Tender No.: 2 of 2022-2023

OFFICE OF THE CHIEF ENGINEER, ZONE – I, PUBLIC HEALTH ENGINEERING DEPARTMENT

TENDER DOCUMENT FOR SURVEY, DESIGN, SUPPLY, INSTALLATION, TESTING & COMMISSIONING OF SAIRANG RAILWAY STATION RAW WATER PUMPING SYSTEM AND WATER TREATMENT PLANT i/c 2 yrs O & M

Tender amount	**Rs. 7,20,12,000.00**
Earnest money	**Rs. 14,40,240.00**
Last date of sale of tender	**Dt 29/Dec/2022**
Last date of submission of tender	**Dt 4/Jan/2023 @ 12:00 hour**
Date of opening	**Dt 4/Jan/2023 @ 14:00 hour**
Cost of tender document	**Rs. 1,500.00**
Time allowed for execution of work	**24 months**

PRESS TENDER NOTICE

PUBLIC HEALTH ENGINEERING DEPARTMENT

TENDER NOTICE

The Chief Engineer, Zone – I, PHED, Aizawl. on behalf of the Governor of Mizoram invites bids in two envelope system with sealed item rate tender in prescribed form affixing court fee stamp worth not less than Rs. 7.50/- (non refundable) for non tribal and up-to-date House Tax Payee Certificate for tribal from reputed contractors experienced in similar type of works.

Notice No.	Name of work	Approximate value of work	Earnest Money	Time of Completion	Cost of Tender (in Rs)	Eligible Class of Contractor
NIT No. 2 of 2022-2023	Survey, design, supply, installation, testing and commissioning of Sairang Railway Station Raw Water Pumping System & Water Treatment Plant i/c 2 yrs O & M	Rs. 7,20,12,000	Rs. 14,40,240	24 months	Rs 1,500	Class I of MPHED/CPWD

Tender document may be obtained from the office of the undersigned on any working days till **29/Dec/2022** on application and on payment of tender cost as mentioned above (non-refundable) without which the tender shall be summarily rejected or the same may be downloaded from PHED website @ www.phed.mizoram.gov.in. and the cost of tender document shall be included in a separate envelope in Technical Bid without which the tender shall be summarily rejected. The tender will be submitted to the office of the undersigned upto **12:00 hours** on **4/Jan/2023**. The tender so received will be opened on **the same date** at **14:00 hours** in presence of intending tenderer or his authorized representative. The undersigned reserves the right to reject any or all of the tenders without assigning any reason thereof.

(F.LIANTLUANGA)
Chief Engineer, Zone-I, PHED
Aizawl, Mizoram.

Copy to-

1. *PS to Honourable Minister, PHED, Mizoram for favour of your kind information.*
2. *The Secretary, PHED, Govt of Mizoram for favour of kind information.*
3. *The Engineer-in-Chief, PHED, for favour of kind information.*
4. *The Chief Engineer Zone-II, PHED, for favour of kind information.*
5. *The Superintending Engineer, PHED, Rural WATSAN Circle, for information.*
6. *The Executive Engineer, PHED, Rural WATSAN Division, Aizawl for information.*
7. *The Director, Information and Public Relation Department, Govt. of Mizoram for information with a request to publish the tender notice in two consecutive issues of two local news papers.*
8. *Concerned file.*
9. *Office notice board.*

Chief Engineer, Zone-I, PHED
Aizawl, Mizoram.

Form CPWD – 6

OFFICE OF THE CHIEF ENGINEER, ZONE-I,
PUBLIC HEALTH ENGINEERING DEPARTMENT
AIZAWL, MIZORAM.

NOTICE INVITING TENDER
(TENDER NO 2 OF 2022-2023)

Item rate tenders are invited on behalf of the Governor of Mizoram from reputed registered contractors for the work: **Survey, design, supply, installation, testing and commissioning of Sairang Railway Station Raw Water Pumping System & Water Treatment Plant i/c 2 yrs O & M**

1. The enlistment of the contractors should be valid on the last date of sale of tenders. In case the last date of sale of tender is extended, the enlistment of contractor should be valid on the original last date of sale of tenders.
   1.1 The work is estimated to cost Rs. 7,20,12,000.00
   1.2 Tenders will be issued to reputed MPHE/CPWD contractors with definite proof from appropriate authority, which shall be to the satisfaction of PHE Department. Standing order for eligibility of different classes of contractor corresponding on the tendered amount will be followed.

2. Contract agreement should be signed within 10 days from issue of letter of intent.

3. The site for the work is available. The time allowed for carrying out the work will be 24 months starting from 1 (one) month after the date of signing contract agreement.

4. Tender document will be issued from the office of the Chief Engineer, Zone-I, PHED, Aizawl between 11.00 AM & 3.00 PM every day except on Saturday, Sunday and public holidays on payment of Rs. 1,500/- (Rupees one thousand five hundred only) in cash.

5. Tender must be accompanied by earnest money of Rs. 14,40,240.00 (2% of the tendered value) in the form of bank guarantee/fixed deposit receipt/demand draft of a scheduled bank located in Aizawl, Mizoram only and issued in favour of the Chief Engineer, Zone-I, PHED, Aizawl. Tender document along with supporting documents and designs shall be placed in one sealed (transparent tape accepted)) envelope mark as technical bid, the financial bid may be placed in one sealed (transparent tape accepted) envelope and both the envelopes shall be submitted together in another sealed (by wax only) envelope with the name of work and due date of opening written on the envelope.

   TECHNICAL BID shall comprise of the following:

   i. Earnest money
   ii. Qualification information in prescribed forms and supporting documents
   iii. Form of technical bid - Form I
   iv. Power of attorney for signing of bid - Form II (If needed)
   v. Bid securing declaration - Form III
   vi. Credit facilities - Form IV
   vii. Affidavit - Form V
   viii. Undertaking - Form VI
   ix. Certificate of understanding - Form VII

FINANCIAL BID shall comprise of the following:

i. Proforma of schedules

6. Bidder whose tender is accepted will be required to furnish performance guarantee of 3% (three percent) of the tendered amount within 10 days from issue of letter of intent. This guarantee shall be in the form of government securities or fixed deposit receipt or bank guarantee bonds of any scheduled bank located in Aizawl, Mizoram only. In case the contractor fails to deposit the said performance guarantee within the period as indicated, the contract shall be liable to be terminated.

7. Canvassing whether directly or indirectly, in connection with tender is strictly prohibited and the tenders submitted by the contractors who resort to canvassing will be liable to rejection.

8. Competent authority on behalf of Governor of Mizoram reserves to himself the right of accepting the whole or any part of the tender and bidder shall be bound to perform the same at the rate quoted.

9. Bidder shall not be permitted to tender for works in the Circle/ Division responsible for award and execution of contracts, in which his near relative is posted as Accounts Officer or as an officer in any capacity between the grades of Superintending Engineer and Junior Engineer (both inclusive). He shall also intimate the names of persons who are working with him in any capacity or are subsequently employed by him and who are near relatives to any gazetted officer in the department. Any breach of this condition by the contractor would render him liable to be removed from the approved list of contractors of this department.

10. No engineer of gazetted rank or other gazetted officer employed in engineering or administrative duties in an engineering department of the Government of Mizoram is allowed to work as a contractor for a period of one year after his retirement from government service, without previous permission of the Government of Mizoram in writing. This contract is liable to be cancelled if either the contractor or any of his employees is found at any time to be such a person who had not obtained the permission of the Government of Mizoram as aforesaid before submission of the tender or engagement in the contractor's service.

11. Tender for the work shall remain open for acceptance for a period of 60 days from the date of opening of tenders. If any tenderer withdraws his tender before the said period or issue of letter of acceptance, whichever is earlier, or makes any modifications in the terms and conditions of the tender which are not acceptable to the department, the Governor of Mizoram shall, without prejudice to any other right or remedy, be at liberty to cause forfeiture of the said earnest money. Further the tenderer shall not be allowed to participate in the retendering process of the work.

12. This tender document, along with latest CPWD Form 8 shall form part of the contract document. However, applicability of the clauses of CPWD Form 8 listed at General Rules and Direction of this NIT may be referred.

13. The department shall deduct Cess & GST, etc as admissible on the value of work done from each bill of the contractor as per prevailing government's instructions/orders. In lieu of this, the department shall issue a certificate of deduction of the tax at source to the contractor.

14. Quoted rate above the tendered amount and below 2% of tendered amount shall be rejected summarily.

15. No tender will be considered for acceptance unless the detailed tender papers are duly purchased by the intending tenderer. A copy of the receipt for the money deposited against purchase of the tender document shall have to be submitted along with the tender as a proof of purchasing the same.

16. Tenderer has to read all terms and conditions of this tender documents carefully. Tenderer has to accept and comply with all terms and conditions of this tender. Overwriting in the proforma of schedules is not acceptable and corrections if any should be initialled and dated by the tenderer.

17. Defect liability period of the contract shall be 12 (twelve) months from the date of commissioning. Any defect noticed in the system during construction as well as defect liability period shall have to be rectified by the contractor at his own cost and risk.

18. Contractor shall carry out O & M for 2 (two) years right after full completion and final commissioning.

19. During this O & M period, PHE/Railway staff will be trained in O & M free of cost by the contractor.

20. The Public Health Engineering Department, Govt. of Mizoram takes no responsibility for delay, loss or non-receipt of tenders sent by post. Unsealed tenders shall not be considered for opening or acceptance.

21. Tender documents shall remain the property of the Public Health Engineering Department, and if obtained by one intending tenderer, shall not be used by any other tenderer.

22. Tender shall be completely filled in all respects and shall be tendered together with requisite information. *Any tender incomplete in any particular shall be liable to be rejected*.

23. If any contradiction arises in any clauses of this NIT and clauses in CPWD Form-8, clauses in this NIT will supersede clauses in CPWD Form-8.

24. Bidder/manufacturer must have adequate experiences on survey, design, supply, installation and commissioning of water treatment units and also of raw water pumping systems.

25. Bidder shall have to submit copies of GST registration number issued by appropriate authority.

26. The terms, conditions and specifications mentioned in tender document shall be binding on the tenderer and no condition or stipulation contrary to the conditions shall be acceptable. It may please be noted that tenderers who do not accept terms and conditions stipulated in this tender documents, their offers shall be liable to be rejected out-rightly without assigning any reason whatsoever. Each page of tender documents & enclosures including blank pages shall be signed by tenderer. All the pages of the documents issued must be submitted along with the offer. The pages of the tenders should be submitted in proper way in an organized manner else the tenders may be cancelled.

27. Rate quoted by tenderer should include all kind of taxes, GST, Cess, insurance, royalty for forest product, etc.

28. Offer of those parties who are found qualified based on the technical evaluation will only be taken for further consideration and the financial bid of only those parties will be opened.

29. PHED reserves the right to reject or accept any or all tenders wholly or partly with proper reasons on the grounds considered advantageous to the department whether it is the lowest tender or not.

30. Contractor shall be responsible for arranging and maintaining at his own cost, all materials, tools & plants, water, electricity, facilities for workers and all other services and amenities including access to worksite which may be required for executing the work.

31. To qualify for opening of Financial Bid, the bidder in its name should have satisfactorily completed (as prime contractor or as nominated sub-contractor) water supply work of similar nature to this tender, otherwise his Technical Bid shall be summarily rejected as technically unfit for the tendered work.

(F.LIANTLUANGA)
Chief Engineer, Zone-I, PHED
Aizawl, Mizoram.

RECEIPT FOR PURCHASE OF TENDER

Type : Item rate tender

Tender No : 2 of 2022-2023

Name of work : Survey, design, supply, installation, testing and commissioning of Sairang Railway Station Raw Water Pumping System & Water Treatment Plant i/c 2 yrs O & M

Issued to : ……..

Signature of officer issuing the documents ……

Designation : .....

Date of issue : ……

TENDER

I/We have read and examined the notice inviting tender, conditions, specifications, schedules, clauses, other documents, rules, related Manuals and all other contents in the tender document for the work.

I/We hereby tender for the execution of the work specified for the Governor of Mizoram within the time specified and in accordance in all respect with the specifications, designs, drawings and instructions and with standard quality materials and in respect of accordance with such conditions so far as applicable.

We agree to keep the tender open for sixty (60) days from the due date of its opening and not to make any modification in its terms and conditions.

A sum of Rs. 14,36,120.00 is hereby forwarded as earnest money. If i/we fail to furnish the prescribed performance guarantee within prescribed period, i/we agree that the Governor of Mizoram shall be, without prejudice to any other right or remedy, at liberty to cause forfeiture of the said earnest money absolutely. Further, if i/we fail to commence work as specified, i/we agree that Governor of Mizoram shall, without prejudice to any other right or remedy available in law, be at liberty to cause forfeiture of the said performance guarantee absolutely. Further, i/we agree that in case of forfeiture of earnest money and/or performance guarantee as aforesaid, i/we shall be debarred for participation in the re-tendering process of the work.

I/We undertake and confirm that similar work(s) has/have been executed by us/through another contractor on back to back basis. Further that, if such a violation comes to the notice of the department, then i/we shall be debarred for tendering in PHE Department in future forever. Also, if such a violation comes to the notice of the department before date of start of work, the Engineer-in-Charge shall be free to cause forfeiture of the entire amount of performance guarantee.

I/We hereby declare that i/we shall treat the tender documents and other records connected with the work as secret/confidential documents and shall not communicate concerned information to any person other than a person to whom i/we am/are authorized to communicate the same or use the information in any manner prejudicial to the safety of the State.

Signature of witness:	Signature of contractor :
Name of witness:	Name of contractor :
Postal address:	Postal address:
Mobile phone number:	Mobile phone number:

GENERAL CONDITIONS OF CONTRACT

1. Signing of contract		Successful tenderer, on acceptance of his tender by accepting authority, shall, within 10 days from the date of issue of letter of intent, sign a contract agreement.
2. Performance guarantee	i	Contractor shall submit an irrevocable performance guarantee of 3% (three percent) of the tendered value within 10(ten) days from the date of issue of letter of intent.
	ii	Performance guarantee shall be valid upto the stipulated date of completion plus 60 days beyond that. In case time for completion of the work gets enlarged, contractor shall get validity of performance guarantee extended to cover such enlarged time for completion of the work.
	iii	In the event of the contract being terminated or rescinded, performance guarantee shall stand forfeited in full and shall be absolutely at the disposal of the Governor of Mizoram.
3.Security deposit	An amount of 2.5% from each running bill and final bill shall be deducted as a security deposit till the sum deducted will amount to 2.5 % of the tendered value of the work. This amount shall be released in single installment only after Defect Clearance Certificate is issued by Engineer-in-Charge.	
4. Compensation for delay	If contractor fails to maintain required progress or fails to complete the work or an item of work or group of items of work, he shall, without prejudice to any other right or remedy available under the law on account of such breach, pay to the Government a compensation @ 1.5% per month of the tendered value of the incompleted work or of the tendered value of the incompleted item or group of incompleted items of work subjected to 10% of value of that item of work until his progress of that work item(s) is found satisfactory by Engineer-in-Charge. The amount paid as compensation to the Government for delay of contract work is irrevocable and at the disposal of the Governor of Mizoram from the day it is paid by the contractor. The amount of compensation may be adjusted or set-off against any sum payable to the contractor under this or any other contract with the Government of Mizoram.	
5. Time and extension for delay	Time allowed for execution of the work as specified or the extended time in accordance with these conditions shall be the essence of the contract. If contractor commits default in commencing execution of the work as aforesaid, the Governor of Mizoram shall, without prejudice to any other right or remedy available in law, be at the liberty to cause forfeiture of performance guarantee absolutely. Program chart: (i) Contractor shall prepare a program chart for execution of the work, showing clearly all activities from start of the work to completion, with details of manpower, equipment and machinery required for fulfillment of the program within stipulated period. (ii) Program chart should include the following: (a) Descriptive note explaining sequence of various activities. (b) Network (PERT/CPM/Bar chart). (c) Program for procurement of materials by contractor.	

