure pipes shall conform to the I.S.12288/1987.

B1 Laying Ductile Iron Pipes

The pipe should be lowered into the trench with tackle suitable for the weight of pipes. For smaller sizes up to 250 mm nominal bore, the pipe may be lowered by the use of ropes but for heavier pipes either a well designed set of shear legs or mobile crane should be used. When lifting gear is used the positioning of the slink to ensure a proper balance, should be checked when the pipe is just clear of the ground. If sheathed pipes are being laid, suitable wide slings are scissor dogs should be used.

All construction debris should be cleared from the inside of the pipe either before or just after a joint is made. This is done by passing a pull through in the pipe, or by hand, depending on the size of the pipe. When laying is not in progress a temporary end closer should be securely fitted to the open end of the pipe line. This may make the pipe buoyant in the event of the trench becoming flooded, in which case the pipe should be held down either by partial refilling of the trench or by temporary strutting. All persons should vacate any section of trench into which the pipe is being lowered.

B2 On gradient of 1.15 or steeper, precautions should be taken to ensure that the spigot of the pipe being laid does not move into or out of the socket of the laid pipe during the jointing operations. As soon as the joint assembly has been completed, the pipe should be held firmly in position while the trench is back filled over the barrel of the pipe. The back fill should be well compacted.

C Jointing of Ductile Iron Pipes

Two main types of joints are used with Ductile Iron Pipes and fittings.

1. Socket and spigot flexible joints.
    A. Push on Joints
    B. Mechanical Joints

2. Rigid flanged joints.
    A. Flexible Joints:

The spigot and socket flexible joint should be designed to permit angular deflection in direction and axial movement to compensate for ground movement and thermal expansion and contraction. They incorporate gasket of electrometric materials and the joints may be of the simple push-on-type or the type where the seal is affected by the compression of a rubber gasket between a seating on the inside of the socket and the external surface of spigot. Joints of the latter type are referred to as mechanical joints. Both push –in and mechanical joints are flexible joints. Flexible joints require to be externally anchored at all changes in direction such as at bends, etc., and blank end to resist the thrust created by internal pressure and to prevent the withdrawal of spigots.

B. Flanged Joints:

Flanged joints are made on pipes having a machined flange at each end pipe. The seal is usually affected by means of a flat rubber gasket compressed between two flanges by means of bolts which also serve to connect the pipe rigidly. Gaskets of other materials, both metallic and non-metallic are used for special applications.

Jointing procedure:

Procedure for jointing will vary according to the type of joint being used.

Basic requirements of all parts:

a. Cleanliness for all types
b. location of components
c. Centralisation of spigot within socket and strict compliance with manufacturer's jointing instructions.

The inside of sockets and the outside of spigots should be clean red and wire brushed for a distance of 150 to 225 mm. Glands and gaskets should be wiped clean and inspected for damage. When lifting gear is used to place the pipe in the trench, it should also be used to assist in centralizing the spigot in the socket.

Where the pipeline is likely to be subjected to movement due to subsidence or temperature variations, the use of flexible joints is recommended. A gap should be left between the end of the spigot and the back of the socket to accommodate such movement.

Cast Iron Detachable joints with Rubber Sealing Rings and Bolts and Nuts (IS 8794/1988)

This joints comprises a central collar, two flanges, two 'Ó' rings bolts and nuts. The pipe ends should be cleaned and the flanges inserted on pipe ends. The Ó' rings should be placed on the pipe by means of an Asbestos Cement or Wooden Cone and rolling the rubber ring upwards towards the pipe. The rubber rings are brought to the correct position by means of a site gauge. The central collar shall the be placed on the laid pipe and the pipe to be jointed brought close to the laid pipe leaving a gap of about 5mm between pipe ends. The collar should be centralized and the rings positioned to touch the collar. The flanges should then be brought closer, bolts inserter and tightened uniformly to ensure a leak proof joint. After every 9 Nos. of AC coupling joints one CI detachable joint shall be used.

Whenever it is necessary to cut the Asbestos Cement pipe at site it shall be done of produce a smooth square-cut-end without damage to the and cylindrical to assure joint integrity.

