



**Design, Construction, Supply, Erection, Testing & Commissioning of STP
based on Moving Bed Biological Reactor (MBBR) technology of 2.40 MLD capacity
complete in all respects including all contingent Electrical, Mechanical, piping &
instrumentation works at JIPMER, Puducherry**

Request For Proposal – Volume I

Tender no. HLL/ID/14/36

MAY 2014

**HLL LIFECARE LIMITED
Infrastructure Development Division
“Adarsh” TC 6/1781, Vettamukku,
Thirumala Post Office
Thiruvananthapuram-695006**

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DISCLAIMER

HLL Lifecare Limited, India (HLL) has prepared this document as internal consultant to Jawaharlal Institute of Post Graduate Medical Education and Research (JIPMER), Puducherry to give bidders, background information on the Project. The information is provided to bidders on the terms and conditions set out in this RFP document and any other terms and conditions subject to which such information is provided.

This RFP document is not an agreement, is not an offer or invitation to any other party. The purpose of this RFP document is to provide interested parties with information to assist the formulation of their bid. The information is not intended to be exhaustive. Bidders are required to make their own inquiries and respondents will be required to confirm in writing that they have done so and they do not rely solely on the information in RFP.

The information is provided on the basis that it is non – binding on Jawaharlal Institute of Post Graduate Medical Education and Research (JIPMER), or HLL Lifecare Limited, any of its authorities or agencies or any of their respective officers, employees, agents or advisors.

Jawaharlal Institute of Post Graduate Medical Education and Research (JIPMER), reserves the right not to proceed with the Project or to change the configuration of the Project, to alter the timetable reflected in this document or to change the process or procedure to be applied. It also reserves the right to decline to discuss the Project further with any party submitting the Tender.

While HLL Lifecare Limited and JIPMER have taken due care in the preparation of the information contained herein and believe it to be accurate neither Jawaharlal Institute of Post Graduate Medical Education and Research (JIPMER), nor HLL Lifecare Limited, any of its authorities or agencies nor any of their respective officers, employees, agents or advisors gives any warranty or make any representations, express or implied as to the completeness or accuracy of the information contained in this document or any information which may be provided in association with it.

No reimbursement of cost of any type will be paid to persons or entities submitting their Tender.

DEFINITIONS

“Engineer” and EIC means the person(s) named by the Employer in the Contract or appointed from time to time by the Employer, who acts on behalf of the Employer under the contract.

“Employer” means JIPMER, which has invited bids for the project.

“HLL” means HLL Lifecare Limited, consultant to JIPMER for the project.

“JIPMER” means Jawaharlal Institute of Post-Graduate Medical Education and Research at Puducherry, India

“MoHFW” means Ministry of Health and Family Welfare, Government of India

“Project” means **Design, Construction, Supply, Erection, Testing & Commissioning of Sewage treatment plant based on Moving Bed Biological Reactor (MBBR) technology of 2.40 MLD capacity complete in all respects including MCC panel room, DG set & all contingent Electrical, Mechanical, piping and instrumentation works and including operation & maintenance for 24 (twenty four) months after successful commissioning at JIPMER, Puducherry on a turnkey basis.**

“Site” means the place where the above-mentioned project work is to be executed.

“Tender” or “Bid” shall mean the offer submitted by a Tenderer in accordance with this document for the above project.

“Tenderer” means a firm that has submitted its Tender of Bid for the Project.

SECTION I
1. NOTICE INVITING TENDER (NIT)

Tender no. HLL/ID/14/36 dated 22.05.2014

1.1 GENERAL

1.1.1 Jawaharlal Institute of Post-Graduate Medical Education and Research invites sealed tenders from reputed Indian Firms for **Design, Construction, Supply, Erection, Testing & Commissioning of Sewage treatment plant based on Moving Bed Biological Reactor (MBBR) technology of 2.40 MLD capacity complete in all respects including MCC panel room, DG set & all contingent Electrical, Mechanical, piping and instrumentation works and including operation & maintenance for 24 (twenty four) months after successful commissioning** at JIPMER, Puducherry.

1.1.2 JIPMER invites sealed tenders for the above-mentioned work (clause 1.1.1).

Approximate Cost of work	To be quoted by the bidder
Tender Security amount	Rs. 2.50 Lakhs (Rs. Two lakhs and fifty thousand only)
Cost of Tender form (Non-refundable)	Rs.5,000/- (Rs. Five Thousand Only) payable by a Demand Draft in favour of “HLL Lifecare Limited” at Thiruvananthapuram
Completion period of the Work	9 Months (Nine Months Only) from the date of issue of letter of acceptance
Tender documents on sale	From 21.05.2014 to 03.06.2014 (between 10.00 Hrs to 17.00 Hrs) on working days
Last date for submission of queries/ Date of Pre-Bid conference	03.06.2014
Last date for Issue of addendum	06.06.2014
Last Date & time of Submission of Tender	12.06.2014, up to 15.00 Hrs
Date & time of opening of Tender (Technical Package – Part I)	12.06.2014, 15.30 Hrs

One set of tender documents (Non-transferable) can be obtained from the office of HLL Lifecare Limited, (A Government of India Enterprise), ID Division, Adarsh, TC 6/1718,Vettamukku, Thirumala P.O., Thiruvananthapuram - 695006. The Bid Documents can also be downloaded from the website of JIPMER @ www.jipmer.edu or HLL website at www.lifecarehll.com or Central Public Procurement Portal. The cost of tender documents in the form of Demand Draft drawn in favour of HLL Lifecare Limited for an amount of **Rs.5000/-** (Rs. Five Thousand Only) payable at Thiruvananthapuram must be furnished in a separate envelope along with the technical bid.

1.2 POINTS TO BE NOTED

- 1.2.1 Works envisaged under this contract are required to be completed in all respects within the period of completion mentioned above.
- 1.2.2 Applicant should be an Indian firm and fulfill the criteria set out in para 2.1 to 2.3 of Section II, Instructions to Tenderers (ITT).
- 1.2.3 This tender is to be submitted in two parts i.e. **TECHNICAL PACKAGE** and **FINANCIAL PACKAGE**. Technical package is to be submitted in two parts, **Part-I** shall consist of information/details for the tenderer FOR ELIGIBILITY and **Part -II** shall be the Technical proposal.
- 1.2.4 Applicant must not have been blacklisted or deregistered by any govt. agencies or public sector undertaking during last 5 years.
- 1.2.5 The net worth of the firms during last three years should not be negative
- 1.2.6 Tender documents consist of:

Volume 1

- Notice Inviting Tender (NIT)
- Instructions to Tenderers (ITT) (Including Annexures)
- Special Conditions of Contract (SCC)
- Employer's requirements

Volume 2

- General Conditions of Contract (GCC)

- 1.2.7 The Contract shall be governed by the documents listed in Para 1.2.6 above and relevant standards and specifications, which may be purchased from the market.
- 1.2.8 Tenderers may obtain further information in respect of these tender documents from the office of the Deputy Vice President (Technical), HLL Lifecare Limited, (A Government of India Enterprise), ID Division, Adarsh, TC 6/1718, Vettamukku, Thirumala P.O., Thiruvananthapuram - 695006
- 1.2.9 All Tenderers are hereby cautioned that tenders containing any material deviation or reservation as described in Clause 6.4 of "Instructions to Tenderers" and/ or minor deviation without quoting the cost of withdrawal shall be considered as non-responsive and shall be summarily rejected.
- 1.2.10 **The offers of Tenderers who fulfill the minimum requirements as specified in para 2.1 to 2.3 and para 6.5.1 of Section II (ITT), only shall be evaluated further.**

1.2.11 JIPMER reserves the right to accept or reject any or all proposals without assigning any reasons, No tenderer shall have any cause of action or claim against the JIPMER for rejection of his proposal.

**For and on behalf of JIPMER
Deputy Vice President (T)
HLL Lifecare Limited**

2. SCOPE OF WORK

2.1 GENERAL

2.1 The sprawling 195 acre JIPMER Campus has at present three Sewage Treatment Plants. The oldest one of 1.2 MLD capacity is out-dated and is not functioning effectively. Two more are of recent installation and their combined capacity is 700 KLD. There is also a proposal to add a new STP (220 KLD) for the III phase expansion project which has just commenced. There are other construction proposals which will come up in the new future.

As the old STP is to be replaced and new ones are required for the on-going and future expansion projects it is proposed to provide one STP of 2.4 MLD capacity based on MBBR technology.

2.2 WORK CONTENT

2.2.1 Brief Scope

The project involves **Design, Construction, Supply, Erection, Testing & Commissioning of Sewage treatment plant based on Moving Bed Biological Reactor (MBBR) technology of 2.40 MLD capacity complete in all respects including MCC panel room, DG set & all contingent Electrical, Mechanical, piping and instrumentation works and including operation & maintenance for 24 (twenty four) months after successful commissioning of STP at JIPMER.**

The system shall cater to the entire campus comprising of 195 acres. The scope of contract shall also cover the operation and maintenance of the system for a period of 2 years.

The work shall, inter-alia, include the following:

- i. Design and engineer the STP to be operator friendly and for the operator's safety, health and hygiene.
- ii. The tender is for turn-key job where it will be the responsibility of the contractor to hand over a completely functional unit complying with Central Public Health and Environmental Engineering Organisation (CPHEEO) Manual/Guidelines and PCB norms and with all necessary components
- iii. **It will be the responsibility of the intending bidder to assess the hospital effluent quality parameters for appropriate design of the STP.**
- iv. Design & installation of all civil structures for the system.
- v. Getting the required approvals, permissions, NOC from the statutory / government agencies.

- vi. All aspects of quality assurance, including testing of equipment and other components of the work
- vii. Project Management to ensure completion of Project as per timelines.
- viii. Submission of Operators' Manual and training of personnel.
- ix. Submission of the completion ('as-built') drawings and other related documents along with a soft copy any related software.
- x. Making good any defect during the Defects Liability Period

2.2.2 Design criteria to be specified with the proposal by the Tenderer

The design of the Tenderer shall be of international standards and should be complete in all respects as per international best practices. Detailed design including the design criteria, codes and standards and specifications of the materials to be used for the design should be submitted by the Tenderer along with his proposal. Other documents as detailed in Employer's Requirements and Sub-clause 4.2.4 of Instruction to Tenderers should be submitted along with the design.

2.2.3 Reference to the Standard Codes of Practice

2.2.3.1 All Standards, Technical Specifications and Codes of practice referred to shall be latest editions including all applicable official amendments and revisions. The Contractor shall make available at site all relevant Indian Standard Codes of practice as applicable.

2.2.3.2 Wherever Indian Standards do not cover some particular aspects of design/ construction, relevant International Standards shall be referred to. The contractor shall make available at site such standard codes of practice.

2.2.3.3 In case of discrepancy among Standard codes of practice, Technical Specifications and provisions in Employer's Requirements, the order of precedence shall be as below:

- i) Provision in General Requirements of Employer's Requirements
- ii) Technical Specifications in Employer's Requirements,
- iii) Standard Codes of Practice.

In case of discrepancy in reference to Standard Codes of Practice, the order of precedence shall be BIS, IRC, BS, ASTM, DIN

2.2.4 Dimensions

The levels, measurements and other information concerning the existing site as shown on the conceptual / layout drawings are believed to be correct, but the tenderer should verify them for himself and also examine the nature of the ground as no claim or allowance whatsoever shall be entertained on account of any errors or omissions and

commissions in the levels or strata turning out different from what is shown on the drawings.

2.3 TIME SCHEDULE

The tenderer shall submit with the tender “Time Schedule” for completion of various portions of works. This schedule is to be within the overall completion period of 9 months. The detailed programme in the form of a Critical Path Method (CPM) network shall include all activities starting from design to completion.

2.4 EXISTING FACILITIES AND UTILITIES

- (i) The new STP shall be constructed adjacent to the existing ones without disturbing their functioning.
- (ii) Utilities shall not be damaged at any cost. If due to some or the other reason, a mishap occurs, it should be rectified immediately by the contractor at his own cost under intimation of HLL/JIPMER.
- (iii) The Contractor shall take care so that the ongoing activities are not disturbed in any manner whatsoever by the activities of the Contractor during the execution of the project.

The above instructions are only indicative, other precautions which are specified from time to time by the utility owning agencies shall be followed by the successful Tenderer at all times.

3. TENDER PRICES AND SCHEDULE OF PAYMENT

3.1 TENDER PRICES

- a. Unless explicitly stated otherwise in the Tender Documents, the Contract shall be for the whole Work and payment shall be based on the milestones as accepted in the Contract.
- b. The design notes, calculations, specifications, dimensioned drawings and milestone schedules prepared by the tenderer in respect of technically acceptable proposal shall be for limited purpose of prima facie evaluation for determining its technical acceptability, price and construction time.
- c. Irrespective of the estimated quantities and /or dimensioned details for various items of work as furnished in the design notes, calculations, specifications or outline /dimensioned drawings accompanying the tender for the work, the successful tenderer shall carry out all changes, modifications or alterations that may, during the scrutiny of the detailed designs and working drawings, or during construction be considered necessary in the opinion of the Engineer for compliance with the Employer's Requirements.
- d. The Tenderer shall include in his quoted price all taxes (VAT, Service Tax), fees and other levies, payable by the tenderer under the Contract. JIPMER shall assist the Tenderer wherever feasible for getting custom duty exemption.
- e. The Payment shall be in accordance with the provisions of **Clauses 14.0 and 15.0** of the General Conditions of Contract (RFP Volume II).

3.2 SCHEDULE OF MILESTONES FOR PAYMENTS

S. N	Milestone	% of total cost
1	On approval of system design (advance)	15%
2	On completion of civil works	25%
3	Installation of electrical, Mechanical & Piping works	40%
4	Successful commissioning of the system and Training of institute staff	15%
4	After completion of defect liability period	5%
	Total	100%

SECTION-II

INSTRUCTIONS TO TENDERERS (ITT)

1.0 GENERAL

1.1 The Proposal

JIPMER (hereinafter also referred as Employer) invites sealed tenders from applicants for **Design, Construction, Supply, Erection, Testing & Commissioning of STP based on Moving Bed Biological Reactor (MBBR) technology of 2.40 MLD capacity complete in all respects including all contingent Electrical, Mechanical, piping & instrumentation works** at JIPMER, on turnkey basis.

The tender papers consist of the documents as specified in Clause 1.2.6 of NIT, along with their Annexures, appendices, addenda and errata if any.

Tenderers should procure relevant standards and specifications referred from the market.

Tenders shall be prepared and submitted in accordance with the instructions given herein.

1.2 Address for Communication

Deputy Vice President (Technical)
HLL Lifecare Limited,
Infrastructure Development Division,
“Adarsh”, T.C 6/1718(1),
Vettamukku, Thirumala PO,
Thiruvananthapuram- 695 006.
Phone - 0471 2365872/73
Fax – 0471 2368144

1.3 Some essential data/requirements pertaining to this Tender along with reference to Clause Number of this Volume where full details have been given are detailed below (also refer Clause 1.2 of NIT):

- a. Date and time of opening of tender (Clause 1.1.2 of NIT) is 12.06.2014, 15.30 Hrs.
- b. Period for which the tender is to be kept valid (Clause 4.7), **120 days** from the last date of submission of Tender.