6. Terms and conditions of payment	1. Bill will be paid depending on availability of fund
7. Materials to be provided by contractor	Contractor shall, at his own expense, provide all materials, required for the works other than those which are stipulated to be supplied by the Government. Contractor shall, at his own expense and without delay, supply to Engineer-in-Charge samples of materials to be used on the work. All such materials to be provided by contractor shall be in conformity with the specifications laid down or referred to in the contract. Engineer-in-Charge shall have full powers to cause removal of all materials from premises which in his opinion are not in accordance with specifications and in case of default, Engineer-in-Charge shall be at liberty to employ at the expense of contractor, other persons to remove the same without being answerable or accountable for any loss or damage that may happen or arise to such materials. And all costs for such removal and substitution shall be borne by contractor.
8. Mobilization Advance	Mobilization advance not exceeding 10 % of the tendered value may be given at simple interest of 10% per annum, if requested by contractor in writing within one month of order to commence the work. In such case, contractor shall furnish a **bank guarantee bond** from a scheduled nationalized bank within Mizoram as specified by Engineer-in-Charge for full amount of mobilization advance before such advance is released. Such advance shall be in two or more installments to be determined by Engineer-in-Charge at his sole discretion. First installment of such advance shall be released by Engineer-in-Charge to contractor on a request made by contractor to Engineer-in-Charge in this behalf. Second and subsequent installments shall be released by Engineer-in-Charge only after contractor furnishes a proof of satisfactory utilization of the earlier installment to entire satisfaction of Engineer-in-Charge.
9. Work to be executed in accordance with specifications, drawings, orders, etc	Contractor shall execute the whole and every part of the work in the most substantial and workman like manner both as regards materials and otherwise in every respect in strict accordance with the specifications. Contractor shall also conform exactly, fully and faithfully to the design, drawings and instructions in writing in respect of the work signed by Engineer-in-Charge and contractor shall be furnished free of charge one copy of the contract documents together with specifications, designs, drawings and instructions as are not included in the standard specifications of Central Public Works Department or in any Bureau of Indian Standard or any other, published standard or code or, Schedule of Rates or any other printed publication referred to elsewhere in the contract. Contractor shall comply with the provisions of the contract and with due care and diligence execute and maintain the work and provide all labor and materials, tools and plants including for measurement and supervision of all works, structural plans and other things of temporary or permanent nature required for such execution and maintenance in so far as necessity for providing these, is specified or is reasonably inferred from the contract. Contractor shall take full responsibility for adequacy, suitability and safety of all works and methods of construction.

10. Foreclosure of contract due to abandonment or reduction in scope of work	If at any time after acceptance of the tender, Government shall decide to abandon or reduce the scope of the works for any reason whatsoever and hence not require the whole or any part of the works to be carried out, Engineer-in-Charge shall give notice in writing to that effect to contractor and contractor shall act accordingly in the matter. Contractor shall have no claim to any payment of compensation or otherwise whatsoever, on account of any profit or advantage which he might have derived from execution of the work in full but which he did not derive in consequence of the foreclosure of the whole or part of the work. Contractor shall be paid at contract rates, full amount for works executed at site.
11. Suspension of work	Contractor shall, on receipt of the order in writing of Engineer-in-Charge, (whose decision shall be final and binding on contractor) suspend progress of work or any part thereof for such time and in such manner as Engineer-in-Charge may consider necessary so as not to cause any damage or injury to the work already done or endanger the safety thereof. Contractor shall, during such suspension, properly protect and secure the work to the extent necessary and carry out instructions given in that behalf by Engineer-in-Charge.
12. Compensation in case of delay of supply of material by Govt.	Contractor shall not be entitled to claim any compensation from Government for loss suffered by him on account of delay by Government in supply of materials where such delay is covered by the difficulties relating to supply of wagons, force majeure or any reasonable cause beyond the control of Government. This will not be applicable for works where no material is stipulated.
13. Action in case work not done as per specifications	All works under or in course of execution or executed in pursuance of the contract, shall at all times be open and accessible to the inspection and supervision of Engineer-in-charge, his authorized subordinates in charge of the work and all superior officers, officers of Quality Assurance Unit of Department or any organization engaged by the Department for Quality Assurance and of the Chief Technical Examiner's Office, and contractor shall, at all times, during the usual working hours and at all other times at which reasonable notice of the visit of such officers has been given to contractor, either himself be present to receive orders and instructions or have a responsible agent duly accredited in writing, present for that purpose. Orders given to contractor's agent shall be considered to have the same force as if they had been given to contractor himself.
14. Contractor liable for damages, defects, etc	If contractor, his working people, servants, machines, materials, debris, spoils or refuses, etc shall break, deface, injure, destroy, damage or cause loss of value, etc to any building, road, road kerb, fence, enclosure, water pipe, cables, drains, electric post, telephone post or wires, trees, grass, crops, pond or cultivated ground, etc or if any damage shall happen while in progress, from any cause whatever or if any defect or other faults appear in the work, contractor shall upon receipt of a notice in writing on that behalf make the same good at his own expense or pay compensation money to owner of such property.
15. Contractor to supply tools & plants etc	Contractor shall provide at his own cost all materials machinery, tools & plants, water, etc required for work execution and maintenance.

16. Labor laws to be complied by the contractor	(i) Contractor shall obtain a valid license under the Contract Labour (R&A) Act, 1970, and the Contract Labour (Regulation and Abolition) Central Rules, 1971, before commencement of the work, and continue to have a valid license until the completion of the work. The contractor shall also abide by the provisions of the Child Labour (Prohibition and Regulation) Act, 1986. Contractor shall also comply with the provisions of the building and other Construction Workers (Regulation of Employment & Conditions of Service) Act, 1996 and the building and other Construction Workers Welfare Cess Act, 1996. Any failure to fulfill these requirements shall attract the penal provisions of this contract arising out of the resultant non-execution of the work.
	(ii) No labour below the age of eighteen years shall be employed on the work.
	(iii) Engineer-in-Charge may require contractor to dismiss or remove from the site of the work any person or persons in contractors' employ upon the work who may be incompetent or misconduct himself and contractor shall forthwith comply with such requirements. In respect of maintenance/ repair or renovation works etc. where labour have an easy access to individual houses, contractor shall issue identity cards to labours, whether temporary or permanent and he shall be responsible for any untoward action on the part of such labours.
17. Work to be executed as per the approval of Engineer-in-Charge	All works to be executed under the contract shall be executed under the direction and subject to the approval of Engineer-in-Charge who shall be entitled to direct at what point or points and in what manner they are to be commenced, and from time to time carried on.
18. Settlement of disputes & arbitration	All questions and disputes relating to the meaning of the specifications, design, drawings and instructions here-in before mentioned and as to the quality of workmanship or materials used on the work or as to any other question, claim, right, matter or thing whatsoever in any way arising out of or relating to the contract, designs, drawings, specifications, estimates, instructions, orders or these conditions or otherwise concerning the works or the execution or failure to execute the same whether arising during the progress of the work or after the cancellation, termination, completion or abandonment thereof shall be dealt by a Dispute Redressal Committee duly constitute by State Government:
19. Levy /Taxes payable by contractor	Sales Tax/VAT/ GST, Building and other Construction Workers Welfare Cess or any other tax or Cess, etc in respect of this contract shall be payable by the contractor and Government shall not entertain any claim whatsoever in this respect.
20. Termination of contract on death of contractor	Without prejudice to any of the rights or remedies under this contract, if contractor dies, Divisional Officer on behalf of the Governor of Mizoram shall have the option of terminating the contract without compensation to contractor.

GENERAL SPECIFICATIONS

1. Materials and methods of construction for all civil works shall be as per relevant Indian standard specification; part of which are incorporated in the standard specification of MPHED and MPWD and all will be followed during the execution of the work. The work shall be executed as per the guidelines and provisions of B.I.S. All materials shall conform to Indian Standard Code, National Building Code and CPHEEO Manual to maintain quality of work.

2. All materials to be used shall conform to the relevant specifications as per the latest version of the Indian Standards, unless otherwise stated in the detailed specifications of items of work. A set of specimen samples of all approved materials shall be kept in bottle or otherwise at site, cost of which is to be borne by the contractor.

3. Water required for execution of the work and for water tightness test shall be supplied by contractor at his own cost in satisfactory manner to Engineer-in-Charge of work.

4. Hydraulic test of water retaining structure shall have to be given by contractor without any extra cost. The filling of reservoir shall be carried out gradually at the rate not exceeding 30 cm rise in water level per hour and shall not exceed 2.0 meter in 24 hours and total period of 72 hours. Records of leakage starting at different levels of water in reservoir if any shall be kept. Reservoir once filled shall be allowed to remain filled for seven days before any readings of drop in water level are recorded. The level of the water shall be recorded again at subsequent intervals of 24 hours over a period of seven days. The total drop in surface level over a period of seven days shall be taken as an indication of the water tightness of reservoir, which for all practical purposes shall not exceed 40 mm.

5. If even after extending the period of test, the drop is more than permissible, contractor should empty reservoir, rectify the defects in tank, by re-plastering whenever necessary, applying water proofing paint etc. and give water tightness test till the drop in level is within permissible limit. This shall be repeated at the cost of contractor without claiming extra cost. Any delay in giving water tightness will invite penal action under relevant topics/standards of the tender agreement.

6. Bricks

Only 1st class kiln burnt bricks shall be used unless otherwise specified. They shall be of a uniform deep cherry color; thoroughly burnt, regular in shape with sharp and square areas and they must emit a clear ringing sound on being struck.

They must be free from cracks, chips, flaws, stones or lumps of any kind and they shall not absorb water more than one seventh of their own weight after soaking them in water for 15 minutes. The bricks shall show no sign of efflorescence either dry or subsequent to soaking in water.

7. Sand

The source from which sand is to be obtained shall be subject to the approval of Engineer-in-Charge. The sand shall be clean, sharp and gritty to touch and be freed from earth and other impurities by washing. The sand shall be washed to such a degree that when a handful is mixed with clean water in a glass and allowed to stand for an hour the precipitate of mud over the sand shall not exceed 5%.

7.1 Course Sand: It is to be screened through a sieve of 64 meshes to the square inch so as to exclude large particles from the work. The fineness modulus shall not be less than 1.0

7.2 **Fine sand:** It is to be screened through a sieve of 64 meshes to the square inch so as to exclude large particles from the work. The fineness modulus shall not be less than 2.5. The sand should conform to IS 382-1982 for fine and course aggregates from natural sources.

7.3 **Stone chips:** It shall be obtained from crushing trap quartzite or hard stones and from quarries approved by Engineer-in-charge. It shall be of approved quality and proper grade. It shall pass through ¾ " mesh and retained on ¼ " mesh. It shall be free from dirt, leaves, clay and any organic matter. The material conforming generally to IS 383-1983 for course and fine aggregate from natural sources or IS 515-1959 for natural and manufactured aggregates for use in mass concrete with latest revisions.

8. Cement

Ordinary or low heat Portland cement conforming I.S. 269 –1989 or PPC conforming to IS: 1489 (Part 1 & 2) shall be used with approval of the Engineer-in-charge. All cement shall be fresh when delivered. Cements of different types are not to be mixed with one another. Consignments shall be used in the order of delivery. Admixture, if any, shall be used only after approvals.

9. Reinforcement

Steel reinforcement shall be of mild steel of tested quality conforming to I.S.- 432 -1966/ H.Y.S.D. bars conforming to IS -1786/1779- with latest amendments of reputed make.

All the reinforcement shall be clean and free from rust, mild scales, dust, paint, oil, grease, adhering earth or any other material or coating that may impair the bond between the concrete and the reinforcement, or cause corrosion of the reinforcement or disintegration of concrete.

Neither the size nor length of bar or wire shall be less than the size or length described in the bar schedule or elsewhere and the length shall not be more than 50 mm in excess of the length as described.

Welded joints in reinforcement may be used but in cases of important connection, tests shall be made to prove that the joints are of the full strength of bars connected, welding of reinforcement shall be done in accordance with the recommendations of the relevant Indian standards for welding mild steel bars used in the reinforcement concrete construction.

Bending and overlapping, placing in position, fabrication, binding, reinforcement with wire of approved gauge shall be done as per I.S. 432 – 1960 (revised) and I.S. 1786 – 1966 and I.S. 2502 (revised). Handling and storage of materials for concrete or RCC should be followed as per I.S. 4082 –1977.

10. Water

The water to be used in making and curing of concrete, mortar etc. shall be free from objectionable quantities of silts, organic matter, injurious amount of oils, acids, salts and other impurities etc. as per IS-456-1978. Engineer-in-Charge or his authorized representatives will determine whether or not such quantities of impurities are objectionable.

Such comparison will usually be made by comparison of compressive strength, water requirement, time of setting and other properties of concrete made with distilled or every clean water and concrete made with the water proposed for use, permissible limit for solids when tested in accordance with I.S. 3025-1964. shall be as tabulated below

1) Organic	200 mg/litre.
2) In-organic	3000 mg/litre.

3) Sulphate (As So 4) 500 mg/litre.
4) Chloride (As CI.) 2000 mg/litre for P.C.C and 1000 mg/litre for R.C.C. work
5) Suspended matter 2000 mg/litre.

If any water to be used in concrete, suspected by the engineer-in-charge/or his authorized representative of exceeding the permissible limits of solids, samples of water will be obtained and get it tested by Engineer-in-Charge in accordance with IS:3025-1964.

11. Cement Mortar

The mortar shall consist of cement and sand mixed in proportion defined in relevant schedule item for various item of work. Only measured quantity shall be used. The sand shall be shovelled in a wooden measure of a clean masonry platform, after removing the measure box and spreading out sand if necessary, the cement (in required proportion) shall be emptied on the top of sand.

The sand and cement shall be then turned over with shovels once dry and made into the form of a hollow cone; into this water can be poured and the whole shall then be turned over completely twice. The color and consistency shall at this stage be quite uniform, if not, further turning shall be done.

Water shall be added by measured quantities if the engineer so direct. Only such quantities of mortar shall be mixed at one time as can be used at once before it can set. No mortar, which has once caked or begun to set, shall be used, nor shall such mortar be remixed; but it shall be removed from the site of the work immediately.

12. Cement concrete

The concrete shall consist of an aggregate of the proportion by volume defined in relevant schedule item or work. Only measured quantity shall be used.

12.1 Laying: The cement, sand and stone chips shall be mixed properly in mechanical mixer in such a manner as to avoid loss of water. The concrete shall be mixed for minimum period of 2 minutes or unit it is of even colour and uniform consistency throughout. As soon as the concrete is mixed it should be removed to the work in iron vessels as rapidly as practicable. The concrete laid will be vibrated for compaction by the vibrators. Slum test will be carried at site during execution of work.

12.2 Curing: The concrete laid shall not be disturbed and shall be kept thoroughly damped by means of wet matting and sand until it shall have become thoroughly set and hard enough to prevent its drying and cracking.

The aggregate shall consist of stone ballast of quality approved by Engineer-in-charge and shall consist of graded size 20 mm and down wards as per specification or the size mentioned in the item description. Curing period for PCC shall be 14 days minimum. Use of curing compound shall be opted as per manufacturer's specification.

12.3 Formworks: The contractor shall furnish on the site of work sufficient number of centering, moulds or templates for its expeditious execution. The forms shall be made in such a way and of such materials as will ensure a smooth surface on the finished concrete. Forms and centering shall be left in place until the concrete has set sufficiently to permit the removal without danger to the structure.

13. Brick masonry work

13.1 Materials: The brick works shall consist of bricks and mortar in accordance with general specification and plans.

13.2 Soaking bricks: All bricks shall be soaked in clean water in tank for a period of at least twelve hour immediately before use. The contractor shall provide at his expense tanks of sufficient capacity to admit of the simultaneous immersion to two days supply of bricks for the work its normal rate of progress.

