



**IIT BOMBAY
RESEARCH PARK**
aspire

IIT BOMBAY RESEARCH PARK FOUNDATION

6B, Main Building, IITB Powai

Mumbai -400076

Tender Document

for

Execution, supply, installation and commissioning

of Effluent Treatment Plant of 57 KLD

at IIT Bombay Research Park

2025 - 2026

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1. Tender Notice

The IIT Bombay Research Park Foundation (hereinafter referred to as IITBRPF) invites proposals from qualified and experienced contractors (ETP COMPANY/contractor) for the execution, supply, installation, and commissioning of an Effluent Treatment Plant (ETP) at the state-of-the-art Research Park building. The detailed design for the ETP has already been finalized by IITBRPF, and this tender specifically pertains to the implementation and execution of the approved design.

The Research Park spans 14 floors, comprising laboratory spaces, office areas, and common facilities. Given the effluent generated by laboratory operations, the ETP is a critical infrastructure to ensure compliance with Pollution Control Board (PCB) standards and the Research Park's commitment to environmental sustainability.

This project is of utmost importance for maintaining the Research Park's operational and environmental standards. IITBRPF seeks experienced contractors with a proven track record in executing ETP projects, particularly those involving laboratory environments. The selected contractor must demonstrate expertise in delivering projects with precision, adherence to quality standards, and timely completion.

Sr.no.	Particulars	Details
1	Tender No.	IITBRPF/Infra/Tender/06/25-26
2	Tender Date	20-02-2026
3	Designation and Address of the RFP Inviting Authority	To, The PIC, IITB Research Park Foundation, 11th Floor, Research Park Building, IIT Bombay campus, Powai, Mumbai - 400076
4	Nature of work	Execution, supply, installation and commissioning of Effluent Treatment Plant of 57 KLD at IIT Bombay Research Park
5	Supply/work to be carried out at	IITB Research Park Building
7	*Earnest Money Deposit (EMD)	Rs 5,00,000
8	Pre-Bid Meeting & Site visit	3/03/2026
9	Last Date and Time for Submissions of tender	12 PM, 30/3/2026
10	Date and Time of Opening of the technical bid	3 PM, 2/4/2026
11	Date and Time of Opening of the Commercial bid	To be announced

2. SUBMISSION OF BIDS

Both the bids (Technical and Financial) duly signed Authorized Signatory should be submitted in two separate sealed envelopes as described below:

All details with the relevant information/documents/acceptance of all terms and conditions strictly as described in this tender document will have to be submitted.

A. **Envelope 1:** Containing Technical Bid duly completed in all respects all relevant documents and the envelope should be superscribed in bold letters with the statements **'Technical Bid for Execution, supply, installation and commissioning of Effluent Treatment Plant of 57 KLD at IIT Bombay Research Park'**

B. **Envelope 2:** Containing the Financial Bid, and the envelope should be superscribed in bold letters with the statements **'Financial Bid for Execution, supply, installation and commissioning of Effluent Treatment Plant of 57 KLD at IIT Bombay Research Park'**

Finally, the above-mentioned envelopes should be kept in a single sealed cover/envelop and the envelope super-scribed in bold letters with the statements – **Execution, supply, installation and commissioning of Effluent Treatment Plant of 57 KLD at IIT Bombay Research Park'** and to be submitted at:

Professor-In-Charge,
IITB Research Park Foundation,
11th Floor, Research Park Building,
IIT Bombay campus, Powai, Mumbai - 400076

3. Eligibility Criteria

Bidders should submit copies of the following documents in the technical bid (along with other supporting documents mentioned under Technical Evaluation Criteria in this document) for the IITBRPF ETP work contract for the Research Park building.

- a) Experience of having Successfully completed similar works during the last 7 years ending previous day of the date of submission of tenders month of as per b and c'.
 - b) Copies of three similar completed work orders for projects with a one-year period not less than 5 crores, along with work completion certificates and performance certificates (in FORM B format), and copies of three ongoing works of similar scope and scale with details such as the date of start, stipulated and actual completion date, the value of work etc.
 - c) A copy of one single work order for any completed work, with work completion certificate, performance certificate, and costing not less than **3 crores** in a Government, Semi-Government, or Public Undertaking organization or large private organization.
 - d) Copies of pan card & Income tax return statement of last three years 2022-23, 2023-24 & 2024-25.
 - e) The ETP COMPANY should have an average annual turnover of Rs. **10 crores** during the last three financial years ending 31/03/2025. This should be certified by a chartered accountant and should not have incurred any loss in more than two years. The format of submission as per FORM A in this document.
 - f) Submit copies of work orders and work completion certificates as mentioned in Sr. No. (b) & (c). Failure to submit these documents will result in the bid capacity not being calculated, and the technical bid will be summarily rejected without opening the financial bid.
 - g) All bidders should submit an EMD amount **Rs. 2,00,000** in the form of demand draft to the IITB Research Park on or before 12:00 PM, 23rd March, 2026 in favor of **IITB Research Park Foundation**. Also bidders have to send a scanned copy of the same D.D. along with technical documents. If EMD is not received from any bidder as detailed above, the tender of that bidder will be liable for rejection. EMD without interest of all unsuccessful bidders will be returned after the completion of tender process and award of contract.
 - h) Bidders should submit the undertaking certificate as specified in Annexure 1 in this document.
 - i) Litigation history of the agency is required to be submitted (on stamp paper) along with the application. A tender would not be awarded if any inquiry proceeding related to the criminal case. Also if the contract is terminated in the last 07 years due to noncompliance with the statutory provision, they cannot participate in this tender and will be summarily rejected.
 - j) Proof of Constitution: An affidavit in case of Sole Proprietorship, Partnership Deed for partnerships, and Articles of Association for Private/Public Limited Companies must be submitted.
 - k) The bidders should submit GST annual turnover certificates for the last three financial years(form F) .
 - l) Bidders are required to submit a valid MSME certificate and income tax exemption certificate(if applicable)
 - m) Bidders to submit inlet parameters after performing mass balancing of the effluent characteristics from member companies and outlet effluent characteristics after treatment (Form K)
- Effluent characteristic data of the member companies in the link below

Link:  Effluent inlet parameter details from all the tenent comparison - 09.03.25.xlsx

Evaluation of applications for eligibility: -

- The applications will be evaluated for conformity to the eligibility criteria under Sr. No. a, b, c, d, e, f, g, h, i, j as per the prescribed format, along with a copy of relevant documents and certificates. All the documents should be signed and sealed by the authorised signatory.
- Only those applications found eligible as per the criteria above will be considered for the technical evaluation, as outlined in the next stage.

Note:

- The available bid capacity will be calculated based on the above information received from the agencies and the agencies that have sufficient bid capacity, ie. bid capacity of more than 5 crores will only be considered. The tender of agencies having less bid capacity will be rejected.
- If required, contractors/Agencies/proprietors should submit the power of Attorney to their representative to deal on any matter with any officer or Staff of IITBRPF on behalf of them or their agency.
- Tender will be rejected if white ink is used in tender documents.
- ETP COMPANY who wishes to attend pre-bid meeting shall intimate IITBRPF with a number of visitors attending it with their names at infra@iitbresearchpark.com in advance on or before.
- Tenderers should send by email all their queries, latest by 15 hours one day before to the scheduled pre- bid meeting date to infra@iitbresearchpark.com
- If there are varying or conflicting provisions made in any one document forming part of the contract, the IITBRPF shall be the deciding authority with regard to the interpretation of the documents and its decision shall be final and binding on the tender.
- IITBRPF reserves its right to verify all the credentials, quality, quantity, workmanship, other required details etc. of the bidders/ ETP COMPANY with their clients along with ongoing/completed work based on-site visit and other sources before finalization and award of the work.
- IITBRPF reserves its right to reject/accept any tender forms and / or accept/reject any tender or re-invite the tenders without assigning any reason and without any reference.

4. Technical Evaluation Criteria

Quality/ schedule/ performance / compliance evaluation of completed works shall be conducted by an Evaluation committee constituted by PIC/CEO, IIT Bombay Research Park. Evaluation will be based on the following performance: -

1. Firm Turnover - 20 marks.
2. Capacity of ETP projects executed - 20 marks.
3. Number of ETP Projects (> 50 KLD) - 30 marks.
4. Presentation - 30 marks.
5. Litigation History

Note: All bidders must submit relevant and verifiable supporting documents for each of the criteria to obtain scores. All the documents/reports should be signed and sealed by the authorized signatory. Failure to provide appropriate documentation may result in zero marks being awarded for that criterion.

Sr. No	Criteria	Max Marks	Remarks/Documents for submission in technical bid folder	Documents for submission in technical bid folder
01	Firm Turnover	20	a) If firm turnover > 50 Cr = 20 Marks b) else If firm turnover is more than 30Cr Cr but up to 50 Cr range =15 Marks C) else If firm turnover is more than 10 Cr but up to 30 Cr range = 10 Marks	a) Firm turnover is defined as the average turnover from ETP work over the last 3 Years b) Chartered Accountant verified / audited turnover statements to be furnished as proof for the same. Bidder shall ensure that any certificate/reports issued/attested by a practicing-chartered accountant in India and submitted in the bid shall mandatorily include the UDIN number. Certificate/reports issued/attested without UDIN number of practicing chartered accountant in India shall not be considered for evaluation.
02	Capacity of ETP projects executed	20	a) Upto 50 KLD – 5 points b) 50 KLD to 150 KLD - 15 Marks c) Above 150 KLD - 20 Marks	Client/Performance Certificates: Must specify ETP capacity (KLD), project location, scope of work, duration, and client satisfaction. 2. Work Orders/Contracts: Highlight project details, value, and capacity. 3. Completion Certificates: For completed projects, confirming capacity and adherence to specifications. 4. Progress Certificates: For ongoing projects, confirming at least 1 year of execution and capacity installed.