- c. Period of commencement of work (Form A), one week of signing of the Contract Agreement.
- d. Defects Liability Period (Form A) **12 months** from the date of issue of “Taking over Certificate”.
- e. Period of completion (Form A) **9 Months** from the date of issue of “Letter of acceptance”.
- f. Validity Period for Performance Security (Form D) **6 months** from the date of expiry of “Defects Liability Period”

2.0 ELIGIBILITY REQUIREMENTS

- 2.1 The intending bidders should have satisfactorily set up on Turnkey basis STPs / ETPs based on any advanced technology except waste stabilization/oxidation pond during the last 7 (Seven) years ending last day of the month of **March 2014** according to any one of the following requirements.
 - a) Three systems of 1 MLD capacity each
 - b) Two systems 1.4 MLD capacity each or
 - c) One system of 1.9 MLD capacity.
- 2.2 The average annual turnover of the firm should not be less than Rs. 1.00 Crores in the last three consecutive financial years ending March 31, 2014. The Firm should be profit making during each of the last three financial years, ending March 31, 2014. Financial data for previous 5 years shall be submitted as per format in Form T V.
- 2.3 The firm shall have a solvency of Rs. 1.00 Crore. Latest Bank Solvency Certificate for amount of Rs. 1.00 Crore from Bank issued in the current financial year shall be submitted by the firm.
- 2.4 All tenders submitted shall include the following information:
 - 2.4.1 General information of the Tenderer shall be furnished in Form T-I. Copies of original documents defining the constitution and legal status, certificate of registration and ownership, principal place of business of the company, corporation, firm or partnership shall also be required to be furnished.
- 2.5 The Tenderers to qualify for award of Contract shall submit a written power of attorney authorizing the signatory(ies) of the tender to commit the Tenderer.
- 2.6 The authorized signatory of the Tenderer shall sign each page of tender. Power of Attorney in favour of the signatory will be required to be furnished as detailed in Clause 4.10

- 2.7 Cancellation or creation of a document such as Power of Attorney, Partnership deed, Constitution of firm etc., which may have bearing on the Tender/Contract shall be communicated forthwith in writing by the Tenderer to JIPMER, through HLL
- 2.8 Each Tenderer, or any associate will be required to confirm and declare in the tender submittal that no agent, middleman or any intermediary has been, or will be, engaged to provide any services, or any other items of work related to the award and performance of this contract. They will have to further confirm and declare in the submittal that no agency commission or any payment, which may be construed as an agency commission, has been, or will be paid and that tender price will not include any such amount.

3.0 TENDER DOCUMENTS

3.1.1 CONTENTS OF TENDER DOCUMENTS

- 3.1.2 The Tenderer is expected to examine carefully all the contents of the tender documents as mentioned in Sub-clause 1.1 including instructions, conditions, forms, terms, Employer's requirements and take them fully into account before submitting his offer. Failure to comply with the requirements as detailed in these documents shall be at the Tenderers own risk. Tenders which are not responsive to the requirements of the tender documents will be rejected.

3.2 CLARIFICATION ON TENDER DOCUMENTS

- 3.2.1 While all efforts have been made to avoid errors in the drafting of the tender documents, the Tenderer is advised to check the same carefully. No claim on account of any errors detected in the tender documents shall be entertained.
- 3.2.2 A prospective Tenderer requiring any clarification of the tender documents may notify the Officer-in-charge in writing or by Tele-fax at the Officer-in-charge's mailing address indicated in Clause 1.2 of ITT. The Officer-in-charge will respond in writing to any request for clarification which he receives prior to dead line mentioned in Clause 1.1.2 of NIT. Written copies of the Officer-in-charge's response (including an explanation on the query but without identifying the source of the inquiry) will be sent to all prospective Tenderers who have received the tender documents. Only written communications/clarifications can be considered as valid.
- 3.2.3 **A pre bid conference will be held on the date specified in Clause 1.1.2 of NIT. A site visit will precede the conference on the same day and the prospective bidders will be shown the existing STPs for understanding the location, layout and the available power and sewage lines.**

3.3 **AMENDMENT TO TENDER DOCUMENTS**

- 3.3.1 At any time prior to the deadline for the submission of tenders, JIPMER may, for any reason, whether at its own initiative or in response to a clarification or query raised by a prospective Tenderer, modify the tender documents by an amendment.
- 3.3.2 The said amendment in the form of an addendum will be sent to all prospective Tenderers who have received the tender documents, on or prior to last date mentioned in Clause 1.1.2 of NIT. This communication will be in writing or by Tele-fax and the same shall be binding upon them. Prospective Tenderers should promptly acknowledge receipt thereof by Tele-fax to the Officer-in-charge.
- 3.3.3 In order to afford prospective Tenderers reasonable time for preparing their tenders after taking into account such amendments, JIPMER may, at his discretion, extend the deadline for the submission of tenders in accordance with Clause 1.1.2 of NIT.

4.0 **PREPARATION OF TENDERS**

4.1 **BIDDERS' RESPONSIBILITY AND SITE VISIT**

- 4.1.1 The Tenderer is solely responsible for the details of his bid and the preparation of bids. In no case shall JIPMER/HLL be responsible for any part of the tender documents submitted by him. Any Site information given in this tender document is for guidance only. The Tenderer is advised to visit and examine the Site of Works and its surroundings at his/their cost and obtain for himself on his own responsibility, all information that may be necessary for preparing the tender and entering into a Contract.
- 4.1.2 Irrespective of whether the Tenderers have attended the pre bid conference or not, they shall be deemed to have inspected the Site and its surroundings beforehand and taken into account all relevant factors pertaining to the Site in the preparation and submission of the Tender.

4.2 **DOCUMENTS COMPRISING THE TENDER**

TECHNICAL PACKAGE

- 4.2.1 **The technical package, clearly labeled as “TECHNICAL PACKAGE”, has to be submitted in two parts**, Part-I shall consist of information of applicants and Part -II is the Technical proposal.

Part –I shall comprise the followings:

- a. Covering letter for the Bid
- b. Checklist for the enclosed documents in the format as appendix 1

- c. Tender Security in original in a separate sealed and duly marked “Tender Security” envelope in the format attached as Form B,
- d. Income tax clearance certificate for the last five years
- e. Attested Copy of Power of Attorney (in favour of the Authorised Signatory of the Tenderer) to submit tender,
- f. Relevant Experience for the projects
- i. Length of time in business in the form attached as Form T-I
- ii. Total number of **STPs of advanced technologies installed** (along with details of the locations and their value) completed successfully on turn-key basis during the last five years by the Tenderer in the format attached as Form T-II
- iii. Performance certificate from client in the Form T-VI in respect of Works above
- g. Financial Data for the past five years
 - i. Net Working Capital in the form T-V
 - ii. Net cash flow in the Form T-V
 - iii. Annual Turnover from similar design and build projects in the form T-V

The Tenderer should validate the data provided as above using suitable documentary evidence such as client certificates, audited balance sheets, annual reports etc clearly giving the reference to the evidence in front of the relevant portion.

- h. Technical and organizational capability
 - i. Number of Technical staff proposed for this project in the Form T-III
 - ii. Academic qualification of the staff in the Form T-III
 - iii. Experience of the proposed staff in the Form T-III

4.2.2 In addition to above, following information shall also be furnished in Part-I of technical package:

- (a) An organization chart with assignment of each key staff member (identified by name), duration & timing together with clear description of the responsibilities of each key staff member within the overall work programme. The minimum level of supervision and qualification/experience of Site-staff is given under Annexure – A.
- (b) The name, background and professional experience of each key staff member to be assigned to the project, with particular reference to his experience of a nature

similar to that of the proposed assignment. The majority of the key staff shall be regular members of the firm for at least six months (CV format in Form T-III).

- 4.2.3 The tenderer shall furnish details of agency/subcontractor proposed to be hired for the Construction Work as well as those available as on date in Part I of technical package.

4.2.4 Part –II shall comprise the followings:

(a) Tender documents as listed in Clause 1.2.6 of NIT

(b) Technical Proposal

The proposal should cover in detail the following:

- i. Understanding and comprehension of the work involved.
- ii. **Details of the System proposed**
- iii. The general approach and methodology proposed for carrying out the services covered in the Scope of Work, including such detailed information as deemed relevant. Apart from above, contractor shall give details and numbers of equipment including their source, to be mobilized for the project with an assurance that equipment mobilized would be able to conduct work as per specifications in stipulated time schedule.
- iv. Detailed work plan, documents mentioned in Clause 2.2.3 of NIT, design of the plant containing the following
 - a) Construction Details
 - b) Equipment
 - c) Service Requirements
 - d) Standards and specifications being followed in the design and for materials to be used in a consolidated tabular form
 - e) Bill of Quantities (un-priced)
- v. List of vendors from whom the materials and equipment are planned to be procured in a consolidated table.
- vi. The details of the concept and technology to be used
- vii. A program implementation schedule with broad list of activities, timelines and milestones (Hard and soft copy). A detailed overall work programme and a bar chart indicating the duration and timing of all major activities. Bar chart shall be

made showing the activity to be performed for the project along with duration of each activity on a weekly basis.

- viii. A detailed cash flow bar chart indicating the project expenses along with duration on a fortnightly basis.
- ix. Proposed quality plan as per requirements of ISO: 9001:2008

4.2.5 No information relating to financial terms of services should be included in the Technical Proposal.

FINANCIAL PACKAGE

4.2.6 The financial package, clearly labeled as “ FINANCIAL PACKAGE” will contain the following:

- i. Form of tender and Appendix thereof (Form A).
- ii. Financial Bid of the Tenderer as per Form C.

4.2.7 The financial proposal should be separately completed and submitted in a separate sealed envelope in the Format prescribed in Form C. The final prices shall be entered in the Form of Tender. These prices should include all costs associated with the contract.

4.2.8 Documents to be submitted by the Tenderer under technical and financial packages have been described under the respective Clauses 4.2. This list of documents has been prepared mainly for the convenience of the Tenderer and any omission on the part of JIPMER shall not absolve the Tenderer of his responsibility of going through the various clauses in the Tender Documents including the specifications and to submit all the details specifically called for (or implied) in those clauses.

4.2.9 All documents issued for the purposes of tendering as described in Clause 1.1, and any amendments issued in accordance with Clause 3.3 shall be deemed as incorporated in the Tender.

4.3 TENDER PRICES

4.3.1 The Tenderer is required to quote for all the items as per tender documents.

4.3.1 The Tenderer shall quote his price in Form-C (Format for Financial Bid). The total price quoted should be final and should be for undertaking the entire project in all respects as per the RFP document.

4.3.2 Prices quoted by the Tenderer, will include all tax liabilities, applicable Labour Cess and the cost of insurance to this contract. There will be no variation in the Contract Price quoted by the Tenderer on any account.

4.3.3 The Tenderer shall keep the contents of his tender and rates quoted by him confidential.

4.3.4 The Tenderer shall utilize Indian labour, staff and materials to the maximum extent possible in execution of Works.

4.4 COST OF TENDERING

4.4.1 The Tenderer shall bear all costs associated with the preparation and submission of his tender and JIPMER/HLL will in no case be responsible or liable for these costs, regardless of the conduct or outcome of the tendering process.

4.5 LANGUAGE OF TENDER

All tender documents shall be in English.

4.6 CURRENCY OF THE TENDER

Tender prices shall be quoted in Indian Rupees only.

4.7 TENDER VALIDITY

4.7.1 The tender shall remain valid and open for acceptance for a period of 90 days from the date of opening of the tenders.

4.7.2 In exceptional circumstances, prior to expiry of the original tender validity period, JIPMER may request the Tenderers for a specified extension in the period of validity. The request and the response thereto shall be made in writing or by Tele-fax. The Tenderer shall not be required or permitted to modify his tender but shall be required to extend the validity of his tender security correspondingly.

4.8 TENDER SECURITY

4.8.1 The Tenderer shall furnish, as tender security, an amount as mentioned in Clause 1.1.2 of NIT.

4.8.2 The tender security will be in the form of a Bank Guarantee from a Scheduled Commercial bank in India acceptable to the Employer. The format of the Bank Guarantee shall be generally in accordance with the sample form of tender security (Form B) included in this volume of tender documents. Other formats may be permitted subject to the prior approval of JIPMER/HLL. Bank guarantees shall be irrevocable

and operative for a period not less than 30 days beyond the validity of the tender (i.e. 120 days from the last date of tender). The Tender Security shall be endorsed/pledged in favour of HLL and shall be submitted in a separate envelope super scribed “Tender security for *Design, Construction, Supply, Erection, Testing & Commissioning of STP based on Moving Bed Biological Reactor (MBBR) technology of 2.40 MLD capacity complete in all respects including all contingent Electrical, Mechanical, piping & instrumentation works at JIPMER, Puducherry*”.

4.8.3 Any tender not accompanied by an acceptable tender security will be summarily rejected by the JIPMER/HLL and shall be treated as non-responsive.

4.8.4 The tender securities of unsuccessful Tenderers shall be discharged/returned by JIPMER/HLL as promptly as possible but not later than 30 days after the expiration of the period of tender validity as defined in Clause 4.7.

4.8.5 The tender security of the successful Tenderer shall be returned upon the Tenderer executing the Contract Agreement and the required performance guarantee for performance, as mentioned in Clause 8.0.

4.8.6 The tender security shall be forfeited:

- a. if a Tenderer withdraws his tender during the period of tender validity, or
- b. if the Tenderer does not accept the correction of his tendered price in terms of Clause 6.6, or
- c. in the case of a successful Tenderer, if he fails to :
 - i. furnish the necessary performance guarantee for performance as per Clause 8.0 and/or
 - ii. enter into the Contract within the time limit specified in Clause 7.5

4.8.7 No interest will be payable by JIPMER/HLL on the tender security amount cited above.

4.9 INCOME TAX CLEARANCE

The Tenderer shall provide income tax clearance certificate for the past five years in Part 1 of the technical bid.

4.10 POWER OF ATTORNEY

Power of Attorney duly notarized and on a stamp paper of an appropriate value, issued and signed by the member authorizing the person signing the tender documents to sign documents, make corrections/ modifications and interacting with JIPMER/HLL and acting as the contact person shall be submitted along with Part 1 of the technical bid.

4.11 FORMAT AND SIGNING OF TENDERS

- 4.11.1 The tender documents (technical package Part 1 and 2 and financial package) shall be stamped and signed on all pages by a person duly authorized to sign the tender documents. The Tenderer shall also submit a power of attorney authorizing the person signing the documents in accordance with Clause 4.10 of the Instruction to Tenderers.
- 4.11.2 Entries to be filled in by the Tenderer shall be typed or written in indelible ink.
- 4.11.3 The complete tender shall be without alterations, overwriting, interlineations or erasures except those to accord with instructions issued by JIPMER/HLL, or as necessary to correct errors made by the Tenderer. The person or persons signing the tender shall initial all amendments/corrections.
- 4.11.4 All witnesses and sureties shall be persons of status and probity and their full names, occupations and addresses shall be written below their signatures.

5 SUBMISSION OF TENDERS

5.1 SEALING AND MARKING OF TENDERS

- 5.1.1 The Tenderer shall follow the procedure as indicated below:
- 5.1.2 Each tender will be submitted in two sets one marked “Original” and the other marked “Copy” (Copy should be photocopy of ‘original’).
- 5.1.3 Each set containing the two packages, TECHNICAL PACKAGE and FINANCIAL PACKAGE shall be sealed in two separate envelopes clearly marked as “Original” and “Copy”. The two envelopes shall be wrapped in an outer envelope addressed to The Deputy Vice President (Technical), HLL Lifecare Limited, Infrastructure Development Division, “Adarsh”, TC.6/1718 (1), Vettamukku, Thirumala P.O, Thiruvananthapuram – 695 006 duly super scribing on top, tender number, name of work and time and last date for submission. The envelope should also bear the name and address of the Tenderer.
- 5.1.4 The contents of Technical Package and Financial Package shall be as detailed under Clause 4.2 herein.
- 5.1.5 No responsibility will be accepted by the JIPMER/HLL for the misplacement or premature opening of a tender, not sealed or marked as per aforesaid instructions.