13.3 Laying: All the best shaped uniformly coloured bricks shall be picked out and used for face work without any extra payment to the contractor.

All courses unless otherwise specified or ordered by the Engineer-in-charge, shall be truly horizontal and the walls shall be taken up truly plumb. Mortar joints shall never exceed 10 mm in thickness and this thickness shall be uniform throughout.

Vertical joints in alternate courses shall come directly over one another. The joints shall be racked out not less than 12 mm deep when the mortar is green so as to provide proper key for the plaster or pointing to be done.

Each face brick shall be set with both bed and vertical joints quite full of mortar. No damaged or broken brick shall be used in any part of the work except such as may be cut to size for closing the course.

The masonry shall be carried up regularly and no step shall be allowed more than 60 cm. Where the masonry of one part has to be delayed, the work must be raked back at an angle not exceeding 45 ^{o} Angles and Junctions. At all angles forming the junction of walls, the brick shall at each alternate course be carried into their respective walls so as to thoroughly unite the work with English bond. Care shall be taken that when a brick is left out to allow support for the scaffold pole on the wall face, such brick shall always be a header and that not more than one header for each pole shall be left out.

13.4 Scaffolding: Proper scaffolding shall be provided whenever necessary having two sets of vertical supports and shall be subjected to the approval of Engineer-in-Charge; who may order the contractor to alter or strengthen the scaffolding if he considers it necessary, without thus becoming responsible either for the safety of the work or workmen or for any additional payment.

Holes shall be made good by bricks to match the face work when scaffolding is removed.

13.5 Curing: All bricks work shall be keep well watered for 10 days after laying.

14. Reinforced Cement Concrete

All R.C.C. work shall be of the grade as given in specifications and as provided in latest IS: 456-2000 (Amendment). The materials will be measured when dry. The stone chips should be thoroughly washed in clean water and stacked.

For water retaining structure minimum grade of concrete shall be M-30 (IS: 3370 latest)

14.1 Laying: Cement, sand and stone chips shall be mixed properly in a mechanical mixer in such a manner as to avoid loss of water. The concrete shall be mixed for minimum period of 2 minutes or until it is of even color and uniform consistency throughout. As soon as the concrete is mixed it

should be removed to the work in iron vessels as rapidly as practicable. The concrete laid will be vibrated for compaction by vibrators. Slum test will be carried at site during execution of work.

14.2 **Curing**: The concrete laid should not be disturbed and shall be kept damped by means of wet matting and sand until it shall have become thoroughly set and hard enough to prevent its curing and cracking.

The aggregate shall consist of stone ballast of quality approved by Engineer-in-Charge and shall consist of graded size 20 mm and downwards as per IS and CPHEEO specification or the size mentioned in the item description.

14.3 **Formwork**: Contractor shall furnish on the site of work sufficient number of centering, forms, moulds or templates for its expeditious prosecution, the forms shall be made in such as way and such material as will ensure a very smooth surface on the finished concrete. Forms and centering shall be left in place until the concrete has set sufficiently to permit the removal without danger to the structure.

14.4 **Reinforcement:** Steel bars for reinforcing concrete shall be of such shape to afford an approved mechanical bond with concrete to ensure intimate control between steel and concrete.

Steel reinforcement shall be either mild steel of tested quality confirming to IS-432-1996 or cold worked stool high strength deformed bars as per IS-1786-1979 in strength grade Fe-415 or hot rolled high yield strength steel deformed bars with minimum yield strength of 425 N/mm as per IS – 1939 –1966 (Amended 1968) Reinforcement bars will be rejected if the actual weight various more than 5% from the standard weight.

All bars must conform to the requirement of Indian standard specification. They shall be protected at all time before placed in the concrete from mechanical injury and the weather and when please in the work, they shall be free from dirt, scales, loose or scaly rust, point and oil.

Bars which are to be embodied in concrete but remain exposed for sometime after being placed in the work shall, if directed be immediately coated with a thin grout of equal part of cement and sand. Bars shall be bent to the shape shown on the drawings and in conforming to approved templates. When bars are cut and bent on the wok the contractor shall employ competent men and provide the necessary appliances for the purpose.

All steel shall be rigidly held in place with 18 gauge annealed steel wire, cement mortar (1:2) cubes. M.S. chairs and spacer shall be used in order to ensure accurate positioning of reinforcement. All joints in steel reinforcement shall be overlapped. The length of overlap for tension and compression shall be as per the requirement of Indian standard specification.

In water retaining structures a clear cover of 40 mm from the face of the steel should be provided.

15. Construction Joints

Construction joints shall be provided, where directed and approved by Engineer-in-Charge. Such joints shall be kept minimum and shall be right angles to the direction of main reinforcement. In case of column and walls the joint shall be horizontal and 8 to 15 cm below the bottom of the beam or slab running into the column or wall head or below the anchor reinforcement of beam and slab coming into the column and wall and the portion of the column or wall between the stopping level and the top of slab shall be concreted with the beam or slab.

15.1 Vertical Joints: At the end of any days work or run of concrete, the concrete should be finished off against temporary shutter stop, which should be vertical be vertical and securely fixed. This stop should be removed as early as weather permits.

15.2 Horizontal Joints: Horizontal joints should be washed down two hours after a casting in the manner described above for vertical joints.

If the concrete has been allowed to hard excessively, the surface shall be chipped over its whole surface to depth of at least 10 mm and there after thoroughly washed. Before fresh concrete is added on the other side of a construction joints, the surface of the old concrete will be thoroughly wetted then covered with a thin layer of cement mortar (1:2).

All the construction joints in all concrete structure I contact with water or earth shall be provided with approved PVC water stops on both side with hot asphalt or approved metallic strips. The longitudinal joints in water stops shall be preferably hot welled.

15.3 Expansion joints: Expansion joints shall be provided wherever directed by the engineer in charge, on where necessary as per standard specification and practice. The filler to be used shall be of approved material.

16. Cement Plaster

12 mm thick cement plaster in (1:4) proportion shall be applied on outside surface of all concrete works from 30cm below ground level up to top. The surface in contact with water will have 12 mm thick cement plaster of not less than (1:3) proportion with 3% water proofing compound. The concrete surface shall be properly hacked, washed, cleaned and applied with thick cement slurry before applying. All brick work unless otherwise specified will be plastered externally and internally with 12mm cement plaster (1:6) proportion.

The plaster shall be protected from sun, rain and frost at contractor's expense by such means as the engineer may approve.

To protect the plaster from the sun, ordinarily the whole surface shall be covered with wet sakes. The contractor shall keep the plaster continuously waited for a period of seven days after application.

17. Flooring

Except where in otherwise specified flooring will have minimum 15cm thick sand filling, one brick flat soling and 100mm thick P.C.C (1:2:4) in ground floor and 25 mm thick patent stone flooring shall be provided over this base. In case flooring in raw water pump house 25mm patent stone flooring shall be provided directly over R.C.C. slab in strip placed in suitable manner to avoid construction cracks.

18. Door and Window

All the doors and windows shall be of good quality well seasoned and well-dressed Sal wood with oxidized iron fittings. All windows shall be provided with M.S. grill of approved design.

Rolling shutter of approved make and size 1.5m wide x 2.1m height with pusher and pull operated properly fabricated with 80 x 1.22mm M.S. lathers including all accessories and necessary fitting of approved quality as per PWD specification will be provided in the pump house.

All the doors and windows shall be painted with two coats of enamel paints over a coat of primer. The materials, the size, the shape and the fitting of doors and windows shall be approved by Engineer-in-Charge before put in position.

19. Roof

R.C.C. grade as per provision made in IS:456 will have to be provided in roof slab of adequate thickness.

20. Wherever necessary, stainless steel pipe posts of 40 mm dia and 1.5 meter long fixed rigidly in cement concrete at 1.50 m apart with 3 rows of horizontal 25 mm dia stainless steel pipes including painting etc will be provided as railing and safety.

21. Colour Wash

All the building shall have two coat of colour wash of approved shade over a coat of cement primer including preparing plastered surface smooth with sand paper, etc. all complete as per building specification.

22. Painting

All steel or wood shall have two coats of synthetic enamel paint over a coat of priming as specified by the manufacture of the paint.

The make, shade and color of the paints shall have to be approved by Engineer-in-Charge before use.

23. Plants, machineries, equipments, devices, etc

All items under this should be made of standard materials and designs based on best performance relative to efficiency, sturdiness and handling, etc.

24. Inspection and Testing:

Contractor should arrange inspection team from the department to have inspection of the pumps, motors, engines and other machineries and equipments at the manufacturer site before dispatch, at his own cost. Moreover all the other appurtenances should also be approved by the Engineer-in-Charge before installation, at contractor's own cost. Materials will not be considered acceptable without inspection-cum-acceptance certificate of approved PHED inspection personnel.

All pipes and other installation subjected to pressure shall be hydraulically tested to 2 times the designed pressures or as directed by Engineer-in-Charge.

25. Guarantee for equipments:

All electro-mechanical equipments and appurtenances supplied and erected by the contractor shall be covered by a guarantee for satisfactory working for a minimum period of 12 months or 2 consecutive rainy seasons whichever is more from the date of satisfactory commissioning of the plant. Any defective parts detected during this guarantee period shall be replaced by the contractor at his own cost, such replacement being arranged by the contractor as expeditiously as may be directed by the Executive Engineer.

26. Completion Drawings:

Contractor shall furnish as-built-drawings after completion of work, together with a descriptive specification for the daily working, operation and maintenance and also a list of spares along with the plant including operation manual for electro-mechanical items.

CONDITIONS FOR CONTRACTOR'S OWN DESIGN

1. Design engineer has to prepare and submit the followings:

a) Site plan showing location.

b) Line diagram showing dimensional, sectional and elevation view with important levels.

e) Design parameters proposed to be adopted for detail design.

2. **After acceptance of tender, contractor have to submit copies of detailed design and drawing of the architectural, structural, hydraulics and piping works within 20 days of acceptance of tender.**

3. Designs, drawings and diagrams will be subjected to thorough check by Engineer – in – Charge and if accepted by Engineer-in-Charge then work may be started as per specifications and approved designs, drawings and diagrams.

4. Design engineer will be required to attend the office of Engineer-in-Charge for preliminary discussion for scrutiny, remarks, etc whenever required with all reference data, books, IS specification etc at his own cost. Engineer-in-Charge shall have power to make any alterations in design, drawings and specifications that may appear to him to be necessary on the ground of safety, economy or convenience. However, this must be done with intimation along with reasons for altering to contractor and design engineer.

5. It will be binding on design engineer of contractor to clarify, modify, redesign and drawings after compliance of scrutiny, remarks, etc by the owner within 10 days of communication of remarks.

6. On approval of design, contractor shall supply free of cost eight (8) sets of design and drawing duly bound for use of the Department.

7. Security deposit of the tender shall be forfeited if he fails to modify his design as per scrutiny, remarks, etc within specified time after levy of compensations as per tender agreement.

8. Even though the design and drawing submitted by contractor are approved by Engineer-in-Charge, contractor will not be relieved of his contractual obligations to hand over the structure in sound condition duly tested.

In case of any damage / failure either during construction, testing or after commissioning, whether due to faulty design or defective construction, all repairs or reconstruction of the structure shall have to be carried out by the contractor, entirely at his risk and cost.

SCOPE OF WORK

1. **Submerged Weir & Intake Chamber:**
   Submerged gravity RCC weir will be constructed at a suitably selected location across the river Tlawng and Intake Chamber will also be constructed to facilitate withdrawal of water.

2. **Raw Water Pumping System:**
   Raw water submersible pumps will be installed to lift raw water from intake chamber to treatment plant.

3. **Raw Water Pumping Main:**
   GI (M) pipe will be laid underground for conveying raw water from intake well to treatment plant.

4. **Thrust Block for Raw Water Pumping Main:**
   RCC thrust blocks will be constructed to fasten raw water pumping main.

5. **Water Treatment Plant:**
   Water treatment plant consisting of aerator, pre-settling tank, flash mixer, clariflocculators, rapid sand filters, filter house and back wash tank with standard operating system will be constructed and electro-chlorinator will be installed.

6. **DG Set:**
   Silent type diesel generating set with complete operating system for raw water pumping will be installed.

7. **Hut for DG Set:**
   A well ventilated RCC framed shed with CGI sheet roofing will be constructed to house DG set.

8. **2 years Operation and Maintenance:**
   Contractor shall carry out O & M for 2 (two) years right after full completion and final commissioning. During this O & M period, PHE/Railway staff will be trained in O & M free of cost by contractor.

DETAILED SPECIFICATION OF WORK

1. Submerged Weir & Intake Well:

60 metre long trapezoidal weir across the river Tlawng (**main weir** - 1 metre top width, 1.2 metre high above river bed; 3 metre base width, 2.6 metre below river bed; **stem or central key beneath the base** - 1 metre deep and 0.75 metre wide, **upstream apron** - 5 metre long, 0.3 metre thick,; **upstream cut-off wall/key** - 1 metre deep, 0.3 metre thick and **downstream apron** - 3 metre long, 0.3 metre thick; **downstream cut-off wall/key** - 1 metre deep, 0.3 metre thick) will be constructed at a suitably selected location.

Main weir body is made of stone pitching in cement mortar 1:3 and then covered with 0.25 metre thick RCC skin.
Aprons and cut-off walls/keys are made of 0.3 metre thick RCC.
Stem/central key beneath main weir is made of RCC.

Box type intake well (4 metre x 3 metre x 3.35 metre high) and RCC floor (300 mm thick) on PCC (200 mm thick) and RCC roof (150 mm thick) with railing and RCC walls (250 mm thick, 3.35 metre high) having one side opening to facilitate withdrawal of raw water will be constructed near weir.

2. Raw Water Pumping System:

Two (2) sets of raw water submersible pumps with control panels, cables, valves, operational equipments, foundations for pumps, piping, plumbing, etc will be installed to lift raw water from intake chamber to treatment plant. Submersible raw water pump sets suitable for discharge of 125 cum/hr at a total head of 193 m will be provided.

3. Raw Water Pumping Main:

200 mm diameter GI (M) pipe @ 1600 metre long will be laid at a depth of 100 centimetre for conveying raw water from intake well to treatment plant. All pipes will be joint by welding with successive coats. Air valves, non-return valves, etc will be installed as per requirement. Pipes will be holdfasted with anchor blocks at suitable intervals.

4. Thrust Block for Raw Water Pumping Main:

Ten (10) numbers reinforced concrete thrust blocks of size 1 metre x 1 metre x 1.5 metre each will be constructed at suitable intervals as per site condition.

5. Water Treatment Plant:

Water treatment plant of 2 MLD production capacity consisting of aerator, pre-settling tank, flash mixer, clariflocculators, rapid sand filters, filter house and back wash tank with standard operating system will be constructed and electro-chlorinator MAC 100 will be installed.

i) Aerator:

Four (4) steps cascade aerator with diameter 0.4 metre at top and diameter 1.78 metre at base as well as 2.68 metre diameter circular channel around it with circular wall will be constructed using RCC.

ii) Pre-settling tank:

Rectangular pre-settling tank of **capacity 6,00,000 litre** will be constructed including inlet and outlet arrangement.