				5. O&M Proof (if applicable): For projects with operation and maintenance experience. 6. Technical Specifications: Summary of project details and technologies used.
03	Number of ETP Projects of capacity more than 50 KLD.	20	a) No. of works of ETP of 100KLD(MBR Technology) capacity ≥ 7 Nos in the past 7 Year = 20 Marks b) No. of works of ETP of 100KLD capacity greater than 4 but lesser than 7 in the past 7 Year = 15 Marks c) No. of works of ETP of 100KLD capacity greater than or equal to 2 and lesser than or equal to 4 in the past 7 Year = 10 Marks d) No. of works of ETP of 100KLD capacity lesser than 2 in the past 7 Year - 05 Marks	Self-attested certificates from clients indicating ETP(MBR) capacity (>50 KLD) and client satisfaction.

Sr. No	Criteria	Max Marks	Remarks/Documents for submission in technical bid folder	Remarks/Documents for submission in technical bid folder
04	Presentation	30	The presentation by the bidders need to cover the following aspects for evaluation assessment by IITBRPF. a) Details of ETP capacities managed for different clients supported by relevant documents. b) List of key professionals / technical staff who will be employed for the project with their qualification & experience. c) Time Lines for execution: (Capacity to complete the work as per the timelines given in tender document) d) Execution methodology: Understanding the treatment scheme.	Innovations or deviations from standard practices showcased in the presentation will be binding in the contract. - Description of innovative practices or technologies proposed for ETP management and their impact on efficiency. - Case studies or references supporting proposed innovations are highly encouraged. 'Presentation will be evaluated by a panel appointed by IITB Research Park. Presentation needs to be given In-person and Date of Presentation will be intimated. Bidders who get minimum 60% marks in other criteria will only be called for the presentation.

			• Description of the methodology to be adopted to execute the overall work e) Interim effluent parameters (after mass balancing) and outlet effluent characteristics after treatment. f) Details of the reuse plan for ETP treated water (e.g., flushing) and discharge to sewer lines, especially considering amendments to the CTO. g) The presentation may also include the year of establishment and a brief company profile, highlighting the firm's core expertise in ETP/MBR systems, total experience in wastewater treatment projects, and a summary of major ETP (MBR) projects executed with details such as client name, capacity, industry type, and scope of work. It may further cover experience in similar institutional or industrial projects, ETP upgrades or retrofits, compliance with CPCB/SPCB discharge norms, relevant ISO certifications, in-house engineering and technical capabilities, operation & maintenance experience, client references, safety and environmental practices, and any notable achievements or recognitions in wastewater treatment projects.	
05	Litigation History	10	No litigation History – 10 marks	Self-declaration on company letterhead regarding litigation history, signed by an authorized signatory.

* A Bidder should mandatorily secure a minimum of 70% marks (i.e. 70 marks out of total 100 marks) in Technical Evaluation in order to be a qualified bidder for being eligible for Technical weight-age and subsequently for opening of financial bids. The authority reserves the right to lower the qualification marks to 60% if at least 2 bidders do not achieve 70 marks out of total 100 marks.

TOTAL MARKS= 100

Kindly Note:

- The bidder shall submit documents/report detailing each of the above **6** items signed by the authorized signatory and should be part of the bid.
- Work order, work completion certificate & Performance certificate of each work should be submitted in the technical bid
- The evaluation of the proposal will be based on a weightage distribution of 70% for technical proposal and 30% for commercial proposal.
- Invitation for presentation and Site visit does not mean the bidder is technically qualified.
- Date of presentation shall be intimated to the bidders after opening of technical bid with prior notice.
- IITBRPF reserves the right to restrict the list of eligible Tenderers/bidders to any number deemed suitable.
- Even though an applicant may satisfy the specified criteria, he/she would be disqualification if he/she has: -

a) Made misleading or false representations or deliberately suppressed the Information in the form statements and enclosures required in the application for eligibility.

b) Record of poor performance such as, slow progress of work, abandoning of work, not properly completing the contract, or financial failures/ weaknesses etc.

*The IITBRPF reserves the right to accept or reject any application and to annul the qualifications process /Tender process and reject all applications at any time without assigning any reason or incurring any liability to the applicants.

5. FINANCIAL BID

Price Bid of only technically qualified bidders shall be opened at later date in presence of Evaluation

committee constituted by PIC/CEO, IIT Bombay Research Park. The date & time of opening the price bid shall be communicated to the technically qualified bidders. In case if the price bid is found to be tampered/modified in any manner, tender will be completely rejected. Do not quote price in the Technical Bid which would lead to bid getting disqualified without any further reference to the bidders. IITBRPF reserves the right to negotiate the quoted price with the successful bidder. The quoted rates shall remain firm throughout the first year of the contract and no revision is permissible for any reason.

List of documents to be submitted by the bidders in the financial bid are as follows:

- 1) FORM C – Estimation of Piping and Pump work
- 2) FORM D – Estimation of Electromechanical Equipment
- 3) FORM E – Estimation of Civil work.
- 4) FORM G – Project cost Declaration certificate
- 5) FORM H - ETP Treated water Pumping and Reuse Plumbing system
- 6) Estimated cost of RO and civil/structural provisions for installation of the RO system (with breakup)

FORM A

FINANCIAL INFORMATION

(To be duly filled, signed and uploaded along with a technical bid by the tenderer.)

I) Financial Analysis:-

Details to be furnished duly supported by figures in Balance sheet/profit and loss Account for the last three years duly certified by the Chartered Account, as uploaded by the applicant to the Income-Tax Department(Copies to be submitted separately).

Sr. No.	Details	Year ending 31 st March of		
		2022-23	2023-24	2024-25
1	Gross annual turnover in ETP work			
2	Profit(+)/Loss(-)			

II) Income Tax Pan details (to be uploaded separately)

III) Solvency certificate from Bankers of Applicant (to be uploaded separately).

SIGNATURE OF APPLICANT (S)

SIGNATURE OF CHARTERED ACCOUNTANT WITH SEAL

FORM B

(To be duly filled, signed and uploaded along with technical bid by the tenderer)

PERFORMANCE REPORT FOR WORKS REFERRED (At least three)

1.	Name of the work & Location.
2.	Scope of work: -
3.	Agreement No.
4.	Tendered Cost
5.	Value of work done
6.	Date of start
7	Date of completion
i	Stipulated date of completion
ii	Actual date of completion
9	Amount of compensation levied for Unsatisfactory work
10	Performance report based on quality of work
11	Excellent/very good/ Good/ Fair

Date :

(*Signature and seal of the client/owner to whom the work executed)

*** Certified by self will not be accepted**

FORM C
Estimation of Piping and Pump work

S No.	DESCRIPTION OF WORK	UNIT	QTY	Supply RATE	Supply Amount	Installation Amount	Installation Amount
A	LAB WASTE, STORAGE TANK & PUMPS						
1	Supplying installing testing and commissioning of HDPE pipes of PE 66 grade PN6 of following diameter including necessary supports, butt welded along with moulded fittings like tee elbows, stub flanges etc complete.						
	Vertical Downtake pipes from Each Floor to Storage Tank at GFL						
a	dia 110 mm	Rm	2,700				
2	Supplying installing testing and commissioning of HDPE pipes of PE 66 grade PN6 of following diameter including necessary supports, butt welded along with moulded fittings like tee elbows, stub flanges etc complete.						
	Pumping Line To E.T.P From Storage Tank						
a	65mm dia	Rm	1,500				
3	Supply, fixing,testing and commissioning of full way lever operated stainless stell I ball valve working pressure not less than PN10 with threaded / flanged joints complete with nuts, bolts, gaskets, washers etc.						
a	65 mm dia (Flanged ends)	Nos	51				

4	Supply, installing testing and commissioning of UPVC non return valves, flanged end to be used in the HDPE pumped mains						
a	65 mm dia	Nos	17				
5	Supplying installing testing and commissioning of digital (Electro magnetic) flow meters of following sizes as per manufacturer's recommendations. These water meters shall be compatable with BMS integration via RS 485 Modbus or Mbus protocol communication						
a	dia 65 mm for lab waste	Nos	17				
6	Double layer of polyethylene ready made HDPE/FRP tank with manhole covers and necessary sleeves for inlet & outlet.(2,000 lts)	Nos	17				
7	Supplying, Installing, Testing and Commissioning of Submersible pumps , suitable for $415 \pm 10\%$ Volts, 3 phase / $230 \pm 10\%$ volts, 50 Hz A.C. power supply. Each pump shall be suitable for automatic / manual operation and shall be complete Control panel inclusive of controller DOL starter, necessary wiring, cable alleys, earthing, interlocking, starter with Automatic float type level controller, provision of high level alarm, sequence timer, potential free contact to starter for connection to BAS. Pump panels shall have provision for potential free contacts for On/Off, Trip status to maintain in BMS.						
	Purpose:To transfer lab effluent water from tank to ETP						
a	Flow rate : 1.0 lps(Each Pump)						
	Head : 25 mwc						
	MOC : SS Body / Impeller & SS Shaft	set	17				

	$I_{set} = (1W+1S)$						
	TOTAL						

FORM D
Estimation of Electromechanical Equipment

Sl.No	Tag	Description	Detailed Specification	MOC	Quantity				Supply Rate	Supply Amount	Installation rate	Installation Amount
					Working	Standby	Total	Unit				
I	WASTE WATER TREATMENT SYSTEM - ETP											
A		Pre-treatment Unit										
1	FS	Fine Screen	Screen Opening: 6 mm	SS	1	0	1	No.				
2	CS	Coarse Screen	Screen Opening: 20 mm	SS	1	0	1	No.				
3	OS	Oil Skimmer	Belt Type / Slotted Type Oil Skimmer	polyurethane belt	1	0	1	No.				
4	ETP	Effluent Transfer Pumps	HCP Non clog type with Mech seal, Cap.: 3 – 4 M3/Hr, 10M head,	CI with SS wetted parts	1	1	2	Nos.				
5	CBM-EQT	Coarse Bubble Mixing for EQT	Coarse Bubble Grid / Diffusers	PVC / PP	1	0	1	Lot				
B		PRIMARY TREATMENT UNIT										
6	FM	Flash Mixer & Flocculator	Suitable for the tank Size: 2 M L x 1.2M W x1.5 M Ht	SS Shaft & Impeller	2	0	2	Set				
7	CDP-1	Coagulant - 1 Dosing Pump for Primary Treatment	Diaphragm / electronic, Cap: 15 LPH @ 3.0 bar Pressure	PP	1	1	2	Nos.				
8	CDP-2	Coagulant - 2 Dosing Pump for Primary Treatment	Diaphragm / electronic, Cap: 15 LPH @ 3.0 bar Pressure	PP	1	1	2	Nos.				