5.2 SUBMISSION OF TENDERS

5.2.1 Tenders should be submitted to:

The Deputy Vice President (Technical),
HLL Lifecare Limited,
Infrastructure Development Division,

“Adarsh”, T.C 6/1718(1), Vettamukku,

Thirumala PO, Thiruvananthapuram- 695 006

The last date for submission of completed tenders is given in Clause 1.1.2 of NIT. The JIPMER/HLL may, at their discretion, extend this date for the submission of tender by amending the Tender Documents in accordance with Clause 3.3, in which case all rights and obligations of the JIPMER/HLL and the Tenderer previously subject to the original date shall thereafter be subject to the new deadline as extended. If such nominated date for submission of tender is subsequently declared as a Public Holiday, the next official working day shall be deemed as the date for submission of tender.

5.2.2 Tenders shall be submitted by hand or through registered post or courier service at the address mentioned in Sub Clause 5.2.1. JIPMER/HLL shall not take any cognizance and shall not be responsible for delay/loss in transit or non-submission of the tender in time.

5.2.3 Tenders sent telegraphically or through other means of transmission (Tele-fax etc.), which cannot be delivered in a sealed envelope shall be treated as defective, invalid and shall stand rejected.

5.3 LATE TENDERS

Any tender received in Office of the **Deputy Vice President (Technical)**, after the deadline prescribed for submission of tenders in Clause 1.1.2 of NIT herein will be returned unopened to the Tenderer.

6 TENDER OPENING AND EVALUATION

6.2 TENDER OPENING

6.1.1 The JIPMER/HLL will open the Tenders in the presence of Tenderers or their representatives who choose to attend on date & time as mentioned as per Clause 1.1.2 of NIT in the office of The Deputy Vice President (Technical), HLL Lifecare Limited, Infrastructure Development Division, “Adarsh”, T.C 6/1718(1), Vettamukku, Thirumala PO, Thiruvananthapuram- 695 006. If such nominated date for opening of Tender is subsequently declared as a Public Holiday, the next official working day shall be deemed as the date of opening of the tender. The Tender of any Tenderer who has not complied with one or more of the foregoing instructions may not be considered.

6.1.2 On opening of the main Tender envelopes, it will be checked if they contain Technical (Part-I & Part-II separately) and Financial Packages.

- 6.1.3 Technical Package – Part I of the Tender will thereafter be opened. They will be examined to see if they are complete, whether the requisite Tender security has been furnished, whether the documents are in order. If the documents do not meet the requirements of JIPMER the Tender Opening Authority will record a note accordingly and the said Tenderer's Technical Package - Part II and Financial Package will not be considered for further processing.
- 6.1.4 The Tenderers name, the presence or absence of the requisite tender security and such other details as JIPMER or his authorized representative, at his discretion, may consider appropriate will be announced at the time of tender opening.
- 6.1.5 The sealed Technical Package – Part II of all responsive tenders will be opened on the date and time to be fixed after the evaluation of the eligibility documents, submitted by the tenderers.
- 6.1.6 The sealed financial packages of all responsive tenders will be opened on date and time to be fixed after the technical evaluation, when the lump sum prices quoted by the tenderers shall be read out.**

6.2 PROCESS TO BE CONFIDENTIAL

- 6.2.1 Except the public opening of Tenders, information relating to the examination, clarification, evaluation and comparison of tenders and recommendations concerning the award of Contract shall not be disclosed to Tenderers or other persons not officially concerned with such process.
- 6.2.2 Any effort by a Tenderer to influence JIPMER/HLL in the process of examination, clarification, evaluation and comparison of tenders and in decisions concerning award of contract, may result in the rejection of the Tenderer's tender.

6.3 CLARIFICATION OF TENDERS

- 6.3.1 Technical evaluation of technical packages submitted by Tenderers shall be undertaken based on details submitted in the technical package only. No clarification/additional information in this regard will be sought from Tenderers. Tenderer shall not be required to submit their own, additional information or material subsequent to the date of submission and such material if submitted will be disregarded. It is therefore essential that all the details are submitted by Tenderer accurately and specifically in their technical package avoiding vague answers. However, JIPMER/HLL reserves the right to ask any clarification from Tenderers for details submitted with technical package if it so desires during the technical evaluation.
- 6.3.2 To assist in the examination, evaluation and comparison of Financial package, JIPMER/HLL may ask Tenderers individually for clarification of their tenders, including

breakdowns of prices. The request for clarification and the response shall be in writing or by Tele-fax but no change in the price or substance of the tender shall be sought, offered or permitted except as required to confirm correction of arithmetical errors discovered by the Officer-in-Charge during the evaluation of tenders in accordance with Clause 6.5 herein.

6.4 DETERMINATION OF RESPONSIVENESS

6.4.1 Prior to the detailed evaluation of tenders, JIPMER/HLL will determine whether each tender is responsive to the eligibility requirements (Technical Package I) and the employer's requirements (Technical Package II) of the tender documents

6.4.2 For the purpose of this Clause, a responsive tender for opening of the Technical Package II, is one which has paid the application fees, is accompanied by the Tender Security, signed on all pages and meets the eligibility criteria as set out in Clause 2 above. Technical Package II shall be considered responsive if it conforms to the employer's requirements and all other terms, conditions and specifications of the tender documents without material deviation or reservation. "Deviation" may include exceptions, exclusions & qualifications. A material deviation or reservation is one which affects in any substantial way the scope, quality, performance or administration of the works to be undertaken by the Tenderer under the Contract, or which limits in any substantial way, JIPMER's rights or the Tenderers obligations under the Contract as provided for in the Tender documents and / or is of an essential condition, the rectification of which would affect unfairly the competitive position of other Tenderers presenting substantially responsive tenders at reasonable price.

6.4.3 If a tender is not substantially responsive to the requirements of the tender documents or if the construction methods proposed by the Tenderer are considered impracticable, it will be rejected by JIPMER, and will not subsequently be permitted to be made responsive by the Tenderer by correction or withdrawal of the non-conformity or infirmity. The decision of the JIPMER/HLL as to which of the tenders are not substantially responsive or have impractical/ defective design or construction technology shall be final.

EVALUATION OF TENDER

6.4.4 (a) The Tenderers should submit the details as per 4.2.1 and should meet the minimum requirements as per Part-I of technical package.

(b) JIPMER will, keeping in view the contents of Clause 6.4, carry out technical assessment of submitted technical proposals to determine that the Tenderer has a full comprehension of the work of the contract. In case the Tenderer's technical submittal

is found non-complaint with the requirements of the project the same is liable to be rejected. This process is to assure that only technically acceptable proposals are considered for the work.

6.4.5 The evaluation of Financial proposals by JIPMER/HLL will take into account, in addition to the tender amounts, the following factors:

- a. Arithmetical errors corrected by JIPMER/HLL in accordance with Clause 6.6
- b. Such other factors of administrative nature as JIPMER/HLL may consider to have a potentially significant impact on contract execution, price and payments, including the effect of items or rates that are unbalanced or unrealistically priced.

6.4.6 Offers, deviations and other factors, which are in excess of the requirements of the tender documents or otherwise and will result in the accrual of unsolicited benefits to JIPMER, shall not be taken into account in tender evaluation.

6.4.7 Price adjustment provisions applicable during the period of execution of the contract shall not be taken into account in tender evaluation.

6.4.8 Evaluation of financial offer will be based on price quoted by the Contractor. Any subsequent alteration in prices shall not be given any cognizance.

6.5 CORRECTION OF ERRORS

6.5.1 JIPMER/HLL for any arithmetical errors in computation and summation will check tenders determined to be technically acceptable during Financial evaluation. Errors will be corrected by the JIPMER/HLL as follows:

- a. Where there is a discrepancy between amounts in figures and in words, the amount in words will govern

6.5.2 If a Tenderer does not accept the correction of errors as outlined above, his tender will be rejected and the tender security forfeited.

7 AWARD OF CONTRACT

7.1 AWARD CRITERIA

7.1.1 Subject to Clause 6.5, JIPMER/HLL will award, the Contract to the Tenderer, whose tender has been determined to be substantially responsive, complete and in accordance with the tender documents, and whose total evaluated price for undertaking the entire project detailed in Scope of work (clause 2.1 to 2.4 of NIT) and Employer's Requirements of RFP Document is the lowest.

7.1.2 If the financial bids of both parties are equal, then the bidders shall be asked to resubmit the financial bid.

7.2 EMPLOYER'S RIGHT TO ACCEPT ANY TENDER AND TO REJECT ANY OR ALL TENDERS

Notwithstanding Clause 7.1, JIPMER/HLL reserves the right to accept or reject any tender, and to annul the tender process and reject all tenders, at any time prior to award of Contract, or to divide the Contract between/amongst Tenderers without thereby incurring any liability to the affected Tenderer or Tenderers or any obligations to inform the affected Tenderer or Tenderers of the grounds for JIPMER's action.

7.3 NOTIFICATION OF AWARD

7.3.1 Prior to the expiry of the period of tender validity prescribed by the JIPMER/HLL, HLL will notify the successful Tenderer by Tele-fax or e-mail, to be confirmed in writing by registered post/ by courier, that his tender has been accepted. This letter (hereinafter and in the Conditions of Contract called 'the Letter of Acceptance') shall name the sum which JIPMER will pay to the Contractor in consideration of the execution, completion, maintenance and guarantee of the works by the Contractor as prescribed by the Contract (hereinafter and in the conditions of Contract called 'the Contract Price'). The Letter of Acceptance will be sent to the successful tenderer. No correspondence will be entertained by JIPMER/HLL from the unsuccessful Tenderers.

7.3.2 The Letter of Acceptance shall constitute a part of the contract.

7.3.3 Upon submission of Performance Security by the successful Tenderer as per clause 8.0, JIPMER/HLL will promptly notify the unsuccessful Tenderers and discharge / return their tender securities.

7.4 SIGNING OF AGREEMENT

7.4.1 JIPMER/HLL shall prepare the Agreement in the Proforma (Form E) included in this Document, duly incorporating all the terms of agreement between the two parties. Within 30 days from the date of issue of the Letter of Acceptance the successful Tenderer will be required to execute the Contract agreement. The performance guarantee should be submitted immediately after issue of letter of acceptance but not later than 30 days of issue of letter of acceptance. One copy of the Agreement duly signed by JIPMER/HLL and the Contractor through their authorized signatories will be supplied by JIPMER/HLL to the Contractor.

7.4.2 Prior to signing of the Contract Agreement, the successful Tenderer shall submit Performance Security within a period of 30 days from the date of issue of the Letter of Acceptance:

8 PERFORMANCE SECURITY

- 8.1.1 The successful Tenderer shall furnish to HLL a security in the form of a bank guarantee for an amount of 10% of the total Contract Price, in accordance with Clause 4.2 of the General Conditions of Contract. The Bank Guarantee has to be from a Scheduled Commercial bank based in Indian and for this purpose the Form of Performance Security (Form-D) provided in this Volume shall be used. The Performance Security shall be furnished within the time limit specified in Sub-clause 7.4.2.
- 8.1.2 Failure of the successful Tenderer to lodge the required Performance Security shall constitute sufficient grounds for the annulment of the award of Contract and forfeiture of the tender security, in which event JIPMER may make the award to the next lowest evaluated Tenderer.

APPENDIX I

CHECK LIST OF DOCUMENTS TO BE SUBMITTED WITH THE TENDER

COMPILED FROM THE PROVISIONS IN THIS VOLUME

Sl. No.	Document	No. of sets to Be submitted	Reference to Clause No. of "Instructions to Tenderers"	Page no.
TECHNICAL PACKAGE part 1				
1.0	Covering letter	(Original)	4.2	
2.0	Tender security (Form B) in separate sealed envelope	(Original & Copy)	4.8	
3.0	Income tax Clearance certificate	(Original)	4.9	
4.0	Power of attorney for individuals signing on behalf of Company/Firm	(Original & Copy)	4.10	
5.0	Experience Data- Form T-I & T-VI	(Original & Copy)	4.2	
6.0	Financial Data- T-V & T-II	(Original & Copy)	4.2	
7.0	Technical and organizational Data – T-III	(Original & Copy)	4.2	
8.0	Organizational Chart	(Original & Copy)	4.2	
TECHNICAL PACKAGE part 2				
9.0	Tender documents	(Original)	4.2	
10.0	Technical Package Part- I & Part –II	(Original & Copy)	4.2	
FINANCIAL PACKAGE COMPRISING OF:				
11.0	Form of Tender and Appendix thereof (Form-A)	(Original & Copy)	4.2	
12.0	Format for Financial Bid (Form C)	(Original & Copy)	4.2	

**INDEX ON
PROFORMA OF FORMS**

1. PROFORMA OF FORMS – GENERAL

(Items (iv) & (v) applicable only for successful Tenderers)

	Descriptions	FORM
I.	Form of Tender with Appendix	A
ii.	Form of Bank Guarantee for Tender Security	B
iii.	Format for Financial Bid	C
iv.	Form of Performance Security (Guarantee) by Bank	D
v.	Form of Contract Agreement	E

2. PROFORMA OF FORMS – QUALIFICATION PARTICULARS

	Descriptions	FORM
i.	General Information	T-I
ii.	Experience Record - Number of Similar Projects	T-II
iii.	Personnel Proposed for the Project	T-III
iv	Financial Data- Value of hospital work done during last five years	T-IV
V	Financial data for assessment of Net Working Capital, Net Worth, Profit etc.	T-V
Vi	Performance Reports of Works	T-VI
vii.	Desired Organizational structure	Annexure A

FORM OF TENDER

Note : i. The Appendix forms part of the Tender

ii. Tenderers are required to fill up all the blank spaces in this form of Tender and Appendix.

Name of Work : _____ (As mentioned under Clause 1.1.1 of NIT)

To,

**The Deputy Vice President (Tech.),
HLL Lifecare Limited,
Infrastructure Development Division,
“Adarsh”, T.C 6/1718(1),
Vettamukku, Thirumala PO,
Thiruvananthapuram- 695 006**

1. Having visited the Site and examined the General as well as Special conditions of contract, Employer's Requirements, Notice Inviting Tenders, Instructions to Tenderers, Preliminary Drawings and Addenda for the execution of above named works, we the undersigned, offer to execute and complete such works and remedy defects therein in conformity with the said Conditions of Contract, Employer's Requirements, NIT, ITT and Addenda for the sum of

(Amount in figures and words) for **Design, Construction, Supply, Erection, Testing & Commissioning of STP based on Moving Bed Biological Reactor (MBBR) technology of 2.40 MLD capacity complete in all respects including all contingent Electrical, Mechanical, piping & instrumentation works at JIPMER.**

2. We acknowledge that the Appendix forms an integral part of the Tender.
3. We undertake, if our Tender is accepted, to commence the works within one week of signing the Contract Agreement to commence and to complete the whole of the Works comprised in the Contract within **9 months** calculated from the date of issue of the Letter of Acceptance, as indicated in the Appendix.
4. If our Tender is accepted, we will furnish a Bank Guarantee for Performance as security for the due performance of the Contract. The amount and form of such guarantee or bond will be in accordance with **Clause 4.2** of the General Conditions of the Contract and as indicated in the Appendix.
5. We have independently considered the amount shown in **Clause 9.7** of the General Conditions of Contract as liquidated damages and Penalty in **Clause 25.0** of Special Conditions of Contract and agree that they represent a fair estimate of the damages likely to be suffered by you in the event of the work not being completed in time.