Laying and Jointing PVC pipes NIL.

Disinfection of Mains:

Upon completion of a newly laid or when repairs to an existing are made the main shall be disinfected as directed by the Engineer.

The mains shall be flushed prior to disinfection except when the tablet method is used. After initial flushing, the hypochlorite solution shall be applied to the water main with mechanically or electrically powered chemical feed pump designed for feeding chlorine solutions. For small applications, the solution may be fed with a hand pump the case of mains a large diameter, water from the existing distribution system or other approved source of supply shall be made flow at a constant measured rate into the newly laid pipe line. The water shall receive a dose of chlorine also fed at a constant measured rate. The two rates shall be proportioned so that the concentration in the water entering the pipeline is maintained at not less than 300 mg/1.

The chlorine shall be applied continuously and for sufficient period to develop a solid column of Slug of chlorinated water that will as it passes along line expose all interior surfaces to a concentration of at least 300 mg/1 for at least 3 hours. As the chlorinated water flows past tees and crosses, related valves and hydrants shall be operated so as to disinfect the appurtenances.

After the applicable retention period, the heavily chlorinated water shall be flushed from the main until the chlorine concentration in the water leaving the mains is not higher than the generally prevailing in the system or less than 1 mg/1.

After final flushing and before the water main is placed in service, a sample or samples shall be collected from the end of the line and tested for bacteriological quality and shall show the absence of coil form organisms. If the initial disinfection fails to produce satisfactory samples, disinfection shall be repeated until satisfactory samples have been obtained. When the samples are satisfactory, the main shall be placed in service.

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MAINTENANCE PERIOD for Pipe Line

1. It is the sole responsibility of the contractor to maintain the Pipe line successfully for the maintenance period of 3 months from the successful Commissioning of the project.

2. The following measures are to be taken essentially by the contractor

   - The contractor should keep all spares required for replacements for the required pipes and specials readily available to ensure uninterrupted Works.

   - All the equipments that go out of order during the course of the maintenance period shall be rectified/ replaced immediately to ensure uninterrupted works. If any equipment/machinery is found to be defective either due to manufacture or due to unsatisfactory maintenance, the same should be replaced by the contractor at his cost.

   - The contractor is responsible for the incidence of any theft; malpractice etc within the project area during the maintenance period and the contractor shall keep the Employer indemnified.

   - During the period of maintenance, all costs towards labour, spares, consumables, chemicals, repairs and renewals shall be borne by the firm.

   - Complete quality service shall be ensured by the contractor during the maintenance period.

   - Necessary log books indicating the hours of running , consume of water and maintenance carried out and repairs attended with details of spares changed shall be maintained by the contractor on a day to day basis and produced to the Engineer in charge whenever called for.

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Contractor

Executive Engineer, TWAD Board,
RWS Division, Tiruvannamalai.

ELECTRICAL EQUIPMENTS AND OTHER ACCESSORIES

1) All the materials used shall conform to the relevant BIS and should be delivered at site of work. The contractor is responsible for safe custody of machinery and other equipments under this contract till handing over to the employer.

2) The rates should include all the minor items of civil works, if any required for installation complete.

3) All necessary civil works for erection of all equipments and accessories offered by the contractor under this contact should be done by the contractor.

4) Test certificates for machinery and equipments should produce along with supply.

5) The bidder should enclose the performance curve duly indicating the duty point for the size of the impeller selected (Family curve should not be furnished.) The performance curve should furnish complete range of operation and the curve should be authenticated by the manufacturer or his authorized dealer. In the event of non compliance the offer shall be summarily rejected.

6) The contractor shall make necessary arrangements to get supply of electricity from TNEB for operating the machinery and equipment. Necessary vouchers in original for the payment made to the EB shall be produced to the employer by the contractor which shall be reimbursed by the employer.

7) Obtaining approval of electrical layout diagram for the installation of all the equipments (transformers, generators, pump sets and other accessories) and obtaining safety certificate on completion of work from Chief Electrical Inspector to Government of Tamil Nadu should be arranged and got approved by the contractor at his cost.