9	PDP	Polymer Dosing Pump for Primary Treatment	Diaphragm / electronic, Cap: 15 LPH @ 3.0 bar Pressure	PP	1	1	2	Nos.				
10	CDT	Chemical Dosing Tank for coagulants & Flocculant	Cap.: 200 Liters	HDPE / LDPE	3	0	3	Nos.				
11	M-C DT	Mechanical Mixing for Chemical Dosing Tank	Suitable for 200 Liters Tank	SS Shaft & Impeller	3	0	3	Nos.				
12	PSTP	Primary Sludge transfer Pump	HCP/ Screw Type, 1 M3/Hr @ 3 bar Pressure	CI	1	1	2	Nos.				
C		BIOLOGICAL TREATMENT SYSTEM										
13	AB-A	Air blower with motor for Aeration Application	Cap.: 175 M3/Hr @ 0.55 Kg/cm2, Blower Speed < 1000 RPM	2 (1W+1S)	1	1	2	Nos.				
14	BSTP	Biological Recirculation & Transfer Pump	HCP Type, 1 M3/Hr @ 1 bar Pressure	CI	1	1	2	Nos.				
15	FBD - 1	Fine Bubble Diffused Aeration System for MBR Tank - 1	Retrivable type, Tubular Type Fine Bubble diffusers, 63 mm (OD) x 1.0 m long	EBDM Membrane	1	0	1	Lot				
16	FBD - 2	Fine Bubble Diffused Aeration System for MBR Tank - 2	Retrivable type, Tubular Type Fine Bubble diffusers, 63 mm (OD) x 1.0m long	EBDM Membrane	1	0	1	Lot				
17		MBR Membrane-Supply, installation,			2		2	Lots.				

		testing, and commissioning of an MBR (Membrane Bioreactor) membrane system suitable for a 57 (in 2 tanks) KLD Effluent treatment plant (ETP), including all necessary fittings, piping, and accessories . The membrane module shall be designed as per the project specifications, ensuring optimal performance and treated water quality compliance . The material of construction shall be suitable for wastewater applications, with high chemical resistance and durability. The system shall be installed,										
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		tested, and commissioned as per the manufacturer's guidelines and project requirements. Capacity: 57KLD (in 2 tanks) Membrane Qty - as per calculations.										
18		Permeate Transfer Pumps - Supply, installation, testing & commissioning of centrifugal horizontal pumping set with CI casing, CI impellers, MS base plate, carbon mechanical shaft seal and suction and discharge casing as per standards, connected to TEFC Ventilated induction motor of 2/4 pole, suitable for 3 phase, 50 Hz 415V A.C. supply with,					4	Nos.				

		vibration elimination pads, dry run protection etc. complete with base and frame, nuts, anchors and bolts. Nos. of Pumps :2 Nos (1w+1s) Water Flow Rate : 5 m3/Hr each Pump Head : 15 M										
19		Supplying, installing, testing and commissio ning approved make Electronic dosing system for dosing pH Correction Chemical with pre - set dosage based on the quantity of water. The dosing system shall consist of Electronic dosing pump of positive displaceme nt type with adjustable stroke length &					1	Set				

		frequency. The quoted rate shall also include HDPE chemical solution tank necessary electricals to make the operation automatic. Max flow rate = 50 lph Cap: 500 Ltrs LDPE tank										
20		Supplying, installing, testing and commissioning approved make Electronic dosing system for dosing Citric Acid with pre - set dosage based on the quantity of water. The dosing system shall consist of Electronic dosing pump of positive displacement type with adjustable stroke length & frequency. The quoted rate shall					1	Set				

		also include HDPE chemical solution tank necessary electricals to make the operation automatic. Max flow rate = 100 lph Cap: 500 Ltrs LDPE tank										
21		Supplying, installing, testing and commissioning approved make Electronic dosing system for dosing NaOCl with pre - set dosage based on the quantity of water. The dosing system shall consist of Electronic dosing pump of positive displacement type with adjustable stroke length & frequency. The quoted rate shall also include HDPE					1	Set				

		chemical solution tank necessary electricals to make the operation automatic. Max flow rate = 200 lph Cap: 500 Ltrs LDPE tank										
22		CIP Tank Supply, installation, testing & commissioning of CIP Tank (MOC:- LDPE) with necessary supports, Inlet, outlet, drain, and Overflow arrangement etc complete. Capacity - 200					1	Set				
23		Supplying, installing, testing and commissioning of instruments required for continuous monitoring of the performance of the Plant. 1. Level switches 2. Pressure gauges 3. Flowmeters					1	Lot				

		with Totaliser 4. Rotameters 5. DO analyser										
18	TP	Tube Packs	Suitable for the tank Size: 2.0 M L x 2.0 M W x 5.0 M Ht	PVC / PP	1	0	1	Lots.				
D		SLUDGE DEWATERING SYSTEM										
19	CBM- SDS	Coarse Bubble Mixing for Sludge Dewatering system	Coarse Bubble Grid / Diffusers suitable for the tank size:3.0 M L x 2.0 M W x 3.6 M Ht	PVC / PP	1	0	1	Lot				
20	PDP- SDS	Polymer Dosing Pump for Sludge Dewatering System	Diaphragm / electronic, Cap: 15 LPH @ 3.0 bar Pressure	PP	1	1	2	Nos.				
21	PDT- SDS	Polymer Dosing Tank for Sludge dewatering System	Cap: 100 Liters Tank with Mechanical Mixer	LDPE / HDPE	1	0	1	No.				
22	FP-F P	Filter Press Feed Pump	HCP/ Screw Type, 1 M3/Hr @ 3 bar Pressure	CI	1	1	2	Nos.				
23	FP	Filter press	Hydraulic Filter Press of Size : 800 mm x 800 mm size, 10 plates	PP Plates, MS Frame	1	0	1	No.				
F		ELECTRI CAL, PIPES & FITTING S - ETP										
24	MCC P -ETP	MCC Panel for Effluent Treatment System	Floor mounting Non Compartmental Type Power & control panel for the operation - 160 Amp		1	0	1	No.				

			incommer with 63 Amp MCBs-D curves.									
25		Power & Control Cables	3C x 4 / 6 Sqmm Armoured Cables along with terminations		1	0	500	Rmts				
26		DB's	8 way SPN flexi DB with 63 Amp DP MCB as incommer 20 Amp SP MCBs 8 nos as out going		4	0	4	No.				
27		Cable Tray & Supports	600mm wide perforated tray with threaded rod support	UPVC & GI	1	0	1	Rmts				
28		Piping, Fittings and valves		UPVC & GI	1	0	1	Lot				
29		Electromag netic Flow meter			1	0	1	No.				
30		Online Conductivi ty Meter			1	0	1	No.				
31		pH Meter			1	0	1	No.				
G		Designing, Supplying, installing, testing and commissioning of Modular Tanks and other accessories as per drawings should include necessary supports, Inlet, outlet, level switch, drain, and Overflow arrangement etc complete. MOC : MSFRP Thickness : Plate thickness shall be 20mm with 3mm FRP lining, a. Primary Flocculation Tank Capacity : 3 KL, Dim : 3.75m X 0.55m X 1.5M Height b. Primary Settling Tank, Capacity : 12 KL, Dim : 3.75m X 1.00m X 3.00m Height c. Anoxic Tank, Capacity : 12 KL, Dim :					1	set				

		3.75m X 1.00m X 3.00m Height d. MBR Tank-1, Capacity : 22.5 KL, Dim : 3.75m X 1.35m X 4.50m Height e. MBR Tank-2, Capacity : 22.5 KL, Dim : 3.75m X 1.35m X 4.50m Height f. Treated Water Tank, Capacity : 31 KL, Dim : 2.70m X 3.30m X 3.50m Height g. Sludge Holding Tank, Capacity : 15 KL, Dim : 3.00m X 2.00m X 2.50m Height									
H		Control Panel for Effluent treatment plant. Panel shall be with necessary fuses, starters with over load relay, single phase preventer, indicating lamps, on/off type push button switch. The same shall work under automatic conditions linked with level controllers and timers.				1	set				
I		Operation and Maintenance (O&M) for 1 year under OEM for MBR plants involves 24/7 monitoring, preventive maintenance, effluent compliance testing, and minor repairs to ensure reliable performance post-commissioning.				1	lumsun				
	TOTAL AMOUNT FOR WASTE WATER TREATMENT SYSTEM								-		

FORM E

Estimation of Civil work

Items & Makes	Units	Basic Price in Inr (ex tax)
TMT	Kg	65
Structural steel	Kg	68
Cement - 43 grade	Bag	290
Cement - 53 grade	Bag	310

	Description	Unit	Quantity	Rate	Amount	Remarks
A	Trench works (Road crossing) & ETP pipe support for existing compound.					
1	Excavation Work :					
	Earth work:					
	Note: Unless otherwise specified rates quoted for all excavation shall include the following: a) Site clearance such as clearing shrubs undergrowth, roots and small trees brush wood, etc., b) Setting out the work to profile, etc., c) Bailing or otherwise removing all water may accumulate in the excavation from all causes. d) Cutting out and throwing soil clear of area excavated or depositing clear of edge of foundation to avoid fall in. e) Trimming all sides to plumb or otherwise as instructed at site and square leveling all bottoms. Clearing out all loose earth etc., f) Disposing surplus soil as directed within the site or outside and dressing to proper level and grade as required. g) Dismantling, removing and stacking as directed existing water pipe and /or soil pipes within the excavated portion. h) Providing shoring and strutting for protecting the sides					

	of foundation where required.					
1 a	Excavation Soil by Mechanical means:					
	Earth work Excavation for foundation of structures by mechanical means (Hydraulic excavator) in all sorts of soils, soft or hard (Sand, clay, black cotton, slushy and marshy soil), Disintegrated/ weathered/ soft rock including soft or hard murrum but excluding hard rock. For footings, pedestals, lift pits, sump, STP, SSM, plinth beam, equipment foundations, pile caps, drains, trenches, cable trenches, man holes, water supply, sanitary lines and electrical conduits etc, as per specifications, including necessary manual excavation for dressing the edges & leveling, all leads and lifts. Rate to include disposing the excess earth and spreading in layers to the required levels within the owner premises as wherever specified and carting away out side the site to the designated areas identified by the local authorities. Dewatering of both ground and surface water, removal of slurry generated while excavation and keeping the area free of water with necessary shoring, strutting, required for keeping earth in position etc,. Excavating loose pockets and compacting the same. Note:PCC area shall be considered for measurement (working space & provision of slopes required for execution will not be paid separately). Note : Above specification includes for all type of soil such as Soft soil and Hard soil which soil having N value from 10 to 60. Where as N indicates corrected standard penetration test.					
i	Excavation From 0.00 Lvl - 1.50 m Lvl	Cum	45.00		-	
ii	Depth exceeding 1.50 m, but not exceeding 3.0 m	Cum	10.00		-	
1 b	Back Filling- Available stored soiled within the site					