FORM A

PAGE 2 OF 3

6. We agree to abide by this Tender for a minimum period of 90 days from the last date fixed for receiving the same and it shall remain binding upon us and may be accepted at any time before the expiry of that period or any extended period mutually agreed to.
7. We declare that the submission of this Tender confirms that no agent, middleman or any intermediary has been, or will be engaged to provide any services, or any other item of work related to the award and performance of this Contract. We further confirm and declare that no agency commission or any payment, which may be construed as an agency, commission has been, or will be, paid and that the tender price does not include any such amount. We acknowledge the right of JIPMER, if it finds to the contrary, to declare our Tender to be non-compliant and if the Contract has been awarded to declare the Contract null and void.
8. We understand that you are not bound to accept the lowest or any tender you may receive.
9. If our Tender is accepted we understand that we are to be held solely responsible for the due performance of the Contract.

Dated this.....day of.....**2014**

Signature

Name..... in the capacity of

duly authorized to sign Tenders for and on behalf of.....

Address

Witness – Signature

Name

Address

Occupation

APPENDIX TO THE FORM OF TENDER

	Condition of Contract & Clause No		
i.	Amount of Bank Guarantee as Performance Security	4.2 of General Conditions	10 percent of the Total Contract Price.
iii	Period for commencement of work from the date of signing of Contract Agreement		One Week
iv	Time for completion from the date of issue of the Letter of Acceptance	24.0 of Special Conditions	9 months
v.	Amount of liquidated damages in case of extension of completion date due to delays by the Contractor	9.7 of General Conditions	0.25% of Contract value of works for each week or part thereof where the Contractor is in default, subject to maximum of 10% of Contract value
vi.	Defects Liability Period from the date of issue of "Taking-over certificate"	12.0 of General Conditions	12 months
vii.	Period of warranty for equipment against faulty design and defective manufacture from the date of completion of period of maintenance.	6.4 of General conditions	
	Signature of authorized signatory on behalf of Tenderer		

Date

Name

Place

Address

FORM OF BANK GUARANTEE FOR TENDER SECURITY

(Ref: Clause 4.8 of “Instructions to Tenderers”)

1. KNOW ALL MEN by these presents that we (Name of Bank) having our registered office at (Name of country) (hereinafter called “the Bank”) are bound unto HLL Lifecare Limited, Thiruvananthapuram (hereinafter called “HLL”) in the sum of **Rs.** ____ for which payment will and truly to be made to the said HLL, the Bank binds itself, its successors and assigns by these presents.
2. WHEREAS.....(Name of Tenderer) (hereinafter called “the Tenderer”) has submitted its tender dated _____for (Name of the work as mentioned under Clause 1.1.1 of NIT) hereinafter called the tender.

AND WHEREAS the Tenderer is required to furnish a Bank Guarantee for the sum of **Rs** ____ (____) as Tender Security against the Tenderer’s offer as aforesaid.

AND WHEREAS _____(Name of Bank) have, at the request of the Tenderer, agreed to give this guarantee as hereinafter contained.
3. We further agree as follows:
 - a. That HLL may without affecting this guarantee grant time or other indulgence to or negotiate further with the Tenderer in regard to the conditions contained in the said tender and thereby modify these conditions or add thereto any further conditions as may be mutually agreed upon between HLL and the Tenderer.
 - b. That the guarantee hereinbefore contained shall not be affected by any change in the constitution of our Bank or in the constitution of the Tenderer.
 - c. That any account settled between HLL and the Tenderer shall be conclusive evidence against us of the amount due hereunder and shall not be questioned by us.
 - d. That this Guarantee commences from the date hereof and shall remain in force till _____(date to be filled up) (up to 150 days from the last date of submission of tender).
 - e. That the expression ‘the Tenderer’ and ‘the Bank’ herein used shall, unless such an interpretation is repugnant to the subject or context, include their respective successors and assigns.

4. THE CONDITIONS OF THIS OBLIGATION ARE:

- a. if the Tenderer withdraws his Tender during the period of Tender validity specified in the Form of Tender, or
- b. if the Tenderer does not accept the correction of his tender price in terms of Clause 6.6 of the “Instructions to Tenderers”.
- c. if the Tenderer having been notified of the acceptance of his tender by HLL during the period of tender validity :
 - i. fails or refuses to furnish the Performance Security in accordance with Clause 8.0 of the “Instructions to Tenderers” and/or
 - ii. fails or refuses to enter into a Contract within the time limit specified in Clause 7.5 of the “Instructions to Tenderers”.

We undertake to pay to HLL upto the above amount upon receipt of his first written demand, without HLL having to substantiate his demand provided that in his demand HLL will note that the amount claimed by him is due to him owing to the occurrence of any one or more of the conditions (a), (b), (c) mentioned above, specifying the occurred condition or conditions.

Signature of

Authorized Official of the Bank

Signature of the witness

.....

Name of Official

Designation

Name of the Witness

.....

Stamp/Seal

of the Bank

Address of the Witness

.....

FORM-C

Page 1 OF 2

**FORMAT FOR FINANCIAL BID
(on the letter head of the Company)**

Date:

To:

The Deputy Vice President (Tech.)
HLL Lifecare Limited,
Infrastructure Development Division,
“Adarsh”, T.C 6/1718(1), Vettamukku,
Thirumala PO, Thiruvananthapuram- 695 006.

Sub.: Selection of an Agency for *Design, Construction, Supply, Erection, Testing & Commissioning of STP based on Moving Bed Biological Reactor (MBBR) technology of 2.40 MLD capacity complete in all respects including all contingent Electrical, Mechanical, piping & instrumentation works at JIPMER*

Dear Sir / Madam:

- (i) Being duly authorized to represent and act on behalf of, and having reviewed and fully understood all the requirements of bid submission provided vide the RFP document dated pertaining to Design, Construction, Supply, Erection, Testing & Commissioning of STP based on Moving Bed Biological Reactor (MBBR) technology of 2.40 MLD capacity complete in all respects including all contingent Electrical, Mechanical, piping & instrumentation works at JIPMER, Puducherry, we hereby provide our Financial Proposal for undertaking this Project.

Total cost for undertaking the entire project detailed in Scope of work (clause 2.1 to 2.4 of NIT) and Employer's Requirements (Section IV) of RFP Document. (as per detailed breakup given in Page 2 of 2 Form C)	_____ Indian Rupees (in figures) _____ (in words)
---	--

- (ii) We understand that the Total Bid Value will be considered for determining the lowest Bid and the contract will be based on the Total Cost of Installation.
(iii) We understand that the Annual O&M Cost will be paid on quarterly basis.
(iv) We agree to be bound by this offer if our offer for this project is accepted.

For and on behalf of :
Signature :
Name of the Person :
Designation :

Instructions:

1. No conditions should be attached.
2. In case of difference between the words and figures, words would prevail.

(Should be given in a sealed envelope).

FORM C

Page 2 of 2

Break up of Cost of Design and Build proposal as per RFP document

S.N	Project Component	Cost in INR
1	Total Cost of Civil Construction	
2	Cost of all other components including cost of installation, commissioning and training of personnel	
	TOTAL COST OF INSTALLATION	
3	Annual O&M (24x7) cost for 2 years to be quoted year wise a) I Year (Defect Liability Period) b) II year	
TOTAL BID VALUE		

FORM-D

PAGE 1 OF 2

FORM OF PERFORMANCE SECURITY (GUARANTEE) BY BANK

(Refer Clause 8.0 of “Instructions to Tenderers”)

1. This deed of Guarantee made this day of _____ between Bank of _____ (hereinafter called the “Bank”) of the one part, and HLL Lifecare Limited (HLL), a company incorporated under the Companies Act 1956 with Registered office at HLL Bhavan, Poojappura, Thiruvananthapuram - 695012) of the other part.
2. Whereas HLL Lifecare Limited (HLL), a company incorporated under the Companies Act 1956 with Registered office at HLL Bhavan, Poojappura, Thiruvananthapuram - 695012 has awarded the contract for ----- (Name of work as mentioned under Clause 1.1.1 of NIT) (hereinafter called the contract) to _____ (hereinafter called the Contractor).
(Name of the Contractor)
3. AND WHEREAS the Contractor is bound by the said Contract to submit to HLL Lifecare Limited a Performance Security for a total amount of Rs. _____ (Amount in figures and words).
4. Now we the Undersigned _____ (Name of the Bank) being fully authorized to sign and to incur obligations for and on behalf of and in the name of _____ (Full name of Bank), hereby declare that the said Bank will guarantee HLL Lifecare Limited the full amount of Rs. _____ (Amount in figures and Words) as stated above.
5. After the Contractor has signed the aforementioned Contract with HLL Lifecare Limited, the Bank is engaged to pay HLL Lifecare Limited, any amount up to and inclusive of the aforementioned full amount upon written order from HLL Lifecare Limited to indemnify HLL Lifecare Limited for any liability of damage resulting from any defects or shortcomings of the Contractor or the debts he may have incurred to any parties involved in the Works under the Contract mentioned above, whether these defects or shortcomings or debts are actual or estimated or expected. The Bank will deliver the money required by HLL Lifecare Limited immediately on demand without delay without reference to the Contractor and without the necessity of a previous notice or of judicial or administrative procedures and without it being necessary to prove to the Bank the liability or damages resulting from any defects or shortcomings or debts of the Contractor. The Bank shall pay to HLL Lifecare Limited any money so demanded notwithstanding any dispute/disputes raised by the Contractor in any suit or proceedings pending before any Court, Tribunal or Arbitrator/s relating thereto and the liability under this guarantee shall be absolute and unequivocal.
6. This Guarantee is valid till (The initial period for which this Guarantee will be valid must be for at least 6-months (six months) longer than the anticipated expiry date of Defects Liability Period as stated in **Clause 11.0** of the “General Conditions of Contract”).

FORM D

PAGE 2 OF 2

7. At any time during the period in which this Guarantee is still valid, if HLL Lifecare Limited agrees to grant a time extension to the Contractor or if the Contractor fails to complete the Works within the time of completion as stated in the Contract, or fails to discharge himself of the liability or damages or debts as stated under Para 5, above, it is understood that the Bank will extend this Guarantee under the same conditions for the required time on demand by HLL Lifecare Limited and at the cost of the Contractor.
8. The Guarantee hereinbefore contained shall not be affected by any change in the Constitution of the Bank or of the Contractor.
9. The neglect or forbearance of HLL Lifecare Limited in enforcement of payment of any moneys, the payment whereof is intended to be hereby secured or the giving of time by HLL Lifecare Limited for the payment hereof shall in no way relieve the bank of their liability under this deed.
10. The expressions "HLL Lifecare Limited", "the Bank" and "the Contractor" hereinbefore used shall include their respective successors and assigns.

In witness whereof I/We of the bank have signed and sealed this guarantee on the ----- day of -----
---- (Month) **2014** being herewith duly authorized.

For and on behalf of

The.....Bank.

Signature of Authorized Bank official

Name :

Designation :

Stamp/Seal of the Bank :

Signed, sealed and delivered

for and on behalf of the

Bank by the above

named _____ in

the presence of :

Witness 1.

Signature

Name

Address

Witness 2.

Signature

Name

Address

.....

FORM OF CONTRACT AGREEMENT

(Refer Clause 7.0 of “Instructions to Tenderers”)

This Agreement is made at Puducherry on the _____ day of _____ **2013** Between HLL Lifecare Limited (HLL), a company incorporated under the Companies Act 1956 with Registered office at HLL Bhavan, Poojappura, Thiruvananthapuram - 695012 hereinafter called “Client” of the one part and _____ (Name of Contractor) (Address of Contractor) _____ of _____ hereinafter called “the Contractor” of the other part.

Whereas HLL for and on behalf of JIPMER (Jawaharlal Institute of Post Graduate Medical Education and Research, Puducherry) is desirous that certain Works should be executed, viz. **Design, Construction, Supply, Erection, Testing & Commissioning of STP based on Moving Bed Biological Reactor (MBBR) technology of 2.40 MLD capacity complete in all respects including all contingent Electrical, Mechanical, piping & instrumentation works at JIPMER**, hereinafter called “the Works” and has accepted a Tender by the Contractor for the execution and completion of such works (** as well as guarantee of such works) and the remedying of defects therein. NOW THIS AGREEMENT WITNESSETH as follows:

1. In this Agreement words and expression shall have the same meanings as are respectively assigned to them in the Conditions of Contract hereinafter referred to.
2. The following documents shall be deemed to form and be read and construed as part of this Agreement, viz:
 - (a) Notice Inviting Tender (NIT)
 - (b) Instructions to Tenderers (ITT)(Including Annexures)
 - (c) Special Conditions of Contract (SCC)
 - (d) General Conditions of Contract (GCC)
 - (e) Employer’s requirements
 - (f) Tender submitted by the Contractor.
 - (i) Programme Implementation Schedule
 - (j) Form of Tender with Appendix
 - (k) Letter of acceptance (LOA)
 - (l) Addendums issued, if any including Minutes of Pre Bid meeting
3. In consideration of the payments to be made by Client to the Contractor as hereinafter mentioned, the Contractor hereby covenants with Client to execute and complete the works by ** _____ and remedy any defects therein in conformity in all respects with the provisions of the Contract.
4. Client hereby covenants to pay the Contractor in consideration of the execution and completion of the works and the remedying of defects therein, the Total Contract Price of **Rs _____ being the sum stated in the letter of acceptance subject to such additions thereto or deductions there from as may be made under the provisions of the Contract at the times and in the manner prescribed by the Contract.

5. OBLIGATION OF THE CONTRACTOR

The contractor shall ensure full compliance with tax laws of India with regard to this contract and shall be solely responsible for the same. The contractor shall submit copies of acknowledgements evidencing filing of returns every year and shall keep JIPMER/HLL fully indemnified against liability of tax, interest, penalty etc. of the contractor in respect thereof, which may arise.

IN WITNESS WHEREOF the parties hereto have caused their respective Common Seals to be hereunto affixed / (or have hereunto set their respective hands and seals) the day and year first above written.

For and on behalf of the Contractor

For and on behalf of HLL Lifecare Limited

Signature of the authorized official

Signature of the authorized official

Name of the official

Name of the official

Stamp/Seal of the Contractor

Stamp/Seal

SIGNED, SEALED AND DELIVERED

By the said

By the said

_____ Name

_____ Name

on behalf of the Contractor in the presence of:

on behalf of HLL Lifecare Limited in the presence of:

Witness _____

Witness _____

Name _____

Name _____

Address _____

Address _____

Note :

- * To be made out by JIPMER/HLL at the time of finalisation of the Form of Agreement.
- ** Blanks to be filled by JIPMER/HLL at the time of finalisation of the Form of Agreement.
- *** to be deleted if not applicable

GENERAL INFORMATION

Notes :

- (i) Attach an attested photocopy of Certificate of Registration.
1. Names of the firm:
 2. Legal Status of the Firm: Individual/Association/Joint Venture/Consortium
 3. Registered Address, telephone, Tele-fax.
.....
.....
.....
 4. Contact Person and His Designation and address, email address
.....
.....
.....
 5. Number of years of experience as EPC Developers
 6. Number of STP systems commissioned on turnkey basis during the last seven years with details
 7. Names and Addresses of Associated Companies to be involved in the Project and whether Parent / subsidiary/ others.
 8. If the company is subsidiary, what involvement, if any, will the Parent Company have in the Project?
 9. State the Quality System followed in the Company. Does the company have an ISO 9001 certificate or it follows an internal quality system.