8) Before supply of machinery, equipments and other accessories prior approval of the engineer should be obtained giving the name of makes and other details required.

9) The contractor should get the layout approval in time before execution and for the size and capacity of the equipments before the supply of the same. After execution of the Safety Certificate if any modification of alteration suggested by the Chief Electrical Inspector on the installation work done by the contractor should be carried out by the contractor at his cost

10) All the materials should be supplied as per BOQ and should be of standard makes mentioned below:-

SL. No.	DESCRIPTION	MAKE
1	Centrifugal pump	Kirloskar, Jyothi, Best and Crompton Mather and Platt, worthington, Flow More or equivalent.
2	Turbine Pumpset	Kirloskar, Jyothi, Best and Crompton Mather and Platt, worthington, Flow More or equivalent.
3	Submersible pump and motar	KSB, Calama, Waterman, Atlanta or equivalent.
4	Make of motor	Jyothi NGEF, GEC, Crompton and Greaves, Siemens or equivalent.
5	Make of transformer	Kirloskar, GEC indo tech, Hindustan or equivalent.
6	Diesel Generator	Kirloskar, GEC of equivalent.
7	Starter	L&T, Cutler Hammer, Siemens, MEI or Equivalent.
8	Switch fuse and circuit breakers	L&T, Cutler Hammer, Siemens, MEI or Equivalent.
9	Cables	Finolex, Unista, Uniflex or equivalent.
10	Valves	Kirloskar, Venus, Upadyaya CALSONS or equivalent.

11) The right of choosing the make among the makes offered by the contractors rest with the employer only.

12) The submersible pumps centrifugal pumps, turbine pumps submersible motors, motors for turbine and centrifugal pump set transformer, generators, Panel Boards to be supplied by the firm will be inspected by the Inspecting Agency fixed by the Employer at the manufactures premises and test certificate will be issued. The contractor should make necessary arrangements for the inspecting staff at his own cost for testing the above pump sets. Post installation inspection of high duty pump

sets (above 25 HP) should be done by the third party inspection agencies to ensure proper functioning of the scheme at the contractor's cost in consultation with the Superintending Engineer in charge.

All tests necessary to ensure that the plant and machinery or equipment complies with the specification and guarantees shall be carried out at site and at the contractor's cost and such test shall be carried out within one month of the completion of erection. Should the result of these test not done within the margin specified, the tests shall if reported within one month from the date of plant is ready for retest and the contractor shall repay to the Engineer all reasonable expenses to which he may be put by such test.

13) If the complete plant or any portion thereof is found to be defective the Engineer shall give the contractor a notice in writing to verify such defects. If the contractor fails to rectify the defects within the specified period the Engineer will rectify the defects at the contractor's risk and cost.

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SPECIAL CONDITIONS for ELECTRICAL EQUIPMENTS

1) The contractor should get the layout approval in time before execution and for the size and capacity of the equipments before the supply of the same. After execution of the Safety Certificate if any modification of alteration suggested by the Chief Electrical Inspector on the installation work done by the contractor should be carried out by the contractor at his cost.

2) The contractor is responsible for safe custody of machinery and other equipments under this contract till handing over to the employer.

3) The rates should include all the minor items of civil works, if any required for installation complete.

4) All necessary civil works for condition of all equipments and accessories offered by the contractor under this contract should be done by the contractor.

5) Test certificates for machinery and equipments should produce along with supply.

6) Before supply of machinery, equipments and other accessories prior approval of the engineer should be obtained giving the name of makes and other details required.

7) The right of choosing the make among the makes offered by the contractors rest with the employer only.

8) All tests necessary to ensure that the plan and machinery or equipments complies with the specification and guarantees shall be carried out at site and at the contractor's cost and such test shall be carried out within one month of completion of erection. Should the result of these test not done within the margin specified, the test shall reported within one month from the date of plant is ready for retest and the contractor shall repay to the Engineer all reasonable expenses to which he may be put by such test.

9) If the completed plant or any portion thereof is found to be defective the Engineer shall give the contractor a notice in writing to verify such defects. If the contractor fails to rectify the defects within the specified period the Engineer will rectify the defects at the contractor's risk and cost.

