Shri Amarnathji Shrine Board

Jammu and Kashmir

TENDER DOCUMENT

FOR

Survey, Design, Supply, Installation, Commissioning, Testing, Operation and Maintenance (Five years) of Sewage Treatment Plant based on Moving Bed Bio Reactor Technology (MBBR) of 300 KLD Capacity complete in all respects to cater the requirement of Nunwan Base Camp (Pahalgam) of Shri Amarnathji Shrine Board.

Additional Chief Executive Officer

Dated: 01.01.2018

TENDER DOCUMENT FOR UPGRADATION OF STP AT NUNWAN BASE CAMP

NAME OF WORK :-

i. Survey, Design, Supply, Installation, Commissioning, Testing, Operation and Maintenance (Five years) of Sewage Treatment Plant based on Moving Bed Bio Reactor Technology (MBBR) of 300 KLD Capacity complete in all respects to cater the requirement of Nunwan Base Camp (Pahalgam) of Shri Amarnathji Shrine Board.

Reference to NIT NO: SASB/DNIT/2018/W/964/01 Dated 01.1.2018

SHRI AMARNATHJI SHRINE BOARD

(Established under Act No. XVIII of 2000 passed by J&K Legislature)
Chaitanya Ashram, Talab Tillo, Jammu (Nov-April)
Tele: 0191-2555662, Telefax: 0191-2503399
Email address: sasbjk2001@gmail.com, website: www.shriamarnathjishrine.com

NOTICE INVITING TENDER

Up-gradation of Sewage Treatment Plant at Nunwan Base Camp

For and on behalf of Chairman, Shri Amarnathji Shrine Board, sealed tenders in two-bid format, are invited from experienced and financially sound registered firm having valid registration, for the execution of following work, at the Nunwan Base Camp. These bids shall be received in the office of Additional Chief Executive Officer, Shri Amarnathji Shrine Board on or before 27.1.2018 up to 1400 hours.

S. No.	Name of work	Approx. cost of work (Rs in Lakh)	Cost of Tender Document (Amt. in Rs)	Earnest Money Deposit (Rs in Lakh)	Time of Completion
1.	Survey, Design, Supply, Installation, Commissioning, Testing, Operation and Maintenance (Five years) of Sewage Treatment Plant based on Moving Bed Bio Reactor Technology (MBBR) of one 300 KLD Capacity complete in all respects to cater the entire requirement of Yatra Base Camp Nunwan of Shri Amarnathji Shrine Board and its disposal.	110.00 lakh	Rs. 1500/-	Rs.5.00 lakh	**90 days**

1. Detailed NIT (DNIT) can be obtained from the FA & Chief Accounts Officer, Shri Amarnathji Shrine Board, Chaitanya Ashram Tallab Tillo, Jammu, from 9.30 AM to 5.00 PM on any working day (Monday - Saturday) from **04.01.2018 to 25.01.2018** on payment of (non-refundable) cost of document in cash amount shown against each or in the shape of Demand Draft drawn in favour of FA & CAO, Shri Amarnathji Shrine Board, payable at Jammu. Alternatively, the DNIT can be downloaded from our website *www.shriamarnathjishrine.com*, in which case the cost of DNIT shall be payable through Demand Draft drawn in favour of Financial Advisor/ CAO, Shri Amarnathji Shrine Board, payable at Jammu, in addition to the Earnest Money Deposit along with the Technical Bid of Tender.

2. The Tender, duly completed, along with Earnest Money Deposit in the form of Demand Draft drawn in favour of Financial Advisor & CAO, Shri Amarnathji Shrine Board, must reach the office of Additional CEO, Chaitanya Ashram Tallab Tillo, Jammu latest by or before **27.01.2018 (1400 hrs.).** The bidder, in their own interest, is advised to deliver the bids personally in the office of Additional CEO, Shri Amarnathji Shrine Board, Chaitanya Ashram, Tallab Tillo, Jammu. Alternatively, they may send the same through courier/ registered post. The Board will not be responsible for any delay, wrong delivery or non-delivery of the bids due to any reason.
3. For further details about the Tender, please refer our DNIT.

No: SASB/DNIT/2018/W/964/01
Dated: 01.01.2018

Sd/-
Addl. Chief Executive Officer

Name of Work:-

Survey, Design, Supply, Installation, Commissioning, Testing, Operation and Maintenance (Five years) of Sewage Treatment Plant based on Moving Bed Bio Reactor Technology (MBBR) of one 300 KLD Capacity complete in all respects to cater the entire requirement of Yatra Base Camp Nunwan (Pahalgam) of Shri Amarnathji Shrine Board and its disposal.

Annexure-I

Detailed Terms and Conditions in respect of Tender Notice issued vide No. SASB/NIT/2018/01 dated: 01.01.2018.

The Bidders shall submit their bids for the work viz. Survey, Design, Supply, Installation, Commissioning, Testing, Operation and Maintenance (Five years) of Sewage Treatment Plant based on Moving Bed Bio Reactor Technology (MBBR) of 300 KLD Capacity complete in all respects to cater the requirement of Yatra Base Camp Nunwan of Shri Amarnathji Shrine Board and its disposal.

The following shall be detailed eligibility conditions for the bidders.

1. Bidder must be an approved manufacture/supplier of Sewage Treatment Plant duly registered under the Companies Act, 1956 and must have at least 05 years experience in the running. The bidder should be an ISO 9001 certified, BIS recognized in designing and execution of STP with its own in house quality plans/ testing effluents.
2. The Bidder must have a carried out satisfactory Annual Maintenance Contract of at least 05 STPs, two of which should have a capacity of 500 KLD or more for the past 03 years.
3. Bidder must be income tax payee and shall submit attested copies of the Income Tax Returns / Income Tax Assessment Order for the last three years 2013–14, 2014-15 and 2015-16. Bidder shall also submit proof of PAN.
4. The bidder must have carried out design, supply, installation, testing and commissioning of Combined/Stand-alone Sewage Treatment Plant of at least 500 KLD capacity of MBBR Technology during the last three years viz. 2014-15, 2015-16 & 2016-17.
5. Bidder must have an Average Annual Turnover during the last three financial years i.e. 2014-15, 2015-16 & 2016-17 equal to Rs 150 lakh in the specific area viz. design, supply, erection, installation, testing and commissioning of Sewage Treatment Plant with MBBR Technology (Attested copies of audited balance sheets and profit & loss of account for the last three years be attached).

6. The bidder should have an experience of having successfully completed similar work (must have satisfactorily/successfully carried out design, supply, erection, installation, testing, commissioning & Maintenance (for Five years) of Sewage Treatment Plant with MBBR Technology and capacity) during last 7 years ending last day of month previous to the one in which application are invited should be either of the following:-

   a. Three similar completed works costing not less than the amount equal to 40% of the estimated cost.

   or

   b. Two similar completed works costing not less than the amount equal to 50% of the estimated cost.

   or

   c. One similar completed work costing not less than the amount equal to 80% of the estimated cost.

7. Bidder must visit the site before quoting to have a cognizance of the site.

General Conditions:

1. Tenders shall be submitted only in the prescribed format. The prescribed format for submitting Technical and Financial Bids are available and the tender forms can be downloaded from the webpage (http://www.shriamarnathjishrine.com)and shall be accompanied by a demand draft for Rs.1500.00 drawn in favour of FA/CAO, Shri Amarnathji Shrine Board, payable at Jammu. If a demand draft for Rs.1500.00 is not submitted along with the downloaded tender forms, such tenders will be summarily rejected.
2. The Bidders should submit Technical Bid and Financial Bid separately. Technical Bid and Financial Bid should be submitted in separate covers and each of these covers should be sealed. On the cover containing Technical Bid, the following should be clearly written: “Technical Bid for Sewage Treatment Plant-300 KLD”. On the cover containing Financial Bid, the following should be clearly written: “Financial Bid for Sewage Treatment Plant-300 KLD”. These two covers should be put in another separate cover which should also be sealed and on this cover the following should be written clearly “Bid for establishment of Sewage Treatment Plant-300 KLD”. Each page of the tender form, schedules etc., should be signed and stamped with the seal of the Company.
3. The Technical Bids will be scrutinized first followed by financial Bids. In the first stage those Bidders whose Technical Bids confirms to the terms and conditions of NIT will be shortlisted. Financial Bids of these short listed Bidders will be opened separately. The short listed Bidders will be informed the date of opening of the Financial Bids. The short listed companies will be informed primarily by India Post. Therefore, the Bidders should indicate his correct postal address in their Technical Bid.

They may also submit the details of their working Telephone & Fax numbers and e-mail ID for this purpose. The information to the short listed Bidders may also be conveyed by telephone, fax or email though it is not mandatory to do so. The undersigned is not responsible if the information on the date of opening of the financial Bids does not reach the Bidders in time due to the failure of the Postal Department. The Shri Amarnathji Shrine Board is not responsible if the telephone, fax or emails of the Bidders are not working or the intimation does not reach the Bidders in time for any other reason.

4. All such offer, along with the terms and conditions duly signed and enveloped as described above, must be dropped by hand in the sealed Tender Box placed in the office of the Shri Amarnathji Shrine Board, Chaitanya Ashram, Tallab Tilloo, Jammu on or before 27/01/2018 upto 1400 Hrs. Alternatively, the sealed tenders may be sent by Registered Post/ Speed Post/ courier addressed to the Addl. Chief Executive Officer, Shri Amarnathji Shrine Board, Chaitanya Ashram, Tallab Tillu, Jammu so as to reach on or before 27.01.2018 upto 1400 Hours. The tenders received after the due date and time shall not be considered.