FORM T-II

NUMBER OF SEWAGE TREATMENT PLANTS INSTALLED IN LAST FIVE YEARS

Applicant's Name:

Sl. No.	Location of the STP	Name and address of the Client	System details		Year of installation	SYSTEM TECHNOLOGY	Alone/Join t Venture/ Consortiu m if in a joint venture or consortiu m state the percentag e participati on	Details and documentary evidence on page number
			Capacity	cost				
1								
2								
3								
4								
5								
6								

FORM T-III
PAGE 1 OF 2

KEY PERSONNEL PROPOSED FOR THE PROJECT

(Refer Clause 4.2)

Sl. No.	Sector	Minimum number required	Number of proposed personnel	Education	Proposed Designation	Total Years of Experience	Relevant Experience in years	Details in Annexure on page no.
1.	Project Manager	1						
2.	Site Supervisor-Civil	1						
3.	Site Supervisor- E&M	1						
4.	Technicians (specify trade)	2						
5.	Electrician	2						

Note :

- 1) A summary of the qualification and work experience of each key staff, to be attached.
- 2) The minimum level of supervision and qualification/experience of site-staff is given under **Annexure – A.**
- 3) **CVs** to be submitted for all the proposed personnel in the format provided

CVS OF KEY STAFF

Name of the Staff		
Designation		
Name of the firm presently employed		
Years with the firm		
Proposed position		
Details of task assigned		
Man- Months budgeted for the task assigned		
Key Qualifications		
Education		
Employment Record		
Name of the Firm	Position Held	Years of Employment

FORM T-IV
PAGE 1 OF 2

FINANCIAL DATA – STP OF ADVANCED TECHNOLOGY INSTALLED

(Refer Clause 4.2)

Total value of STPs installed on Turnkey basis during the last five financial years (For each member in case of Group):

S.No.	Description	2012-13	2011-12	2010-11	2009-10	2013-14
(1)	(2)	(3)	(4)	(5)	(6)	(7)
1.	Total value of Projects					

-
- Attach attested copies of the Audited Financial Statements of the last five financial years as Annexures. **Financial Values to be given in Crores of Rupees.**
-

FORM T-IV

PAGE 2 OF 2

FINANCIAL DATA

(Refer Clause 4.2)

List of all Ongoing Contracts

Name of the applicant (constituent member in case of Group)	Total number of works in hand	Number of contracts of each type			Number for which applicant went in for		Number of contracts in which date of completion given in the original has already burst	**Total value of balance works yet to be done in 2014-15Rupee equivalent in Crores
		A. STP	B. ETP	C. O&M	Arbitration	Litigation		

Applicant (each member of the group) should provide information on their current commitments or all contracts that have been awarded or for which a letter of intent or acceptance has been received or for contracts approaching completion but for which a completion certificate is yet to be issued.

** This figure should also include the year-wise break-up of part value of works to be executed in the year even if completion of such works spills over beyond the year.

FINANCIAL DATA FOR ASSESSMENT OF NET WORTH ETC.

YEAR	2013-14	2012-13	2011-12	2010-11	2009-10
Net Working Capital					
Net Cash Flow					
Annual Turnover					
Profit /Loss					

Attach documentary evidence in support of the data clearly marking the relevant portion.

FORM T-VI

PAGE 1 OF 1

PERFORMANCE REPORT OF WORKS (On Clients' Letter Head)

1. Name of work/ Project and location
2. Agreement No.
3. Contract Value
4. STP / ETP details
 - a. TECHNOLOGY
 - b. CAPACITY
5. Date of Start
6. Date of Completion
 - a. Stipulated Date of Completion
 - b. Actual Date of Completion
7. Amount of Compensation levied for delayed completion if any
8. Performance report

a. Quality of work	Very Good/ Good/ Fair/ Poor
b. Financial soundness	Very Good/ Good/ Fair/ Poor
c. Technical Proficiency	Very Good/ Good/ Fair/ Poor
d. Resourcefulness	Very Good/ Good/ Fair/ Poor
e. General behaviour	Very Good/ Good/ Fair/ Poor

Date:

Authorised Signatory (with stamp)

Annexure –A

DESIRED SITE ORGANISATION STRUCTURE

MINIMUM LEVEL OF SUPERVISION AND QUALIFICATION/EXPERIENCE OF KEY STAFF IS
AS FOLLOWS:

S.No.	DESIGNATION	QUALIFICATION	EXPERIENCE LEVEL
1.	Project Manager (Team Leader)	Engineering/Management Graduate with knowledge of MS Project/ Primavera	Minimum 5 years as Project Manager of similar works with a Minimum total experience of 15 yrs.
2.	Site supervisor a. Civil engineer b. Electrical & Mechanical Engineer	Graduation/Diploma in concerned Disciplines	Minimum site supervision experience Graduate – 2 years, Diploma Holders – 5 years

SECTION III

SPECIAL CONDITIONS OF CONTRACT

Sl. No.	Reference to GCC Clause No.	<u>Modified Clause</u>
1.	Name of the Work	Name of the Work shall be as per Clause 1.1.1 of NIT
2.	1.4 Law and Language	<p>The Contractor shall keep a suitably qualified person at the Site who is fluent in local language and is able to interact with local people.</p> <p>In addition to this, any document, which is in any language other than English, shall be translated to English and certified.</p> <p>The Contractor shall familiarize himself with the local laws and administration of Puducherry and comply by them.</p>
3.	2.1 Right of Access to Site	The Employer shall give right of access of Site to the Contractor within 15 days of the signing of the Contract Agreement.
		<p>The Contractor, after obtaining any necessary consent from any relevant authority, shall submit to the Engineer, proposals showing the layout of pedestrian routes, lighting, signs, and guarding any road opening or traffic diversion which may be required in connection with the execution of the Works and which the Contractor intends to construct. Any consent given by the Engineer to such proposals shall not relieve the Contractor of any obligation under the Contract or absolve the Contractor from any liability for or arising from such proposals or the implementation thereof.</p>
4.	4.1 Contractor's General Obligations	<p>The Contractor's proposals for erection of all ancillary and temporary works shall be in conformity with the proposals submitted along with the tender and modifications thereto as approved by the Engineer.</p> <p>The Contractor shall submit drawings, supporting design calculations where called for by the Engineer and other relevant details of all such works to the Engineer for approval at least one month before he desires to commence such works. Approval by the Engineer of any such proposal shall not relieve the Contractor of his responsibility for the adequacy of such works.</p> <p>No extra payment will be made for complying with the provisions of this clause and the cost of such works shall be deemed to be included in the contract price.</p>

		This submittal shall be made minimum one month before the Works are to be carried out to give the Engineer and the Employer reasonable time to examine the drawings or other documents, to prepare comments and for any changes to be accommodated by the Contractor.
		The installation shall be in conformity with the Bye-laws, Regulations and Standards of the local authorities concerned in so far as these become applicable to the installation. But if these Specifications and Drawings call for a highest standard of materials and / or workmanship than those required by any of the above Regulations and Standards then these Specifications and Drawings shall take precedence over the said Regulations and Standards. However, if the Drawings or Specifications violate any Bye-Laws and Regulations, then the Bye-Laws and Regulations shall govern the requirement of this installation.
5.	4.2 Performance Security	<p>The Contractor shall submit a performance security equal to 10% of Contract value within 30 days of issue of letter of acceptance</p> <p>The Performance Security should be submitted in the form of a Bank Guarantee from a scheduled commercial bank in India in the format supplied for bank guarantees in the Contract.</p>
6.	4.6 Setting out	<p>The contractor shall survey the location, set out the STP maintaining vertical & horizontal clearances and keeping in view important site references and obligatory locations in consultation with Engineer.</p> <p>The Contractor shall establish at his cost, at suitable points, additional reference lines and bench marks as may be necessary. The Contractor shall remain responsible for the sufficiency and accuracy of all his benchmarks and reference lines. He shall take precautions to see that lines, points and bench marks fixed by the Engineer are not disturbed by his work and shall make good any damage thereto.</p>
7.	4.7 Safety Procedures	The Contractor shall not disturb the ongoing activities of the Institute. He shall take care that his activities do not result in any kind of accidents, spread of any infection etc in the campus. At the same time he shall as well ensure that his personnel are safe and do not get any infection from the hospital activities.
		The obligations and requirements for safety and industrial health under this Contract are entirely without prejudice to, and do not derogate from, the Contractor's statutory obligations, with respect to safety and industrial health.

8.	4.10 Sufficiency of the Contract Price	The responsibility of Contractor under sub-clause 4.10 of General Conditions of Contract is full and final and no claim by the Contractor for additional payment or extension of time shall be allowed on the ground of any misunderstanding or misapprehension by the contractor or that incorrect or insufficient information was given to the Contractor or that he failed to obtain correct and sufficient information.
9.	4.12 Right of Way and facilities	The Employer shall provide right of way to the Contractor within its land for the purpose of executing the Contract.
10.	4.13 Avoidance of Interference	The Contractor shall maintain a safe environment for patients, personnel and public. The Contractor shall ensure that his employees do not leave the Site at any time without the permission of the Engineer. The Contractor shall ensure that the vehicles, machines and equipment, which he uses, are safe and do not cause any harm to patients, students or personnel.
11.	4.13 Avoidance of Interference of Quiet Operation and vibration isolation	All equipment shall operate under all conditions of load without any sound or Vibration, which is objectionable and beyond the limits specified by the relevant laws. In case of rotating machinery sound or vibration noticeable outside the room in which it is installed or annoyingly noticeable inside its own room shall be considered objectionable. The Contractor at his own expense shall correct such conditions.
		Existing roads and other public roads may be used by the Contractor at his risk and cost to carry out construction activities, with prior approval of the competent authority. The Contractor shall repair any damage to the road or bear the cost thereof due to movement of contractor's plants and equipment, vehicles etc. to the specifications and satisfaction of road authorities as well as of Engineer. The Contractor shall plan transportation of construction materials to work site in accordance with traffic regulations enforced by local traffic authorities from time to time and in such a way that road accidents are avoided and minimum inconvenience is caused. No claim whatsoever shall be entertained on this account. The transportation of certain equipment and materials and launching may not be possible during day and may have to be carried out within time schedule specified by traffic police.
		The Contractor must note that the installation is to be done in a working hospital and ensure that no part of his works interfere or damage or cause harm to the existing activities of

		<p>the institute.</p> <p>The Contractor shall ensure that the noise levels are not high and do not disturb the patients inside the hospital and academic activities.</p> <p>Proper barricading shall be provided to ensure the safety of works and public.</p>
12.	4.16 Contractor's Equipment	For any imported equipment or part thereof offered by the Contractor, he will have to make his own arrangements for import formalities and procurement of equipment without involving the Employer in any way for any clearance certificates/licenses/assurances.
		The Employer may assist (but is not obligated to) the Contractor, where required, in obtaining clearance through the Customs for Constructional Plant, Materials and other things required for the Works.
		The contractor shall obtain all permits / licenses and pay for any and all fees required for the inspection, approval and commissioning of their installation.
13.	4.17 Protection of Environment	The Contractor shall not cut or destroy any tree in the campus to the maximum extent possible. In case any tree is to be cut he shall obtain prior permission from the engineer and shall plant equal number of saplings or adhere to the requirements of the prevailing Environmental laws which ever is more stringent. The Contractor shall use all means to minimize the effluents from his construction work and transportation activity or any other activity in the course of the Project.
14.	4.19 Employer's Equipment	The Employer shall supply no material, tools, plant and equipment. The Contractor shall arrange all tools, plant, equipment as well as the required construction materials.
15.	4.22 Contractor's Operations on Site	All construction debris shall be removed from site daily or as they accumulate. All surface and sub-soil drains at the site shall be maintained in a clean, sound and satisfactory state of performance.
16.	4.23 Fossils, Discoveries and Items of Value	The Contractor must note that the project may involve some items of demolition. If during such works, the Contractor finds any items of Salvage Value, which can be sold, he shall indicate the same in the monthly progress report submitted to the Employer and sell it off only after the approval from the Employer. The payments shall be adjusted accordingly as per the decision of the Engineer.
17.	5.1 General Design Obligations	The contractor shall submit his preliminary design and make a presentation to the Employer within 21 days from the date of issue of letter of acceptance as mentioned in Clause 1.3 of

		<p>Instructions to Tenderers.</p> <p>If the Engineer has reasonable cause for being dissatisfied with the Contractor's design, drawings or documents the Engineer shall, within a period of 21 days from the date of submittal, require the Contractor in writing to make such amendments thereto as the Engineer may consider necessary. The Contractor shall make and be bound by such amendments at no additional expense to the Employer and shall resubmit the amended drawings or documents for the Engineer's approval for the execution of Works within next 21 days.</p> <p>No extension of time or extra payment shall be given to the Contractor to comply with the above.</p>
		<p>Should it be found at any time after notification of consent that the relevant drawings or documents do not comply with the Contract or do not agree with drawings or documents in relation to which the Engineer has previously notified his consent, the Contractor shall, at his own expense, make such alterations or additions as, in the opinion of the Engineer, are necessary to remedy such non-compliance or non-agreement and shall submit all such varied or amended drawings or documents for the consent of the Engineer.</p>
18.	5.2 Contractor's Documents	<p>The Contractor shall submit the following in addition to the documents stated in the contract, with his design:</p> <ol style="list-style-type: none"> Detailed drawings including the structural drawings (where necessary), component drawing etc. Consolidated statement in a tabular form for the Standards and Specifications being followed in the design and for materials to be used List of vendors from whom the materials are proposed to be procured Tests required to be carried out in the contract Outline safety plan for the site and an outline quality plan
		<p>The Contractor shall include in his design, in addition to operational needs, considerations of provisions for infection control, life safety, and the progress of the Project as detailed out in Employer's Requirements.</p>
		<p>The Contractor shall satisfy himself that the Design Data, in the case of submissions up to and including the proposed Design, comply with the Employer's Requirements and is in accordance with, and incorporates the Contractor's Technical</p>

		<p>Proposals.</p> <p>In the case of submissions subsequent to the proposed Design, the Design Data shall be in accordance with Employer's Requirements and the accepted Design.</p>
19.	5.5 Training	<p>The Contractor shall arrange training sessions for the Employer's Personnel for using the machinery and equipment especially the operation of the system and its components.</p>
		<p>The Contractor shall submit to the Engineer-in-charge a draft copy of comprehensive operating instructions maintenance schedule and log sheets for all systems and equipment included in this contract. This shall be supplementary to manufacturer's operating and maintenance manuals. Upon approval of the draft, the contractor shall submit four (4) complete bound sets of printed operating instructions and maintenance manuals.</p> <p>The contractor shall also train the institute personnel, to operate the plant and carry out routine checks, during the period of installation and testing.</p>
20.	6.0 Equipment	<p>The Contractor shall bear all charges for the order, purchase, transport, supply erection and commissioning of the equipment including taxes, duties etc wherever applicable and the same shall be deemed to have been included in his Contract price.</p> <p>The Employer, wherever feasible, may at his discretion, assist the Contractor in getting the approvals for import</p>
21.	7.2 Rates of wages for labour	<p>The Contractor must familiarize himself and comply with relevant labour laws like Minimum Wages Act, 1948 and Contract Labour (Regulation and Abolition) Act, 1970 etc. No extra payment whatsoever shall be made to the Contractor to comply with the rules and laws.</p>
22.	7.5 Working Hours	<p>No works shall be carried out in the nights except as permitted by the Engineer under exceptional circumstances.</p> <p>Lighting and Fire Protection: Where night working is permitted by the Engineer to facilitate the Contractor's Work operations, temporary lighting equipment as per approved layout shall be provided, installed, maintained for the duration of the contract and removed after completion of work by and at the expense of the Contractor.</p> <p>No extra payment will be made to the Contractor for the provision of temporary lighting and fire prevention measures.</p>
23.	7.6 Facilities for staff and labour	<p>The Contractor shall provide at his own expense, all necessary accommodation and the welfare facilities for his staff and labour. This includes good practices like provision of</p>