Inlets shall be designed to distribute the water equally and at uniform velocities. A baffle should be constructed across the basin close to the inlet and should project several feet below the water surface to dissipate inlet velocities and provide uniform flow;

Outlet weir or submerged orifice shall be designed to maintain velocities suitable for settling in the basin and to minimize short-circuiting. A baffle should be provided in front of the weir to stop the floating matter from escaping into the effluent.

iii) Flash Mixer:

Circular chamber having 1.2 metre diameter and 2 metre depth will be constructed including inlet and outlet arrangement. Electric motor of 0.75 KVA with gears, cables, control panels, base rails, shafts, mixing vanes, etc will be installed.

iv) Clariflocculators:

Two (2) nos of clariflocculators having 1 MLD capacity each will be constructed with rotating scrappers, electric motors, gears, control panels, cables, inlet & outlet arrangements, etc.

v) Rapid Sand Filter:

Three (3) bedded rapid sand filter (2 working + 1 standby) having 2 MLD capacity with **filtration rate 4500 lt/hr/sq m** will be constructed with operating equipments, valves, flow measuring units, rate controllers, backwash system, inlet & outlet arrangement, etc.

Filter sand and gravel shall be of the following specifications**:**

a)	Effective size of sand	: 0.45 to 0.70 mm
b)	Uniformity coefficient of sand	: 1.3 to 1.7
c)	Sand shall be hard, resistant quartz and free from clay, dust, roots and other impurities.	
d)	When sand is immersed it should not be soluble in water and diluted HCL acid in 24 hours	
e)	Specific gravity of sand	: 2.55 to 2.65
f)	Wearing loss of sand	: 3 % maximum by weight
g)	Sand shall be as per IS : 8419 (Part I) – Filter Media Sand and Gravel	
h)	Depth of sand	: 700 mm (coarser sand below finer sand)
i)	Depth of gravel	: 500 mm
j)	Gravel size	: 2 mm at top and 50 mm at bottom

Size and spacing of under-drainage system shall be as per standard design. The perforations size and spacing shall be as per standard design.

Back wash gutter, air compressor, backwash pump, valves, etc with complete back washing system of standard capacity and design shall be provided of in each filter unit.

Indicator type flow meter should be provided for both air and wash water lines. Since air and wash water have to be increased slowly, the control valves shall be of a type permitting slow opening.

Globe valve for air and butterfly valve for water shall be preferred. For all filter valves which are subjected to heavy wear and tear, only standard and sturdy best reputed type valves shall be provided.

Filter rate controller should be of sound and accurate design. Its efficiency and functioning shall be critically examined.

vi) Filter house:

Filter house with plinth area of 14 metre long x 5.6 metre wide will be constructed. Ground floor will consist of 3 (Three) filter beds with complete standard operating systems, first floor will consist of control devices and top floor will consist of backwash tank (59,360 litre capacity) and penthouse covered by mumty roof.

For backwash tank, necessary pipe assembly for rising, delivery, overflow and wash out mains with puddle collars, specials and valves arrangement of cast iron of adequate sizes shall be provided, suitable water level indicator and mosquito proof wire netting on the ventilating lantern should be provided.

Backwash water pump units of suitable capacity to fill wash water tank in 1 (one) hour with 100% stand by to be provided as per CPHEEO Manual including CI pipes specials, sluice valves etc. complete should be provided.

Backwash water is proposed to be disposed off in nearby nalla through gravity. Backwash water gutter invert level should therefore be fixed considering H.F.L. of river so that drainage by gravity during flood can be possible.

vii) Electro-chlorinator:

Seaclor Mac-100 electro-chlorinator will be installed with all operating system complete.

6. DG Set:

Silent type diesel generating set of 320 KVA, 3 phase, 415 V with complete operating system for raw water pumping will be installed.

7. Hut for DG Set:

A hut of plinth area 7 metre x 3 metre with wall height 3 metre using RCC framed structure and CGI sheet roofing will be constructed to house DG set. Plinth wall will be brick masonry and lower half of main wall will be GI sheet and upper half of main wall will be galvanized wire net for better ventilation.

8. 2 (two) years Operation and Maintenance:

Contractor shall carry out O & M for 2 (two) years right after full completion and final commissioning. During this period, PHE/Railway staff will be trained in O & M services at free of cost by contractor.

BILL OF QUANTITIES (BOQ)

BILL OF QUANTITIES FOR COSTRUCTION OF THRUST BLOCKS – 10 Nos

Sl no	Description of item	Unit	Quantity	Amount(Rs)
1/2.07	Earthwork in excavation in foundation trenches or drains etc. (not exceeding 1.5m in width or 10sqm on plan) including dressing of sides and ramming of bottoms b) Hard soil	m^3	1.5	944.85
2/4.02	Providing and laying cement concrete of specified graded excluding cost of centering and shuttering -all work upto plinth level: a) 1:2:4	m^3	0.15	1,248.69
3/5.01	Providing and laying in position reiforced cement concrete excluding the cost of centring, shuttering, and reinforcement in- a) 1:1.5:3	m^3	1.5	14,107.50
4/5.18	Steel reinforcement for RCC work including straighthening, cutting, bending, placing in position and binding all complete. (b)Thermo-Mechanically Treated bars.	Kg	75.78	7,698.93
5/5.10	Centering and shuttering including strutting, propping, etc. and removal of form works in – b) Wall	m^2	4.80	2,457.60
	Total for 1 No (Say) **For 10 Nos**			**26,400.00** **2,64,000.00**

BILL OF QUANTITIES FOR COSTRUCTION OF CASCADE AERATOR

Sl no	Description of item	Unit	Quantity	Amount(Rs)
1/2.06	Earthwork in excavation over areas (exeeding 30cm in depth,1.5m in width as well as 10sqm on plan) including disposal of excavated earth, lead upto 50m etc	m^3	79.19	32,584.87
2/2.07	Earthwork in excavation in foundation trenches c) Very hard soil	m^3	2.20	1,848.03
3/4.02	Providing and laying in position cement concrete of specified grade excluding cost of centering and shuttering - All work upto plinth level: 1:2:4	m^3	1.46	12,141.28
4/5.18	Steel reinforcement for RCC work including straighthening, cutting, bending, placing in position and binding all complete.	kg	300	30,480.00
5/7.21	Supplying and stacking of hard stone for stone pitching 22.5cm thick at site	m^3	0.714	837.81
6/5.10	Centering and shuttering including strutting,proppingetd. And removal of form for:			
	a) Walls etc	m^2	9.51	4,868.8
7/5.28 +5.30	Providing and laying in position machine batch ed and machine mixed design M-25 grade cement concrete for RCC work etc. b)All works from plinth	m^3	2.43	28,087.56
8/20.11	15mm cement plaster 1:3	m^2	15.05	5,023.73
			Total	115872.00
			Say	**1,15,800.00**

BILL OF QUANTITIES FOR COSTRUCTION OF FLASH MIXER

Sl no	Description of item	Unit	Quantity	Amount(Rs)
1/2.06	Earthwork in excavation over areas (exeeding 30cm in depth,1.5m in width as well as 10sqm on plan) including disposal of excavated earth	m^3	36.60	15,060.00
1/2.07	Earthwork in excavation in foundation trenches or drainsetc. a) Very Hard Soil	m^3	1.90	1,595.37
3/4.02	Providing and laying in position cement concrete of specified grade excluding cost of centering and shuttering - All work upto plinth level: 1:2:4	m^3	1.05	8,707.03
4/6.06	Half brick masonry with first class brick in supersructure	m^2	5.30	8,874.85
5/5.18	HYSD bars like TATA/SAIL (ISI/ISO certified) or equivalent reinforcement for RCC work including straighthening, cutting, bending, placing in position and binding all complete. b)Thermo-mechanicaly treated bar	**kg**	332.00	33,731.20
6/5.10	Centering and shuttering including strutting, propping, etc. and removal of form works in -	m^2	27.56	14,110.72
7/5.28 +5.30	Providing and laying in position machine batch ed and machine mixed design M-25 grade cement concrete for RCC work etc. b)All works from plinth	m^3	3.39	39,621.76
8/20.11	15mm cement plaster 1:3	m^2	30.17	10,072.46
9/20.49	Applying priming coat with ready mixed primer of approved brand a) Ready mix white primer	m^2	16.15	1,565.41
10/20.75	Finishing wall with exterior emulsion of required shade	m^2	16.15	4,140.52
11	Providing, fitting and fixing of 100mm dia GI			30,639.00

	pipes with specials for inlet and outlet			
12	Providing and fixing Cast Iron gate valve with flange of LEVCON made 100mm dia			369,60.00
13	Providing, fitting fixing of electric motor 50kVa with necessary appliances complete			80,000.00
			Total	2,85,078.81
			Say	**2,85,000.00**

BILL OF QUANTITIES FOR COSTRUCTION OF PRE-SETTLING TANK

Sl no	Description of item	Unit	Quantity	Amount(Rs)
1/2.06	Earthwork in excavation over areas (exeeding 30cm in depth,1.5m in width as well as 10sqm on plan) including disposal of excavated earth, etc. a)Ordinary soil	m^3	472.5	1,94,433.75
2/7.14	Dry Stone pitching 22.5cm thick including supply of stone and preparing surface, etc. complete.	m^3	268.96	1,50,778.98
3/4.02	Providing and laying in position cement concrete of specified grade excluding cost of centering and shuttering - All work upto plinth level: 1:2:4	m^3	53.79	4,47,796.88
4/5.01	Providing and laying in position reinforced cement concrete excluding cost of centering and shuttering - All work upto plinth level: a) 1:1.5:3	m^3	67.24	6,32,405.65
5/5.02	Reinforced cement concrete works in walls,columns,posts,abutments etcupto floor five level excluding cost of centering 1:1.5:3	m^3	141.3	15,07,204.71
6/5.18	Steel reinforcement for RCC work including straigthening, cutting, bending etc b}Thermo-Mechanically Treated bars.	kg	14224.7	14,45,238.05
7/5.10	Centering and shuttering including strutting, propping etc and removal of formworks in-			
	a) foundation,footing etc.	m^2	36.36	13,056.68
	b)Walls including attached pilaster etc	m^2	1134.2 4	5,80,730.88
8/20.07	Cement plaster 12 mm thick in cement mortar 1 : 3.	m^2	1348.29	4,00,846.62
9	Providing steel ladder for inspection	No	4	60,000.00
10	Providing and fixing control CS LEVCON /FCE Brand sluice valves 100 mm dia.for Drain	No	5	4,12,200.00

	valve including flange			
11	Providing ang fixing of 100mm dia. GI pipe for drain	Rm	12.5	25,475.00
			Total	58,70,167.39
			Say	**58,70,200.00**

BILL OF QUANTITIES FOR COSTRUCTION OF 1Mld CLARIFLOCCULATOR – 2 Nos

Sl no	Description of item	Unit	Quantity	Amount(Rs)
1/2.08	Earthwork in excavation in foundation trenches etc. not exceeding 2 meters depth including dressing of bottom and sides etc. a) Hard Soil	m^3	433.50	2,02,271.10
2/4.03	Providing and laying in position cement concrete of specified grade excluding cost of centering and shuttering - All work upto plinth level:	m^3	5.14	37,760.33
3/5.34	Providing and laying in position machine batched, machine mixed and machine vibrated design mix M-25 grade reinforced cement concrete excluding cost of centering and shuttering and reinforcement in -	m^3	60.53	7,00,055.47
4/5.21	Steel reinforcement for RCC work including straighthening, cutting, bending, placing in position and binding all complete. b) Thermo-mechanicaly treated bar	kg	5843.40	5,93,689.00
5/5.10	Centering and shuttering including strutting, propping, etc. and removal of form works in -			
	a) Footing	m^2	10.4	3,734.64
	b) Wall& Launder	m^2	325.77	1,66,793.73
	c) Column	m^2	24.0	14,841.6
6/19.08	Applying double coated PIDIFIN-2K or equivalent on the surface of cement concrete for prevention of water infiltration and dampness in water tanks, basement, terraces, etc.) @1.85kg per sqm.	m^2	204.24	88,170.41
7/19.05	Providing and mixing water proofing chemical (PIDIPROOF LW chemical) in plain and reinforced cement concrete work 1 : 1.5 : 3 , @ 0.4 % by weight of cement. c) Cement mortar 1:3	m^2	60.53	21,452.63

8/19.09	Applying double coated Pidicrete Multipurpose Binder (MPB) to existing reinforcement and cement concrete for improving structural bonding of old and new concrete including cleaning, roughening etc. of the existing surface. @ 0.74 Litre per sqm.	m^2	204.24	1,01,854.49
9/20.01	15mm cement plaster 1 : 3 (1 cement : 3 fine sand).	m^2	374.14	1,24,925.68
10/20.5	Applying one coat of water thinnable cement primer of approved brand and manufacture on wall surface :	m^2	364.00	29,302.00
11/20.68	Finishing walls with water proofing cement paint of approved brand and manufacture and of required shade to give an even shade. New work (two or more coats) a)Regular exterior emulsion like supercote, walmasta etc.	m^2	364.00	37,164.40
	Mechanical Compoment			
12	Providing and fitting of Clarifier arm & scraper including rail etc. complete, 25 HP electric motor, Influent pipe etc. complete and all necessary components recommended for the unit by engineer - in - charge.	Lot	1	18,82,900.00
	Total (Say)			**40,00,000.00**
	Total for 2 units			**80,00,000.00**

BILL OF QUANTITIES FOR COSTRUCTION OF 2Mld RAPID SAND FILTER i/c COMPLETE SYSTEM

Sl no	Description of item	Unit	Quantity	Amount(Rs)
	A. Civil Work			
1/2.08	Earthwork in excavation in foundation trenches or drainsetc. Hard Soil(pickwork)	m^3	182.0	84,921.00
2/2.17	Filling available excavated earth in trenches, plinth etc complete in Foundation	m^3	86.40	11,188.80
3/4.03	Providing and laying in position cement concrete of specified grade excluding cost of centering and shuttering - All work upto plinth level: 1:2:4	m^3	12.41	91,228.30
4/5.34	Providing and laying in position machine batch ed and machine mixed design M-25 grade re-inforced cement concrete etc.			
	a) All works upto foundation	m^3	16.55	1,78,729.98
	b) All works above plinth	m^3	119.73	13,84,682.08
5/5.21	Steel reinforcement for RCC works including straightening, cutting etc complete			
	d) Thermo- Mechanicallt treated bars	kg	16576.57	16,84,179.84
6/5.11	Centering and shuttering including strutting, propping, etc. and removal of form works in -			
	a) Footing etc	m^2	73.56	26,415.40
	b) Wall	m^2	461.01	2,36,038.14
	c) Column	m^2	73.92	45,712.13
	d) Beam	m^2	219.7	1,05,478.93
	e) Tanky cover, inlet channel, stairs etc	m^2	260.21	1,75,196.70

7/19.08	Applying double coated PIDIFIN-2K or equivalent on the surface of cement concrete, etc.) @1.85kg per sqm.	m^2	222.37	95,995.27
8/19.05	Providing and mixing water proofing chemical (PIDIPROOF LW chemical) @ 0.4 % by weight of cement. c) Cement mortar 1:3	m^2	57.35	20,324.84
9/19.09	Applying double coated Pidicrete Multipurpose Binder (MPB) to existing reinforcement and cement concrete @ 0.74 Litre per sqm.	m^2	244.45	1,21,905.07
10/6.09	7.5cm thick brick masonry with first class brick in superstructure above plinth etc complete in 1:3 cement mortar	m^2	143.38	1,49,748.16
11/20.11	15mm cement plaster 1:3	m^2	1044.71	3,48,828.67
12/20.07	12mm cement plaster 1:3	m^2	213.39	63,440.85
13/20.25	6mm cement plaster 1:3	m^2	60.11	13,374.48
14/20.5	Applying one coat of water thinnable cement primer of approved brand	m^2	2735.68	2,20,222.08
15/20.68	Finishhing wall with water proofing cement paint of approved brand	m^2	2735.68	2,79,312.72
16/11.05	Providing and fixing glazing aluminium door, window, etc. complete	m^2	13.32	30,481.49
17/10.01	Supplying and fixing steel rolling shutter of approved make etc. complete	m^2	3.15	15,265.85
18	Providing 20mm dia GI pipes for railing	Rm	170.0	22,547.10
19	Gravel and quartzite sand for filter media			
	Sand	m^3	14.98	2,69,568.00
	Gravel	m^3	11.856	2,13,408.00
	Total of A			**58,88,194.06**