5. The Shrine Board shall not be responsible for any postal delay. Any conditional tender or tenders, which are not appropriately sealed in the two-bid format, as explained above, or tenders received after the stipulated date and time, shall not be entertained. Any cutting or overwriting in the Tender Documents will also make the bid liable for rejection. The Technical Bids shall be opened by the Tender Committee on 27/01/2018 upto 1500 Hrs. at Jammu in the presence of the Bidders who may choose to be present. In case of change in date and time of opening of Technical Bids, the information regarding the same shall be uploaded on our official website: http://www.shriamarnathjishrine.com for the information of the concerned. The date of opening of Financial Bids shall be intimated only to the eligible Bidders are short-listed after evaluation of the Technical Bids.

6. The Bidders should go through the technical details mentioned in the Annexure-II and stick to the specifications mentioned there in while quoting the rates. The rate should include all incidental expenditure such as transportation of the Sewage Treatment Plant-300 KLD to the site, insurance including transit insurance etc.

7. The Bidders should quote separately for each of the item mentioned in the Annexure-II.

8. The rate quoted should be inclusive of all taxes. Rates mentioned in the quotations should be in Indian Rupees. All costs of importing any components will be the responsibility of the Bidders.

9. Tenders should be typed neatly or written in ink without cutting/ overwriting. Tenders with cutting/overwriting and/or written in with pencil

will be summarily rejected. All tender documents and schedules shall be signed on all pages and the seal of the company shall be affixed on all tender documents and schedules on each page.

10. Any Government body in India should not have blacklisted the Bidder/OEM its subsidiary, dealing in similar products.
11. The tender should be filled in neatly, quoting the rates both in words and figures, without any cutting/overwriting. In case of any cutting/overwriting, the bid shall be out rightly rejected.
12. Conditional, illegible, ambiguous tender(s) or tender(s) received after the stipulated date and time shall be out rightly rejected.
13. The STP contractor shall be completely responsible for the design of all components, structural details & supervision of the civil works, material, Supply, Installation, Testing of the Mechanical, Electrical pipes, Fittings & other accessories.
14. Operation Maintenance of the entire system including consumables for the specified period (Yatra Period) shall be done strictly as per the client's guidelines and requirements.
15. The Plant shall be operational during the Yatra period only. The cost of shutdown after Yatra & re-commissioning before next Yatra (for 5 years) shall also be part of Contract.
16. Work under this contract is time-bound and has to be completed within the time limit set in the tender. Work shall be executed in accordance with an agreed schedule within the overall time frame.
17. The Bidders shall maintain secrecy of tender documents, drawings or any other record connected with the work given to them. The unsuccessful Bidders shall return all drawings given to them.
18. The rate quoted by the Contractor in item tenders shall be on correct basis and not the amount worked out by them. The rate quoted in words will be correct basis and not the rate shown in figures in case of discrepancy between them.
19. The Shrine Board reserves absolute right to reject any or all Bids without giving any reason whatsoever. Shrine Board also reserves the right to cancel the tender without assigning any reason.
20. Tenders not submitted on the lines indicated above are liable to be rejected without correspondence.
21. Request for extension in last date of receipt of tender shall not be entertained on any grounds.

22. The Shrine Board reserves the right to order additional quantity or reduce the quantity of the material advertised at the time of placement of order for which the quoted rates shall be valid.
23. All legal proceeding in connection with the order/tender will be subject to the jurisdiction of local court of Jammu and Kashmir State alone.
24. The Shrine Board reserves the right to divide the target between two or more Tenderer for 100% achievement.
25. In case of any doubt, dispute or differences arising out of the contract, the same shall be referred to the Arbitrator to be appointed by the Chairman, SASB for arbitration to be appointed under J&K Arbitration & Conciliation Act, whose decision shall be final.
26. The Chief Executive Officer, Shrine Board shall not be bound to accept the lowest or any tender and reserves to itself the right of accepting the whole or a portion of any of the tender, as it may deem fit, without assigning any reason thereof.
27. Any form of canvassing by the Tenderer to influence the consideration of their tender shall render the tender liable to summary rejection.
28. In order to avoid delay caused by postal correspondence and to expedite the process, the Shrine Board may require the successful Tenderer to hold Technical & Commercial negotiations with the Shrine Board.
29. The conditions hereinafter deal with system details and supplementary conditions of the contract in addition to those stipulated in foregoing clauses which along with schedules and Annexure, shall be deemed to form part of detailed specification for equipment. The Tenderer are advised to study and familiarize themselves with the terms and conditions of the tender.
30. All materials shall be of the Government approved quality, new and unused and be capable of satisfactory operation when exposed to the local atmospheric conditions.
31. The Tenderer is required to submit a statement of facts in details as to their previous experience in performing a similar or comparable work and business and technical organization, financial resources and manufacturing facilities available and to be used in performing the contract.
32. Force Majeure: If during the currency of Contract, there is any out-break of war/ natural calamity, which whether financially or otherwise affects the execution of the Contract, the firm, unless contract is terminated under provision of this Clause, shall make his / her best efforts to complete the Contract. However after outbreak of such war / natural calamity, Shri Amarnathji Shrine Board shall be entitled to terminate the Contract at any time by giving notice in writing. Force Majure is hereby defined as a

'Clause' which is beyond the control of SASB/ Firm and which consequently affects the performance of the Contract.

33. The contractor shall comply with the provisions of the Apprentices Act, 1961, Minimum Wages Act, 1948, Workmen's Compensation Act, 1923, Contract labour (Regulation and Abolition) Act, 1970, Payment of Wages Act, 1936, Employers Liability Act, 1938, Maternity Benefits Act, 1961, the Industrial Disputes Act, 1947 etc as may be applicable, and the rules and regulations made there under from time to time. Failure to do so shall amount to breach of the contract and the Unit-in-charge may, at his discretion, terminate the contract. The contractor shall also be liable for any pecuniary liability arising on account of violation by him of the provisions of the Act.

Specific Conditions

1. The entire STP shall be installed preferably above the ground. The design shall be as per final architectural approval and final architectural planning requirements. If space availability is a constraint, then the STP may need to be constructed in multiple levels. Proper arrangements for ventilation/ exhaust/passage have to be provided accordingly in the construction plant.
2. It is proposed to utilize the entire treated effluent for "Horticulture/flushing" purpose. Therefore, the system components have to be provided accordingly.
3. For sludge handling, a proper sludge handling network/centrifuge shall be provided, and it is recommended to collect the de-watered compressed sludge into HDPE bags for disposal to the final destination as per the approval of the J&K State Pollution Authorities.
4. Disposal of Solid Waste: The disposal of all solid waste including from sludge handling network as generated from the STP during construction, commissioning, and O & M shall be the responsibility of the contractor. The solid waste shall be disposed off in accordance with the J&K State Pollution Control Board's Norms to the site identified by the Unit In-charge. Loading, unloading, transportation of solid waste shall be to the contractor's account.
5. The evacuated grit and screenings are to be disposed from the STP site by the contractor to the site identified by the Unit In-charge from time to time and the rates shall cover this item also.
6. The successful Bidder may have to provide an acoustic enclosure for STP and shall ensure no foul smell or noise is there during the operation or its idle state.
7. A successful Bidder has to secure necessary approval from J&K State Pollution Control Board for the sewerage treatment plant and confirm that

the treated effluent is within IS limits for recirculation to Horticulture, flushing or to recharge ground water.

8. Location (Site Information) The Bidders should establish the Sewage Treatment Plant of 300 KLD for the Shrine Board's Complex at Nunwan Pahalgam. Necessary power connection will be provided by the Shri Amarnathji Shrine Board.
9. Before filing this tender, Contractor shall visit the site and satisfy himself as to be conditions prevalent there, especially regarding repairs to the existing structures to be used in this work, nature and extent of ground, working condition, stacking of materials, installation of tools, plants, accommodation and movement of labour, supply of water and power for satisfactory completion of the work contract.
10. All statuary clearances required shall have to be obtained by the successful bidder after Award of Contract of his own.

Scope of Work

1. The proper execution of work involves provision of all plants, equipment, materials, liaison and performance of all operations needed for Survey, Design, Supply, Installation, Commissioning, Testing, Operation and Maintenance (Five years) of Sewage Treatment Plant based on Moving Bed Bio Reactor Technology (MBBR) of 300 KLD Capacity complete in all respects to cater the requirement of Yatra Base Camp Nunwan (Pahalgam) Shri Amarnathji Shrine Board and its disposal based on proven eco-friendly technology and securing necessary approval from State Pollution under Residential scheme for Shri Amarnathji Shrine Board. They will broadly include the following:-

    a) Planning and designing of the sewage treatment plant as per latest standard laid down by Government of India, State Govt.'s., I.S.I. Standards.

    b) Execution of works includes all civil, electrical, mechanical, civil Designing & Drawing, plumbing processing equipments etc. including manufacture, supply and erection as per the details provided in the Technical Specification in Annexure-II to the NIT.

    c) Any other allied work required for the functioning of the treatment plant conforming to the Statutory Acts, Rules, Standards etc.

    d) Equipment and connecting piping shall be so installed as to prevent any obstruction for general movement.

    e) Equipment shall be installed in a manner to provide adequate ventilation for all motors.

f) Adequate provision shall be made in the equipment mounting to prevent excessive noise transmission directly or through piping and structures.

g) Overall design factor for individual elements shall be as per the Manual of Sewerage, Govt. of India, New Delhi.

h) All work shall be planned, designed and executed based on latest IS codes of practice and other relevant codes applicable to civil/electrical/mechanical / plumbing works.