	Supply and filling in foundations and the area wherever specified with approved good quality filling materials in plinths, area development, Retaining Wall Sides, Foundations etc., wherever specified in layers of not exceeding 150 mm thick including breaking clods, storing, transportation, double handling, watering, compacting each layer with vibratory compactor and at inaccessible places with wooden/steel rammers to achieve 98% proctor density at optimum moisture content, all leads and lifts, bailing/ pumping out of water to keep site dry while backfilling; cost shall include conveyance of all materials, labour, machinery etc. complete as directed. The rate to include loading, unloading, hire and fuel charges for tools and plants and other incidental charges etc., complete as directed by engineer-in-charge.	Cum	25.00		-	
2	Plain Cement Concrete : Ready Mix Pumped / Site Mix Concrete.					
	Note: Unless otherwise specified, the following will apply for all items of Reinforcement cement concrete. Rate quoted shall be inclusive of the following but will exclude cost of inserts like bolts, plates, sleeves, pipes etc., a) All form of work moulds, centering and shuttering. Shuttering material shall be steel, timber or plywood as directed. b) Adequate protection to edges and corners for damage during construction. c) Work either straight, curved, plain or tapered. d) Keeping the work well watered for at least 14 days after casting. e) Roughening concrete to surface where required after removal of centering or shuttering receiving plaster. f) Work on all floors at all levels. g) Building and placing in position any insert supplied. h) Weigh batching and machine mixing and consolidation using; vibrators of approved type. i) Fine aggregates shall conform to appropriate gradation/zones as per IS: 383 - 1990. j) Course aggregate shall be of hard broken Granite, basalt or trap of size specified. and shall confirm to IS: 383-1990. k) The contractors are particularly advised to study relevant drawings before quoting. l) A qualified mechanic shall be available during concreting for maintenance of mixers and vibrators. m) Minimum cement content for controlled concrete shall be of specified grade as per IS 8112. n) PCC shuttering will not be paid.					

	Providing and laying cement concrete conforming to specified grade (IS 456-1976) with 20mm and down size graded aggregate of granite as per specifications, excluding to cost of reinforcement, and including all leads / levels and lifts, pumping using line pump or boom placer, vibrating/ compaction, staging, scaffolding wherever necessary, curing as directed, excluding cost of Steel reinforcement, shuttering and centering etc., complete as directed by engineer in charge, hacking the exposed surface to receive plaster wherever necessary etc., complete as per drawings and specifications for the following items of work :					
	The maximum allowed replacement of OPC in concrete by fly ash shall be restricted to 15% or The maximum allowed replacement of OPC in concrete by Ground granulated blast furnace slag shall be restricted to 30%.					
2 a	PCC - 20mm down size					
	Providing and laying in position plain cement concrete of mix 1:3:6 for foundation wall trenches and column footings/ below flooring with OPC cement with 20mm and down size graded granite metal coarse aggregates using by RMC concrete, concrete laid in layers not exceeding 10 cms. thick, well compacted, in foundation, including cost of all materials, labour, HOM of machinery, curing complete as per specifications.	Cum	3.00		-	
3	Reinforced Cement Concrete Work :					

	Note: Unless otherwise specified, the following will apply for all items of Reinforcement cement concrete. Rate quoted shall be inclusive of the following but will exclude cost of inserts like bolts, plates, sleeves, pipes etc., a) All form of work moulds, centering and shuttering. Shuttering material shall be steel, timber or plywood as directed. b) Adequate protection to edges and corners for damage during construction. c) Work either straight, curved, plain or tapered. d) Keeping the work well watered for at least 14 days after casting. e) Roughening concrete to surface where required after removal of centering or shuttering receiving plaster. f) Work on all floors at all levels. g) Building and placing in position any insert supplied. h) Weigh batching and machine mixing and consolidation using; vibrators of approved type. i) Fine aggregates shall conform to appropriate gradation/zones as per IS: 383 - 1990. j) Course aggregate shall be of hard broken Granite, basalt or trap of size specified. and shall confirm to IS: 383-1990. k) The contractors are particularly advised to study relevant drawings before quoting. l) A qualified mechanic shall be available during concreting for maintenance of mixers and vibrators. m) Minimum cement content for controlled concrete shall be of specified grade as per IS 8112. n) PCC shuttering will not be paid.					
	Providing and laying cement concrete conforming to specified grade (IS 456-1976) with 20mm and down size graded aggregate of granite as per specifications, excluding to cost of reinforcement, and including all leads / levels and lifts, pumping using line pump or boom placer, vibrating/ compaction, staging, scaffolding wherever necessary, curing as directed, excluding cost of Steel reinforcement, shuttering and centering etc., complete as directed by engineer in charge, hacking the exposed surface to receive plaster wherever necessary etc., complete as per drawings and specifications for the following items of work :					
	The maximum allowed replacement of OPC in concrete by fly ash shall be restricted to 15% or The maximum allowed replacement of OPC in concrete by Ground granulated blast furnace slag shall be restricted to 30%.					

4 a	RCC M25 Grade Design mix Ready Mix Concrete :					
	Providing and laying in position reinforced cement concrete of Design Mix M25 grade as per design drawing at machine mixed, concrete laid in layers not exceeding 15 cms thick, vibrated for all works in foundation for footings, pedestals, retaining walls, return walls, walls (any thickness) including attached pilasters, columns pillars, posts, struts, Slab, Beam, Flat slab, drops, buttresses, bed blocks, anchor blocks & plinths etc., including cost of all materials, labour, HOM curing, complete but excluding cost of reinforcement as per specifications.					
i	RC wall concrete/drain wall/drain bottom slab	Cum	22.00		-	
5	Form work :					
	a. Scheme of Formwork including casting slabs to gentle slope, special staging for casting floors of different heights, roof projections at various levels and profiled formwork. b. Contractors shall submit drawings showing the scheme of formwork including back propping and proper sequence of removal of formwork and back propping so that the structural slab will not be overloaded due to construction loads. c. Formwork shall be designed for close jointed rigid, durable and shall have adequate strength, water tightness and ensure easy removal etc., d. Props, shorings and bracings shall be all in steel or Aluminium. e. Formwork designed with proposed materials (to be approved prior to making) shall be able to retain its shape, line, dimension, level within the allowable limits of variations. f. Formwork shall facilitate for making holes / recess for leaving dowels embeddings etc. at no additional cost and shall be submitted for approval. g. Necessary arrangement shall be envisaged to provide camber in beams or slabs as per design. h. Formwork shall have adequate openings for cleaning. i. Providing, fabricating and erecting form work, special staging for casting floors of different heights, roof projections at various levels and profiled formwork as per drawing at all levels and places wherever needed/ specified as per drawing including striking with 12mm Plastic coated, marine resistant waterproof ply with					

	adjustable steel props of acceptable Staging system and with sufficient bracing as approved by consultant.					
	j. Cost to include designing of proper form work and staging system to suit the requirements, Submission of design calculations and shop drawings for approval, sealing the joints with heavy duty brown self adhesive tape, aligning to line and levels including M.S. Ties, PVC Spacer, Providing openings/ cutouts/ pockets, applying deshuttering chemical, Deshuttering as approved by the consultant etc., complete at all levels, double/tripple heights and profiles for Note : Only plan area shall be considered. No extra shall be paid for Side shuttering of Drop panel/column capitals. k. Formwork for construction joints shall be submitted for approval, sealing the joints with heavy duty brown self adhesive tape, applying mould releasing agents(Rebol from Fosroc or equivalent), aligning to line and levels including M.S Ties, PVC spacer, Providing openings/cut outs/ pockets , All slabs shall be progressively deshuttered and backpropped as per instructions by structural engineer, complete at all levels, double/tripple height and profiles. l. Only plan area shall be considered for payment. Sides of drop panels/ column capitals shall not be considered for payment. Shuttering below the shrinkage strip at every level shall be retained in place without disturbing for a time as specified by the structural engineer, Contractors shall submit drawings showing the scheme of formwork including back propping and proper sequence of removal of formwork and back propping so that the structural slab will not be overloaded due to construction loads. Any honey coombs not affecting structural stability shall be smootly finished with CM 1:4. Any undulations, bulging etc shall be chipped and finished by the contractor without any extra cost. Any leakage of slurry, concrete etc should not be payed exrtia. (o). The Exposed surface of concrete which plasterying will be coming, hence grainding of concrete column, beam, ceiling shall be considered in the cost.					
	Providing, fabricating and erecting form work at all levels and places wherever needed / specified as per drawing including 12mm thk shuttering plywood suitably framed with silver oak sections and supported by adjustable steel props of acceptable Staging system and with sufficient bracing as approved by consultant. Cost to include designing of proper form work and staging system to suit the requirements, sealing the joints with heavy duty brown self adhesive tape, aligning to line and levels including M.S.					