	B. Mechanical Components			
1	Fitting of valves including spindle, companion flange and all necessary accessories			
	250mm valve	No	3	28,3,500.00
	200mm valve	No	3	2,52,090.00
	150mm valve	No	3	1,40,700.00
	80mm valve	No	3	68,250.00
2	90mm PVC lateral pipes including end capping etc complete	Rm	75.06	45,036.00
3	Providing 250mm backwash pipe	Rm	24	72,000.00
4	Providing 200mm raw water inlet	Rm	6	15,000.00
5	Providing 150mm clear water outlet	Rm	6	13,800.00
6	Providing 80mm air pipe with all accessories complete	Rm	40	60,000.00
7	Providing and installation of air blower, backwash pump including complete accessories	No	1	3,00,000.00
8	Providing and installation of float system flow rate controller	No	1	1,00,000.00
	Total of B			**13,50,376.00**
	Total of A & B			**72,38,570.06**
	Say			**72,38,500.00**

BILL OF QUANTITIES FOR COSTRUCTION OF INTAKE CHAMBER AND SUBMERSIBLE WEIR

A) Intake chamber

Sl no	Description of item	Unit	Quantity	Amount(Rs)
1/2.08	Earthwork in excavation in foundation trenches etc. not exceeding 2 meters depth including dressing of bottom and sides of trenches etc. d) Soft rock	m^3	31.5	23,401.5
2/4.01	Providing and laying in position cement concrete of specified grade excluding cost of centering and shuttering - All work upto plinth level:1:1.5:3	m^3	2.992	27,251.73
3/5.02	Reinforced cement concrete work in walls including attached pilasters, columns, piers, abutments, return walls etc. excluding cost of centering and shuttering and reinforcement in a) 1:1.5:3	m^3	17.17	1,83,157.91
4/5.18	HYSD bars like TATA/SAIL (ISI/ISO certified) or equivalent reinforcement for RCC work including straighthening, cutting, bending, placing in position and binding all complete.	kg	4161.0	4,22,769.79
5/5.10	Centering and shuttering including strutting, propping, etc. and removal of form works in -			
	b)walls including atteched pilaster etc.	m^2	36.18	18,524.16
	c) columns,piers,postetc	m^2	53.6	33,146.24
	e) suspended floor,roof ,landing etc	m^2	14.96	10,072.57
6/20.07	12mm cement plaster 1 : 3 (1 cement : 3 fine sand).	m^2	102.28	30,407.84
7/20.68	Finishing walls with water proofing cement paint of approved brand and manufacture and of required shade to give an even shade.New work(two or more coats)	m^2	102.28	10,442.79

8/5.01	Providing and laying in position cement RCC excluding cost of centering and shuttering for approach step 1:2:4	m^3	17.51	1,51,120.67
9/10.10	Providing hand railing along approach step and around top of intake chamber GI Tube 40mm dia	kg	587.76	1,11,498.07
9/7.12	Construction of Hand pack dry stone wall with boulder including supply of stone and labour etc.	m^3	104.0	1,85,400.00
	Total			12,07,193.92
	Add for cover of opening			20,000.00
	G.Totalof A(Say)			**12,27,000.00**

B. INTAKE DIVERSION WEIR.

Sl no	**Description of item**	**Unit**	**Quantity**	**Amount(Rs)**
1/2.06	Earthwork in excavation over areas (exeeding 30cm in depth,1.5m in width as well as 10sqm on plan) including disposal of excavated earth	m^3	126.0	51,849.00
2/2.08	Earthwork in excavation in foundation trenches etc. not exceeding 2 meters depth including dressing of bottom and sides etc. d) Soft rock	m^3	549.0	4,07,855.10
3/4.01	Providing and laying in position cement concrete of specified grade excluding cost of centering and shuttering - All work upto plinth level: a) 1:1.5:3	m^3	36.0	3,27,895.20
4/5.02	Reinforced cement concrete work in walls including attached pilasters, columns, piers, abutments, return walls etc. excluding cost of centering and shuttering etc. b) 1:1.5:3	m^3	437.78	46,69,614.59

5/5.18	HYSD bars like TATA/SAIL (ISI/ISO certified) or equivalent reinforcement for RCC work including straighthening, cutting, bending, placing in position and binding all complete. c) Thermo-mechanicaly treated bar	kg	35022.0	35,58,235.20
6/5.10	Centering and shuttering including strutting, propping, etc. and removal of form works in – e) Foundation	m^2	420	1,50,822.00
7/7.13	Stone pitching in cement mortar 1:3 (1 cement : 3 sand) in slopes of roads, in slopes of embankments etc. including supply of stone and preparing surface, etc. complete.	m^3	304.5	17,89,211.55
8/20.07	12mm cement plaster 1 : 3 (1 cement : 3 fine sand).	m^2	480.0	1,42,704.00
	Total of B (Say)			**110,98,000.00**
	G. Total (A and B)			**123,25,000.00**

BILL OF QUANTITIES FOR COSTRUCTION OF DIESEL GENERATOR SHED

Sl no	Description of item	Unit	Quantity	Amount(Rs)
1/2.06	Earthwork in excavation over areas (exeeding 30cm in depth,1.5m in width as well as 10sqm on plan) including disposal of excavated earth, lead upto 50m and lift upto 1.5m, a) Ordinary and hard soil	m^3	140.0	1,6460.00
2/2.08	Earthwork in excavation in foundation trenches etc. not exceeding 2 meters depth including dressing of bottom and sides of trenches and subsequent filling etc. a) Ordinarysoil	m^3	6.0	1,866.60
3/7.01	Regular coursed rubble masonry with hard stone in foundation including curing etc.complete.	m^3	9.0	66,654.00
4/4.02	Providing and laying in position cement concrete of specified grade excluding cost of centering and shuttering - All work upto plinth level: 1:2:4	m^3	2.7	22,476.00
5/5.01	Providing and laying in position reinforced cement concrete excluding cost of centering and shuttering etc. 1:2:4	m^3	1.63	14,071.79
6/5.21	Steel reinforcement for RCC work including straighthening, cutting, bending, etc. Hot rolled deformed bars	Kg	204.88	20,815.80
7/5.10	Centering and shuttering including strutting,proppingetd. And removal of form for:			
	b) Columns etc	m^2	9.6	5,936.64
	d) Beams etc	m^2	11.50	5,521.15
8/6.09	7.5 cm thick brick masonry with first class brick in superstructure above plinth level upto floor two level including curing, etc. complete .	m^2	16.38	17,107.27

9/20.07	12mm cement plaster 1 : 3 (1 cement : 3 fine sand).	m^2	40.76	12,117.94
10/9.04	Providing 2nd class local wood work dressed in frames of sill, upright, batten, post, beams, etc. as structural members fixed in position complete.	m^3	0.96	33,339.45
11/9.07	Providing 2nd class local wood work dressed in frames of chaukat for doors, windows, clerestory windows fixed in position.	m^3	0.22	10,282.20
12/9.09	Providing 2nd class local wood in trusses, etc. including hoisting, fixing in position, supplying necessary fittings such as spikes, nuts and bolts, nails, etc.	m^3	0.74	27,492.00
13/9.26	Providing and fixing 20mm thick 2nd class local wood battened and braced shutters for doors and windows with necessary ledges etc.	m^2	9.18	22,586.47
14/13.10	Providing 0.63mm I.S. thickness CGI sheet walling with galvanised iron screws, bolts and nuts 8mm dia. with bitumen and G.I. limpet etc.	m^2	32.44	30,332.00
15/13.11	Providing and fixing of 23mm to 20mm mesh 1.00mm dia. galvanised wire net walling in 1st. class local wood, etc.	m^2	10.0	4,152.00
16/16.01	Providing corrugated G.S. sheet roofing fixed with polymer coated J or L hooks, bolts and nuts 8 mm diameter with bitumen etc.	m^2	44.8	24,545.92
17/16.06	Providing ridges or hips of width 60 cm over all width plain G.S. sheet fixed with polymer coated J. or L hooks, bolts and nuts 8 mm dia. G.I. limpet and bitumen washers complete.	Rm	8.0	4,240.80
18/20.71	Painting two or more coats on GI sheet with anti-fungus roof paint of approved brand and manufacture on new work	m^2	85.24	9,725.88
19/20.60	Painting with oil type wood preservative of approved brand and manufacture on new works	m^2	16.83	1,183.15
20/20.66	Distempered with oil bound washable distemper of approved brand and manufacture on new	m^2	32.76	5,854.21

	works			
21/9.51	Providing and fixing flat iron ties 3mm x 2cm x 20cm L-section with galvanised screw for joints of post plate and upright in Assam type building.	Nos	12.0	837.60
22/9.52	Providing and fixing flat iron ties 3mm x 2cm x 15cm L-section with galvanised screw for joints of post plate and roof trust in Assam type building.	Nos	12.0	186.00
	Total			3,57,785.12
	Add 1.5% for electrification			5366.76
	G.Total (Say)			**3,63,100.00**

BILL OF QUANTITIES FOR ELECTRO-MECHANICAL COMPONENTS

Sl no	Description of item	Unit	Quantity	Amount(Rs)
1	Pump & Machineries: SITC of Submersible Pump with a Discharge of 125m3/Hr at a total head of 193m with pump foudation and piping works.	No	2	186,78,000.00
2	Supply, Installation, Testing and Commissioning of Electro-Chlorinator MAC 100- 1no	No	1	14,38,650.00
3	Supply, Installation, Testing and Commissioning of DG set 320 KVA, 3-phase 415V for Raw Water pump	No	1	78,48,750.00
	G.Total (Say)			**2,79,65,400.00**

Annexure - 3.1

WELDING RATE ANALYSIS FOR GI PIPE 200mm Dia

Taking 10m length of 200 mm dia G.I. pipe for welding on joints including cutting and placing in position complete.
(Taking 2(two) welding coats for one joint)

A	**MATERIALS**								
(i)	Welding electrode 3.15 mm for cutting								
		10	nos	@	Rs.	30 /no	=	Rs	300.00
(ii)	Welding electrode for welding								
		15	nos	@	Rs.	30 /no	=	Rs	450.00
(iii)	Steel Brush								
		3	nos	@	Rs.	175 /no	=	Rs	525.00
(iv)	Fuel (HSD)								
		10	Lits.	@	Rs.	85 /lit	=	Rs	850.00
(v)	Grinding Disc								
		5	nos	@	Rs.	660 /no	=	Rs	3300.00
B	**MAN POWER FOR WELDING**								
(i)	Welder	2	nos	@	Rs.	640 /no	=	Rs	1280.00
(ii)	Grinder/Cutter	1	nos	@	Rs.	520 /no	=	Rs	520.00
(iii)	Engine Operator	1	nos	@	Rs.	520 /no	=	Rs	520.00
(iv)	Helper	2	nos	@	Rs.	380 /no	=	Rs	760.00
C	**MAN POWER FOR TRENCHING AND REFILLING (100cm Depth)**								
(i)	Excavator (S/SK)	2	nos	@	Rs.	420 /no	=	Rs	840.00
(ii)	Breaking (U/SK)	4	nos	@	Rs.	380 /no	=	Rs	1520.00
(iii)	Coolie (U/SK)	5	nos	@	Rs.	380 /no	=	Rs	1900.00
	Total cost of 10m						=	Rs	12765.00
	Cost per metre						=	Rs	1276.50

(Rupees one thousand two hundred seventy six and fifty paise)only.

Junior Engineer, PHED
Rural WATSAN Sub-Division, Aizawl

Sub-Divisional Offcer, PHED
Rural WATSAN Sub-Division, Aizawl

PROFORMA OF SCHEDULES

Schedule 'A' : **Schedule of Quantities :**

Quoted rate should be both in figure and words.

Sl No	Description of Work	Quoted Amount in figure (Rs)	Quoted Amount in words (Rs)
	A. Civil Works		
1	Laying of Raw water pumping main 200mm dia – 1600 Rm		
2	Construction of thrust block – 10nos		
3	Construction of Aerator – 1no		
4	Construction of Pre-Settling Tank – 1no		
5	Construction of Flash Mixer – 1 no		
6	Construction of 1 Mld Clariflocculator – 2nos		
7	Construction of 2 Mld Rapid Sand Filter		
8	Construction of building for DG Set		
9	Construction Intake Chamber and Submersible Weir		
	Sub-Total		
	B. Electro-mechanical and allied work		
10	Supply, Installation, Testing and Commissioning of Submersible Pump with discharge of $125m^{3/}hr$ at static head of 193.0m with pump foundation and piping works – 2 Sets		
11	Supply, Installation, Testing and Commissioning of Electro-Chlorinator MAC 100- 1no		

12	Supply, Installation, Testing and Commissioning of DG set 320 KVA, 3-phase 415V for Raw Water pump		
	Sub-Total		
	Total A and B		
	Add 6% for increase in GST for Item no2-12 and 18% for item no 1		
13	**Operation and Maintenance Cost for 2 yrs**		
	G.Total		

(Rupees ……) only

SCHEDULE 'B'

Schedule of materials to be issued to contractor:- Note: No materials will be issued to contractor.

SCHEDULE- 'C'

Tools and plants to be hired to contractor:- Note: Tools and Plants should be arranged by contractor.

SCHEDULE 'D'

Extra schedule for specific requirements/ document for the work, if any

SCHEDULE 'E'

Reference to General Conditions of Contract.

Name of Work : Survey, design, supply, installation, testing and commissioning of Sairang Railway Station Raw Water Pumping System & Water Treatment Plant i/c 2 yrs O & M

(i) Estimated cost of work: Rs. 7,20,12,000.00

(ii) Earnest Money: Rs. 14,40,240.00 (2 % of tendered amount)

(iii) Performance Guarantee: Rs. 21,60,360.00 (3 % of tendered amount)

(iv) Security Deposit: Rs. 18,00,300.00 (2.5 % of tendered amount)

SCHEDULE 'F'

Reference to General Conditions of Contract.

GENERAL RULES AND DIRECTIONS

Officer inviting tender:	Chief Engineer, Zone - I, PHED Aizawl, Mizoram

Definitions:

1	Engineer-in-Charge	Executive Engineer, Rural WATSAN Div, PHED, Aizawl.
2	Accepting authority	Chief Engineer ,Zone - I, PHED, Mizoram Aizawl
3	Schedule of rates	MPHED / MPWD Schedule of Rates
4	Department	PHE Department
5	Latest standard CPWD Contract Form	Applicability of the clauses under CPWD Form 8 are listed below

Clause 1:

1	Time allowed for submission of Performance Guarantee from the date of issue of letter of intent	10 days
2	Maximum allowable extension beyond the period provided in Sl No 1 above	5 days

Clause 1(A):

I	Security deposit	2.5% of the tendered value will be deducted

Clause 2:

I	Authority for fixing compensation	SE i/c

Clause 2A (Incentive for early completion):

i	Whether Clause 2A shall be applicable	No

Clause 3 & 3A (Whether contract can be terminated): Applicable.

Clause 4 (Contractor liable to pay compensation even if action not taken under Clause3): Applicable.

Clause 5 (Time and extension for delay):

i	Number of days from the date of signing of contract agreement for reckoning date of start:		30 Days
ii	Milestone(s) as per table given below:-		
Sl. No	Description of milestone (Physical)	Time allowed in days for execution of work (from date of start)	Amount to be withheld in case of non-achievement of milestones
	No Description of milestone (Physical) in The DPR	As before Column	Penalty Clause applicable as per clause-2 of CPWD Form-8.
	"NIL"	" NIL"	

iii	Time allowed for execution of work::		24 Months
iv	Authority to decide:		
	(i) Extension of time:		As per CPWD Works Manual
	(ii) Rescheduling of mile stones:		SE i/c

Clause 6, 6A (Measurements of work done) : Clause applicable

Clause 7 (Payment on intermediate certificate to be regarded as Advances) : Not applicable

Gross work to be done together with net payment /adjustment of advances for material collected, if any, since the last such payment for being eligible to interim payment:	Rs…….