i) The sludge will be handled properly so that the cakes are formed to be used as manure by installing mechanical sludge handling/beds.

j) The rate should include all taxes, supervision, and erection of mechanical, electrical equipments and operation of system for five years after taking over.

k) The firm will submit quotation on turnkey basis along with schematic and process scheme consumable, power etc. required along with cost of maintenance.

l) The successful Bidder shall provide the architectural and structural drawings/working drawings of complete piping route/plan, MOC and other plumbing work till the site of STP for approval from General Manager (W), SASB.

m) All RCC and masonry works related to sewage treatment plant and related foundation works for electrical and mechanical equipment shall be executed by the Shrine Board and the Bidder shall submit detailed drawings of structures to enable the Shrine Board to get them approved by the consultant, and execute all Civil works.

n) The Shrine Board shall have power to make any alteration, omissions, additions to or substitutions for the original specifications, drawings, designs and instructions that may appear to be necessary, advisable during the progress of work, and the contractor shall be bound to carry out the work in accordance with any instruction which may be given to him in writing, signed by the Unit In-charge. Such alteration, addition or substitution shall not invalidate the contract and any altered, additional or substituted work shall be carried out by the contractor on the same conditions in all respects on which he agreed to do the main work and at the same rate as are specified in tender for the main work. The time of completion of the work shall be extended on in the proportion that the altered, additional or substituted work bears to the original contract work and the certificate of the Unit In-Charge shall be conclusive as to such proportion. The rates of such additional, altered or substituted work shall be determined in accordance with following provisions in their respective order.

Designing of Civil work:-

a) Civil structures of the Sewage Treatment Plant shall have to be designed for the total sewage flow 300 KLD/day within the available land / site for the project.

b) The STP contractor provide all the necessary details & Drawing for Modifications of Existing ABR tank in to Raw Sewage Collection Tank. The modification drawing for Existing Oil & grease Trap shall also provide for any changes, if required. SASB shall execute all the necessary civil works required to complete the project as per the detailed drawing & design provide by the STP Bidder.

c) The Bidders have to provide Architectural and working drawings of Fencing around the treatment plant, battery limits, entry gate, storm water outlets, Rain Protection Canopies on Electrical Drives, All manholes, vent pipes, railings & supports as required.

d) The Bidder shall be required to execute as a part of scope of work, any other item not specified above or indicated in the tender but essentially required for satisfactory and desired functioning of the plant. The Bidder shall provide a defined scheme based upon this process along with sizes of different tanks and equipment and take guarantee of the treated effluent to the standard required as per Pollution Control Board norms. Without restricting to the generality of the foregoing, the work shall consist of Designing of all civil works consist of:-

- Bar Screen Chamber
- Modification of Existing ABR
- Modifications of Existing Oil & Grease Trap
- Raw Sewage Collection Tank
- Foundation for Mild Steel Tanks
- Pump Foundation
- Sludge Drying Beds
- Building Works if any

Designing of Mechanical Equipment

Design, supply, erection, commissioning and testing of all mechanical equipments, as discussed in the proceeding sections, generally comprising of:

- Coarse Screen/Fine Screen
- Raw Sewage Lifting Pumps
- Prefabricated MBBR Tanks
- Prefabricated Secondary Clarifier/Tube settler Tank
- Prefabricated Clear Water Tank
- Air Blower
- Sludge Transfer Pump

- Filter Feed Pump
- Multi Grade Sand Filter Column
- Activated Carbon Filter Column
- Ozone Dozing System
- Any other equipments required for functioning of STP or as per client's requirement.

Designing of Electrical Equipment:-

Design, Supply, Erection, Commissioning and Testing of all Electrical equipment generally comprising of:

- Electric motors for all equipments as required.
- Motor control center complete in all respect as per norms.
- Electrical cables from M.C.C panel to all electric motors and units.
- Electric earthling stations as per I.E.E. rules.

Designing of Piping Work:-

Lying of all piping work as per detailed designs and generally for:

- All above mentioned civil structure and tanks.
- For the interconnection of the various equipment's.
- All interconnecting piping between various units bypass etc.
- Effluent piping from O&G trap to STP.

Power & Water:

Power & Water for erection, testing and commissioning shall be provided at one point near the site of work. The contractor shall extend the lines as required to his site of work at his cost.

Storage of Material and Safe Custody:

Lockable storage space, if available at site shall be made available to the successful Bidder by the Unit-In-Charge. However, the contractor shall be responsible for security and safe custody of his equipment installations, till they are formally taken over by the Unit-In-Charge. Non-availability of lockable storage space due to any reasons shall not relieve the contractor of his contractual obligations in any way.

Measurement:

All works shall be measured in accordance with relevant IS Standards not withstanding general or local practices unless where specifically described otherwise in the specific sections of the specifications. All measurements shall be taken by the Unit-In-Charge in the presence of the successful Bidder/ or his authorized representative and shall be jointly signed by both the parties. Payments shall be released against invoice of the contractor based on the joint measurements recorded as per the terms of payment specified in the order.

Material Inspection, Examination & Testing:

All materials and equipment shall be new. On arrival of the materials at site they shall be inspected and checked by the Unit-In-Charge to ensure that the materials conform to the specifications and standards. The Unit-In-Charge and his representatives shall at all reasonable time have free access to the contractor's/ manufacturers works. They shall have full powers to examine the materials and workmanship of the various items being manufactured at the contractors/manufacturer's works or at any other place from where the material or equipment is obtained. The contractor shall give every facility to the Unit-In-Charge and his representatives and necessary help for inspection, examination & test as specified in Indian standards. Original test certificates of the manufacturer shall be submitted by the Contractor for all major equipments before they are accepted by the Unit-In-Charge. Acceptance of any material or equipment shall in no way relieve the Contractor of his responsibility for meeting the requirements of the contract. Consultant will also visit the works/ site to satisfy himself that items being supplied / executed are as per contract condition.

Delivery:

1. Delivery and installation & commissioning of the Sewage Treatment Plant-300 KLD should commence simultaneously within one month from the date of placement of order and should be completed within 90 days.
2. In case of failure to execute the contract, the Shrine Board shall have the right to order risk contract at the cost of supplier or / and cancel the contract and claim reasonable compensation / damages. The contract of the supply shall be repudiated if the work is not executed within the prescribed period and to the satisfaction of the Shrine Board.
3. As soon as the allotment letter is issued to the Contractor/ Bidder, he will submit to the Unit-in-Charge, his program to complete the works by the time indicated in the contract, in the form of a Bar Chart for review of the Unit-in-Charge and make suggested modifications before his approval of the same. The approved bar chart shall be diligently and strictly followed with a view to complete the works as per schedule. The progress & planning of works shall be reviewed from time to time and he may modify the same depending upon the exigencies of the work and stage of the works.

Performance Criteria of the Plant:

It shall be the Contractor's responsibility to ensure the quality of the treated sewage to comply with the local Authorities requirement for the various applications and the following characteristics, whichever is stringent. Latest Guidelines issued for regulation of Hotels and Restaurants under Water and

Air act by JK Pollution Control Board (JKPCB) shall be adhered to in letter and spirit.

The treatment plant shall be designed to treat the influent based on the following parameters and expected to fulfill the Shrine Board's requirement as described below.

S. No	Description	Consultant's Requirement/ Recommendation
1	**Flow Capacity**	
	Total daily ultimate flow in Cum/day	300 m^3/day
	Peak factor	3.00 hours
2	**Quality of the Treated Effluent**	
i	pH	6.5-9.0
ii	BOD	< 10mg/lit
iii	COD	< 50mg/lit
iv	TSS	< 20 mg/lit
v	NH4-N	< 5mg/lit
vi	N-tatal	< 10mg/lit
vii	Fecal Coliform (MPN/100ml	< 100
3	**Treatment Methodology**	Moving Bed Bio-Reactor

Treated Sewage shall be connected to a tertiary filtration treatment and shall be treated for use for irrigation and flushing purpose. The contractor shall carefully consider the operation loading for the Sewage Treatment Plant. The total capacity of intermediate and final storage tank shall be designed for 2 days retention period.

Basic Design Consideration for Sewage Treatment Plant:

The project of sewage treatment is to stabilize decomposable organic matter present in sewage so as to produce an effluent and sludge which can be disposed of in the environment without causing health hazards or nuisance. Before proceeding with the design of the treatment plant, it is essential to know the variations in quantity and characteristics of the raw sewage and the quality of the final effluent desired. The Bidders has to account following parameters while designing the STP

a) Degree of treatment:

The degree of treatment will mostly will be decided by the regulatory agencies and the extent to which the final products of treatment are to be utilized. These regulatory bodies might have laid down standards for the effluent or might specify the conditions under which the effluent could be discharged into a natural stream, sea or disposed of on land. These regulatory bodies may be the local body or the **State Pollution Control Board**. The method of treatment adopted should not only meet the requirements of these regulatory agencies but

also result in the maximum use of end products consistent with economy.

b) Design period:

The Bidders has to design Sewage treatment to meet the requirements over a 10 year period after its completion.

c) Population Served:

Estimates for present and future population of areas of involved in the project are made to determine the quantity of sewage to be treated. These estimates would have formed a part of the main sewerage project itself.

d) Sewage Flows:

The quantity of sewage and its characteristics show a marked range of hourly variation and hence peak, average and minimum flows are important considerations. The process of loadings in the sewage treatment are based on the daily average flows and the average characteristics as determined from a 24 hour weighted composite sample. In the absence of any data, an average flow of 150 lpcd may be adopted. The hydraulic design load of various components of the treatment plant with all appurtenances, conduits, channels etc. shall be designed for the maximum flow, which may vary from 2.0 to 3.5 times the average flow. Sedimentation tanks are designed on the basis of average flow, while consideration of both maximum and minimum flow is important in the design of screen and grit chambers.