	Ties,PVC Spacer, Providing openings/ cutouts/ pockets,Deshuttering as approved by the consultant etc., complete at all levels.					
	Providing and fixing CENTERING AND SHUTTERING in foundations, footings,raft beams, slabs, pile caps, retaining walls, jambs, counter-forts, buttresses, trenches, equipment/machine foundations, pedestals, abutments, pipe sleepers, columns, plinth beams, lintels, suspended slabs, beams, staircases, landings, steps, non-circular tunnels/bunkers/ silos/ shafts/ hoppers/liquid storage structures etc. for all depths including shuttering for single pour concreting, strutting, bracing, propping etc., keeping the same in position during concreting and removal of the same after specified period etc. for Straight/ Inclined Shuttering, keeping necessary provision for inserts, projecting dowels, anchor bolts or any other fixture etc. all complete and as specified and directed.					
i	RC walls	Sqm	85.00		-	
6	Reinforcement steel work :					
	Note :- Preparing Bar Bending schedule, obtaining consultant's approval, supplying, fabricating,delivering at site, hoisting and fixing in position and making all steel work in accordance with the design drawings prepared by the consultants.					
	Providing and fixing : reinforcement for RCC work with TMT or equivalent HYSD bar of various diameters and grade of steel and percentage elongation, minimum 14.5% as per IS:1786 including decoiling, straightening, cutting, bending,and placing in position at all levels according to drawings and binding the reinforcement with 18 gauge galvanised annealed binding wire of double fold and providing precast cement concrete cover blocks for placing the reinforcements in position and for maintaining the cover specified as per drawing or according to relevant IS codes. Note:Unless noted otherwise the measurements in accordance with IS 1200. However reinforcement shall be measured only in lengths of bars as actually placed in position on standard weight basis, no allowance being made in the weight for rolling margin and wastage. splices ,Chairs of any shape & profile, Spacer bar of any shape & profile, cover block, wastage, binding wire and proper protection of reinforcement shall not be measured and shall be included in the quoted rates. Quoted rate shall be	M.T	2.50		-	

	deemed to have considered the above stipulation. Quoted rate to include lead, lift, placing at all levels and as directed. Authorised laps only payable. Grade of reinforced steel - Fe 500 (Basic rate shall be 65,000 Rs/M.T excluding tax)					
7	Fabrication Works - ETP pipe support					
	Structural Steel (Shop dwg must be submitted for consultant approval. Rate included for preparation of shop dwgs)					
	Providing, fabricating and erecting Structural steel members SHS/RHS/Angles/Chanells in position at all levels and at all heights as specified in the drawings made out of standard MS sections conforming to IS 226/2062/800. Cost to include fabricating necessary Gusset Plates, Stiffener plates, Brackets, Bolts, Cleats, seating angles etc., to the required size, shape, alignment etc, as per the drawings. Cost to include welding of members using structural steel welding electrodes as per IS 814/816/817, a coat of anti corrosive primer (non flammable) to the exposed surfaces, testing as per IS 7307 (PART 1), necessary equipments, tools and tackles, staging, scaffolding required etc.,complete. for roof, etc., including a coat of zinc chromate primer and two coats of Synthetic enamel painting.					
i	ISMB/ISMC/RHS/SHS	M.T	1.20		-	
ii	plates/bolts/stiffeners	M.T	0.50		-	
8	Manhole Cover					
	Providing, Supplying, Loading, Unloading, fixing on site Factory made steam cured R.C.C Precast drain cover slab, for drain width of approved sizes (Inside Dimensions-Lx B X H) as approved in design drawing. The drain shall be of M40 grade concrete including reinforcement Fe550 Grade or HD Wire of IS:432 Part II, OPC 53 Grade Cement. The surface finish shall be smooth finish, with special in built insert, sleeves at appropriate location as specified in drawing for fixing, lifting including mechanical means, loading, transportation at site including all leads, lifts. The slab cover is designed to withstand fire tender vehicular loading.					

i	Size 1800mm x 800mm x 200/250mm	Nos	15.00		-	
ii	Size 1800mm x 900mm x 200/250mm	Nos	R.O			
	TOTAL				-	
B	PEDESTAL FOR EFFLUENT TANK					
1	Reinforced Cement Concrete Work :					
	Note: Unless otherwise specified, the following will apply for all items of Reinforcement cement concrete. Rate quoted shall be inclusive of the following but will exclude cost of inserts like bolts, plates, sleeves, pipes etc., a) All form of work moulds, centering and shuttering. Shuttering material shall be steel, timber or plywood as directed. b) Adequate protection to edges and corners for damage during construction. c) Work either straight, curved, plain or tapered. d) Keeping the work well watered for at least 14 days after casting. e) Roughening concrete to surface where required after removal of centering or shuttering receiving plaster. f) Work on all floors at all levels. g) Building and placing in position any insert supplied. h) Weigh batching and machine mixing and consolidation using; vibrators of approved type. i) Fine aggregates shall conform to appropriate gradation/zones as per IS: 383 - 1990. j) Course aggregate shall be of hard broken Granite, basalt or trap of size specified. and shall confirm to IS: 383-1990. k) The contractors are particularly advised to study relevant drawings before quoting. l) A qualified mechanic shall be available during concreting for maintenance of mixers and vibrators. m) Minimum cement content for controlled concrete shall be of specified grade as per IS 8112. n) PCC shuttering will not be paid.					

	Providing and laying cement concrete conforming to specified grade (IS 456-1976) with 20mm and down size graded aggregate of granite as per specifications, excluding to cost of reinforcement, and including all leads / levels and lifts, pumping using line pump or boom placer, vibrating/ compaction, staging, scaffolding wherever necessary, curing as directed, excluding cost of Steel reinforcement, shuttering and centering etc., complete as directed by engineer in charge, hacking the exposed surface to receive plaster wherever necessary etc., complete as per drawings and specifications for the following items of work :					
	The maximum allowed replacement of OPC in concrete by fly ash shall be restricted to 15% or The maximum allowed replacement of OPC in concrete by Ground granulated blast furnace slag shall be restricted to 30%.					
1 a	RCC M25 Grade Design mix Ready Mix Concrete :					
	Providing and laying in position reinforced cement concrete of Design Mix M25 grade as per design drawing at machine mixed, concrete laid in layers not exceeding 15 cms thick, vibrated for all works in foundation for footings, pedestals, retaining walls, return walls, walls (any thickness) including attached pilasters, columns pillars, posts, struts, Slab, Beam, Flat slab, drops, buttresses, bed blocks, anchor blocks & plinths etc., including cost of all materials, labour, HOM curing, complete but excluding cost of reinforcement as per specifications.					
i	RC wall concrete/drain wall/drain bottom slab	Cum	16.00		-	
2	Form work :					

a. Scheme of Formwork including casting slabs to gentle slope, special staging for casting floors of different heights, roof projections at various levels and profiled formwork. b. Contractors shall submit drawings showing the scheme of formwork including back propping and proper sequence of removal of formwork and back propping so that the structural slab will not be overloaded due to construction loads. c. Formwork shall be designed for close jointed rigid, durable and shall have adequate strength, water tightness and ensure easy removal etc., d. Props, shorings and bracings shall be all in steel or Aluminium. e. Formwork designed with proposed materials (to be approved prior to making) shall be able to retain its shape, line, dimension, level within the allowable limits of variations. f. Formwork shall facilitate for making holes / recess for leaving dowels embedments etc. at no additional cost and shall be submitted for approval. g. Necessary arrangement shall be envisaged to provide camber in beams or slabs as per design. h. Formwork shall have adequate openings for cleaning. i. Providing, fabricating and erecting form work, special staging for casting floors of different heights, roof projections at various levels and profiled formwork as per drawing at all levels and places wherever needed/ specified as per drawing including striking with 12mm Plastic coated, marine resistant waterproof ply with adjustable steel props of acceptable Staging system and with sufficient bracing as approved by consultant.					
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j. Cost to include designing of proper form work and staging system to suit the requirements, Submission of design calculations and shop drawings for approval, sealing the joints with heavy duty brown self adhesive tape, aligning to line and levels including M.S. Ties, PVC Spacer, Providing openings/ cutouts/ pockets, applying deshuttering chemical, Deshuttering as approved by the consultant etc., complete at all levels, double/tripple heights and profiles for Note : Only plan area shall be considered. No extra shall be paid for Side shuttering of Drop panel/column capitals. k. Formwork for construction joints shall be submitted for approval, sealing the joints with heavy duty brown self adhesive tape, applying mould releasing agents(Rebol from Fosroc or equivalent), aligning to line and levels including M.S Ties, PVC spacer, Providing openings/cut outs/ pockets , All slabs shall be progressively deshuttered and backpropped as per instructions by structural engineer, complete at all levels, double/tripple height and profiles. l. Only plan area shall be considered for payment. Sides of drop panels/ column capitals shall not be considered for payment. Shuttering below the shrinkage strip at every level shall be retained in place without disturbing for a time as specified by the structural engineer, Contractors shall submit drawings showing the scheme of formwork including back propping and proper sequence of removal of formwork and back propping so that the structural slab will not be overloaded due to construction loads. Any honey coombs not affecting structural stability shall be smootly finished with CM 1:4. Any undulations, bulging etc shall be chipped and finished by the contractor without any extra cost. Any leakage of slurry, concrete etc should not be payed exrta. (o). The Exposed surface of concrete which plasterying will be coming, hence grainding of concrete column, beam, ceiling shall be considered in the cost.					
Providing, fabricating and erecting form work at all levels and places wherever needed / specified as per drawing including 12mm thk shuttering plywood suitably framed with silver oak sections and supported by adjustable steel props of acceptable Staging system and with sufficient bracing as approved by consultant. Cost to include designing of proper form work and staging system to suit the requirements, sealing the joints with heavy duty brown self adhesive tape, aligning to line and levels including M.S. Ties, PVC Spacer, Providing openings/ cutouts/ pockets, Deshuttering as approved by the consultant etc., complete at all levels.					