10) Civil work related with foundation and related electrical wiring etc. would be provided by the concerned Indenter.

11) Control Panel along with all electrical equipment shall comply with Indian electricity Act / Rules and IS:1356 (part-1)/72. Earthling terminals shall be provided on electrical motor including the control gear. Hinged cover shall be interlocked with the machine to prevent operation of the machine when the covers are open. Necessary cover guards and shield etc. shall be provided on all moving parts and machine guarding shall be as per IS: 9474/80.The control penal shall have door inter-lock to cut off the supply when the panel is open.

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Contractor

Executive Engineer, TWAD Board,
RWS Division, Tiruvannamalai.

ADDITIONAL TERMS AND CONDITIONS for ELECTRICAL EQUIPMENTS

1. PRICE:

   A) Price of materials is F.O.R. delivery at site. Price should be inclusive of Sales tax, Excise duty and other taxes etc. complete and no variation in the taxes and duties will be accepted.

   B) The prices are for materials and labour charges etc. and are firm till date of completion of work and no price variation under any circumstances will be accepted.

2. DESPATCH INSTRUCTION:

   Detailed dispatch instruction will be issued by the Assistant Executive Engineer, TWAD Board, RWS sub division, Villupuram. It is the responsibility of Contractor to provide necessary watch and ward staff for the safe storage of materials at the site of work during erection.

3. GUARANTEE:

   The plants and equipments supplied should bear a guarantee period of 36 months from the date of supply against any defects. Any part or parts found defective during the guarantee period should be replaced by the contractor free of cost. During this guarantee period for services in addition to any break down, should be done by the Contractor free of cost. If any extended guarantee period to the solar panel, battery and inverter will be applicable in this agreement.

4. DELIVERY PERIOD AND ERECTION PERIOD:

   The supply and delivery of all items and erection & commissioning of above plants mentioned in the Schedule "A" should be completed within 30 days from the date of receipt of this work order.

5. PRE – DELIVERY INSPECTION:

The Iron core Oil Cooled 400 KVA /22KV/433V Transformer to be supplied by the firm will be inspected by the authorized inspecting agencies by TWAD Board and test certificates will be issued for each and every consignment. The contractor should make necessary arrangements for the inspecting staff at his own cost for testing. The contractor should be give prior intimation to the inspecting officer, so that, inspection could be done without affecting the delivery schedule as promised by the contractor. The test will be conducted as per ISS. The Material should be dispatched to site only after pre – delivery inspection. The inspection charges will be borne by the contractor.

7. POST DELIVERY INSPECTION:

The plant and machineries supplied by the firm will be inspected after commissioning by the third party agency as per the Board orders as directed by the Executive Engineer, TWAD Board, RWS Division, Villupuram and inspection fees will be borne by the contractor. Service facility and recalibration facility details to be furnished.

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MAINTENANCE PERIOD for ELECTRICAL EQUIPMENTS

1. It is the sole responsibility of the contractor to maintain the **Electrical Equipments** successfully for the maintenance period of **1 month** from the successful Commissioning of the project.

2. The following measures are to be taken essentially by the contractor

- The contractor should keep all spares required for replacements for the Electrical Equipments readily available to ensure uninterrupted Works.

- All the equipments that go out of order during the course of the maintenance period shall be rectified / replaced immediately to ensure uninterrupted works. If any equipment / machinery are found to be defective either due to manufacture or due to unsatisfactory maintenance, the same should be replaced by the contractor at his cost.

- The contractor is responsible for the incidence of any theft; malpractice etc within the project area during the maintenance period and the contractor shall keep the Employer indemnified.

- During the period of maintenance, all costs towards labour, spares, consumables, chemicals, repairs and renewals shall be borne by the firm.

- The cost of Diesel, Iron core oil charges during the maintenance period shall be borne by the Employer.

- Complete quality service shall be ensured by the contractor during the maintenance period.

- Necessary log books indicating the hours of running, consume of Diesel, Iron core oil and maintenance carried out and repairs attended with details of spares changed shall be maintained by the contractor on a day to day basis and produced to the Engineer in charge whenever called for.