e) Temperature:

Observation of temperature of sewage is useful in indicating the solubility of oxygen which affects oxygen transfer capacity of aeration equipments and rate of biological activity. Extremely low temperature affects adversely the efficiency of sedimentation. Normally the temperature of domestic and municipal sewage is slightly higher than that of the water supply.

f) Hydrogen Ion concentration:

The hydrogen ion concentration, more conveniently expressed as pH, is a valuable parameter in the operation of biological units. The pH of fresh domestic sewage is slightly more than that of the water supply to the community. However, the onset of septic conditions may lower the pH while the presence of industrial wastes may produce extreme fluctuations.

g) Colour and Odour:

Fresh domestic sewage has a slightly soapy and earthy odour and cloudy appearance depending upon its concentration. With

passage of time, the sewage becomes stale, darkening in colour with a pronounced smell due to microbial.

h) Solids:

Though sewage contains only 0.1 percent solids, the rest being water, still the nuisance caused by the solids cannot be overlooked, as they are highly putrescoble and therefore need proper disposal. The sewage solids may be classified into suspended and dissolved fractions which may be further subdivided into volatile and non-volatile solids. Knowledge of the volatile or organic fraction of solid which is putrescible becomes necessary as this constitutes the load on biological treatment units or oxygen resources of a stream when sewage is disposed of by dilution. The estimation of suspended solids, both organic and inorganic, gives a general picture of the load on sedimentation and grit removal processed in sewage treatment. Dissolved inorganic fraction is to be considered when sewage is used for land irrigation or reuse of sewage is planned.

i) Nitrogen:

The principal nitrogenous compounds in domestic sewage are proteins, amines, amino-acids and urea. Ammonia nitrogen in sewage results from the bacterial decomposition of these organic constituents. Nitrogen being an essential component of biological protoplasm, its determination in waste is necessary for proper biological treatment or land irrigation. Where nitrogen content is inadequate, it becomes necessary to supplement with addition of salts containing nitrogen. Generally domestic sewage contains sufficient nitrogen, to take care of the needs biologic treatment.

j) Phosphorus:

Phosphorus is contributed to domestic sewage from food residues containing phosphorus and their breakdown products. The use of increased quantities of synthetic detergents add substantially to the phosphorus content of sewage. Phosphorus just as nitrogen is an essential nutrient for biological processes. Generally domestic sewage contains adequate quantities of phosphorus.

k) Chlorides:

Concentration of chlorides in sewage above the normal chloride content of water supply is used as an index of the strength of the sewage. The daily contribution of chlorides averages to about 8 gm per person. Based on an average sewage flow of 150 lpcd, this would result in the chlorides content of sewage being 50 mg/l higher than that of the water supplied. Any abnormal increase should indicate discharge of chloride bearing wastes or saline ground water infiltration, the latter

adding to the sulphates which may lead to excessive generation of hydrogen sulphide.

l) Biochemical Oxygen Demand:

The Biochemical Oxygen Demand (BOD) of sewage or of polluted water is the amount of oxygen required for the biological decomposition of biodegradable organic matter under aerobic conditions. The oxygen consumed in the process is related to the amount of decomposable organic putrescibility of the sewage is to be determined. The standard BOD test is carried out for a period of 5 days at 20o C and is expressed as BOD5.

m) Chemical Oxygen Demand:

The Chemical Oxygen Demand (COD) test gives a measure of the oxygen required for chemical oxidation. This does not differentiate between biologically oxidisable and non-oxidisable material. However, the ratio of the BOD does not change significantly for a particular waste and hence this test could be used conveniently for interpreting performance efficiencies of the treatment units. In situations where the presence of toxic materials is likely to interfere with the BOD, this test is very useful.

Contract Rates:

The Contract rates and prices shall be deemed to include all labour, materials, equipments, temporary works and buildings, insurance, all taxes including GST, tolls and duties, establishment charges, profit, supervision, transport, testing and other charges and fees and other incidental expenses that may be incurred for proper execution, completion and maintenance of the works, and shall include for all obligations imposed upon him by the specifications, schedules and drawings pertaining to the work.

Place of Manufacture and Inspection:

The Bidders shall state in his tender the place of manufacture and inspection of the Sewage Treatment Plant-300 KLD offered in the tender. The Shrine Board or his duly authorized representative/Agency shall have access to the supplier's work place at any time during working hours for the purpose of inspecting the manufacture of the Sewage Treatment Plant-300 KLD and the supplier shall provide all necessary facilities for such inspection. No supplies unless otherwise directed shall be dispatched without prior inspection and approval by the Shrine Board and the charges on account of inspection shall be borne by the supplier.

Guarantee and Defects Liability:

All Works covered by this contract shall be guaranteed by the Contractor against faulty material and workmanship for a period of 12 months

from the date of successful commissioning and handing over to the Unit-In-Charge to his entire satisfaction. Any part found defective shall be replaced free of all costs by the contractor. If performance of equipment during guarantee period is not satisfactory, the guarantee period shall be extended for further periods as decided by the General Manager (WORKS), considering the time taken to achieve satisfactorily performance.

Warranty:

Bidder shall be fully responsible for the manufacturer's warranty in respect of proper quality and workmanship of all the components of Sewage Treatment Plant-300 KLD etc. covered by the tender for a period of 12 months from the date of satisfactory installation of the Sewage Treatment Plant-300 KLD equipment. The provision for extended warranty with terms and conditions thereof, if any, may also be specifically mentioned.

The supplier shall be responsible to replace free of cost (including transportation and insurance expenses) to the Shrine Board, whole or any part of supplies which under normal and proper use becomes dysfunctional within one week from the Shrine Board Lodging such a complaint or informing the supplier in this regard. This agreement will be valid for the entire maintenance period of 5 years.

In case the supplier fails to rectify / replace the defective / damaged STP equipment including transit damages, shortage within one week from the date of intimation of such shortage / damages, it shall have to pay penalty @ 5% per month on the value of such materials and such amount equal to penalty shall be deducted from the Annual operation and maintenance charges payable to the successful Bidder, by the Shrine Board.

Permits & Licenses:

The successful bidder shall obtain all permits and/ or licenses, as required for any part of the work from Government authorities (State/ Central) including JKPCB and SASB to pay any and all the fees required for the same.

Insurance:

The contractor shall insure all equipment, materials, machinery and installations as a whole until successful completion and handing over to the Unit-In-Charge. Insurance policy should cover for all kinds of erection risks, fire, theft, or loss in transit. All workers and third party shall be insured in accordance with the Workmen Compensation Act in the event of an accident.

Operation & Maintenance:

1. Sewage Treatment Plant-300 KLD shall be maintained by the successful Bidder to the entire satisfaction of the Shrine Board for a period of five years after the installation and successful commissioning.

Bidder shall specifically spell out the arrangements envisaged for carrying out the maintenance of the plant. The supplier shall however execute a separate agreement with Shrine Board for the maintenance of Sewage Treatment Plant-300 KLD.

2. The successful bidder shall ensure proper functioning of the system as a whole during the maintenance period of five years, which shall begin on the date of actual commissioning of the plant. All preventive/routine maintenance and breakdown/corrective maintenance required for ensuring maximum uptime shall have to be provided by the successful Tenderer.
3. The preventive/routine maintenance shall be undertaken by the successful Tenderer on regular basis. The maintenance record shall be properly maintained and submitted from time to time to the Shrine Board. In case, the routine visit is not conducted as per the mandated schedule, suitable penalty shall be imposed for each such deviation and the same shall be debited from the amount payable under Annual maintenance contract.
4. In respect of breakdown/corrective maintenance, whenever a complaint is lodged by the Shrine Board, the successful Tenderer shall attend to the same within a reasonable period of time (03 days) and in any case the breakdown shall be corrected within a period not exceeding 07 days from the date of lodging of complaint, failing which suitable penalty on per day basis shall be imposed by the Shrine Board, which shall have to be paid by the firm, failing which it shall be recovered from the Annual maintenance charges.
5. If the system is found damaged/defective due to non-maintenance, the cost for correcting the breakdown system will be deducted from the payment chargeable under Annual maintenance contract.
6. Successful Bidder shall provide all necessary manpower including skilled and unskilled labor, consumables, chemicals etc. as required for the complete operation and maintenance as per requirements.
7. Experience, Qualification and minimum staff required for O&M: For all O&M work, the successful Bidder shall provide skilled staff who have adequate qualifications and sufficient experience of similar works. O&M personal to be provided by the successful Bidder shall be suitably qualified & the successful Bidder will get their CV resume duly vetted by the competent authority of Shrine Board before engaging them. The contractor shall include the availability of the minimum man power throughout the Yatra period in his quoted rates for O&M of the plant.
8. Company shall get the final test reports done from an approved External Testing agency on monthly basis for the influent and effluent

quality, suitable to ensure proof that the entire Plant is running satisfactorily.

9. The Chemicals and reagents required for testing will be arranged by the successful Bidder from his own sources. The contractor will employ its own staff for testing purpose. However, the Shrine Board will be at liberty to get random sampling and testing done on its own or from any other agency.
10. The successful Bidder has to ensure maximum of cleanliness in the operation and maintenance of the plant. At any time, the plant, its equipment and its surroundings have to be kept clean and proper failing which a suitable penalty will be levied which shall be equivalent to per day Operation and maintenance charges to be recovered from the Annual Maintenance Contract.