Clause 8, 8A and 8B (Completion Certificate and Completion Plans) : Applicable

Clause 9 (Payment of final bill) : Payment will be made depending on the availability of fund and no other claims shall be made by the contractor. Interest shall not be claimed by the contractor if payment is not made due to unavailability of fund.

Clause 10A (Materials to be provided by contractor): All materials will be provided by the contractor at his own expense.

List of testing equipment to be provided by the contractor at site lab (Contractor may list down all the equipments).

1		2		3	
4		5		6	

Clause 10B(ii): Mobilization advance: Applicable if the contractor made a request in writing provided fund is available.

Clause 10C: Payment on account of increase in price/wages due to statutory orders : Not applicable.

Clause 10CA: Payment due to variation in prices of materials after receipt of tender: Not applicable

Clause 10CC: Payment due to increase/decrease in prices/wages: Not applicable

Clause 10D: Dismantled materials Govt. property: Applicable.

Clause 11: Applicable, all specification and appropriate latest IS Code and CPHEEO Manual will be followed for each item.

Clause 12: Deviation on extra items, substituted items, quantities etc: Applicable

Clause 13: Foreclosure of contract due to abandonment or reduction in scope of work: Applicable

Clause 14: Carrying out part work at risk & cost of contractor: Applicable

Clause 15: Suspension of work: Applicable

Clause 16: Action in case work not done as per specifications : Applicable

Clause 17: Contractor liable for damages, defects, during maintenance period : Applicable

Clause 18A & 18 B : Applicable

Clause 19 (Labour laws to be complied by contractor) : Applicable

Clause 20 (Minimum wages act to be complied with) : Applicable

Clause 21 (Works not to be sublet. Action in case of insolvency) : Applicable

Clause 22 : Applicable

Clause 23 (Changes in firm's constitution to be intimated) : Applicable

Clause 24 : Applicable

Clause 25 : (Settlement of disputes & arbitration) : Applicable

Constitution of Dispute Redressal Committee (DRC)	Competent Authority to appoint
As per provisions of CPWD Works Manual.	Secretary to the Govt. of Mizoram, PHE Department.

Clause 26 : (Contractor to indemnify Govt. against patent rights) : Applicable

Clause 27 : (Lumpsum provisions in tender) : Applicable

Clause 28 : (Action where no specifications are specified) : Applicable

Clause 29 & 29A : (Withholding and lien in respect of sum due from contractor) : Applicable

Clause 31, 31A & 32: (Water supply) : Applicable

Clause 33: (Return of surplus materials) : Applicable
Clause 34: (Hire of plant & machinery) : Applicable

Clause 35: (Condition relating to use of asphaltic materials) : Applicable

Clause 37: (Levy/taxes payable by contractor) : Applicable.

Clause 38: Conditions for reimbursement of levy/taxes if levied after receipt of tender : Not applicable.

Clause 39:(Termination of contract on death of contractor) : Applicable

Clause 40:(If relative working in the Department then contractor not allowed to tender) : Applicable

Clause 41:(No Gazetted Engineer to work as contractor within one year of retirement) : Applicable

Clause 43: Compensation during war situations : Not applicable

QUALIFICATION INFORMATION

1. Qualification information of the bidder

1.1 Constitution or legal status of bidder :
[If any, attach copy]
Place of registration :
Principal place of business :
Power of attorney of signatory of bid :
[Attach copy]

1.2 Total value of works performed in the last five year (immediately preceding the financial year in which bids are received)

Year	Description of work	Nodal officer	Value (Rs in lakh)
20____ to 20____			
20____ to 20____			
20____ to 20____			
20____ to 20____			
20____ to 20____			

1.3 Experience in works of similar nature

Work performed as prime contractor, work performed in the past as a nominated sub-contractor will also be considered provided the sub-contract involved execution of all main items of work described in the bid document, provided further that all other qualification criteria are satisfied (in the same name) on works of similar nature over the last five years (immediately preceding the financial year in which bids are received). ***Authenticated completion certificate from competent authority shall be enclosed for reference***.

Project name	Name of Employer*	Description of work	Contract No	Value of contract (Rs in Lakhs)	Date of issue of work order	Stipulated period of completion	Actual date of completion*	Remarks explaining reasons for delay & work completed

1.4 Existing commitments and on-going works:

Description of work	Place & State	Contract No	Name & address of employer	Value of contract (Rs in lakh)	Stipulated period of completion	Value of remaining works to be completed	Anticipated date of completion

1.5 Proposed sub-contractors and firms to be involved:

Sanctions of the work	Value of sub-contract	Sub-contractor (Name & address)	Experience in similar works

1.6 Evidence of access to financial resources to meet the qualification requirements. List them below and attach copies of support documents

Sl. No	Source of funding	Amount	Remarks
1			
2			
3			
Total			

1.7 Name, address and telephone, telex and fax numbers of the bidders' bankers who may provide references if contacted by the Employer.

Sl. No	Name of bank	Address	Contact phones/telex/fax	Remarks

1.8 Information on litigation history in which the bidder is involved

Other Parties	Employer	Cause of dispute	Amount involved	Remarks (present status)

Signature of authorized signatory ……

Name……

Title ……..

Postal address……

Mobile phone number……

Date ……..

Form – I

FORM OF TECHNICAL BID

Name of Work: _____

Bid No: _____

To

————————————————————[Employer]

————————————————————[Address]

Sir,

We, the undersigned, declare that:

1. We have examined and have no reservations to the bidding document, including addenda.

2. We offer to execute the works described above and remedy any defects therein in conformity with conditions of contract including specifications, drawings, bill of quantities, etc.

3. We undertake, if our bid is accepted, to commence the work as stipulated in this contract, and to complete the whole work comprised in the contract within the time stated in the contract document.

4. We agree to abide by this bid for the period of _____ days from the date fixed for receiving the same, and it shall remain binding upon us and may be accepted at any time before the expiration of that period;

5. We undertake that unless and until a formal agreement is prepared and executed, this bid, together with your written notification of letter of acceptance shall constitute a binding contract between us.

6. We understand that you are not bound to accept the lowest or any tender you may receive.

7. I/We do hereby submit our technical bid, complete with all the required information as stipulated in your bidding documents.

Signature of authorized signatory ……

Name……

Title ……..

Date …….

POWER OF ATTORNEY FOR SIGNING OF BID

Know all men by these presents, We…….. (name of the bidder/firm and address of the registered office) do hereby irrevocably constitute, nominate, appoint and authorize Mr./ Ms (name), …… son/daughter/wife of…… and presently residing at……., who is presently employed with us as our true and lawful attorney (hereinafter referred to as the "Attorney") to do in our name and on our behalf, all such acts, deeds and things as are necessary or required in connection with or incidental to submission of our bid(s) for the _____ [name of work] proposed by the _____(name of department) including but not limited to signing and submission of all bids, and other documents and writings, participate in conferences/ meetings and providing information/ responses to the authority, representing us in all matters before the authority, signing and execution of all contracts and undertakings consequent to acceptance of our bid[s], and generally dealing with the authority in all matters in connection with or relating to or arising out of our bid for the said work[s] and/ or upon award thereof to us and/or till the entering into of the contract with the authority.

And we hereby agree to ratify and confirm and do hereby ratify and confirm all acts, deeds and things lawfully done or caused to be done by our said attorney pursuant to and in exercise of the powers conferred by this power of attorney and that all acts, deeds and things done by our said attorney in exercise of the powers hereby conferred shall and shall always be deemed to have been done by us.

In witness whereof we, ……., the above named principal have executed this power of attorney on this …… day of…., 2

For
(Signature)
(Name, title and address)
Witnesses:
1. Accepted
2. Accepted
……
(Signature)
(Name, title and address of the attorney)
(Notarised)
Person identified by me/ personally appeared before me/
signed before me/ attested/ authenticated*
(*Notary to specify as applicable)
(Signature, name and address of the notary)
Seal of the notary
Registration number of the notary
Date:_____

Notes: 1. *The mode of execution of the power of attorney should be in accordance with the procedure, if any, laid down by the applicable law and the charter documents of the executant(s) and when it is so required, the same should be under common seal affixed in accordance with the required procedure*.

1. *Also, wherever required, the bidder should submit for verification the extract of the charter documents and documents such as a resolution/ power of attorney in favour of the person executing this power of attorney for the delegation of power hereunder on behalf of the bidder.*

Form - III

BID SECURING DECLARATION FORM

(The bidder shall complete in this form in accordance with the instructions indicated)

Date :……(insert date as day, month and year) of bid submission

Tender No……

To:

We/I, the undersigned, declare that:-

1 We/I understand that, according to your conditions, bids must be supported by a bid securing declaration.

2 We/I accept that we will automatically be suspended from being eligible for bidding in any contract under your department for a period of 2 (two) years upon receipt of your **blacklisting order**, if we/i are in breach of our obligation(s) under the bid conditions, because we/I:-

a) withdrawn our bid during the period of bid validity specified or

b) having been notified of the acceptance of our Bid by the Purchaser during the period of bid validity,

i) fail or refuse to execute the contract, if required, or

ii) fail or refuse to furnish the performance guaranty

3 We/I understand that this bid securing declaration shall expire if we are not the successful bidder, upon the earlier of

i) our receipt of a copy of your notification of the name of successful bidder, or
ii) twenty-eight days after the expiration of our tender

Signed:

Name: ……

Date : …….

FORMAT FOR

EVIDENCE OF ACCESS TO or AVAILABILITY OF CREDIT FACILITIES

BANK CERTIFICATE

This is to certify that M/S_____ is a reputed firm with a good financial standing.

If the contract for the work, namely _____ is awarded to the firm, we shall be able to provide overdraft/credit facilities to the extent of Rs. _____ to meet their working capital requirement for executing the above work during the contract period.

(Signature)

Name of bank

Senior Bank Manager

Address of the bank

AFFIDAVIT

1. I, the undersigned, do hereby certify that all the statements made in the required attachments are true and correct.
2. The undersigned also hereby certify that neither our firm M/S _____ has abandoned any works in India nor any contract awarded to us have been rescinded during the last five years prior to the date of this bid.
3. The undersigned hereby authorize and request any bank, person, firm or corporation to furnish pertinent information deemed necessary and required by the department to verify this statement or regarding my (our) competence and general reputation.
4. The undersigned understand and agree that further information may be requested and agrees to furnish any such information at the request of the department.

(Signature of authorised signatory of the firm) _____

Name of the signatory _____

Title of the signatory _____

Date _____

UNDERTAKING

I, the undersigned do hereby undertake that the bid submitted by our firm M/S

_____ [name and address of bidder] is valid for a period of _____

days and valid till _____

Signed by authorized signatory of the firm:_____

Title of the signatory_____

Name of firm _____

Date_____

(To be written in the company's letterhead)

CERTIFICATE OF UNDERSTANDING

Bid No.: ----------

Name of work: **----------**

To:

……(Employer)

…… (Address)

Dear Sir,

We, <*name of manufacturer*>, are official manufacturer/dealer of <*name of product*> having factories at ……The machinery tendered by <*name of Bidder*> is manufactured by us and is within our range of production.

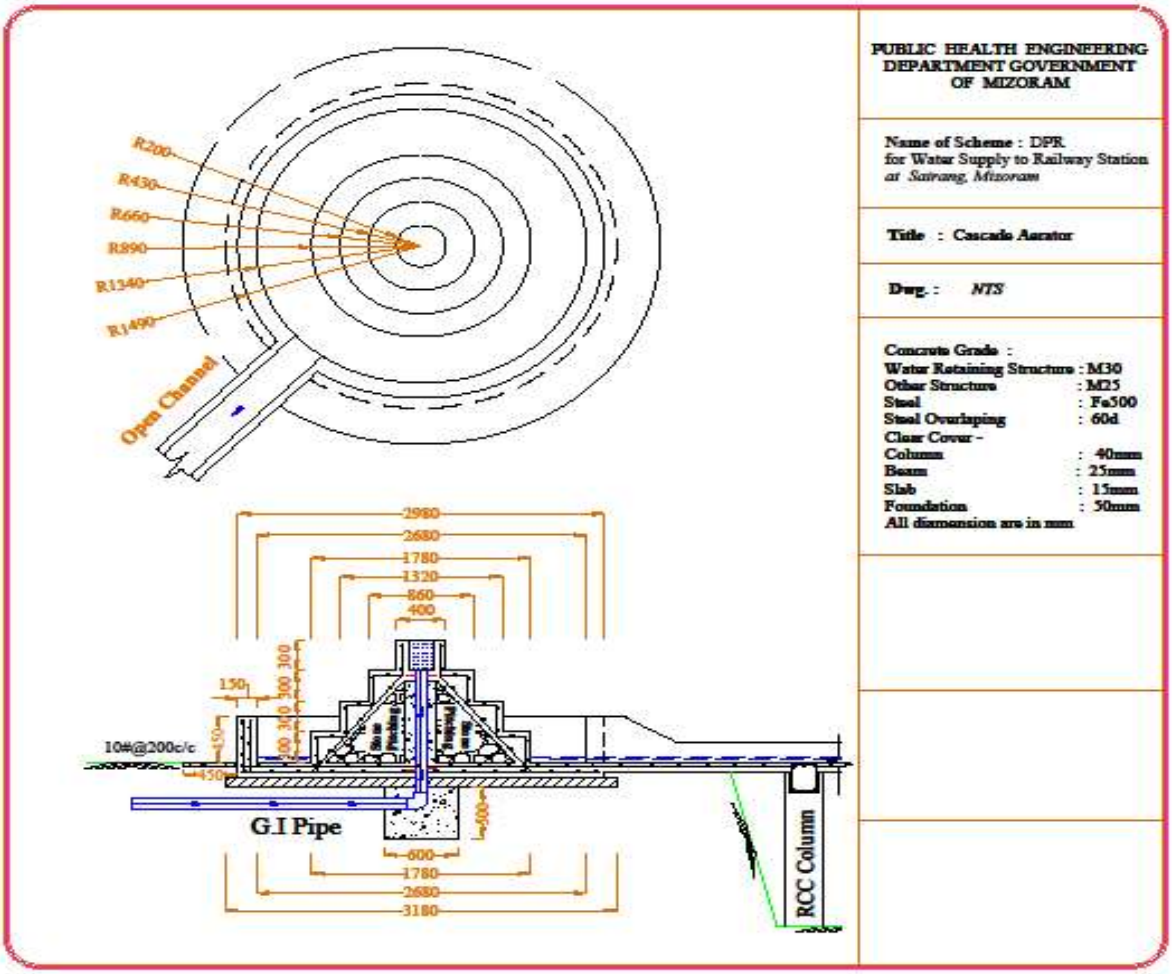
We further affirm that we are willing to sell our product to <*name of bidder*> and shall extend support in installation, testing and commissioning at site including supports in after sales services as deemed necessary.