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Contractor

Executive Engineer, TWAD Board,
RWS Division, Tiruvannamalai.

TEMPERATURE RISE

The insulation should be perfect so as to limit the temperature rise in windings.

a. OUTPUT:
The motor shall be capable of developing the Mechanical output for the required conditions and shall have continuous normal rating to suit the maximum load when operated at the pump speed.

ii) TECHNICAL DATA:
The motor HP shall be such that to safety take the load when the total head is reduced by the rise of water level.

The H.P of the motor offered shall have a Margin above the H.P absorbed by the pump set at duty point and also above the maximum BHP absorbed by the pumps etc., at duty point and also above the maximum absorbed by the pump set offered.

i) OVERLOAD CAPACITY:
The motor shall be capable of withstanding the over load specified in the relevant condition of BIS.

ii) STARTING:
The motor shall give full load torque when taking 1 to 1.5 times full load current. The motor shall have a name plate giving the following information.

a. Induction motor.
b. Name of manufacturer.
c. Manufacturer's number & frame reference.
d. Type of enclosure.
e. B.H.P.
f. Rated voltage and winding connections.
g. Rated output in K.W.
h. Number of phases.
i. Frequency in HZ.
j. Current approximate in amperes at rates output.
k. Speed in revolutions per minute at rates output.

iii) STARTERS:

The Starters shall suitable for the Motor offered. This should have single phasing preventer, mounted on Ammeter, suitable capacity fuses etc., with all the standard safety devices such as no volt coil, over load releases with time lag arrangements dry running preventer suitable inter locking devices, cable entries, name plates and ear thing facilities etc.,

NOTE: (a) DOL Starters are suggested up to 10 HP.

(b) Air break fully automatic star delta starters are suggested for above 10HP up to 50HP except submersible pump sets for which fully automatic ATS starters are suggested.

(c) Air break soft starters are suggested for 50HP and above.

(d) While selecting starters, the contact rating is the criteria and not the motor rating.

iv) SWITCH BOARD:

The switch board shall complete with all necessary internal connections and accessories as mentioned in the BOQ and as per latest IE Rules and CEIG regulations. This switch Board should contain all equipments house in cubicle; the bus bars should have ample current carrying capacity for connected load and painted with powder coated painting.

v) CABLES:

The cables shall be supplied as mentioned in BOQ with ISI mark; Laying and jointing of cables shall be as per IE Rules. The cable should have current carrying capacity to withstand over load due to low voltage drop. Cable jointing should be done in such manner that there is adequate bondage strength and safety to equipments and operators.

vi) EARTHING:

Twin copper earthing of the plant and equipments shall be done as per IS 3043/1966 and IE Rules 1996 and amended from time to time. Two separate lead should be taken to two separate earth pits located outside the pump house.

vii) PUMPHOUSE, WIRING AND LIGHTING:

Pump house wiring and lighting shall be carried out, as per IE Rules with sufficient no of light points, lamps and other accessories (to be supplied by the contractor) as prescribed in the BOQ and shall be of standard make.

viii) LAYING AND JOINTING:

The items of laying and jointing of pipes, specials and valves should include the necessary clamps, supports, trenches, wherever necessary.

Supporting studs, bolts, nuts, washers, necessary jointing materials together with spare bolts and nuts and jointing materials shall also be supplied free of cost.

ix) ERECTION AND TESTING:

The contractor shall provide a skilled Engineer and skilled labour for the entire execution of the work and final testing of the plants at sites.

All erection tools including spanners, dieses, etc., shall be supplied by the contractor and the contractor's representatives shall have full and uninterrupted access to the site during erection.

The employer may be deputing any officer under his control to visit the work at any time during the stage of erection for inspection. The plant shall be tested by employer. Post/ delivery inspection by the third party inspection agency in the presence of the firm's engineer or any other representative to ensure performance and all testing equipments as may be reasonably required shall be provided by the contractor.