Earnest Money Deposit:

1. The Bidders should submit an EMD of Rs.5,00,000/- (Rupees Five Lakh Only) in the form of CDR pledged to the Chief Accounts Officer, Shri Amarnathji Shrine Board, Chaitanya Ashram, Talab Tilloo, Jammu. There shall be no relaxation/ concession to any Unit/Agency whatsoever in regard to the amount of EMD to be paid.
2. EMD should be included along with the Technical Bid in the cover containing Technical Bid as the Technical Bid will be opened first. The Bidders should NOT include EMD in the cover containing Financial Bid. If the EMD is not found in the cover containing Technical Bid, the tender will be rejected.
3. Tenders received without enclosed EMD in the cover containing Technical Bids will be summarily rejected. EMDs other than in the form of CDR will not be accepted and the tenders with EMD in the form of other than CDR Draft will be summarily rejected. The EMD amount will not bear any interest. The Shrine Board will not entertain any request for adjusting the EMD from the tender due / running bills or from the EMD / Security Deposit of / for any other Bidders. In case of withdrawal of tender by the Bidders within the Validity period of the offer or before finalization of the order, the EMD amount paid will be forfeited.
4. The earnest money of the Bidders shall be forfeited if they withdraw their tender or raise the price of their offer within the validity period. The earnest money shall also be forfeited in case of the Bidders who do not comply with the purchase order placed on them within the validity period of the offer or violate any terms and conditions contained herein, for this purpose purchase order shall be deemed to have been placed from the date of letter of intent.

5. Earnest money deposited shall be released in favour of the unsuccessful Bidders(s) within one month after finalization of the order.

Security Deposit:

1. The CEO/ Addl. CEO, SASB may award the Contract to the Bidder whose bid has been evaluated to be responsive and who is eligible and qualified to perform the Contract satisfactorily as per Terms and Conditions incorporated in the DNIT. The CEO/ Addl. CEO, SASB will send to such eligible bidder a letter (hereinafter referred to as the 'Letter of Intent') prescribing the amount which the Shrine Board intend to pay to the eligible bidder in consideration of work/ services to be executed by the Contractor as prescribed in the DNIT.
2. The eligible Bidders shall furnish security deposit equivalent to 10% (ten percent) of the value of the contract in the form of Bank Guarantee from Nationalized/ Scheduled Bank pledged to the Chief Accounts Officer, Shri Amarnathji Shrine Board, Chaintanya Ashram, Talab Tillu, Jammu valid upto the end of Maintenance Contract period of five (05) years. Such security deposit shall be furnished within ten days from the date of receipt of Letter of Intent (LOI). Failure to do so within the stipulated period will make the contract liable for cancellation together with forfeiture of the E.M.D at the discretion of Chief Executive Officer, Shri Amarnathji Shrine Board. The EMD of the successful Bidders of the contract could also be adjusted as security deposit subject to its validity.
3. The eligible bidder after furnishing the prescribed Security Deposit (SD) will have to enter into an Agreement with the Shrine Board as per the Terms and Conditions mentioned in the DNIT or such other terms that may be prescribed, within a period of fifteen days from the date of receipt of 'Letter of Intent'.

4. On the receipt of Security Deposit and execution of Agreement with the SASB within the stipulated time, the Letter of Award (LoA) shall be issued in favour of the eligible bidder.

5. Chief Executive Officer, SASB reserves the right to reject all or any of the bids in whole, or in part, without assigning any reason. Any enquiry after the submission of Tender will not be entertained

Payment Terms:

1. 5% of Project Cost against submission and approval of all shop drawings including procedures and deliverables mentioned in the scope of the work namely Pre-delivery Inspection and design validation, Method Statement, etc. and to be released on a prorata basis on the satisfaction of Unit In-charge, SASB.

2. 60% of Project Cost on prorata basis after delivery of material and equipment at site (No part shipment of a full equipment will be entertained for payment)
3. 10% of Project Cost on prorata basis against installation at site to the satisfaction of Unit In-charge, SASB.
4. 15% of Project Cost on Testing & Commissioning.
5. 10% of Project Cost on final submission of all claims/ bills, drawing including O&M manuals, maintenance charts, training manpower of the client etc. to the satisfaction of SASB and securing necessary approval from the Shrine Board including obtaining all the licenses and approvals from statutory authorities/ bodies.

Escalation

No escalation either on material or labour (market or statutory) shall be allowed during the currency of this contract.

Penalty

In case of failure on the part of the Bidders to install & commission the Sewage Treatment Plant-300 KLD and execute the work in full or part thereof within the delivery schedule stipulated in the award of work, a penalty @ 0.5% (half percent) per week of unfinished work subject to a maximum of 10% (five percent) of the cost of unfinished portion of the contract shall be levied at the discretion of the Shrine Board.

Prices, Taxes & Levies Etc:

1. Prices quoted must be firm and FOR work site and it should include all the components of all taxes, local levies (entry tax and toll tax payable at Lakhanpur), prices for transit insurance, freight, installation, etc. at destination site, discount, if any, should be shown separately while quoting rates per unit.
2. GST or any other tax chargeable at present rates shall be borne by the Bidders.

Validity of the offer

The Tender should be unconditionally valid for a period of 120 days. Quoted prices shall be fixed and not fluctuating with the market price. The rates approved as per the NIT would be valid for further contract during the validity period.

Jurisdiction

All questions, disputes, or difference arising under and out of, in connection with the contract, if concluded, shall be subject to the jurisdiction of Courts at Srinagar(J&K), India only.

Agreement:

The successful Bidder shall be required to execute an agreement (within a period of 15 days from receipt of “Letter of Intent”) on a valid stamped paper for strict compliance of the terms and conditions of the contract, vis-à-vis the NIT, after providing of Security deposit within a period of 10 days from receipt of ‘Letter of Intent’ by him after the placement of order. The Bidder shall bear the legal expenses, which shall be incurred on the execution of the agreement.

Addl. Chief Executive Officer
Shri Amarnathji Shrine Board

SHRI AMARNATHJI SHRINE BOARD
(Established under Act No. XVIII of 2000 passed by J&K Legislature)
Chaitanya Ashram, Talab Tillo, Jammu (Nov-April)
Tele: 0191-2555662, Telefax: 0191-2503399
Email address: sasbjk2001@gmail.com, website: www.shriamarnathjishrine

SCHEDULE –A

S. No.	Particular / Criterion		
1	Name of the Firm Organization with complete details, including Address (Telephone No./ Contact Mobile No. / Fax No. / E-mail) along with brief description of background (The background may be as a separate).	:	
2	Date of establishment of the Firm. Details of Registration No. of the firm/ company. Location of Head Office, Regional Office and Branch Office.	:	
3	Please specify whether you are submitting your tender as a proprietor of the firm or as a partner of the firm or Director of the Company.	:	
4	Name of the Proprietor / Partner / Directors of the tendering firm / Company together with technical qualifications. Organization Charts, Manpower Strength and details of key personnel.	:	Attached / Not Attached
5	Past experience in the field along with performance certificates (please enclose testimonials / documentary evidence)	:	Attached / Not Attached
6	Annual turnover in the last three years as per audited balance sheet, a copy whereof to be enclosed along with profit and loss account statements.	:	Attached / Not Attached
7	a) PAN (proof to be enclosed) b) ITR statements / Income Tax Assessment Order (for the last 03 years to be enclosed) c) GST Registration No.	:	Attached / Not Attached
8	Detail of EMD (in form of CDR / FDR only)	:	Amount: Name of issuing Bank: Date of issue
9	Duration of validity of Bid	:	
10	Does the Bidders owe by himself or by proxy or on behalf of any other person any		Yes/ No

	money / due in connection what so ever to the Shrine Board.	:	
11	GST Registration Number (attach copy)	:	
12	Tender Fee ` …….	:	Shrine Board Receipt No. & date _____ Or DD No. _____ dated _____ Bank _____ Payable at_____
13	Attested copy of valid BIS Certificate attached or not:	:	
14	Literature / leaflets on products	:	Attached / not attached
15	Copy of Certificate,	:	Attached / not attached
16	Authenticate Photostat copies of test certificates from	:	Attached / not attached
17	Any other documents / information required to be provided as per terms and conditions and requirements of the tender document (indicate item wise)	:	Attached / not attached

I certify that I am authorized to furnish the information given in the Schedule-A on behalf of the firm I represent and that it is true to the best of my knowledge and belief

Signature of Bidder_____

Name of the Firm & Address _____

_____

_____

_____

SHRI AMARNATHJI SHRINE BOARD
(Established under Act No. XVIII of 2000 passed by J&K Legislature)
Chaitanya Ashram, Talab Tillo, Jammu (Nov-April)
Tele: 0191-2555662, Telefax: 0191-2503399
Email address: sasbjk2001@gmail.com, www.shriamarnathjishrine

Tender document for: Survey, Design, Supply, Installation, Commissioning, Testing, Operation and Maintenance (Five years) of Sewage Treatment Plant based on Moving Bed Bio Reactor Technology (MBBR) of 300 KLD Capacity complete in all respects to cater the requirement of Yatra Base Camp Nunwan of Shri Amarnathji Shrine Board.

NIT No.: _____
Dated : _____

Cost of Tender Document : Rs.1500/-

Receipt No. & Date: _____

Issued to M/s _____against Demand Draft for an amount of Rs._____ drawn vide No._____ dated_____.