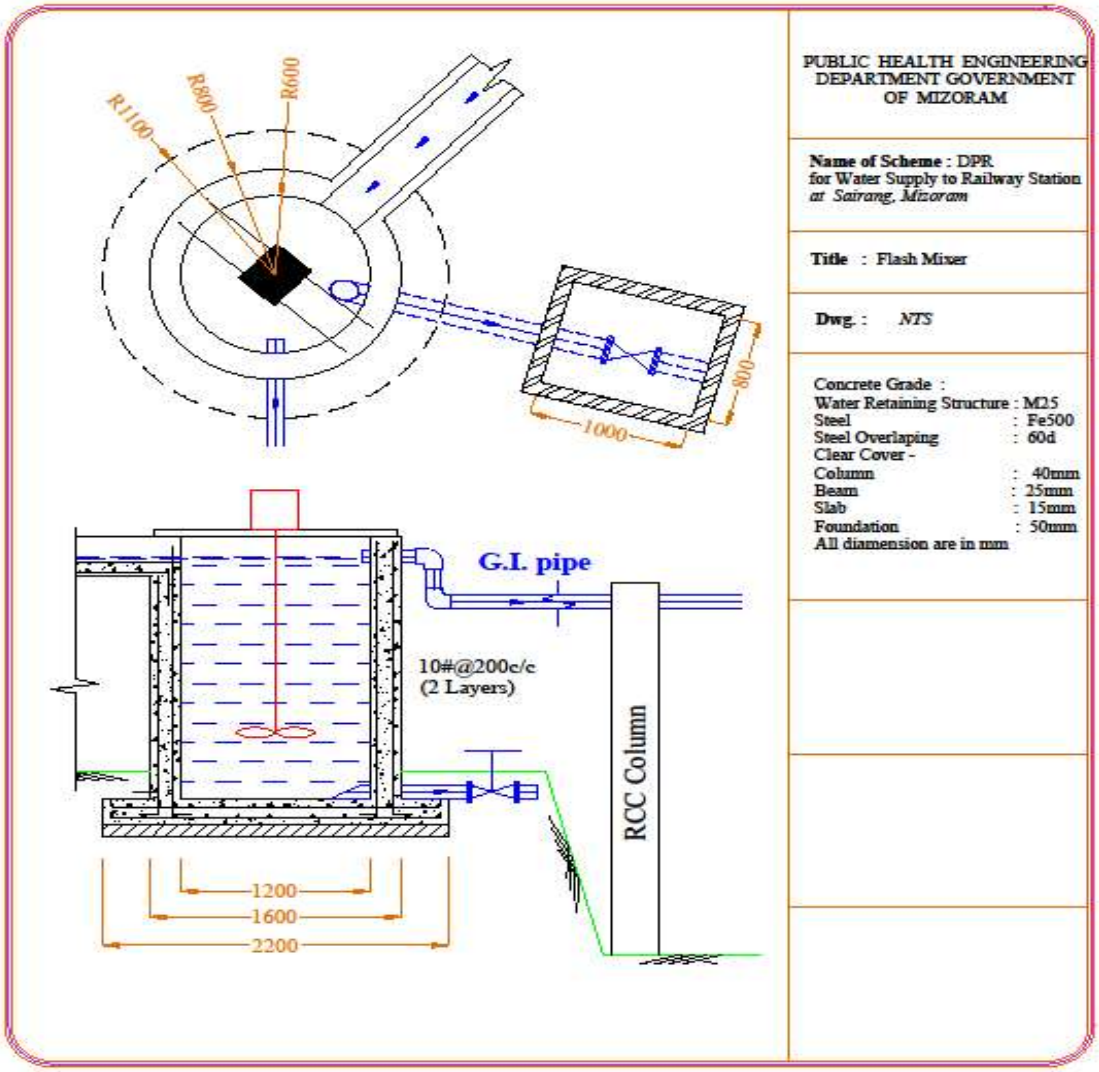
Signed ……..

Name……..

Designation……

Seal……..


R200
R430
R660
R890
R1340
R1490
Open Channel
2980
2680
1780
1320
860
400
150
300 300 300
10#@200c/c
450
450
G I Pipe
500
600
1780
2680
3180
RCC Column
PUBLIC HEALTH ENGINEERING DEPARTMENT GOVERNMENT OF MIZORAM
Name of Scheme : DPR for Water Supply to Railway Station at Sairang, Mizoram
Title : Cascade Aerator
Dwg. : NTS
Concrete Grade :
Water Retaining Structure : M30
Other Structure : M25
Steel : Fe500
Steel Overlaping : 60d
Clear Cover -
Column : 40mm
Beam : 25mm
Slab : 15mm
Foundation : 50mm
All dimension are in mm



PUBLIC HEALTH ENGINEERING DEPARTMENT GOVERNMENT OF MIZORAM

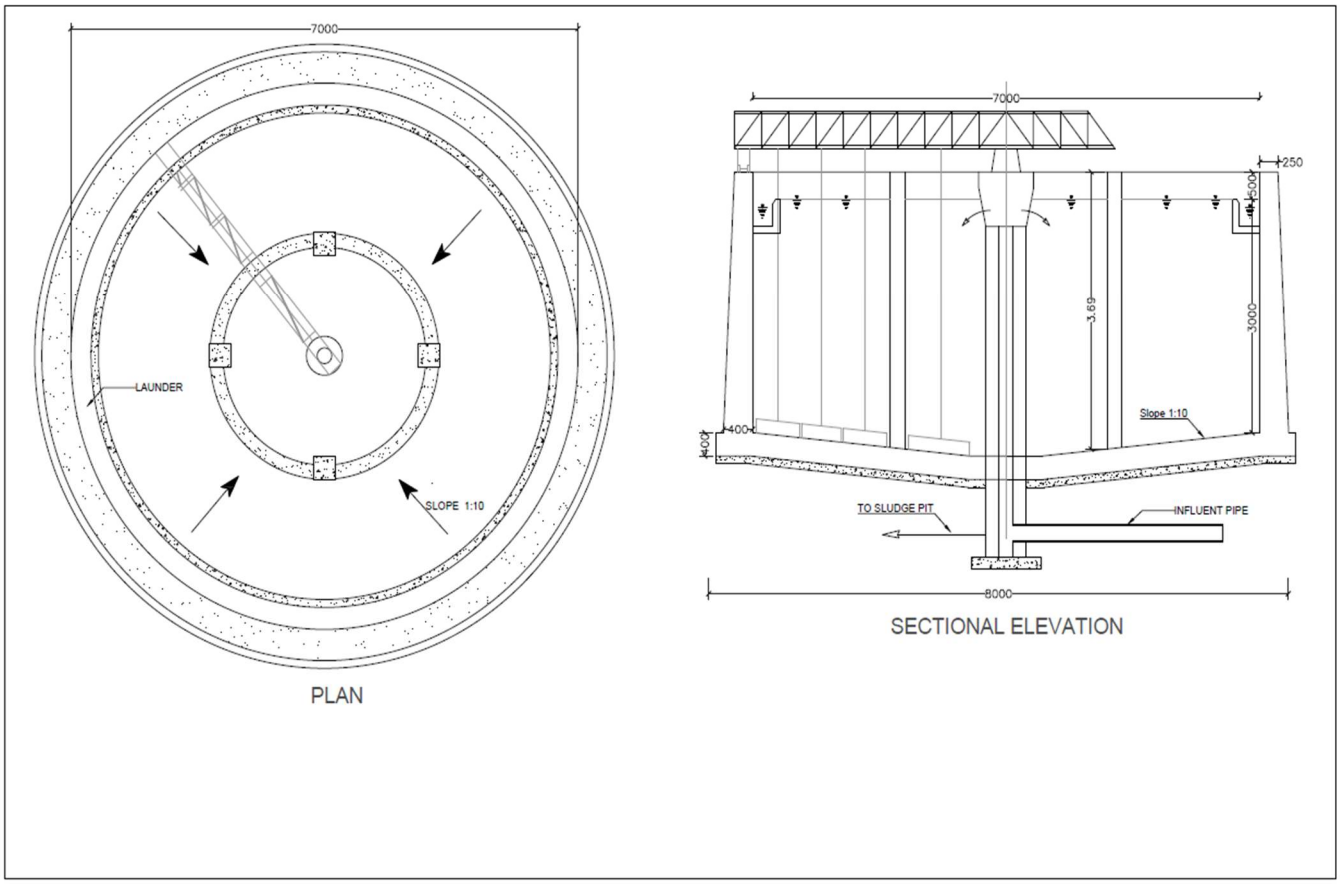
Name of Scheme : DPR for Water Supply to Railway Station *at Sairang, Mizoram*

Title : Flash Mixer

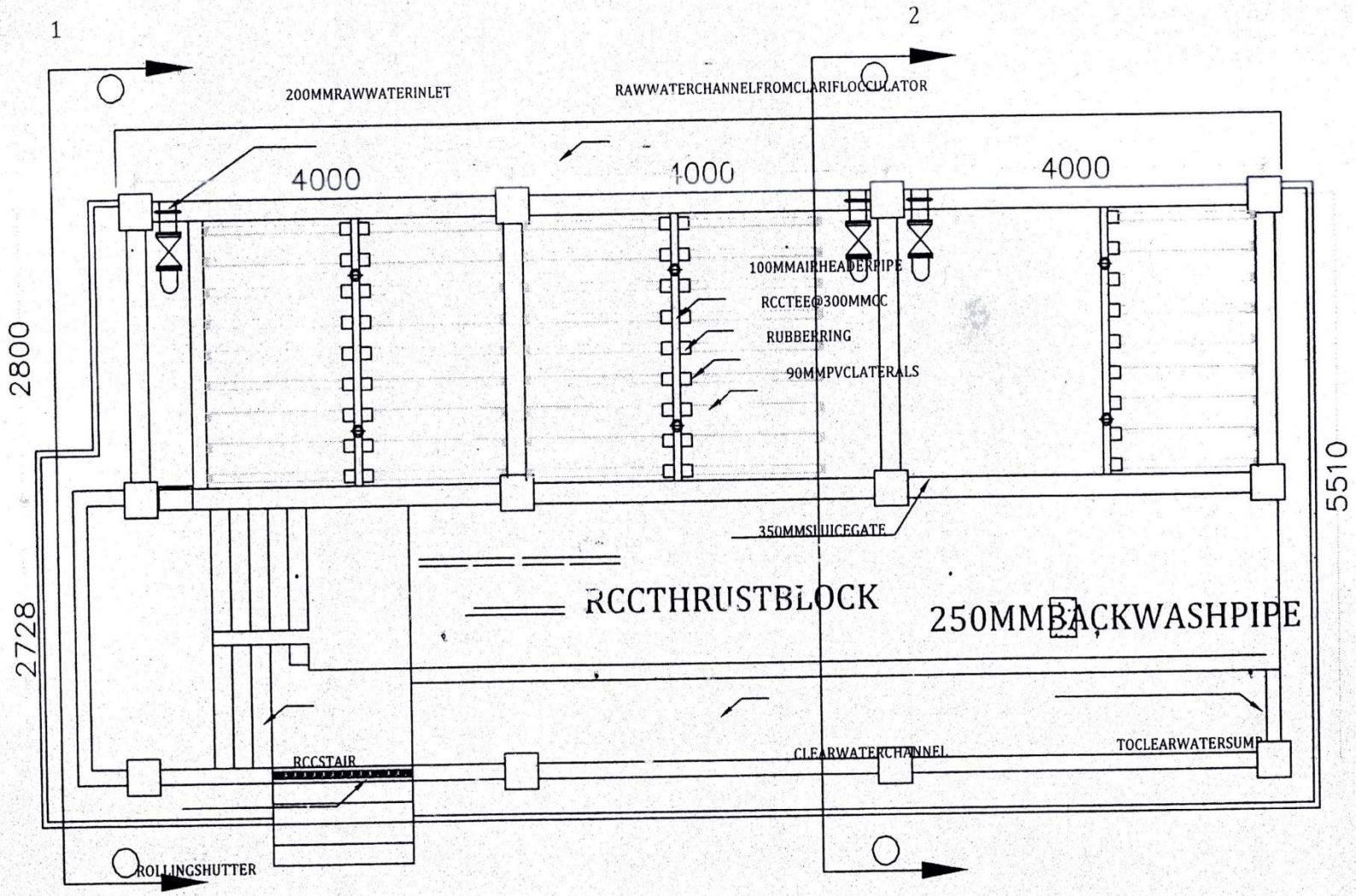
Dwg. : *NTS*

Concrete Grade :
Water Retaining Structure : M25
Steel : Fe500
Steel Overlaping : 60d
Clear Cover -
Column : 40mm
Beam : 25mm
Slab : 15mm
Foundation : 50mm
All diamension are in mm