	Providing and fixing CENTERING AND SHUTTERING in foundations, footings,raft beams, slabs, pile caps, retaining walls, jambs, counter-forts, buttresses, trenches, equipment/machine foundations, pedestals, abutments, pipe sleepers, columns, plinth beams, lintels, suspended slabs, beams, staircases, landings, steps, non-circular tunnels/bunkers/ silos/ shafts/ hoppers/liquid storage structures etc. for all depths including shuttering for single pour concreting, strutting, bracing, propping etc., keeping the same in position during concreting and removal of the same after specified period etc. for Straight/ Inclined Shuttering, keeping necessary provision for inserts, projecting dowels, anchor bolts or any other fixture etc. all complete and as specified and directed.					
i	RC walls	Sqm	40.00		-	
6	Reinforcement steel work :					
	Note :- Preparing Bar Bending schedule, obtaining consultant's approval, supplying, fabricating,delivering at site, hoisting and fixing in position and making all steel work in accordance with the design drawings prepared by the consultants.					
	Providing and fixing : reinforcement for RCC work with TMT or equivalent HYSD bar of various diameters and grade of steel and percentage elongation, minimum 14.5% as per IS:1786 including decoiling, straightening, cutting, bending,and placing in position at all levels according to drawings and binding the reinforcement with 18 gauge galvanised annealed binding wire of double fold and providing precast cement concrete cover blocks for placing the reinforcements in position and for maintaining the cover specified as per drawing or according to relevant IS codes. Note:Unless noted otherwise the measurements in accordance with IS 1200. However reinforcement shall be measured only in lengths of bars as actually placed in position on standard weight basis, no allowance being made in the weight for rolling margin and wastage. splices ,Chairs of any shape & profile, Spacer bar of any shape & profile, cover block, wastage, binding wire and proper protection of reinforcement shall not be measured and shall be included in the quoted rates. Quoted rate shall be deemed to have considered the above stipulation. Quoted rate to include lead, lift, placing at all levels and as directed. Authorised laps only payable.	M.T	0.50		-	

	Grade of reinforced steel - Fe 500 (Basic rate shall be 65,000 Rs/M.T excluding tax)					
7	Cement flooring					
	Providing and laying cement flooring with concrete of 75mm avg thick, under layer 40 mm thick cement concrete screed of 1:2:4 (1 cement : 2 coarse sand : 4 graded stone aggregate 12 mm nominal size) including machinaries, labor, powerflooter, making grooves of 10mm width and 6mm deep and filling with polysulphide filler. groove interval 1.2x12.m interval bays or as per direction of Engineer incharge. including cost of all materials, mortar, labour, etc., Complete as per specification.	Sqm	150.00		-	
8	Epoxy flooring					
	Providing and laying 3mm thick Self levelling epoxy flooring of reputed brand applied at 1ltr/m ² on existing Concrete substrate of 25Mpa or more. The Concrete shall be free from any defects and cracks. The epoxy compound shall have low VOC and is chemically resistant & antimicrobial. The surface of Concrete shall be cleaned thoroughly and free from laitance and applied with primer cured for 6-8 hours. The mix shall be mixed using Hand mixing rotary machine. The underlay shall be laid with 3mm thickness and overlay at 2mm. The entire operation shall be finished in line with epoxy coving and marked with 100mm thickness Yellow marking lines complete as per the direction of Engineer in charge.	Sqm	150.00		-	
9	Water proofing					
	Providing and applying 2 or more coats of PU coating with two component high performance polymer modified cementitious waterproofing coating of approved brand, having minimum elongation of 120%, Tensile strength 1 N/mm ² (As per ASTM D412), Shore A hardness of 60 (As per ASTM D 2240) and Crack bridging up to 2mm (As per ASTM C836) including reinforcing the coating with 45gsm glass fibre mesh at all corners. The coating shall be applied with a total consumption of 1.5 Kg/Sqm in two coats above FFL on vertical surface over other walls as per manufacturer's specification and methodology. The system includes base preparation of cleaning, brushing and removal of flaky materials, grouting the porous area with cementitious grout, sealing the minor cracks, proper coving between slab and wall junctions and pre-wetting the surface to attain SDD condition before application of the	Sqm	150.00		-	

	waterproofing coating, followed by the application of waterproof coating.					
10	PCC below cement flooring					
	Providing and laying in position plain cement concrete of mix 1:2:4 by using cement @240kgs, with 20mm and down size graded granite metal coarse aggregates and fine aggregates, mixed with water proof compound of approved quality as per Manufacturers specifications including machine mixed, tamping, cost of all materials, labour, HOM of machinery, curing complete as per specifications.	Cum	16.50		-	
	TOTAL				-	
C	UNDERGROUND TANK RCC WALL CASING.					
1	Excavation Work :					
	Earth work:					
	Note: Unless otherwise specified rates quoted for all excavation shall include the following: a) Site clearance such as clearing shrubs undergrowth, roots and small trees brush wood, etc., b) Setting out the work to profile, etc., c) Bailing or otherwise removing all water may accumulate in the excavation from all causes. d) Cutting out and throwing soil clear of area excavated or depositing clear of edge of foundation to avoid fall in. e) Trimming all sides to plumb or otherwise as instructed at site and square leveling all bottoms. Clearing out all loose earth etc., f) Disposing surplus soil as directed within the site or outside and dressing to proper level and grade as required. g) Dismantling, removing and stacking as directed existing water pipe and /or soil pipes within the excavated portion. h) Providing shoring and strutting for protecting the sides of foundation where required.					
1a	Excavation Soil by Mechanical means:					

	Earth work Excavation for foundation of structures by mechanical means (Hydraulic excavator) in all sorts of soils, soft or hard (Sand, clay, black cotton, slushy and marshy soil), Disintegrated/ weathered/ soft rock including soft or hard murram but excluding hard rock. For footings, pedestals, lift pits, sump, STP, SSM, plinth beam, equipment foundations, pile caps, drains, trenches, cable trenches, man holes, water supply, sanitary lines and electrical conduits etc, as per specifications, including necessary manual excavation for dressing the edges & leveling, all leads and lifts. Rate to include disposing the excess earth and spreading in layers to the required levels within the owner premises as wherever specified and carting away out side the site to the designated areas identified by the local authorities. Dewatering of both ground and surface water, removal of slurry generated while excavation and keeping the area free of water with necessary shoring, strutting, required for keeping earth in position etc,. Excavating loose pockets and compacting the same. Note:PCC area shall be considered for measurement (working space & provision of slopes required for execution will not be paid separately). Note : Above specification includes for all type of soil such as Soft soil and Hard soil which soil having N value from 10 to 60. Where as N indicates corrected standard penetration test.					
i	Excavation From 0.00 Lvl - 1.50 m Lvl	Cum	55.00		-	
ii	Depth exceeding 1.50 m, but not exceeding 4.0 m	Cum	60.00		-	
1 b	Back Filling- Available stored soiled within the site					
	Supply and filling in foundations and the area wherever specified with approved good quality filling materials in plinths, area development, Retainning Wall Sides, Foundations etc., wherever specified in layers of not exceeding 150 mm thick including breaking clods, storing,transportation , double handling, watering, compacting each layer with vibratory compactor and at unaccessible places with wooden/steel rammers to achieve 98% proctor density at optimum moisture content, all leads and lifts, bailing/ pumping out of water to keep site dry while backfilling; cost shall include conveyance of all materials, labour, machinery etc. complete as directed. The rate to includes loading, unloading, hire and fuel charges for tools and plants and other incidental charges etc., complete as directed by engineer-in-charge.	Cum	50.00		-	

2	Plain Cement Concrete : Ready Mix Pumped / Site Mix Concrete.					
	Note: Unless otherwise specified, the following will apply for all items of Reinforcement cement concrete. Rate quoted shall be inclusive of the following but will exclude cost of inserts like bolts, plates, sleeves, pipes etc., a) All form of work moulds, centering and shuttering. Shuttering material shall be steel, timber or plywood as directed. b) Adequate protection to edges and corners for damage during construction. c) Work either straight, curved, plain or tapered. d) Keeping the work well watered for at least 14 days after casting. e) Roughening concrete to surface where required after removal of centering or shuttering receiving plaster. f) Work on all floors at all levels. g) Building and placing in position any insert supplied. h) Weigh batching and machine mixing and consolidation using; vibrators of approved type. i) Fine aggregates shall conform to appropriate gradation/zones as per IS: 383 - 1990. j) Course aggregate shall be of hard broken Granite, basalt or trap of size specified. and shall confirm to IS: 383-1990. k) The contractors are particularly advised to study relevant drawings before quoting. l) A qualified mechanic shall be available during concreting for maintenance of mixers and vibrators. m) Minimum cement content for controlled concrete shall be of specified grade as per IS 8112. n) PCC shuttering will not be paid.					
	Providing and laying cement concrete conforming to specified grade (IS 456-1976) with 20mm and down size graded aggregate of granite as per specifications, excluding to cost of reinforcement, and including all leads / levels and lifts, pumping using line pump or boom placer, vibrating/ compaction, stagging, scaffolding wherever necessary, curing as directed, excluding cost of Steel reinforcement, shuttering and centering etc., complete as directed by engineer in charge, hacking the exposed surface to receive plaster wherever necessary etc., complete as per drawings and specifications for the following items of work :					

	The maximum allowed replacement of OPC in concrete by fly ash shall be restricted to 15% or The maximum allowed replacement of OPC in concrete by Ground granulated blast furnace slag shall be restricted to 30%.					
2 a	PCC - 20mm down size					
	Providing and laying in position plain cement concrete of mix 1:3:6 for foundation wall trenches and column footings/ below flooring with OPC cement with 20mm and down size graded granite metal coarse aggregates using by RMC concrete, concrete laid in layers not exceeding 10 cms. thick, well compacted, in foundation, including cost of all materials, labour, HOM of machinery, curing complete as per specifications.	Cum	3.50		-	
3	Reinforced Cement Concrete Work :					
	Note: Unless otherwise specified, the following will apply for all items of Reinforcement cement concrete. Rate quoted shall be inclusive of the following but will exclude cost of inserts like bolts, plates, sleeves, pipes etc., a) All form of work moulds, centering and shuttering. Shuttering material shall be steel, timber or plywood as directed. b) Adequate protection to edges and corners for damage during construction. c) Work either straight, curved, plain or tapered. d) Keeping the work well watered for at least 14 days after casting. e) Roughening concrete to surface where required after removal of centering or shuttering receiving plaster. f) Work on all floors at all levels. g) Building and placing in position any insert supplied. h) Weigh batching and machine mixing and consolidation using; vibrators of approved type. i) Fine aggregates shall conform to appropriate gradation/zones as per IS: 383 - 1990. j) Course aggregate shall be of hard broken Granite, basalt or trap of size specified. and shall confirm to IS: 383-1990. k) The contractors are particularly advised to study relevant drawings before quoting. l) A qualified mechanic shall be available during concreting for maintenance of mixers and vibrators. m) Minimum cement content for controlled concrete shall be of specified grade as per IS 8112.					