Authorized Signatory

SHRI AMARNATHJI SHRINE BOARD
(Established under Act No. XVIII of 2000 passed by J&K Legislature)
Chaitanya Ashram, Talab Tillo, Jammu (Nov-April)
Tele: 0191-2555662, Telefax: 0191-2503399
Email address: sasbjk2001@gmail.com, www.shriamarnathjishrine

SCHEDULE–'B'
Financial Bid

Name of the Tender: _____

NIT No. with Date: _____

CDR/FDR Details: _____

The Addl. Chief Executive Officer,
Shri Amarnathji Shrine Board,
Jammu (J&K)

Sir,

I _____S/o Shri _____ R/o_____ in capacity as Proprietor of a firm/ Partner of a firm/ Director of Company, hereby submit my tender for the Survey, Design, Supply, Installation, Commissioning, Testing, Operation and Maintenance (Five years) of Sewage Treatment Plant based on Moving Bed Bio Reactor Technology (MBBR) of 300 KLD Capacity complete in all respects to cater the requirement of Yatra Base Camp Nunwan of Shri Amarnathji Shrine Board for an amount mentioned below:-

S. NO.	Description of Component of Project		Amount
1	Kitchen waste Treatment Plant	B-1	
2	Sewage Treatment Plant	B-2	
3	ELECTRICAL PANEL	B-3	
4	Operation & Maintenance for Yatra Period- 5 years	B-4	
5	Complete Shutdown of STP after Yatra & overhauling maintenance Oiling, Commissioning before next Yatra – for 5 years	B-5	
	Total Cost		

Total Cost Rs._____(L/s Amount)
(in words)

I affirm that the rates offered are inclusive of all taxes, duties, freight, insurance, carriage, etc. I further affirm that I have read and fully understood the tender notice and agree to abide by all the terms and conditions laid therein, which are being signed in token of my acceptance.

Signature of Bidders _____

Signature of Block Letters _____

Name of the Firm & Address _____

PRICE BID FOR ELECTRO - MECHANICAL EQUIPMENT, PIPING & VALVES ETC.

B-1. Kitchen waste Treatment Plant

S. No.	Description	Tentative (Qty to be specified by vendor)	Rate	Price
SHRI AMARNATHJI SHRINE BOARD				
1	**Coarse Screen (Bar Screen)**			
	Remove coarse material in the water by screen interception to protect the pipes and pumps from tearing and wearing.			
	Quantity	1 No.		
	Size	1.0 m x 1.0 m		
	MOC	SS 304		
	Bar Spacing	12 - 16mm		
2	**Basket Screen**			
	Remove fine material in the water by screen interception to protect the pipes and pumps from tearing and wearing.			
	Quantity	1 No.		
	Size	1 m x 1 m x 1 m		
	MOC	SS 304		
	Mesh Size	8 - 10mm		
3	**Kitchen Waste Lifting Pumps**			
	Providing & fixing centrifugal non-clog sewage handling type pump for raw sewage transfer from collection sumps to combined STP. The pump shall have complete CI construction, TEFC induction motor including pressure gauge, lifting arrangement for the pump, all necessary piping, valves, level controller, probes, cable etc. and other accessories as required			
	Make	KSB / CNP		
	Nos.	2 nos. (1W + 1S)		
	Type	Submercible cutter type		
	Discharge of Each Pump	4 m3 / Hr		
	Head	Min. 15-20 Metre		
	RPM	As required		
	Particle handling	8-10mm		
	Power requirement	As required		
4	**MCC for Kitchen Waste Lifting Pumps**			
	Supply, installation testing and commissioning of electrical panel, front accessible only, free floor standing conforming to minimum IP-55 degree of protection. All incomings/outgoings shall be arranged in modular compartments. The panel steel structure shall undergo several tanks pre-treatment process before painting. The sheet steel shall be all of 2.0 mm thick CRCA sheet. All the operable compartments of the panel shall be completely shrouded, provided with padlocking arrangement on all compartments including bus bar and cable alley chambers.			
	Make	As per contractor		
	Nos.	1 No.		
	Type	IP-55		
	Rating	As per Pumps		
	Total B-1			

B-2. Sewage Treatment Plant

PRICE BID FOR ELECTRO - MECHANICAL EQUIPMENT, PIPING & VALVES ETC.				
S. No.	**Description**	**Tentative (Qty to be specified by vendor)**	**Rate**	**Price**
SHRI AMARNATHJI SHRINE BOARD				
1	**Coarse Screen**			
	Remove coarse material in the water by screen interception to protect the pipes and pumps from tearing and wearing.			
	Quantity	1 No		
	Size	0.6 m x 0.6 m		
	MOC	SS 304		
	Bar Spacing	12 - 16mm		
2	**Fine Screen**			
	Remove coarse material in the water by screen interception to protect the pipes and pumps from tearing and wearing.			
	Quantity	1 No		
	Size	0.6 m x 0.6 m		
	MOC	SS 304		
	Mesh Size	8-10mm		
3	**Sewage Transfer Pumps**			
	Providing & fixing fully submersible, centrifugal non-clog sewage handling type pump for raw sewage transfer from collection sump to MBBR Reactor. The pump shall have complete CI construction, TEFC induction motor including pressure gauge, lifting arrangement for the pump, all necessary piping, valves, level controller, probes, cable etc. and other accessories as required			
	Make	KSB		
	Nos.	2 nos. (1W+1S)		
	Type	Submersible		
	Discharge of Each Pump	15 m3 / Hr		
	Head	15 Metre		
	RPM	As required		
	Particle handling	20mm		
	Power requirement	As required		
4	**Anoxic Tank with Cover & Vent Pipe with Mosquito Proofing**			
	Quantity	1 Nos		
	Size	Dia 2.1M x 4.6M + 0.4M FB		
	Capacity	15.92 M^3		
	MOC	MS 5mm Thick		

	Surface Protection	Inside: FRP (3mm thick), Outside: Epoxy		
5	**MBBR Reactors with Cover & Vent Pipe with Mosquito Proofing**			
	Quantity	2 Nos		
	Size	Dia 3.5M x 4.5M + 0.5M FB		
	Capacity	43.27 M^3 (Each)		
	MOC	MS 5mm Thick		
	Surface Protection	Inside: FRP (3mm thick), Outside: Epoxy		
6	**Secondary Tube Settler with MS Grating**			
	Quantity	1 No.		
	Size	3.2M x 3.4M x 1.8M + Hopper		
	Surface Area	10.88 M^2		
	MOC	MS 5mm Thick		
	Surface Protection	Inside: FRP (3mm thick), Outside: Epoxy		
7	**Clear Water Tank with Cover**			
	Quantity	1 No.		
	Size	Dia 3.2M x 3.85M + 0.5M FB		
	Capacity	30.94M^3		
	MOC	MS 5mm Thick		
	Surface Protection	Inside: FRP (3mm thick), Outside: Epoxy		
8	**Submersible Mixer for Anoxic Tank**			
	Providing, Fixing and Installation of Submersible Mixer along with the lifting mechanism and its adjustment at various level.			
	Make	ABS / unolex		
	Nos.	1 Nos.		
	Power requirement	as contractor		
	RPM	As required		
9	**Air Blower**			
	Provide the air to Aeration Tank and Sludge Thickener			
	Make	Everest / Beta		
	Nos.	2 Nos. (1 Working + 1 Standby)		
	Power requirement	as contractor		
	Flow	350m3/hr		
	Head	5000 mm WC		
	RPM	As required		
	Type of Enclosure	Acoustic Enclosure		

10	**Fine Air Diffusers**			
	The **air diffusers** responsible for the oxygenation to the plant.			
	Make	Rehau		
	Nos.	32		
	Type	Fine Bubble		
	Discharge	Min. 6 m3 / diffuser		
11	**Coarse Air Diffusers**			
	The **air diffusers** responsible for the oxygenation to the plant.			
	Make	Rehau		
	Nos.	40		
	Type	Coarse Bubble		
	Discharge	Min 3-5 m3 / diffuser		
12	**Sludge Recirculation Pumps**			
	Providing and fixing horizontal, centrifugal Sludge disposal pump for the disposal of sludge to tanker or to sludge dry beds. The pumps shall have CI casing, CI shaft & sleeve with mechanical rotary shaft seal connected by a flexible tier type coupling to TEFC induction motor mounted on a common channel base-plate with coupling guard, 150 mm dia pressure gauge with GM isolation cock, suitable vibration eliminator pads of approved design. Motor to be suitable for including all necessary piping, valves and other accessories and concrete foundation complete as required			
	Make	Kirloskar / Johnson		
	Nos.	2 Nos. (1 w+ 1s)		
	Type	Centrifuge, Self Priming		
	Discharge	7 M3/hr		
	Head	10 mtr		
	Particle handling	25-40 mm		
	Power requirement	As required		
13	**Filter Feed Pumps**			
	Providing and fixing horizontal, non clog, centrifugal filter feed pump. The pumps shall have CI casing, CI shaft & sleeve with mechanical rotary shaft seal connected by a flexible tier type coupling to TEFC induction motor mounted on a common channel base-plate with coupling guard, 150 mm dia pressure gauge with GM isolation cock, suitable vibration eliminator pads of approved design. Motor to be suitable for including all necessary piping, valves and other accessories and concrete foundation complete as required			
	Make	Kirloskar / Johnson		
	Nos.	2 Nos. (1 w+ 1s)		