		temporary crèche (Bal Mandir) where 50 or more women are employed at a time. The Contractor at his cost shall maintain all accommodation in a clean and sanitary condition.
		The Contractor shall prepare and submit compliance reports of adherence to labour laws as and when desired by the Engineer.
24.	9.2 Time for Completion	Time for Completion of the entire project is 9 months from the date of issue of Letter of Acceptance.
25.	9.3 Program	<p>Activities in the initial works programme would be arranged as per the Works Break Down Structure (WBS) of the work developed by the contractor in consultation with and approved by the Engineer.</p> <p>The Contractor will prepare Programme based on Computerized CPM network using the Precedence Diagramming Method within 30 days of award for approval as 'Baseline Programme' The base line program shall clearly reflect interface and access dates for other civil/ system-wide contracts.</p> <p>After the work has started, the Contractor shall deliver in the first week of every month to the Engineer an update of the Programme showing changes, if any, in planning or progress scheduling and reflecting the progress of all the activities of the network and the project status as at the end of previous month.</p> <p>Detailed Network Plan (Works Programme)</p> <p>Detailed Network Plan shall be prepared by the Contractor for each and every activity within the same time frame and in the same sequence as indicated in the Baseline Programme. Activity at this level shall not be more than 15 days duration, except for summary items like procurement/ mobilization etc.</p> <p>The Engineer's monitoring team will have access to all the data/information of the Contractor, required for the assessment of the progress and monitoring. If necessary, the monitoring team will visit the Vendor/Contractor's works in order to assess the status of critical activities.</p> <p>The Employer or the Engineer will hold periodic Project Status Review Meetings. The Contractor shall depute his Engineers/Managers at appropriate level as decided by the Engineer to attend the Review Meetings.</p> <p>The Contractor shall provide additional inputs whenever the PERT-CPM diagram indicates a possible slippage in the completion schedule. Such additional inputs may require supplementing of equipment, personnel, work in excess of the normal work per day, and work in excess of the normal</p>

		work per week or other resources. Provisions under Sub-Clause 8.7 of General Conditions of Contract will be applicable in cases of delays due to Contractor.
	Penalty	<p>Should there be any delay in the achieving any milestone as per the 'Baseline Programme' referred to in the previous clause, the Contractor shall be liable to pay penalty for the delay to an extent of Rs. 1,000 per day to the Employer.</p> <p>This penalty shall be in addition to liquidated damages if any, which shall be incurred if the performance of the Contract is delayed.</p> <p>This penalty shall not relieve the contractor from his obligation to complete the Works or from any other of his obligations and liabilities under the Contract.</p>
26.	10.0 Tests on Completion	The Contractor shall in addition to the tests instructed by the Engineer, carry out the tests on Completion for the equipment installed in the different departments of the Facilities after Substantial Completion of the Project as per the Manuals.
27.	12.0 Defects Liability Period	Defects Liability Period for the purpose of the Contract shall be in accordance with Clause 1.3 of Instruction to Tenders.
28.	15 Contract Price and Payments	<p>The Contract price shall be a lump sum price mentioned in the Letter of Acceptance.</p> <p>The Contractor shall not be paid any charges towards any taxes or duties etc. Sales Tax/VAT (except Service Tax), Building and other Construction Workers' Welfare Cess or any other tax or cess in respect of this contract shall be deemed to have been included in the Contract price.</p> <p>The Employer reserves the right to conduct any post payment audit, which he considers appropriate.</p>
	Post Payment Audit	<p>The Employer reserves to himself the right to carry out a post payment audit and/or technical examination of the Works and the Final payment including all supporting vouchers, etc., and to make a claim on the Contractor for the refund of any excess amount paid to him, if as a result of such examination, any overpayment to him is discovered to have been made in respect of any work done or alleged to have been done by the Contractor, under the Contract.</p> <p>If any under payment is discovered, the Employer shall pay the same to the Contractor. Such payments or recoveries shall not carry any interest.</p>
		The Contractor is required to pay all taxes, levies etc for the Works and shall be deemed to have included the same in his Contract Price.

SECTION IV

EMPLOYER'S REQUIREMENTS

1. Introduction to the project

Jawaharlal Institute of Post Graduate Medical Education and Research, Puducherry, intends to replace the existing sewage treatment plants by installing a **2.4 MLD STP based on MBBR Technology** to cover the existing and proposed buildings in its campus.

The project shall be carried out on Turnkey basis, where the selected agency shall be responsible for the all aspects of the implementation of the project including the planning, design and construction of ancillary structures, as well as procurement, installation and commissioning of the system in accordance with the Employer's Requirements.

The Project is scheduled to be completed within a period of 9 months from the date of award.

2. Scope of Work

Scope of the work shall include the following activities.

- i. Design and engineer the STP to be operator friendly and for the operator's safety, health and hygiene.
- ii. The tender is for turn-key job where it will be the responsibility of the contractor to hand over a completely functional unit complying with Central Public Health and Environmental Engineering Organisation (CPHEEO) Manual/Guidelines and PCB norms and with all necessary components
- iii. **It will be the responsibility of the intending bidder to assess the hospital effluent quality parameters for appropriate design of the STP.**
- iv. Design & installation of all civil structures for the system.
- v. Getting the required approvals, permissions, NOC from the statutory / government agencies.

- vi. All aspects of quality assurance, including testing of equipment and other components of the work
- vii. Project Management to ensure completion of Project as per timelines.
- viii. Submission of Operators' Manual and training of personnel.
- ix. Submission of the completion ('as-built') drawings and other related documents along with a soft copy any related software.
- x. Making good any defect during the Defects Liability Period

2.2 Though the capacity of the STP is indicated as 2.4 MLD, the contractor shall estimate the required capacity taking into account the existing facilities, the ongoing projects and the future demand.

3.0 SEWAGE TREATMENT PLANT (STP):

The components specified in this document are only indicative. This does not absolve the contractor from his responsibility for design adequacy and meeting desired discharge standards as per PCB Norms. Any other data required for designing the treatment plant shall be generated / collected by the contractors on their own.

3.1 Component units:

- Component unit Receiving chamber
- Screening/screen channels
- Grit removal channel
- MBBR One process train having adequate number of reactors in series.
- Flocculation Tank with Polymer / Alum dosing tank
- Secondary clarifier
- Filter feed Sump
- Filter feed pumps
- Pressure Dual media filter
- Filter Back wash water pumps
- Hypo Chlorine Shed and Chemical storage Room
- Hypo dosing tanks with mixers & Pumps
- Treated water collection cum chlorination tank
- Treated Effluent pumping sets
- Sludge blending sump
- Sludge thickener feed pumps
- Sludge holding tank
- Sludge drying beds feed pumps
- Sludge drying beds Minimum 4in No.

- Excess Sludge Platform
- MCC Room
- Generator
- Blower platform
- Interconnecting pipes, gates, valves, weirs, valve chamber, hardies channels for conveyance of wastewater, sludge and filtrate.
- Stairs as per requirement, Railings along the walkways, platforms
- Painting to all the above units, wherever required
- Walk-way with railing around all the structures higher than 1.00 m above Formation Level .(Provided in such a manner so as to have easy movement from one structure to other , otherwise individual stair case with railing to be provided.)

3.2 Receiving Chamber: Inlet chamber shall be designed for flow of 2.40 MLD. The entire construction will be in RCC M- 30 (Minimum). CI puddle flange of main header pipe size shall be provided at bottom of chamber for connecting raw sewage delivery. 100 mm CI pipe with flanged sluice valve of same size shall be provided for scouring during maintenance. There shall be a platform of 1.2m wide all around the receiving chamber with railing as per specifications.

3.3 Screening Channels: There shall be two manually operated screening channels (one working and one stand by) each designed for peak flow considering design Flow of 2.40 MLD. The materials of construction for screens shall be SS-316 flat. The screens will have 6 mm clear spacing between two bars each of 10mm thickness & 25 mm depth. Designed velocity through screen shall be between 0.6 M/sec to 1.2 m/sec. Each screen channel shall have a down take CI DF (100mm) pipe with a S.V. to drain out sewage into a collecting chamber from where it will be discharged into the sump of existing main pumping station through external sewerage system. The angle of inclination of the manual bar screen with the horizontal shall be 45 to 60°. The assembly (bars and frames by using ISLC, 75 mm x 40mm x 6mm) shall be installed in such a way that it can be installed and removed as and when required. The parts other than stainless steel shall be given two coats of epoxy paint. There shall be a platform of 1.2m wide all around the screen chamber with railing as per specifications. RCC stairs 1.00 m wide for climbing up from ground level to platform and connecting inlet chamber, screening chamber, grit channel, collecting sump & MBBR shall be provided. Hot dip galvanized or epoxy coated MS Chute for screening disposal up to tractor trolley level is to be provided. If all the structures cannot be approached with one stair, another RCC stair shall be provided for proper approach and as decided by the Engineer in Charge. There shall be one number CI sluice gate at each inlet of the screen channel with manually operated gear to regulate the flow of raw sewage. Free board Minim.: 500 mm. Minimum channel length ahead of bar screens shall be three times the depth of flow or 1.50 m whichever is greater.

All other accessories, whether specified or not, but functionally required shall form part of contractors scope.

3.4 Grit Removal chamber: The grit particles in the sewage need removal to protect mechanical equipment from abrasion. Manually cleaned grit chamber should be provided with adequate capacity to store the grit between intervals of cleaning. There shall be 2 numbers (one working & one stand by) Grit channels, operated manually and each designed for a Flow of 2.40 MLD. There shall be sufficient space for storage of two days grit in each grit channel. Floor shall have 1.0% slope towards the inlet of the grit channel having a hopper in the end with cast iron sluice valve of 150 mm diameter for withdrawal of grit at a suitable height in the tractor trolley for disposal. Below the down take pipes a brick masonry collection chamber shall be constructed from where the spillage and drain water will be discharged into the external sewerage system. There shall be 1.2 M wide platform all around the grit channel/chamber with pipe railing and cast iron rungs for going inside the chamber for cleaning and maintenance purpose. There shall be a suitable platform for operation of 150 mm diameter S.V. ISI marked at the hopper of grit chamber operation. Proportional weir as flow control device to be provided in grit channels. Proportional weir shall have free fall so that it never works under submerged conditions.

All other accessories, whether specified or not, but functionally required shall form part of contractors scope.

3.5. Collection Sump/MBBR feeder channel : There shall be one collection sump of suitable size (Min. 20 seconds HRT at designed flow) constructed in RCC M-30 (min. with 500 mm free board) and with 100 mm i/d CI D/F drain pipe with CI D/ F SV of the recommended make for scouring in a separate manhole . The sump shall be connected to MBBR for feeding the influent.

The bed level of this sump shall be so maintained that it is 30 cm. (minim.) above the FSL of the MBBR. This is to avoid the entry of media in the channel through the inlet pipe.

All other accessories, whether specified or not, but functionally required shall form part of contractors scope.

3.6. Moving bed Biofilm Reactor (Aerobic Attached Growth Biofilm Reactor) The sewage shall be conveyed to MBBR unit for treatment. The concept underlying the MBBR is to provide continuously operating Bio-film reactor, which is non-clogging, does not require back washing and has a very low pressure drop. This is achieved by growing bio- film on smaller carrier elements that move along with the waste water in the reactor. The air stream constantly keeps the bio-media in suspension and at the same time provided required oxygen to the biomass. Reactor shall be designed for single stream operation with 2 reactors in series, liquid depth not less than 5.00 m and free board not less than 1.00 M. The bioreactor shall be designed to treat the sewage with aerobic attached growth moving bed process. Total HRT of the reactor shall be 2 hours to 2-1/2 hours. The reactor shall be rectangular in shape and constructed in RCC (M-30) (minimum) of suitable size to take the organic and solid load in the raw sewage and to deliver consistently the outlet sewage quality as per treated waste water quality mentioned. There shall be a 1.00 m wide platform with pipe railing all around the reactors and a RCC Stair of 1.00 m width which can be common with the primary unit. Reactor shall have

minimum 100 mm diameter cast iron ISI marked pipe with ISI marked S.V. in a separate valve pit having provision for extended rod with wheel for scouring. CI rungs in all valves chambers and reactor, for maintenance and shall be connected to common pit or sump for drainage of reactors in to the main sump by gravity. Suitable sieve shall be provided in scour pit to prevent escape of media. There shall be suitable piping arrangement with valves/gates for by passing reactors. The media shall be of virgin HDPE (white) with 0.95 ± 0.02 specific gravity non degradable and UV Stabilized. The media quantity shall be adequate to provide sufficient surface area for maintaining the microbial strength as required achieving the quality. Nominal carrier dia. should be around 25 mm and depth equal to 10 mm. The BOD loading on media shall not be taken more than 1.50 kg of BOD/100 sqm of media surface area of MBBR media /Day for designing purpose and the volume of media (carrier fill) shall not be less than 25% volume of the reactor in the tank. The surface area of media to be used for designing purpose shall not be more than 500 Sqm/cum where as in actual it shall not be less than 600 sqm /cum of approved make . If necessary, the sample of the media shall be drawn by the concerned Engineer- in- charge and be got tested from the lab. Of their choice. The oxygen requirement for BOD removal shall not be less than 1.00 kg Oxygen/Kgs. of BOD5 removed. The air quantity required shall be sufficient for maintaining minimum 2 PPM necessary dissolved oxygen at 200 C liquid temperature at all times. The diffusers used shall be suitable for coarse bubble air diffusion and for design purpose Oxygen transfer efficiency shall be considered not more than 15%. The air agitation or diffusion is to be applied continuously to circulate the media and keep in suspension. The RPM of the blowers & motors shall not be > 1500. Cylindrical Sieves in SS-304 construction shall be provided at the outlet of each reactor to retain the media. The sieves shall be sized for max. flow. The inflow & outflow in each compartment shall be opposite to each other . The launder shall be provided with suitably designed weir to maintain control on the water level in the MBBR. For MBBR unit, BOD loading has to be considered for raw sewage quality. MBBR parameters given in the tender are only indicative. In case if any change is required to amend the design the bidder should include the same in his offer to achieve the desired standards at outlet of filter. After the launder the reactor shall be connected to a Flocculation tank and then to secondary clarifier through DI pipe . The pipe from the Flocculation tank to clarifier shall be designed for a velocity not > 0.90 m /sec and shall be CI /DI. The approach velocity for computation of the sieve area shall range between 0.006 to 0.009 m/sec. at designed flow. Accordingly length and numbers of the sieves shall be provided.

3.6.1 Diffusers & Air Blowers: Diffusers shall be submerged coarse bubble, high transfer efficiency, low pressure type, low energy consumption, low maintenance, non-buoyant type. The coarse aeration system with diffusers shall be so arranged to provide a mixing pattern that causes the media to be thoroughly mixed through the whole depth and area of the oxic volume and shall prevent media from floating at the tank surface. For design of aeration system value of α (oxygen transfer correction factor) shall be considered as 0.80 and value of β (salinity correction factor) shall be considered as 0.95. The bubble diameter should be of 6 to 12 mm. Material of construction of diffusers and the entire under water system including accessories shall be of non-corrosive and abrasive resistant material. The entire piping for distribution of air in reactor shall be of SS – 304 material only. All the pipes in reactor shall be of SS-304 and

the pipes outside (not in contact with sewage) can be of epoxy coated GI(Class B) or of SS. The inlet arrangement to the reactors shall be provided in such a fashion so as to bypass one compartment and to bypass all the reactors, if so required.

3.6.2 Air blowers: The air shall be supplied using positive displacement rotary type air blower out door type with acoustic enclosure minimum 3 in numbers (2 working + 1 Stand by) each of 50% capacity. The capacity and head for the blowers shall be decided on the basis of S.O.R. requirements of diffusers as specified elsewhere duly considering the losses between the governing point of delivery (diffusers) and the blowers. Blowers shall be complete with motor and accessories like base frame, anti-vibratory pad, silencer, non-return valve, air filter, blow-off valve, silencer, acoustic enclosure, embedded instruments etc; as per requirements. Vibrations due to air blowers shall be minimised to avoid damage to structures. Further, blowers shall have acoustic enclosures to ensure that the noise level at 1.00 M from blowers is below 85 db level.