Installation testing and commissioning should be in accordance with relevant ISS. The pre delivery inspection certificate for the pump sets, panel board and other equipments, TNEB and Test certificate for transformer to be obtained by the bidder.

x) SPARE PARTS:

Supply of spares and Tools shall be made as per the list prescribed in BOQ with index card.

xi) TOOLS:

Standard tools for the maintenance of the equipments shall be supplied as detailed.

D/E Spanners	:	1 set
Ring spanners	:	1 set
Bearing puller	:	1 No.

Grease gun	:	1 No
Hand Gloves tested for Electrical operation	:	1 pair
Ball Peen hammers	:	1 No
Screw drivers	:	1 set
Electrical tester	:	1 No
Electric megger	:	1 No

xii) COMPLETION PLANS:

The successful bidder shall be requested to furnish completion plans in triplicate within one month from the date of the first testing of the plants. The plan should show the entire layout of the plant executed. Two copies of plan should be supplied to the Employer and one to be framed and suspended in the head works. The contractor shall in addition to the above furnish detailed specifications of the equipment provided to the Employer. With all technical date.

xiii) MAINTENANCE MANUAL:

The periodical maintenance schedules for each equipment shall be given with reference to the hours of operation. Detailed information about the spare parts (part name, identification number etc.,) should be given. The copies of the manuals should be furnished within one month from the date of commissioning.

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(a) SUBMERSIBLE PUMP

The pump shall be of latest standard designed to give maximum efficiency when operated under most exacting condition at speed 3000 rpm. The equipment shall confirm to the following specifications as per IS 8030 – 1996.

xiv) PUMP BOWL:

The pump bowl shall be manufactured to offer resistance to corrosion. The bowls may be equipped with replaceable bearing.

The bowl assembly shall bear a name plate giving the following information.

a. Name of the manufacturer or trade mark :
b. Serial Number of the pump set :
c. Pump type :
d. Number of stages :
e. Total head :
f. Capacity :
g. Speed :

xv) IMPELLERS:

The impellers shall be open or closed or semi closed type. They shall be turned and accurately finished and balanced on their own pump shaft for maximum lifting capacity without over loading the prime mover irrespective of water level fluctuations. The impeller may be of the enclosed or semi enclosed type and shall be properly balanced. Dynamic balancing is recommended. Enclosed impellers may be equipped with sealing rings on their hubs.

xvi) PUMP SHAFT:

The pump shaft shall be stainless steel of ample size and stiffness to transmit maximum power without strain or vibration. The pump shaft shall be guided by bearings provided below and above the impeller shaft assembly. The shaft without protecting sleeves shall have a surface finish of 0.75 micron.

xvii) BEARING SLEEVE:

The bearing sleeve shall be of leaded bronze.

xviii) DISCHARGE CASING:

The discharge casing shall be manufactured to offer resistance to corrosion.

xix) SUCTION CASING:

The suction casing shall be manufactures to offer resistance to corrosion.

The opening in the suction case of the entrance shall be of proper size and shape to reduce loss.

The suction case shall be fitted with a strainer made of corrosion resistant materials.

Suitable guard shall be provided just above the suction case bearing to prevent the entry of foreign matter into the suction case.

xx) COUPLING:

A suitable coupling arrangement shall be provided in case of directly coupled pump sets.

xxi) NON RETURN VALVE:

Non return valve shall be provided above the pump discharge case.

xxii) CHARACTERISTIC CURVES:

The performance curves for the full range of operation indicating the head in meter, efficiency and BHP absorbed at the pump shaft against the output in liters per minute shall be furnished.

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(b) SUBMERSIBLE MOTORS

i) TYPE OF MOTORS:

The submersible motor shall be wet type, squirrel cage induction motor suitable for operation on 360/440 Volts. 3 phase 50 Cycles AC supply and capable of developing the required HP at a speed 1500/3000 RPM. The motor windings and the bearing bushes of the rotor shaft shall be lubricated by pure water or oil filled in the motor before erecting the pump sets. The motor shall confirm to IS 9283 – 1979.

The motor shall be connected by means of cable glands rubber seals etc., from inside of bore well to arrest the entry of sand and other foreign matter.