	Type	Centrifuge, Self Priming		
	Discharge	18 M3/hr		
	Head	30 mtr		
	Power requirement	As required		
14	**Multi-grade Sand Filter Column**			
	Providing and fixing vertical Multi-grade Media Pressure Filter fabricated from high performance M.S plate of minimum 6mm thick for shell & 8mm thick for dished ends (Quality of Steel as per IS: 2062 Grade B, thickness as per ASME Section 8, with supporting calculations from vendor) internally treated with epoxy, complete with initial charge of media, M.S face piping, valves, accessories, external painting with 2 coats of red oxide primer and enamel paint, testing and commissioning complete. (Tested to 5.0 Kg/m2)			
	Flow	Down Flow		
	Type	Strainer Type		
	Nos	1		
	Size	Dia 1.2M x 1.5M Height		
	MOC of vessel	MSEP		
	Media	Sand, Gravel		
15	**Activated Carbon Filter Column**			
	Providing and fixing vertical Activated Carbon Filter fabricated from high performance M.S plate of minimum 6mm thick for shell & 8mm thick for dished ends (Quality of Steel as per IS: 2062 Grade B, thickness as per ASME Section 8, wtih supporting calculations from vendor) internally treated with epoxy, complete with initial charge of media, M.S face piping, valves, accessories, external painting with 2 coats of red oxide primer and enamel paint, testing and commissioning complete. (Tested to 5.0 Kg/m2)			
	Flow	Down Flow		
	Type	Strainer Type		
	Nos.	1		
	Size	Dia 1.2M x 1.5M Height		
	MOC of vessel	MSEP		
	Media	Activated Carbon		
16	**Ozone Dosing System**			
	Supply, installing, testing & commissioning of Ozone Doing System having High Barrier Quartz Electrode to give high concentration ozone and high Operating life with •Venturi Ozone dosing system for better Ozone mixing			
	Ozone Output	100 gms/hr		
	Nos.	1 No.		
	Cabinet MOC	M S Powder Coated		
	Electrode	SS 316 Outer Electrode		

	Dielectric	High Barrier Quartz		
	Transformer	Ferrite Based Oil Cooled		
	Electrical	230 V 50 Hz Single Phase		
	Oxygen Flow Switch	To Cut off Ozone if no oxygen flow.		
	Make	AM Ozonics/Ozone Engineer / Creative		
17	**Piping & Valves**			
	Providing and fixing all piping (as described below) and isolation contro valves for making the system complete.			
	MS Epoxy (Class 'B')	All piping before chlorine contact tank.		
		Non submerged air piping.		
	GI / PVC Piping (Class 'C')	All piping after filter feed pump.		
	Material	G.I./MS/PVC		
	Make	Tata/Jindal		
	Class	Class 3		
18	**Electromagnetic Flow Meter**			
	Quantity	2 Nos. (Inlet & Outlet)		
	Line Size	As per Requirement		
	Make	Forbes Marshall / ABB		
19	**MBBR Media**			
	Quantity	25 M^3		
	Type	Floating		
	MOC	PVC		
	Make	MM Aqua / Cooldeck / Bharat		
20	**Tube Settler Media**			
	Quantity	7.5 M^3		
	Type	Hexagonal Tube Media		
	MOC	PVC		
	Make	MM Aqua / Cooldeck / Bharat		
	Total B-2			

B-3. ELECTRICAL PANEL WITH WIRING FOR STP

S. No.	Description of Material	Qty	Rate	Price
SHRI AMARNATHJI SHRINE BOARD				
1	Supply, installation testing and commissioning of electrical panel, front accessible only, free floor standing conforming to minimum IP-55 degree of protection. All incomings/outgoings shall be arranged in modular compartments. The panel steel structure shall undergo several tanks pre-treatment process before painting. The sheet steel shall be all of 2.0 mm thick CRCA sheet. All the operable compartments of the panel shall be completely shrouded, provided with padlocking arrangement on all compartments including bus bar and cable alley chambers.	**1**		
	The panel designed shall not exceed 2200 mm and the maximum operating height for any switchgear shall not be more than 1600 mm. The panel shall be provided with minimum 75 mm base channel frame fabricated from ISMC sections. All bus bar links in the panel shall be solid bus bars with coloured PVC shrinkable sleeves. No wires will be acceptable. Continuous earth bus shall run all round the panel with earthing studs provided at minimum 2 places. The control wiring shall be carried with min. 2.5 mm2 copper wires and shall be adequate for remote operation of the starters.			
	All MCCBs shall be provided with rotary handles and minimum fault rating of MCCB shall be 25 KA. Proper sized cable termination gland plates shall be provided on cable alleys and knock outs for same shall be provided at fabrication stage itself. A 5A socket service outlet (single phase shall be provided in one of the compartments as service outlet in the panel. Panel shall be so designed as to have min. 20% spare feeders/space. Panel shall undergo epoxy powder coating with required color shade. All cable terminations shall be from top/bottom. All starters more that 10 HP shall be star delta type. All bus bars shall be of aluminum, electrolytic grade only. Maximum design density shall not exceed a 0.8 amps/mm2. All bus bars shall be insulated with coloured heat shrinkable PVC sleeved. All bus bar supports shall be SMC supports.			
	The panel shall be manufactured in conformance to requirement of local electricity board.			
	Incoming Section :			
	One (1) No. suitable rating, TPN MCCB (25 kA) with over current over/under voltage & earth fault protection.			
	One (1) No. suitable rating, ammeter with ammeter selector switch & required CTs.			
	One (1) No. 0-500 V, voltmeter with voltmeter selector switch & required control fuses.			

	RYB phase indication Lamps with control fuses.			
	One (1) No. earth leakage relay with multi-trip settings and suitable CBCT.			
	One (1) No. energy meter, digital panel mounted type.			
	One (1) Set 8 nos. window annunciator with hooter, Acknowledge, reset, test push buttons. Provision shall be made to Acknowledge the system from remote with sufficient nos. of NO/NC contacts.			
	Bus bar :			
	Set of suitable rating aluminum bus bar suitable for 415 V.			
	Outgoing feeders:			
	Air Blowers			
	Sewage Transfer Pumps			
	Sludge Recirculation Pumps			
	Filter Feed Pumps			
	Chlorine dosing system			
	Spare Feeders			
	Note :			
	All wiring from Control Panel to all electrical equipments with STP/ETP plant area is included in contractor scope.			
	All starter (DOL & star delta starter) shall be provided with auto/manual switch, over load relay with single phase preventing feature, ON/OFF/TRIP indication lamps, ON/Off push buttons, contactors suitable for remote/local operation, contacts for building automation system, indication & spare potential free contacts, level controllers level switches etc. as required. All wiring from Panel to all equipment for STP are included.			
	Total Inclusive of all taxes/Transportation/Erection and commissioning of the plant (B-3)			

B-4. **OPERATION & MAINTENANCE PERSONNEL FOR YATRA PERIOD**

OPERATION & MAINTENANCE PERSONNEL			
S. No.	**Description**	**SASB Recommendation**	**As per Contractor's Offer**
1	Lab-in-charge	1 No. Qualified chemist with minimum 5 years experience in handling chemicals (one fulltime shift per day)	
2	Supervisor	1 Nos. experienced STP-in-charge with minimum 3 years experience (3 fulltime shifts per day for 24 hour operations)	
3	Operators	2 Nos. Operator in day shift with 1 in each shift for 24 hour operations	
4	Cost and carriage of consumables ,TNP	Per day (24 hrs)	
	Total Cost per day		

Total cost for O&M for 5 Years Operation (during Yatra period) Inclusive of Service Tax (B-4)				
S. No.	**YEAR**	**Expected No. Of Yatra period (days)**	**Rate per day**	**As per Contractor's Offer**
1	2018	70		
2	2019	60		
3	2020	51		
4	2021	67		
5	2022	55		
	Total cost for O&M for 5 Years			

B-5**. Complete Shutdown of STP, flushing, cleaning, drying, decommissioning, proper covering of STP after Yatra & Overhauling maintenance Oiling, Commissioning before next Yatra**

S. No.	**Description**	**As per Contractor's Offer**
1	Complete Shutdown of STP (decommissioning) including flushing, cleaning, drying, proper Covering of STP after Yatra - 2018 (Complete Job)	
2	Overhauling maintenance Oiling, Commissioning before next Yatra 2019 (Complete Job)	
Total Decommissioning after Yatra - 2018 & Commissioning before next Yatra - 2019		
Total decommissioning and commissioning for 5 years (B-5)		

SPECIFICATION FOR PIPING WORK

1.0 SCOPE OF WORK

Work under this section consists of furnishing detailed designing, labor, materials and necessary equipment required to provide all piping valves and other appurtenances for the treatment plant.

Without restricting to the generality of the foregoing, the piping work shall consist of:-

- All gravity pipes between various units.
- Pressure pipes from pumps to aeration tank, treated effluent disposal.
- All other pipes, valves and control gates necessary and required.
- All piping shall be of suitable material/make, to be as per the approval of the Unit-In-Charge.

2.0 PIPES (FOR TREATMENT PLANT)

a. All pipes under pressure / gravity shall be cast iron double flanged pipes class "A", conforming to I.S. 1537 or S&S C.I. pipe to I.S.1536 class LA.

b. Fittings for double flanged and S/S pipes shall conform to I.S: 1536.

c. Sluice valves shall be non-rising type spindle with wheel conforming to I.S: 780 of reputed make e.g. Kirloskar.

d. Pipes, fittings and valves shall be jointed with 3mm thick rubber gasket conforming to I.S: 638 and units and bolts S/S pipes shall be jointed with refined pig lead Tyton joints.

e. Pipes shall be laid true to level and gradient and properly supported by brick masonry or concrete pillars at appropriate places.

f. If required the pipes can be fabricated from heavy duty M.S Black pipes and then painted, as per required specifications.

g. All pipes shall be tested to a hydrostatic pressure 100 psi. for at least 30 minutes without any leakage.