	n) PCC shuttering will not be paid.					
	Providing and laying cement concrete conforming to specified grade (IS 456-1976) with 20mm and down size graded aggregate of granite as per specifications, excluding to cost of reinforcement, and including all leads / levels and lifts, pumping using line pump or boom placer, vibrating/ compaction, staging, scaffolding wherever necessary, curing as directed, excluding cost of Steel reinforcement, shuttering and centering etc., complete as directed by engineer in charge, hacking the exposed surface to receive plaster wherever necessary etc., complete as per drawings and specifications for the following items of work :					
	The maximum allowed replacement of OPC in concrete by fly ash shall be restricted to 15% or The maximum allowed replacement of OPC in concrete by Ground granulated blast furnace slag shall be restricted to 30%.					
4 a	RCC M25 Grade Design mix Ready Mix Concrete :					
	Providing and laying in position reinforced cement concrete of Design Mix M25 grade as per design drawing at machine mixed, concrete laid in layers not exceeding 15 cms thick, vibrated for all works in foundation for footings, pedestals, retaining walls, return walls, walls (any thickness) including attached pilasters, columns pillars, posts, struts, Slab, Beam, Flat slab, drops, buttresses, bed blocks, anchor blocks & plinths etc., including cost of all materials, labour, HOM curing, complete but excluding cost of reinforcement as per specifications.					
i	drain bottom slab	Cum	8.00		-	
ii	RC wall concrete/drain wall/drain bottom slab	Cum	50.00		-	
5	Form work :					

a. Scheme of Formwork including casting slabs to gentle slope, special staging for casting floors of different heights, roof projections at various levels and profiled formwork. b. Contractors shall submit drawings showing the scheme of formwork including back propping and proper sequence of removal of formwork and back propping so that the structural slab will not be overloaded due to construction loads. c. Formwork shall be designed for close jointed rigid, durable and shall have adequate strength, water tightness and ensure easy removal etc., d. Props, shorings and bracings shall be all in steel or Aluminium. e. Formwork designed with proposed materials (to be approved prior to making) shall be able to retain its shape, line, dimension, level within the allowable limits of variations. f. Formwork shall facilitate for making holes / recess for leaving dowels embedments etc. at no additional cost and shall be submitted for approval. g. Necessary arrangement shall be envisaged to provide camber in beams or slabs as per design. h. Formwork shall have adequate openings for cleaning. i. Providing, fabricating and erecting form work, special staging for casting floors of different heights, roof projections at various levels and profiled formwork as per drawing at all levels and places wherever needed/ specified as per drawing including striking with 12mm Plastic coated, marine resistant waterproof ply with adjustable steel props of acceptable Staging system and with sufficient bracing as approved by consultant.					
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j. Cost to include designing of proper form work and staging system to suit the requirements, Submission of design calculations and shop drawings for approval, sealing the joints with heavy duty brown self adhesive tape, aligning to line and levels including M.S. Ties, PVC Spacer, Providing openings/ cutouts/ pockets, applying deshuttering chemical, Deshuttering as approved by the consultant etc., complete at all levels, double/tripple heights and profiles for Note : Only plan area shall be considered. No extra shall be paid for Side shuttering of Drop panel/column capitals. k. Formwork for construction joints shall be submitted for approval, sealing the joints with heavy duty brown self adhesive tape, applying mould releasing agents(Rebol from Fosroc or equivalent), aligning to line and levels including M.S Ties, PVC spacer, Providing openings/cut outs/ pockets , All slabs shall be progressively deshuttered and backpropped as per instructions by structural engineer, complete at all levels, double/tripple height and profiles. l. Only plan area shall be considered for payment. Sides of drop panels/ column capitals shall not be considered for payment. Shuttering below the shrinkage strip at every level shall be retained in place without disturbing for a time as specified by the structural engineer, Contractors shall submit drawings showing the scheme of formwork including back propping and proper sequence of removal of formwork and back propping so that the structural slab will not be overloaded due to construction loads. Any honey coombs not affecting structural stability shall be smootly finished with CM 1:4. Any undulations, bulging etc shall be chipped and finished by the contractor without any extra cost. Any leakage of slurry, concrete etc should not be payed exrta. (o). The Exposed surface of concrete which plasterying will be coming, hence grainding of concrete column, beam, ceiling shall be considered in the cost.					
Providing, fabricating and erecting form work at all levels and places wherever needed / specified as per drawing including 12mm thk shuttering plywood suitably framed with silver oak sections and supported by adjustable steel props of acceptable Staging system and with sufficient bracing as approved by consultant. Cost to include designing of proper form work and staging system to suit the requirements, sealing the joints with heavy duty brown self adhesive tape, aligning to line and levels including M.S. Ties, PVC Spacer, Providing openings/ cutouts/ pockets, Deshuttering as approved by the consultant etc., complete at all levels.					

	Providing and fixing CENTERING AND SHUTTERING in foundations, footings,raft beams, slabs, pile caps, retaining walls, jambs, counter-forts, buttresses, trenches, equipment/machine foundations, pedestals, abutments, pipe sleepers, columns, plinth beams, lintels, suspended slabs, beams, staircases, landings, steps, non-circular tunnels/bunkers/ silos/ shafts/ hoppers/liquid storage structures etc. for all depths including shuttering for single pour concreting, strutting, bracing, propping etc., keeping the same in position during concreting and removal of the same after specified period etc. for Straight/ Inclined Shuttering, keeping necessary provision for inserts, projecting dowels, anchor bolts or any other fixture etc. all complete and as specified and directed.					
i	RC walls	Sqm	90.00		-	
6	Reinforcement steel work :					
	Note :- Preparing Bar Bending schedule, obtaining consultant's approval, supplying, fabricating,delivering at site, hoisting and fixing in position and making all steel work in accordance with the design drawings prepared by the consultants.					
	Providing and fixing : reinforcement for RCC work with TMT or equivalent HYSD bar of various diameters and grade of steel and percentage elongation, minimum 14.5% as per IS:1786 including decoiling, straightening, cutting, bending,and placing in position at all levels according to drawings and binding the reinforcement with 18 gauge galvanised annealed binding wire of double fold and providing precast cement concrete cover blocks for placing the reinforcements in position and for maintaining the cover specified as per drawing or according to relevant IS codes. Note:Unless noted otherwise the measurements in accordance with IS 1200. However reinforcement shall be measured only in lengths of bars as actually placed in position on standard weight basis, no allowance being made in the weight for rolling margin and wastage. splices ,Chairs of any shape & profile, Spacer bar of any shape & profile, cover block, wastage, binding wire and proper protection of reinforcement shall not be measured and shall be included in the quoted rates. Quoted rate shall be deemed to have considered the above stipulation. Quoted rate to include lead, lift, placing at all levels and as directed. Authorised laps only payable.	M.T	5.00		-	

	Grade of reinforced steel - Fe 500 (Basic rate shall be 65,000 Rs/M.T excluding tax)					
7	Fabrication Works - RCC casing top cover					
	Structural Steel (Shop dwg must be submitted for consultant approval. Rate included for preparation of shop dwgs)					
	Providing, fabricating and erecting Structural steel members SHS/RHS/Angles/Chanells in position at all levels and at all heights as specified in the drawings made out of standard MS sections conforming to IS 226/2062/800. Cost to include fabricating necessary Gusset Plates, Stiffener plates, Brackets, Bolts, Cleats, seating angles etc., to the required size, shape, alignment etc, as per the drawings. Cost to include welding of members using structural steel welding electrodes as per IS 814/816/817, a coat of anti corrosive primer (non flammable) to the exposed surfaces, testing as per IS 7307 (PART 1), necessary equipments, tools and tackles, staging, scaffolding required etc.,complete. for roof, etc., including a coat of zinc chromate primer and two coats of Synthetic enamel painting.					
i	ISMB/ISMC/RHS/SHS	M.T	0.70		-	
ii	Chequered plates	M.T	0.75		-	
ii i	Plates/bolts/stiffeners	M.T	0.25		-	
	TOTAL				-	

Document Name	APPROVED MAKE LIST	
Document No.	KSI-162-DD-P14-TBOQ-01-R0	
Date / Rev	19.02.2026 / 00	
Sr. No.	Description	MAKE

1	OPC - 53 Grade Cement	Birla Super / Ultratech cement / ACC
2	Ready Mix Concrete	RMC Readymix (India) Pvt. Ltd./ ACC - RMC / Ultratech RMC
3	Nito Bond/Conbextra GP2	FOSROC Chemicals (India) Ltd., / BASF construction chemicals (India) Pvt Ltd.,
4	Tor steel (Rolled) / TMT STEEL	Steel Authority of India Ltd., / JSW Steel Ltd., / TATA Steel Ltd.
5	Structural steel	JSW Steels Ltd./ TATA Steel Ltd./ Steel Authority of India Ltd.,
6	PUF panels roofing	JSW Steels Ltd./ Millennium Building Systems Inc.,/
7	Roofing & Cladding sheets	Lloyd Insulations (India) Ltd., Ltd./ Tata Blue Scope / JSW Roofing Solutions
8	Waterproofing compound / Waterproofing solutions & Agency	FOSROC Chemicals (India) Ltd., / Pidilite Industries Limited / Sika India
9	Concrete Interlock pavers / Cubical pavers	Sobha Developers Ltd, (Concrete Products Div.) / Basant Beton / Pavit .
10	Cobble Stones	Basant Beton / Pavit / Ultra tile
11	Anchor Bolts	Hilti India Pvt Ltd / Fischer Building Materials India

FORM H

ETP Treated water Pumping and Reuse Plumbing system

Item No.	Description	Qty		Material Rate		Labour Rate	Per	Amount
A	ETP TREATED WATER TANK TO FLUSHING STORAGE TANK PIPES AND FITTINGS (EXTERNAL & INTERNAL)							
1	Supplying, Installing, Testing & Commissioning at site in position UPVC SCH-80 pipes confirming to ISO:22391-2:2009 of approved make for water supply pipes, jointing with push fit fittings (elbows, unions, tees, reducers, couplings, nipples etc.) complete with clamping in position with G.I. "U" bolts (8 mm thick) on G.I. slotted rails (1.6 mm thick), Rail legs (2.5 mm thick) with rubber lining of approved make, as per drawings to the satisfaction of the Project Manager.							
1.2	65mm dia. (ETP treated Water Tank to OHT Flushing Tank)	210	R M					
2	Providing and fixing Brass heavy approved make ball valves screwed type of the following diameters (20 Kg/cm ²) (upto 65mm dia.							