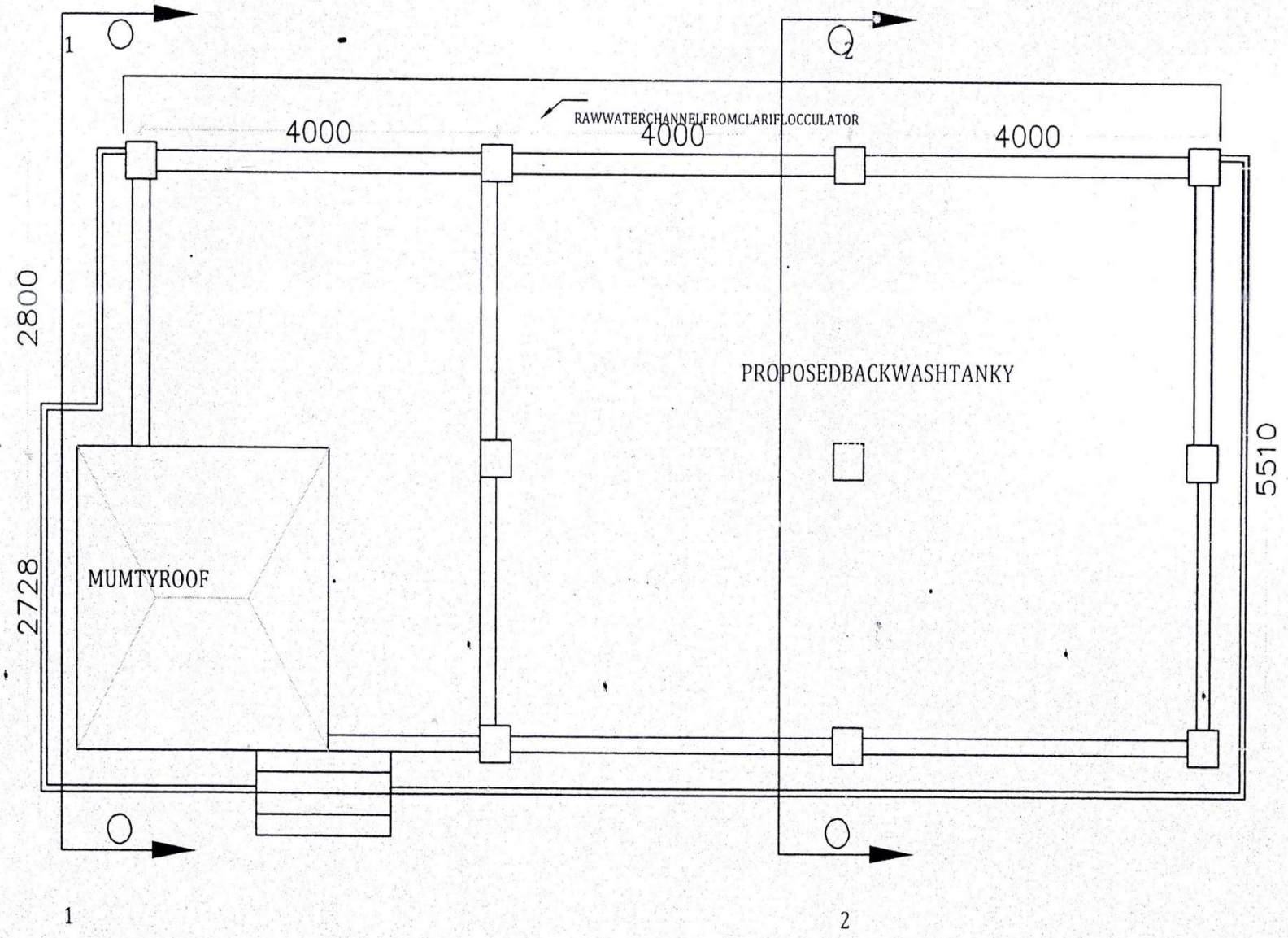
CLARIFLOCCULATOR



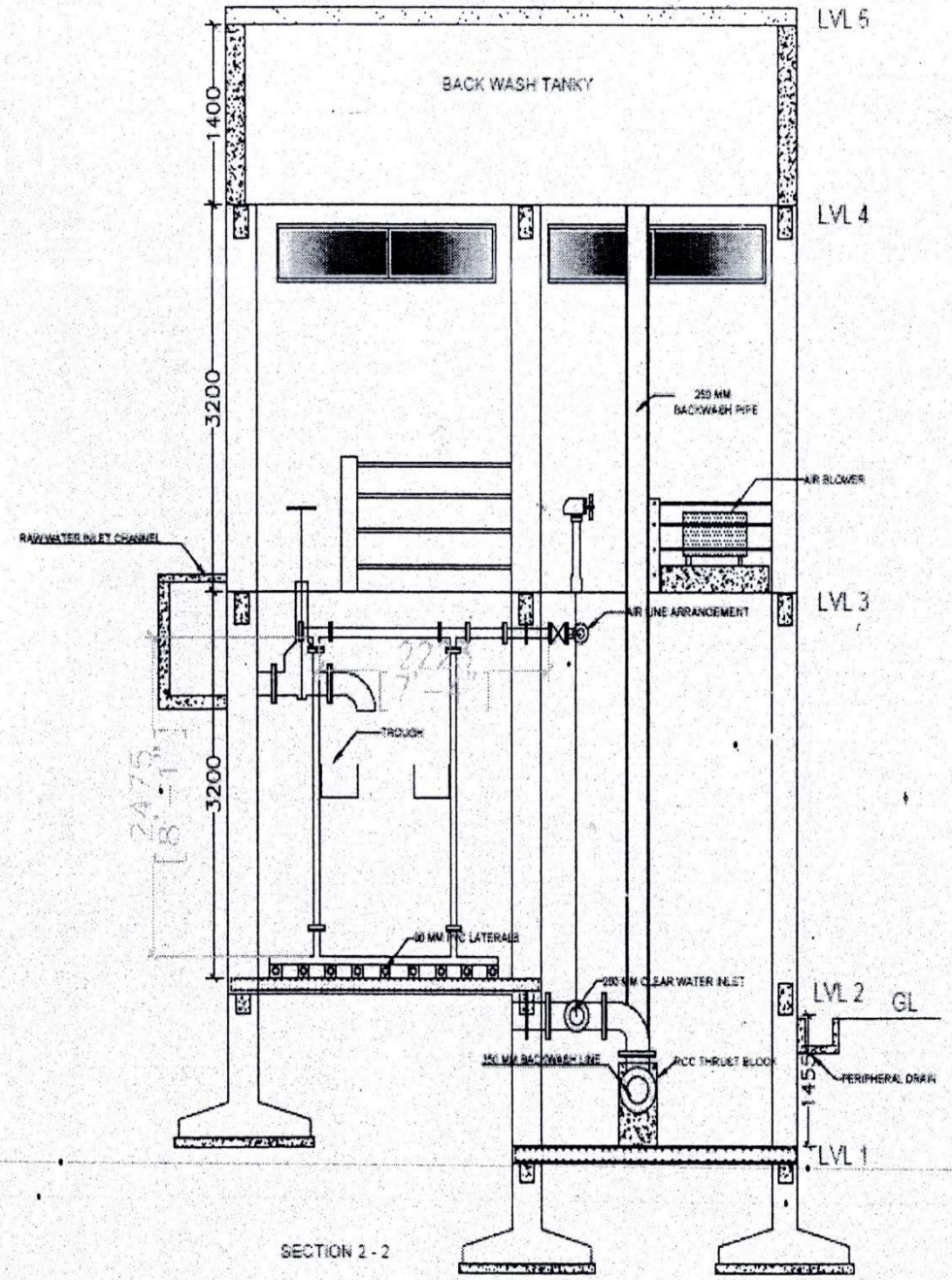
CONSTRUCTION OF 2MLD RAPID SAND FILTER



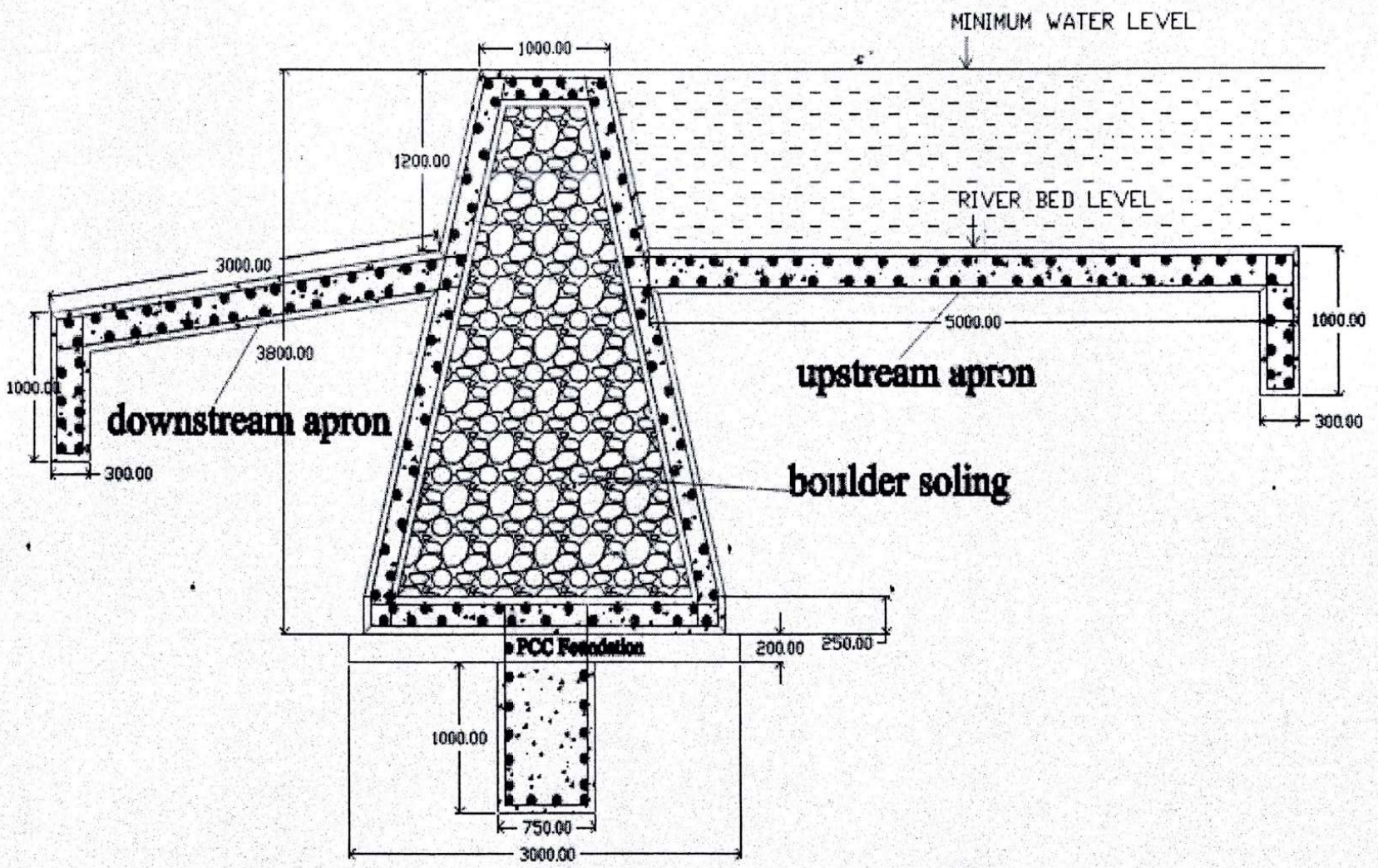
PLAN(FILTERBEDFLOORLEVEL)


CONSTRUCTION OF 2MLD RAPID SAND FILTER
1
2
RAWWATERCHANNELFROMCLARIFLOCCULATOR
4000
4000
4000
2800
2728
5510
PROPOSEDBACKWASHTANKY
MUMTYROOF
1
2
PLAN(OPERATINGPLATFORMLEVEL)

CONSTRUCTION OF 2 MLD RAPID SAND FILTER

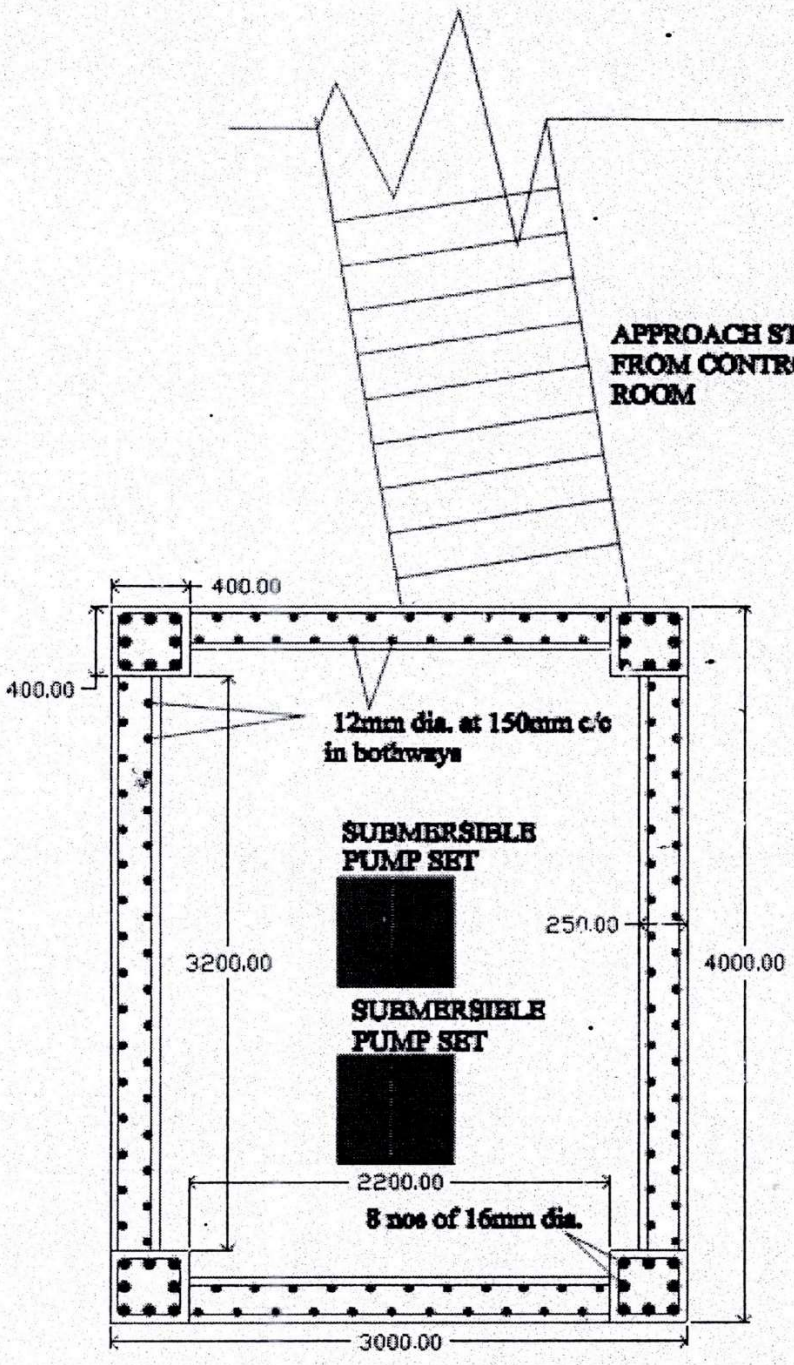


SECTION 2 - 2



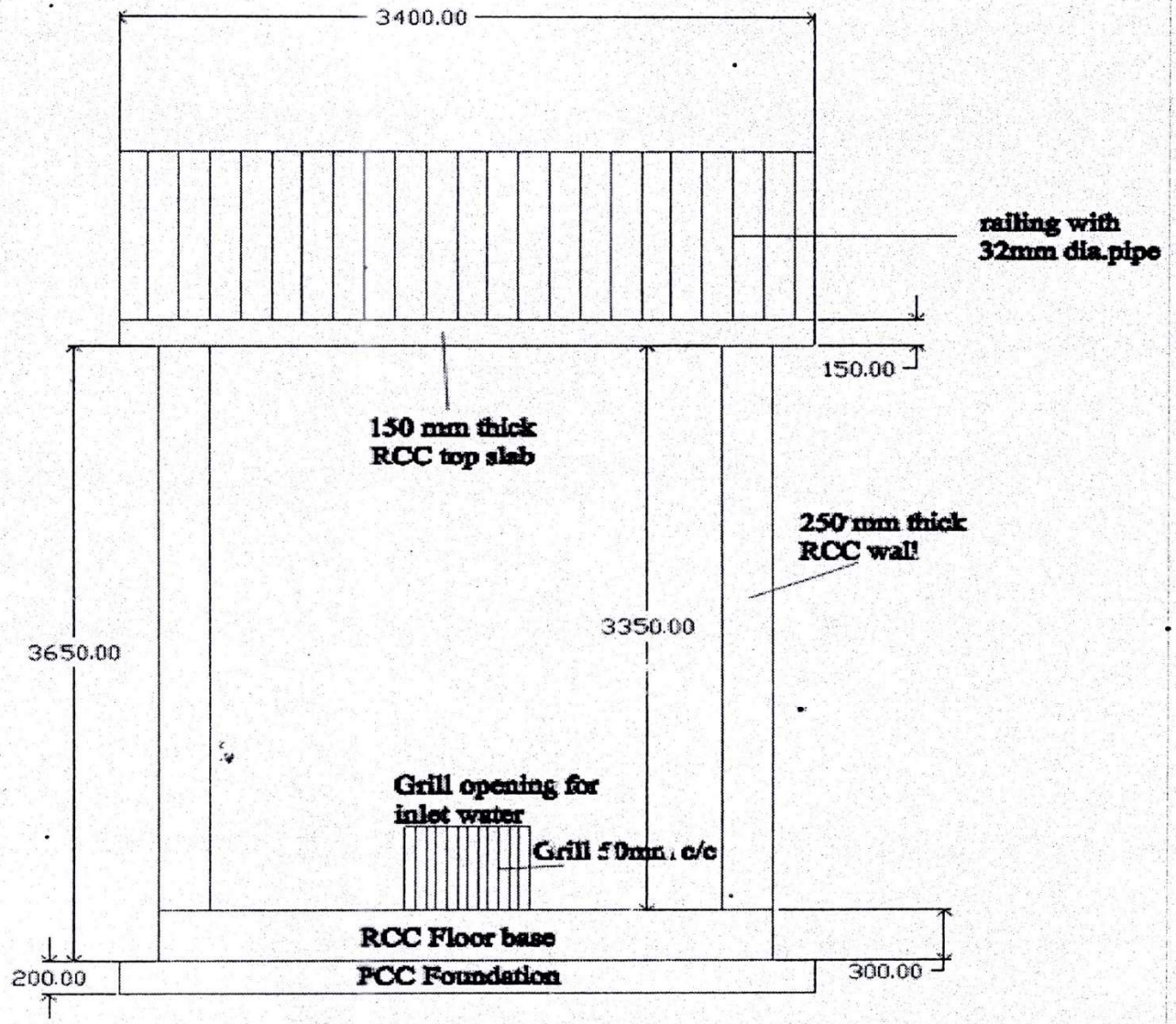
Note: All dimensions are in mm

Fig. SUBMERSIBLE WEIR



Note: All dimensions are in mm

Fig. INTAKE CHAMBER NEAR SUBMERSIBLE WEIR



Note: All dimensions are in mm

Fig. INTAKE CHAMBER NEAR SUBMERSIBLE WEIR

Appendix - VI

SCHEMATIC DIAGRAM OF RAIL STATION WATER SUPPLY SCHEME,SAIRANG.