3.0 VALVES

Valves for effluent outlet shall be 80mm and sludge outlet shall be 100mm dia. Both valves in each unit shall cast iron butterfly valves manually operated. **Other valves necessary and required shall be standard cast iron full way valves.**

4.0 SPECIFICATION FOR MECHANICAL EQUIPMENT

4.1 SCOPE OF WORK

Work under this section shall consist of providing detailed design, labor, materials and equipment necessary and required to provide all mechanical equipments for the treatment plant. All the works shall conform to the list of Indian Standards on Sewerage and Sewage treatment as stand enclosed in the annexure

5.0 GENERAL

All Mechanical Equipment shall be provided with proper protection from the external environment, in the form of coverings, tin-sheds etc.

6.0 DIFFUSED AERATION

Diffused aeration is an efficient way to transfer oxygen to a water body. A compressor on shore pumps air through a hose, which is connected to an underwater aeration unit. Attached to the unit are a number of diffusers. These diffusers come in the shape of discs, plates, tubes or hoses constructed from glass-bonded silica, porous ceramic plastic, PVC or perforated membranes made from EPDM (ethylene propylene diene Monomer) rubber. Air pumped through the diffuser membranes is released into the water. These bubbles are known as *fine bubbles*. The EPA defines a fine bubble as anything smaller than 2mm in diameter. This type of aeration has very high oxygen transfer efficiency (OTE). On average, diffused air aeration diffuses approximately 2–4 cfm (cubic feet of air per minute).

Fine bubble diffused aeration is able to maximize the surface area of the bubbles and thus transfer more oxygen to the water per bubble. Additionally, smaller bubbles take more time to reach the surface so not only is the surface area maximized but so are the number of seconds each bubble spends in the water, allowing it more time to transfer oxygen to the water. As a general rule, smaller bubbles and a deeper release point will generate a greater oxygen transfer rate.

However, almost all of the oxygen dissolved into the water from an air bubble occurs when the bubble is being formed. Only a negligible amount occurs during the bubbles transit to the surface of the water. This is why an aeration process that makes many small bubbles is better than one that makes fewer larger ones. The breaking up of larger bubbles into smaller ones also repeats this formation and transfer process.

6.1 **Blowers and Aeration System:**

The treatment plant shall be provided with rotary positive displacement roots type blowers with a common base and a central electric control panel, belt drive system, drip proof induction type electric motors, necessary valves including a pressure release valve and suitable filter and silencing. All piping and related accessories necessary to connect the blowers to the plant air header shall be provided by the plant manufacturer. All air piping from the blower-motor unit to the air header shall be approved steel pipe with malleable iron fittings. Flexible reinforced rubber connecting sleeves shall be provided wherever required. There shall be 100% standby arrangements for blowers.

6.2 **Air Diffusers**

Each diffuser drop-pipe shall be equipped with non- clog fine bubble diffuser of sufficient quantity to keep pressure loss through the drop-pipe assembly to a minimum. The air diffusion devices shall be designed to distribute air to cover the entire length of the tanks and to have efficiency such that an adequate supply of oxygen is maintained in the tanks to treat the effluent load for which the plant is designed.

7.0 SEWAGE RELIFT PUMPS, SLUDGE RECIRCULATION, FILTER FEED PUMPS, FILTERED WATER PUMPS.

(Each type of pumps shall be min. N+1 redundancy (N working + 1 standby)

7.1 Raw sewage re-lift pumps shall be compact, mono-block, dry motor submersible type with non-clog free flow open impellers and with solid handling capacity of required size.

Sludge return, filter feed & soft water pumps shall be horizontal non-clog centrifugal pumps for the required discharge and head and of required specifications. Pump shall be directly connected to an electric motor by means of a flexible coupling and mounted on a common C.I. or M.S. base plate.

7.2 Each sludge return pump shall have a capacity suitable for re-circulating 100% sludge. The second pump shall be a standby.

8.0 CHEMICAL DOSING PUMPS

8.1 Provide chemical dosing pumps complete with plastic suction and delivery piping, solution tank, mixing tank and feed arrangement.

8.2 Pumps shall be complete with motor control center, cabling and connection.

9.0 **PRESSURE FILTER**

Complete Pressure filter with dual filter media of appropriate capacity.

10.0 **ACTIVATED CARBON FILTER**

Complete Activated Carbon filter of appropriate capacity.

11.0 **CHLORINATION UNIT**

Providing gravity feed type chlorination plant working on differential pressure principle. The unit shall include solution tank, one mixing tank and feed arrangement with suitable device to control the dosage.

All fabricated surfaces shall be painted after thoroughly freed from dust and grease and dried with a coat of red oxide primer and three coats of finish paint as per provisions of I.S:1477-1971 and I.S:1477-1971.

12**.** **Specification for Electrical Work**

Work under this section shall consist of providing detailed designing, labour, materials and equipment necessary and required to provide all electrical equipment for the treatment plant.

12.1 Without restricting to the generality of the foregoing the electrical installation work shall consist of:-

(i) Electric motors for all equipment.
(ii) Cabling to all electrical motors.
(iii) Wiring for pumping station and control room.
(iv) Motor control center
(v) Instrumentation
(vi) Internal electrification of all pumps/control rotors.

13.0 **GENERAL**

13.1 All electrical motors and other equipment shall be suitable for 400 volts, 3 phase, 50 cycles or 220 volts, single phase, 50 cycles, A.C., Supply motor 1 H.P. or below shall be single phase. All motors installed in open area must have space heaters and the circuits should have provision for automated operation.

13.2 All motors shall be rated 10% above the required H.P.

13.3 Each motor shall be provided with weatherproof terminal box and motors in exposed conditions shall be provided with suitable removable PVC covers.

13.4 Connections to all motors shall be made with flexible connections with suitable bushes and terminal lugs.

13.5 **All electrical equipment supplied shall conform to relevant Indian or British standards wherever applicable and of**

reputed makes. All items shall be tested at manufacturer's works and certified copies of such tests shall be supplied to the owners.

13.6 All electrical equipment e.g. motors, switchgears, cables etc. shall be of reputed make only approved makes Siemens, NGHP, Crompton, Kirloskar, Indian Cable Company, Cutler and Hammer or Larsen & Turbo.

13.7 All electrical work shall be executed by authorized and qualified persons competent to undertake such works under the rules and regulations of the local electric supply authority.

14.0 MOTORS

Electric motors shall be totally enclosed fan cooled induction type squirrel cage motors conforming to I.S: 325.

Each motor shall be provided with a starter and stop push button switch suitably mounted near each motor. This shall be in addition to the main switchgear provided in the switchboard cubicle. Not required for sludge/effluent pump).

15.0 MOTOR CONTROL CENTRE

Company shall supply and install cubicle type motor control center fabricated from 16 gauge M.S. sheet and angle irons. The cubicle shall be stove enamel painted inside and outside. Provision of space for switchgear for future installations shall be made as specified below:-

The Switchgear shall comprise of:-

- Incoming switch fuse unit of required rating.
- Flush panel mounted voltmeter on incoming main with selector switch for reading voltage between each phase 0-500 volts.
- Bus bar chamber with copper bus bars of required capacity.
- Isolation S.F. Units one for each motor.
- Isolation S.F. Unit for yard lighting circuit 60 amps.
- Isolation S.F. unit for pump house and control room lighting circuit 15 amps.
- Push button operation DOL starters for motors / pumps upto 7.5 H.P. and automatic star-delta starters for motor 7.5 H.P. and above for all motors.
- Space for two starters for future installations.
- One flush mounted Ampere meter for each 3 Phase motor.
- Three phase indicating lamps on incoming main.
- On/Off Neon indicating lamps for each motor.
- All interconnection color-coded wiring from incoming S.F. unit to switches, starters, motors and other accessories. All wiring inside the panel shall be with copper conductors.

- Provision of remote starting (from plant room)

16.0 CABLING

16.1 Company shall supply install and commission all cables from the M.C.C. panel to each motor. Underground cables shall be laid to a minimum depth of 900 or as specified by the Consultant and shall be protected with sand and bricks on top. Cables running on surfaces shall be neatly clipped to aluminum saddles at suitable intervals.

16.2 All cables shall be “Tropodur” PVC sheathed cables of 1100 volts grade conforming to I.S: 1554 part-I. All cabling work shall be as per standard practice in accordance with i.e. rules.

17.0 EARTHING

17.1 Company shall provide two earthing stations independent of each other separated by 3 m from the building.

17.2 Earth plates shall be buried in a pit 1.2x1.2 m wide and at a depth of at least 3 m. below ground level. The connection between main bars shall be made by means of three 5mm brass studs fixed at 100mm centers. The pit shall be filled with coke breeze loose soil and salt. A G.I. pipe 20mm dia. With perforations shall be placed vertically on the periphery to reach to ground level. A manhole of brick masonry 30x30x24 Consultant to surround the pipe shall be provided over the pit for inspection.

17.3 All conduit runs metal clad equipment, main switches, plug, boxes metallic fittings shall have effective earthing using appropriate size of G.I. wire and proper clips to comply with the requirements of the rules.

Wiring:

All wiring shall be in accordance with the relevant Indian Standard. All wire shall be run in continuous lengths from controller to valve. All cable jointing shall be contained in waterproof containers and adequately sealed against moisture penetration with commercially available joiners designed for direct burial. All joints shall be in a valve box. Adequate wire (1000 mm) shall be left at valves during installation to enable future replacement of valves without the need for excessive jointing of wires. Wires shall be laid below or beside the pipe reticulation system in a common trench with the pipes. Wires not in pipe trenches should be in suitably sized heavy duty electrical conduit.