All other accessories, whether specified or not, but functionally required shall form part of contractors scope.

3.7 Flocculation Tank: The entire construction shall be in M-30 grade concrete and as per IS:3370. RCC access platform OneMtr wide with railing as specified shall be provided. RCC stair/MS ladder shall be provided for access from the GL to the top of the unit and to the operating platforms. OR alternatively unit shall be connected with other units of the STP for easy access. The tank shall be provided with Flocculation Tank Mechanism having turbine type impellers and solid shaft in SS-316 MOC, coupled to motor through reduction gear box.

All other accessories, whether specified or not, but functionally required shall form part of contractors scope.

3.8. Clarifier: The clarifier should be designed for 2.40 MLD flow. The unit shall be constructed in RCC (M-30) with 50 mm thick IPS (1:1 ½:3) smooth floor finish over the base slab. The flow shall enter in a RCC central pier with outlet ports at FSL and distributed radially in to the unit and outlet shall be through SS-304 V-Notch type weir. The clarifier shall be designed at 14.00 cum/ sqm /day surface loading and solids loading at average flow @ 70 kg/day at 6000 MLSS with SWD not less than 3.00 M. The free board shall be 500 mm . Clarifier shall be provided with inlet DI pipe of suitable size with central column and inlet drum of diameter not less than 10% of clarifier diameter. Inlet apertures should be positioned from approximately 2.00 M depth to mid tank depth. Inlet port velocities shall be in the range of 0.075 to 0.15 mtr. per second. The circular secondary settling tank with peripheral driven centrally supported MS bridge with suspended scrappers (SS 304) shall be provided having minimum 1.2 m wide walkway with 6 mm thick chequered plate/grating. The maximum weir loading on V-Notch shall be 185 cum/m/day .The bridge shall have a suitable arrangement for scum scrapping at the top of the water level with a separate launder inside the outer periphery wall with separate pit and pipe for discharge of scum. The sludge hopper will be designed to collect the sludge and allow moving towards drain pit with mechanical scrappers. The solids separated shall be drained out with established frequency for further disposal. There shall be

150 mm diameter CI S.V. with sludge decanting system, telescopic type, for continuous sludge bleeding and scouring of the settling tank. The valve shall be installed in a separate pit with rungs as provided in the MBBR as above.

3.8.1 Rotating Scraper Bridge and Accessories:

The scrapers blades and the Rotating/Bridge provided by the contractor shall generally be manufactured in Stainless steel. The rotating bridge structure shall incorporate a walkway having a minimum effective width of 120 cm, which shall be surfaced with M.S. 6mm thick chequered plates, painted black. The bridge shall be designed to take its own dead weight together with uniformly distributed load of 250 kg/sqm over the full span and width of the walkway bridge and a moving point load of 500 kg. Maximum deflection of the bridge under the specified loading shall not exceed 1/360th of the span. The positive camber shall be kept initially to compensate for the maximum deflection under dead weight and superimposed loads. The bridge shall be so braced as to limit lateral deflection to less than 80 mm measured at mid – span under a full load condition. The bridge shall have hand railing to both sides forming an enclosure at the center in between. The finished height of the railing shall be 1m above the walkway. Toe guards shall be provided and secured around the bridge walkway: which shall not be less than 100 mm high and 5 mm thick. The bridge structure shall be supported at the peripheral walls of clarifier and & in central shall be guided by means of central bearing assembly. Oil fills and drain points, where applicable shall be extended to provide a convenient access for filling and draining the system. Catch drains shall be provided under all oil and grease points to prevent spillage from reaching the water surface. The wheel carriage assembly shall be suitably proportioned to provide adequate stability to the rotating bridge structure, whilst providing the suitable base for the motors gearbox, driving and idling wheels, shafts and bearing. The bridge drive shall comprise of either (a) motor with reduction gear a chain sprocket or (b) a geared motor. The assembly shall be rigidly mounted and shall be adequately rated for continuous service in a sewer treated works environment. All lubrication points and all necessary provisions shall be made for routine maintenance and for prevention of oil and grease spillage. A deflector shall be provided and fitted to the leading edge of the driving carriage. Scrapers shall be suspended and arranged to give continuous and progressive scrapping. The configuration of blades shall be designed to carry sludge and deposited suspended solids from the periphery of the tank and deposit it efficiently in the withdrawal hopper/sludge pocket. The number and length of individual blades shall be designed by the contractor but the depth shall not be less than 300 mm and the thickness not less than 6 mm. Renewable fabric reinforced rubber wearing strips of cross section not less than 12mm x 100mm shall be fitted to each blade to provide a continuous contact surface which is adjustable for wear. The material shall have hardness not greater than 40 and be manufactured from well proven compound.

Backing strips shall be fitted to give support to the fixing of the rubber wearing strips and the assembly shall be secured by means of galvanized bolts. Appropriate washers shall be fitted beneath all bolt heads and nuts. The top connections shall permits the blades to follow slight undulations in the tank floor. The bottom connections shall allow the blades to maintain

contact with the floor throughout its length, while accommodating slight variations in the radial plane of the tank floor. The electrical supply to bridge drive motor shall be taken through a multi ring and slip ring collector unit mounted in a fully water proof enclosure. The unit shall be fitted at the center of rotation of bridge and shall be complete with all necessary support brackets anti-rotation device. A suitable means of lubrication shall be provided. The Slip ring assembly shall be mounted above the top level of the tank walls. Sufficient rings shall be included to cover the motor supply and any ancillary circuits. Bridge drive and Flocculation motors shall be of squirrel cage type, protected and shall be need 15% above design duty. All cables shall be connected to a termination box at the wall of the clarifier. From there cables will be connected to the main control panel. The bridge drive shall be controlled from an outdoor panel installed in the central part of the bridge.

3.8.2 Material of Construction:

- | | | |
|--------------------------------|---------------------------------|--------|
| • Tank | RCC (M-30) (minimum) | |
| • Feed well | SS-316 | |
| • Bridge | MSEP | |
| • Rake Arm | SS-316 | |
| • Vertical shaft / Center cage | | SS-316 |
| • Blades | SS-316 | |
| • V-notch weir | FRP/SS-316 | |
| • Squeegees | Neoprene | |
| • Platform | MS Chequered plate/Grating | |
| • Handrail | 40 NB MSPVC coated. | |
| • Vertical post | CI | |
| • Scum skimmer | SS-316 | |
| • Scum Box | SS-316 | |
| • Scum Baffle | | SS-316 |
| • Anchor Bolt | | SS-316 |
| • Fasteners— under water. | SS-316 Fasteners – Above water. | SS-316 |

All other accessories, whether specified or not, but functionally required shall form part of contractors scope.

3.9. Filter feed sump: Overflow water from the clarifier shall be collected in an intermediate clarified water sump, This sump acts as a buffer tank between the secondary and the tertiary treatment stages in an STP. The filter inlet sump made of RCC shall be provided to feed sewage to filter on continuous basis. In a well-run STP, the treated water quality at this stage is good enough for reuse on lawns and gardens with sufficient disinfection, and water for garden use may be directly taken from this sump, without having to overload the tertiary units. Also, during lean inflow periods to the STP, backwashing of the filter is carried out. At this time, this tank must hold sufficient buffer stock of water for backwash purposes. Despite best design, trace quantities of solids always escape the clarifier into this tank. This means presence of live bacteria in this tank. Therefore, it is advisable to aerate this tank, in order to

keep the bacteria alive and keep the water fresh. The air bubbles also serve another purpose: The compressed air keeps these solids in continuous suspension by constantly agitating the water. This prevents the solids from settling at the bottom of the sump and accumulates there. (Settled bacteria will eventually starve and die, as this tank does not have enough food for them. That would turn the contents of the tank septic.) The tank should be able to properly feed the suction pipeline of the filter feed pumps. Minimum aeration with coarse bubble diffusers shall be provided in this tank to prevent settling of the trace amounts of suspended solids slipping through the settling tank. It should be possible to clean and maintain the diffusers with ease.

RCC platform 1000 mm wide with railing as per specifications shall be provided . RCC stair case minimum 1000 mm wide shall be provided for access from the ground level to the top of the unit and operating platforms. The inlet and outlet pipes shall be designed for design flow + 25%.

All other accessories, whether specified or not, but functionally required shall form part of contractors scope.

3.10 Filter feed pumps: Filter feed pumps shall be used to take the water from the clarified water sump and pass it through the pressure sand filter.

Suitable number of Horizontal Type Centrifugal pump of adequate capacity, slurry/turbid duty (open impeller type) shall be provided. Working hours for the pump shall be 18 hrs (per day)

Pumps shall be installed on a concrete platform 60 cm higher than the level of nearest road and shall be covered with GI/fibre glass sheet as directed. The shed shall be extended in such a way that the pumps are protected from rain.

All other accessories, whether specified or not, but functionally required shall form part of contractors scope.

3.11 Dual media Pressure filter:

The filter should be able to treat all the water that is decanted from the Secondary Clarifier tank.

The pressure sand filter (PSF) shall be used as a tertiary treatment unit to trap the trace amounts of solids which escape the clarifier, and can typically handle up to 50 mg/l of solids in an economical manner. The Filter vessel shall be designed as a pressure vessel (it consists of a straight cylindrical shell, with convex dish-shaped ends welded to the top and bottom). The vessel should be designed to withstand a pressure of 5 kg/cm². In this vessel, a bolted dish at the top for ease of maintenance shall be provided. A hand-hole of > 200 mm dia shall be provided at the bottom of the cylinder, to facilitate removal of media from the vessel at the time of servicing. A set of pipes, valves, bypass line, backwash waste line etc. shall also be provided to facilitate operations such as filtration, bypass (during servicing), backwash etc. Pressure gauges shall be provided at the inlet and outlet, to monitor the pressure drop across

the filter. The shell height shall typically vary between 1.2 m to 1.5 m.. Graded pebbles ranging from 0.5” to 1” are filled as bottom layers in the filter, up to a depth of nearly 0.5 -0.6 m. The top layers shall consist of the filtering sand media, and activated carbon like filter media to a depth of 0.6 – 0.7 m. A freeboard of nearly 0.3 m above the level of sand shall be provided (to allow for expansion of sand during backwash). Necessary appurtenances shall be provided at the top for distributing the inflow uniformly across the cross-sectional area of the filter: similarly, a pipe manifold with laterals shall be fitted at the bottom as the under drain system. (Without these structures, the water flow inside the filter will be restricted to the center line; and the media placed near the wall of the tank will not contribute to the filtering action.) These good engineering practices ensure optimum filtration efficiency by avoiding short circuiting of flow inside the filter, and also minimizing pressure loss in the filter due to sudden expansion/ constrictions in the fittings. The pressure filter shall be made of MS with FRP lining inside and epoxy coating outside to avoid corrosion. The overflow effluent channel/CI pipe of suitable capacity from unit shall be connected to inlet chamber by gravity. Filter outlet shall be collected in Treated effluent cum chlorine contact tank by RCC Channel / CI pipe. Necessary piping arrangement shall be done.

All other accessories, whether specified or not, but functionally required shall form part of contractors scope.

3.12. Sludge Sump & Pump house: Sludge sump shall be provided to collect the sludge settled at the bottom of clarifier and to collect the back wash water from generated during the back wash of Dual media pressure filter. Sludge sump shall be circular or rectangular RCC structure and shall be connected through pipe with clarifier. HRT of the sump shall not to be < 2 Hrs. and the same shall be provided with aeration facility. Minimum working depth of the sump shall be 1.50 m below the invert level of the incoming pipe. Top level of the sump shall be 60 cm above the Formation Level. The blending in the Sludge sump shall be arranged to ensure minimum surface loading of 12 cum/sq m/day for sludge thickener and this blended sludge be pumped using non clog submersible pumps 2 units (1W + 1 SB) in to sludge thickener. The sludge thickening and mechanical dewatering plant shall designed suitably so as to give 100% trouble free operation at all times. There shall be a telescopic knife gate valve with chamber and cover arrangement to sludge pipe. Diameter of the valve shall be same as that of sludge pipe. Sludge from the sump shall be pumped to the thickener by means of common rising main. Minimum dia. of excess sludge pipe shall be 150 mm . Sludge sump shall be constructed in M 30 grade concrete and as per IS:3370. Pumps shall be installed on a concrete platform 60 cm higher than the level of nearest road and shall be covered with GI/fibre glass sheet as directed. The shed shall be extended in such a way that the pumps are protected from rain. The platform shall be enclosed with PVC encased wire mesh up to 2.00 M height with a MS frame gate, the design for which shall be approved by the EIC. Sludge sump shall be painted inside with appropriate abrasion and corrosion resistant paint as per IS: 12944. Sludge pumps shall be of Screw type

All other accessories, whether specified or not, but functionally required shall form part of contractors scope.

3.13. The Sludge from the clarifiers shall be taken in to sludge sump of minimum 2 hours HRT with aeration facility for sludge mixing with clarified water drawn from clarified water sump to ensure surface loading minimum as 12 cum/sqm/day for sludge thickener and this blended sludge be pumped using non clog submersible pumps 2 units (1W + 1 SB) in to sludge thickener. Thickener is a circular RCC construction in M-30 (minimum) tank of suitable size designed at 30 kg/sqm/day solids loadings. The excess sludge wasted shall be calculated for not < 0.50 kg/kg BOD5 removed. 50% TSS shall be considered as non volatile solids with 4 – hours loading for peak flow for the design of thickener with mechanical scrapper .The tank shall be provided skimmer, trough, scum baffle, weir plate and sludge scrapping mechanism. Suitable piping and valve arrangement shall be done. Scum from thickener shall be taken to the thickened sludge holding sump. Mechanical scrapper shall be provided for increasing concentration of sludge from 1% to 3.50%. The supernatants shall be collected in the launders outside/inside the periphery of the tank and shall be carried to the sludge holding sump by gravity.

3.13.1. Thickener Mechanism (Central Driven fixed full bridge type) Thickener Mechanism shall be suitable for installation in RCC tank of specified size. The mechanism shall comprise of the following main components.

- Bridge Superstructure spanning the tank diameter.
- Drive assembly complete with drive head, chain and sprocket, geared motor etc.
- Feed well
- Center Shaft
- Cone scraper
- Rake arms
- Tie rods for rake arms
- Plough blades and squeegees
- Weir plate

3.13.2. Brief Technical Specification for the above components:

Bridge Superstructure: It shall span the entire diameter of the tank. The width of the walkway shall be Minimum 1.2 M. The bridge shall rest on the clarifier wall at both the end. The bridge shall be of truss type welded steel construction with walkway of gratings/ chequered plates for the bridge and center platform. The truss bridge shall be provided with one row of the middle.

Drive Assembly with Drive Head: The central drive had shall rest on the bridge at the center. The drive head shall be coupled to a geared motor through chain and sprocket and shall

support the center shaft at the bottom for rotating the rake arms. The service factor for the gear shall not be less than 2.5.

Feed Well: A fixed feed well shall be of hung from the bridge superstructure. The inlet feed pipe shall run under the bridge up to the feed well.

Center shaft: The center shaft shall be of SS welded ERW pipe and shall be attached to the output shaft of the drive head. The center shaft shall be bolted to the drive head at the top and shall support the rake arms at the bottom through torque frame. Cone Scraper A cone scraper shall be attached to the bottom of the center shaft and shall serve to stir the sludge in the bottom hopper.

Rake Arms and Tie Rod: Two sets of rake arms shall be attached to the center shaft torque cage in diametrically opposite direction through a hinged connection. The rate arms shall be attached to the center shaft through tie rods with provision for adjustment of inclination of the rake arms. Each rake arms shall be provided with plough blades at the bottom and adjustable renewable squeegees for scraping of sludge. Weir Plate V-notch weirs of size 5mm thick x 150mm wide shall be provided along the periphery of thickener for uniform draw-off of the overflow. The weir plate shall be fixed to the tank wall by means of plate washers.