The motor shall be provided with a breathing attachment like bellows diaphragm etc., to compensate the Volumetric variation due to changes in the temperature. The motor shall be made of corrosion resisting materials or suitable treated materials to resist corrosion under normal condition.

ii) BEARINGS:

The thrust bearing shall be of adequate size to withstand the weight of all rotating parts as well as the imposed hydraulic thrust. These shall be lubricated suitably. The thrust bearing housing shall be provided with a drain plug to empty the oil pure water filled into thrust bearing housing rotor.

iii) MOTOR:

The motor shaft shall be provided with shaft protective sleeves having a surface finish of 0.75 micron.

iv) EARTHING ARRANGEMENT:

The earthing of motor shall comply with IS: 3043-1966 Code of practice for earthing provision shall be made for double earth copper connection. Two separate lead should be taken to two separate earth pits located outside the pump house.

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Pump characteristics

I. a) Submersible Pump.
   b) Motors for Submersible Pump.

II. a) Starters.

(The above annexure as applicable should be filled in and duly signed and enclosed)

Sl.No.	Description	Technical Details	Remarks
a)	Capacity in LPM (discharge).		
b)	Total head in meters.		
c)	Net positive suction head required.		
d)	HP absorbed by the Pump. i) at duty point. ii) at max BHP point given in the range of curve furnished.		
e)	HP of the motor offered.		

Note:
The motor must not get over loaded; at Positive low head Conditions due to Maximum W.L. Conditions in Bore well / well.

ANNEXURE – I

Submersible Pumps

01.	Name of Manufacturer	:
02.	Type of pump and Model	:
03.	Number of stages	:
04.	Material of strainer	:
05.	Delivery Branch dia.(in mm)	:
06.	Total discharge in LPM	:
07.	Materials of casing	:
08.	Type of impeller	:
09.	Materials of impeller	:
10.	Material of impeller shaft	:
11.	Type of bearings	:
12.	Are the bearings external or internal	:
13.	Material of bearings	:
14.	Maker's name and code number of bearings	:
15.	Whether moving parts are balanced	:
16.	If so, type of balancing	:
17.	BHP of the pump	:
18.	Efficiency of the pump	:
19.	Weight of the pump	:
20.	Diameter of the pump	:
21.	Pump speed	:
22.	Are the characteristics curves of the pumps attached.	:
23.	Total Head	:
24.	Does the pump conform to BIS Specification	:
25.	Specification reference	:
26.	What is the nature of drive	:
27.	Type of coupling	:
28.	Weight of the heaviest part of the pump	:
29.	Weight of the pump complete	:

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Contractor

Executive Engineer, TWAD Board,
RWS Division, Tiruvannamalai.

ANNEXURE – II

Motor (for Submersible Pumpsets)

01. Name of Manufacturer :
02. Type of Motor :
03. Brake Horse Power of the Motor :
04. Number of phases :
05. Cycles :
06. System Voltage :
07. Frequency :
08. Speed at full load :
09. Full load current :
    a) Normal full load : ..... Amps
    b) Maximum starting : ..... Amps
10. Efficiency Load Percent Tolerance
    as per BIS Full :
    $\frac{3}{4}$:
    $\frac{1}{2}$:
11. Over load capacity:
    a) 25% :
    b) 50% :
    c) 100% :
12. Power Factor Load Percent
    as per BIS Full :
    $\frac{3}{4}$:
    $\frac{1}{2}$:
13. HP of the Motor :
14. Number of poles :
15. Type of enclosure :
16. Type of Rotor :
17. Bearing manufacturer :
18. Type, number and size of bearing
    (Driving end) :
19. Size of coupling and its type :
20. Does the Motor conform to BIS
    Specification

Contractor

Executive Engineer, TWAD Board,
RWS Division, Tiruvannamalai.

:

21. If so state the No. :
22. Weight of Motor :
23. Total weight of pump and Motor :
24. Diameter of the Pump set :
25. Overall efficiency of the pump set :

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ANNEXURE - III

Starters

1. Name of Manufacturer :

2. Type of Starter :

3. Type of Cooling :

4. Over load relay :

5. No Volt Coil :

6. No. of starters permitted in one hour :

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