All civil works along with anchor bolts, inserts etc. All electrical, instrumentation and cabling including motor starters, Inlet piping and sludge outlet piping shall be included.

Material of Construction:

Tank	RCC (M-30 minimum)
Feed well	SS-316
Bridge	MSEP
Rake Arm	SS-316
Vertical shaft / Center cage	SS-316
Blades	SS-316

All other accessories, whether specified or not, but functionally required shall form part of contractors scope.

3.14 Thickened Sludge holding sump: There shall be one thickened sludge holding sump of RCC M-30 as per IS :3370. Thickened sludge shall be collected in a sludge holding sump of 6 hours hydraulic retention time with coarse bubble diffused aeration/ mixing facility. The Sludge from this sludge sump shall be pumped on the sludge drying beds with the help of non clog submersible pumps, 2 units (1 working + 1 standby). Pumps shall be installed on a concrete platform 60 cm higher that the level of nearest road and shall be covered with GI/fibre glass sheet as directed. The shed shall be extended in such a way that the pumps are protected

from rain. The platform shall be enclosed with PVC encased wire mesh up to 2.00 M height with a MS frame gate, the design for which shall be approved by the EIC.

3.15 Sludge Drying beds (SDB) (minimum 4 No.) Suitably sized Sludge drying beds constructed in brick work (1:4) with suitable drainage arrangements have to be designed for one complete cycle of 10 days. Flat brick lining in 1:5 cement sand mortar on 12.5mm thick 1:3 cement sand slurry is proposed at the bottom of sludge drying beds and necessary slope for drainage are to be achieved by grading the natural ground to required slopes. A 150mm thick layer of gravel having 30-50 mm size is spread on the brick lining which is followed by 150 mm thick layer of gravel having a size of 12-30mm. On top of this gravel layer, a 300 mm thick layer of sand having 0.3-0.7 mm size is laid. The sludge thickness applied over sludge drying beds should not be more than 300mm. There should be access of 4.0 M concrete paved path from one side of each S D B s. The concrete paving on path shall consist of under layer of 100 mm thick CC 1:3:6 with stone ballast and covered with 150 mm thick upper layer of CC 1:2:4.

V-notch weir	FRP/SS-316	
Squeegees	Neoprene	
Walkway	MS Chequered plate/grating	
Handrail	40 NB MSPVC coated.	
Vertical post	CI	
Scum skimmer	SS-316	
Scum Box	SS-316	
Scum Baffle	FRP	
Anchor Bolt	SS-316	
Fasteners – under water	SS-316	Fasteners – Above water SS-316

3.16 Back Wash Water collection sump: The waste water from pressure filter is to be collected to the back wash collection sump. This structure will be in RCC M-30 and the minimum size shall be 2.00 M x 2.00 M x 1.50 M.

3.17. Back Wash Water pumps: The overflow of back wash water sump shall be transferred to the inlet of raw sewage pumping station by gravity and the solids collected at the bottom of the sump shall be transferred to the sump or chamber through pumping.

BACK WASH WATER PUMPS: Type - Horizontal Centrifugal type Qty. - 2(1W+1SB) Capacity - 10.00 m³ /hr. MOC - The material of construction for all parts coming in contact with the liquid shall be of stainless steel of most appropriate grade and thickness.

Pumps installation platform: Pumps shall be installed on a concrete platform 60 cm higher than the level of nearest road and shall be covered with GI/fibre glass sheet as directed. The shed shall be extended in such a way that the pumps are protected from rain.

3.18. Treated Effluent Cum chlorination sump: A treated effluent cum chlorine contact tank shall be provided with mixing arrangement for disinfection using Sodium Hypochlorite as disinfectant. The tank shall be constructed in RCC M- 30 .The baffle walls shall be provided to achieve proper disinfection. The baffle walls shall be constructed in brick masonry CM 1:4 and plastered with 20 mm thick cement plaster 1:2 on either side. The length /width ratio of this tank shall not be < 3.00 and the water depth not < 2.50 mtr. The treated water is disinfected to destroy and render harmless disease-causing organisms, such as bacteria, viruses, etc. The common form of Chlorine to be used shall be Sodium Hypochlorite (Hypo) available commercially at 10-12 % strength, being safe, easy to handle and having a reasonable shelf life. The Chlorine disinfection system shall consist of a Hypo-holding tank (size depending on the flow rate of the STP) and an electronically metered dosing pump. Hypo solution of desired concentration shall be prepared in the tank. The dosing rate shall be set in the metering pump as per the desired Chlorine dose rate, typically 3-5 PPM. Hypo solution shall be dosed at the outlet of the ACF, online, so that adequate mixing of Hypo with the treated water is achieved. Treated effluent from pressure filter shall be taken to the treated effluent cum chlorination sump through pipe/channel. The chlorinated effluent is to be used for horticultural purposes in the University campus and the bidder should devise the ultimate chlorine dose (normally 0.5 to 2.00 ppm) accordingly.

Design flow - 2.40 MLD Number of units - 1 Detention time - 30 minutes for designed flow Free board - 1.00 M Top of the tank - open

3.19 Hypo chlorine shed & Chemical storage room: The hypo chlorine feeding tank with pumps shall be placed on a raised platform adjoining preferably abutting the treated effluent tank. The minimum area of the platform shall be 8.00 m². Below this platform shall be chemical storage room (8.00 m² area). The chemical storage room shall be in brick work with adequate ventilation and lighting arrangement. The room shall be provided with 2.00 m wide rolling shutter, ramp. Floor of the storage room shall be of 100 mm thick CC 1:2:4 laid over 100 mm thick CC 1:6:12 with brick ballast. Ramp and stairs shall be provided to this room. 0.90 m wide RCC stair with railing shall be provided for rising up to the top of the platform. The raised platform shall also be covered with RCC slab and minimum height of the roof shall be 3.35 m above the top of platform. Chlorination of effluent shall be with Hypo-chlorite Solution. / The dosing should be of range 3 to 5 PPM chlorine for disinfection with required accessories and safety as per minimum requirement. Filter. The platform with access to install Hypo Solution tanks shall also be made by the bidder.

3.20 Treated effluent pump sets: Two centrifugal type electric driven pump sets shall be provided with treated effluent sump to pump out the effluent. The pumps shall be electric driven centrifugal type capable for carrying raw water (water with turbidity). There shall be two no pumps (1W+1SB) each of capacity 70.00 m³/hr. at a head of 20.00 M. The pumps shall be

connected with the treated effluent sump with separate suction pipes, valves etc; and shall be provided with PVC (10 Kg/cm²) common delivery pipe and a SV laid 1.00 M b.g.l. The pump sets shall be installed on concrete platform like other pumps and protected with GI sheet roof. Brick chamber shall be constructed around the SV to make its operation easy.

3.21 MCC room: M.C.C. (Motor control center) room building: The MCC room building shall be single storey brick masonry structure with RCC roof and shall accommodate MCC & PCC panels. Bidder shall consider following parameters for the preparation of lay out plan.

Unit Minimum floor area

MCC Room 12.00 Sq. m

Clear height 3.35 m.

Space between structure and pipeline minimum 1000mm. or 1.5 times the dia. of the pipe whichever is higher.

The MCC room shall be adequately lighted. All windows should be fully glazed and have an area of minimum 20% of the floor area. Adequate arrangement of artificial light will be made to supplement the day light. The floor of the MCC room shall be of vitreous non skidding tiles of minimum size 450 mm x 450 mm. dado and skirting shall be of the same material as of floors and shall be 0.15 m high.

3.22. Platform for Blowers, DG set and dry sludge bed: The following platforms shall be provided for installation of suitable outdoor type blowers, & DG set. The acoustic enclosure type air blowers shall be installed on a platform 0.60 m high above Formation Level and of 15.00 sqm, DG set on 18.00 sqm. There must be 1.50 m walking space all around the installed equipment and if the bidder feels the specified area less, he should include in his rates the excess area to be provided. The bed of these platforms shall consist of CC1:2:4, 15.00 cm thick laid over 10.00 cm thick CC 1:6:12 with stone ballast. One number two way crane with chain pulley block of capacity = 2.00 times the weight of DG set / blower which so ever is heavy for operation and maintenance of blowers and DG set shall be provided. All these platforms shall be enclosed with PVC encased wire mesh up to 2.00 M height and separate open able gates for each unit. The dry sludge platform shall be of size 4.00M x 3.00M x 0.60 M (high above Formation Level). The bed of the platforms shall consist of CC1:2:4 15.00 cm thick laid over 10.00 cm thick CC 1:6:12 with stone ballast. The walls shall be in BB 1:4. The sludge platform shall all around be provided with 0.90 m high brick wall in CM 1:4 plastered both sides to avoid spilling of sludge. Proper drainage shall be provided to drain out any water.

3.23. Inter connecting Pipes, Gates, Valves, Channel etc; All interconnecting Pipes, Gates, Valves, Channels for conveying wastewater/sludge from one unit to the other and also for bypassing various units shall be included in this scope of work. Entire piping used for inter connection shall be CI/DI except inside MBBR reactors. Internal pipe of MBBR shall be SS 316. Air conveying pipes shall be GI class B outside MBBR & SS-316 inside the MBBR. Pipes

to be laid underground shall in general be CI (LA) or DI (K7). Whereas pipes to be laid above ground shall be CI D/F (B) or DI D/F, welded type made from K9 pipe. All inter connecting pipes and channels shall be designed hydraulically for designed flow + 25%. All valves & gates are manually operated. All items of piping works for MPS & STP shall be inclusive of excavation in any type of strata, including supply, laying, jointing and testing of all pipelines, construction of sewer appurtenances and valve chambers, pipe support pedestals complete in all respects.

3.24 Stairs as per Requirement

RCC/MS staircase shall be provided to access all the platform provided/required for all the units above ground level. The tread width shall be minimum 250mm and c/c spacing between two consecutive treads shall not be more than 175 mm. The width of the staircase and their type shall be as approved by Engineer-in-charge before execution of the work.

3.25 Railing along Platforms and stairs: Railing along all platforms and stairs shall consist of 40mm GI pipe class B (two rows) & height of railing 0.9 m with CI vertical posts at distance of 2.0 m c/c .The vertical pipe apart from painting shall be epoxy coated also.

3.26. External Sewerage System: The external sewerage system consisting of GSW, CI/DI pipes shall be provided for conveying the wastewater from all the units to the sump of existing Main pumping station. Required number of manholes shall be constructed as per drawings approved by Engineer-in- charge.

3.27. Painting, Whitewashing and Allied works All the units/items/equipment of the MCC room shall be painted/ coated wherever required. All the internal surfaces of the walls, ceiling of the building shall be painted with synthetic enamel paint. All the external surfaces of the building shall be either brick faced or plastered with cement sand mortar 1:4 and outside with cement based paint.

The inner concrete surfaces of all the water retaining structures including channel shall except the reactor be painted (two coats) with approved make bitumen paint. The reactor basin shall be painted with Epoxy. All the CI/DI pipes and specials and other equipment shall be painted with two coats of approved make anti corrosive paints. Note :- 1. The reduced levels of the bottom of various units and the full supply levels of water in these units shall be so designed that the flow of water from one unit to another unit and finally to collecting tank is by gravity. The agency will also submit the calculations for head losses in various units along with the hydraulic design. While designing the various components free fall conditions shall be observed.

3.28 Lowering of Ground water table during construction: The ground water table, if encountered during construction shall be lowered sufficiently so as to enable construction in dry conditions.

4.00. SCOPE OF WORK SHALL ALSO REQUIRE;

i. Operation and maintenance of the plant (the assets created in this contract) for a period of 24 (Twenty Four) months after testing and running the same successfully for 90 days during trial run /defect liability period. If the plant is not stabilized during the 90 days period of trial run, this period can be extended by the EIC without making any extra cost and the contractor shall be responsible for complete stabilization of the plant to the entire satisfaction of the EIC. The O& M period of 24 (Twenty Four) months shall start after the plant is handed over by the contractor to the EIC.

ii. In case during the maintenance of the assets created in this contract it is observed that the functioning of the any of the component is not as per satisfaction of the Engineer- in-Charge then the necessary changes in the component will be done by the contractor at his own cost without claiming anything extra.

5.00 Miscellaneous Provisions:

- I. All liquid retaining RCC structure should be M-30 (minimum) designed mix with protective coating as required.
- II. All PCC shall be minim. 10 cm thick M-15.
- III. Internal lighting, exhaust fan, ceiling fan, cables, switchgears and other control equipment is in scope of contract.
- IV. Any design parameter not covered in the employer's requirement shall be as per sewage manual.
- V. Contractor will have to make own arrangement for water requirement during construction. 6. Contractor will have to make own arrangement for electricity requirement during construction.
- VI. All the reaction tanks/chambers with drain and filtrate shall be connected in such a way that the entire tank can be emptied gravity.
- VII. Pipe network for conveying water to various units/locations in the plant area, required during operation/maintenance of the plant is also covered in the scope of work. However, source of water shall be Client's responsibility. The detailed technical specifications for all the items are covered in this part of the tender documents, in case any item is not covered or missing, CPWD Specifications and relevant IS code shall be followed upon approval of Engineer-in-charge. Moreover, in case of any discrepancy between specifications laid down in this documents and CPWD Specifications/ IS code; the decision of the Engineer-in-charge will be final & applicable. Wherever reference is made to Indian Standard Specifications, the latest specifications are applied.
- VIII. All electrical cabling from main panel in MCC Room to various consumption points including DG set and vice versa is included in this contract. So also

cabling from transformer to main panel is part of this contract. The changeover switch between Power supply and DG set is part of this contract.

6.00 Periodical Progress review

Periodical review of the progress of the project shall be carried out in every 21 days and at any time desired by the Employer. For this purpose the Contractor shall prepare and submit the progress reports as stated in the Contract.

The contractor shall keep at site a latest copy of the following:

- a. Contractor's Documents that shall include but not limited to the technical documents as follows:
- b. Construction Drawings Detailed including any modifications etc.
- c. List of Codes, standards and specifications being followed.
- d. Documents required to satisfy all regulatory approvals,
- e. A complete set of "as-built" records of the execution of the Works, showing the exact as-built locations, sizes and details of the work as executed.
- f. Any other document which the Engineer instructs from time to time
- g. Design documents as mentioned above.
- h. Operation and Maintenance Manuals
- i. Records of Contractor's Personnel, Labour and Equipment
- j. Copies of quality assurance documents, test results and certificates of Materials
- k. List of Variations, notices given under Sub-Clause 2.4 (Employer's Claims) and notices given under Sub-Clause 20.1 (Contractor's Claims);

7.0 Quality Control

The Contractor must ensure that the works conform to the quality standards and to the satisfaction of the Employer. The contractor shall submit his quality plan in accordance with the above. The works and materials shall be subject to tests from time to time as per best practices in the industry. Wherever mentioned in the Contract, the tests must be carried out at the Contractor's expense. The materials shall be procured from reputed vendors approved by the Engineer. The Contractor must also supply samples to the Engineer for his approval and also carry out the tests as and when required by the Engineer.

8.0 Tests after completion

After completion of the project, the Employer may carry out the tests after completion, which shall be carried out under normal operating conditions to assure that the system performs well under normal operating conditions.

These tests will include but not limited to:

- i. Running of equipment and system as a whole to a minimum of 90 days
- ii. System specific tests and equipment specific test

- iii. Any other test which Employer intends to carry out to check the stability and reliability of the system.

Any defects if pointed out in the tests after completion shall be ratified at Contractor's expense and within time as deemed reasonable by the Engineer.