2.1	65mm dia (Butterfly Valve)	4	No s.					
3	Providing and fixing ball cock heavy duty with copper float all complete.							
3.1	65mm dia.	1	No s.					
4	Providing and fixing G.M. heavy non-return valve screwed type.(16 Kgs/cm ²)							
4.1	65mm dia..	2	No s.					
	TOTAL CARRIED OVER TO SUMMARY PAGE							
B	PLANTS & EQUIPMENTS							

1	Supply, installation, testing and commissioning of Submersible type centrifugal pumps having cast iron casing and cast iron diffuseres, Bronze impeller Dynamically Balanced AISI 304 stainless steel shaft running in ball bearing on both ends and protected by Bronze shaft sleeves. Pumps shall be fitted with mechanical seals, 2900 RPM, 415 volts, 50 cycles Ac 3 phase Motor should be rated for +/- 10% voltage fluctuation of standard 415 volts including all relevant accessories for complete installation and providing probe level control with cabling all complete.							
1.1	Pumps 100 LPM @ 80 Mt. head, Approx 3.5 H.P. x (1w + 1s) (O.H.T.FEED)	1	Set			-	Set	-
2	CONTROL PANEL							
	MCC Motor control centres shall be of tailor-made design, wall/ floor-mounted type manufactured in factory/shop. Enclosure shall be fixed type (modular draw-out design), dust-tight and vermin-proof having IP54 degree of protection. Main bus for phase and neutral shall be of							

	uniform size insulated electrolytic copper. Separate insulated copper earth bus within the board shall be provided with a link between neutral and earth bus.							
	Board shall be provided with tow distinct and separate earth terminals on opposite side to connect external earth conductor. All accessible live terminals/ portion of components shall be provided with shrouds.							
	Board shall be of sheet steel enclosed free-standing self-supporting indoor type having front and rear doors. Minimum 2.5mm thick cold rolled (CR) sheet steel shall be used for load bearing members and 1.6mm thick CR sheet shall be used for doors and covers.							

	Board shall be provided with 75mm high base channel, with holes drilled for grouting to foundation. Maximum height of panel, including the height of base channel shall be 2450mm. Minimum and maximum operating heights shall be 300mm and 1800mm respectively. Each feeder compartment shall have a separate hinged door with rolled edges with concealed hinges and thumb grip type screws without any sharp corners to doors. suitably sized thick non-deteriorating, continuous, neoprene sponge rubber gaskets shall be provided all round the perimeter of adjacent cubicles, between cubicles and baseframe. Cutouts on front door for mounting lamps, meters, control switches, handle, etc with inscription plate for component shall be provided. Undrilled gland plate of 3mm thick shall be provided on rear TOP of board cable termination chamber shall be at the rear of the board							
	Incoming and outgoing connections from switching devices shall be brought to the cable chamber in a staggered manner for cable terminations. These connections shall be supported on DMC/ epoxy insulators such that external cables are not required to be connected directly to the terminals of switching devices. Detachable barriers							

	of perforated metal sheet or minimum 4mm thick non-hygroscopic hylam sheet shall be provided to prevent accidental contact with any live parts.							
	Board shall be spray painted after rust removal, cleaning, rinsing, pickling in acid and phosphatising treatment on sheet steel with two coats of zinc-rich primer and two coats of epoxy paint of approved shade.							
	Non rusting metallic or PVC engraved label with proper designation shall be fixed on the front cover of each compartment, in addition to the name-plate for entire MCC. The weight and overall diemensions (LxDxH) MUST be furnished along with the offer with the details of shipping sections, if any. Scope of these TWO MCCS shall comply with all above requirements.							
	The Contractor shall provide additional spare Contact in his Panel/Starter for Alarm indicating & connection for Building Automation System.							
	The Contact shall be Voltage free as required.							

	Tenderer shall provide any all suitable cables as required for respective panels to pump for complete working of the System at no additional cost. Cables shall be copper conductor minimum size 3Cx2.5 sq.mm PVCA 1.1 KV grade							
	Fabricating, Supplying and installing in position sheet steel wall/clad floor mounting pattern front opening type control panel.							
	All the pumps can be selected for off/ manual position through its manual position its individual selector switches. In manual position the pump shall run continuously till switched off. In automatic position the pump shall start and stop on the level controllers.							
	Probe level controllers shall be provided including necessary cabling from tanks to pumps wherever necessary.							
	Vendor shall submit shop drawings for electrical panel and wiring diagram for approval.							

Not e:	Panel shall be fabricated as per the Drawings furnished by the Consultants and from their approved Vendor							
	CONTROL PANEL FOR OVER HEAD FEED PUMPS							
2.1	O.H.T.FEED Pumps 1 + 1 x (3.5 H.P. each)	1	No .			-	N o.	-
	TOTAL CARRIED OVER TO SUMMARY PAGE							-

FORM F

GST INFORMATION

(To be duly filled, signed and uploaded along with a technical bid by the tenderer.)

I) GST details:-Details to be furnished duly supported by GST annual turnover certificates for the last three financial years, certified by a Chartered Accountant (Copies to be submitted separately)

Sr. No.	Details	Year ending 31 st March of		
		2022-23	2023-24	2024-25
1	GST annual turnover			
2	GSTIN(registration number)			
3	GST paid			

III) Income Tax Pan details (to be uploaded separately)

IV) Solvency certificate from Bankers of Applicant (to be uploaded separately).

V) GST certificate

SIGNATURE OF APPLICANT (S)

SIGNATURE OF CHARTERED ACCOUNTANT WITH SEAL

FORM K

Description	Inlet Parameters (after mass balancing)	Outlet Effluent characteristics after treatment(ETP)	Outlet Effluent characteristics after treatment(ETP + RO)
pH			
Total Dissolved Solids (TDS), mg/l			
Total Suspended Solids(TSS),mg/l			
Total Hardness (TH),mg/l			
Biochemical Oxygen Demand (BOD),mg/l			
Chemical Oxygen Demand (COD),mg/l			
Oil & Grease,mg/l			
Ammoniacal Nitrogen,mg/l			
Total Kjeldahl Nitrogen (TKN),mg/l			
Silica,mg/l			
Flurides			
Sulphates			
Nitrate - N			
Colour			

Annexure 1

UNDERTAKING CERTIFICATE

To,
PIC,
IIT Bombay Research Park,
Powai, Mumbai, Maharashtra- 4000076

Name of Work: - Execution, supply, installation and commissioning of Effluent Treatment Plant of 57 KLD at IIT Bombay Research Park

Dear Sir,

We are hereby quoting all the rates for the attached schedule of tender of the above-mentioned work. We hereby accept & sign all the General Terms and Conditions of the Contract.

We hereby submit our quotation for the open tender for the above-mentioned work. We accept and sign all the General Terms and Conditions of the Contract. We agree to keep the validity of the bid for 180 days from the date of opening the tenders, without any modification to its terms and conditions.

We confirm that the information provided in our bid is accurate and complete to the best of our knowledge. We undertake to execute the work as per the scope, specifications, and timelines mentioned in the tender documents if the contract is awarded to us. We understand and agree that failure to comply with the terms and conditions may result in disqualification or cancellation of the bid.

We look forward to the opportunity to execute the work as per the requirements of IIT Bombay Research Park.

Thanking you,

Yours faithfully,

Signature of the authorized signatory of ETP COMPANY
with the official Seal/ stamp of the firm.

Form G

Quotation for the ETP Project of IITB Research Park – Price Submission

To,
PIC,
IIT Bombay Research Park,
Powai, Mumbai, Maharashtra- 4000076

Name of Work: - Execution, supply, installation and commissioning of Effluent Treatment Plant of 57 KLD at IIT Bombay Research Park

Our rate for the above-mentioned work/project (as defined in the scope of work in terms and conditions) is as under:

In figures: Rs.....

In words :Rupees.....

The above rates are inclusive of prices of materials & services proposed to supply under the contract, all taxes, duties, packing and forwarding charges, levies of state or central governments, all costs like travel, lodging and boarding, local travel expenses etc.

Yours faithfully,

Signature of the authorized signatory of ETP COMPANY
with the official Seal/ stamp of the firm.

6. Terms & Conditions of the Contract

1. Before submissions of the tender, the prospective bidders are expected to examine Technical Specifications of the equipment/machinery allied items required, terms and conditions, etc., given in the Tender Documents. Failure to furnish all information required by the Tender documents may result in the rejection of the bid.
2. The Vendor/contractor/bidder should provide both theoretical and practical training to the IITBRPF team after commissioning the machinery or at an appropriate stage.
3. In the Financial Bid, the Bidders shall indicate all the prices of material & services Proposed(FORM C, D E & G) to supply under the contract. All costs shall be inclusive of all taxes, duties, charges and levies of State or Central Governments, as applicable, at the time of submitting the financial bids. No concessional form will be provided by the IITBRPF. The Financial Bid shall indicate all prices for materials and services. Quoted prices shall be all-inclusive of taxes, duties, charges, levies, travel, lodging, and local transport costs. Any statutory changes in taxes after bid submission shall be mutually reviewed and adjusted only if officially notified by the Government. IITBRPF shall not bear additional costs beyond the quoted bid.
4. The contractor shall insure all materials from the time of dispatch until final completion and handover to IITBRPF. Insurance shall cover loss, damage, theft, or transit risk. Proof of coverage must be submitted prior to dispatch
5. The successful bidder shall provide a Performance Bank Guarantee (PBG) of 5% of the total contract value, issued by any Nationalised bank in favour of IITB Research Park Foundation (IITBRPF). This PBG will remain valid for the entire contract duration including the Defect Liability Period (DLP).), and will be returned after successful completion of the work and expiry of the DLP. IITBRPF may invoke the PBG in case of non-performance, with written notice detailing reasons. The PBG claim shall be final and binding.
6. The terms of payment shall be as under :
 - a) 20% of the contract value will be paid as advance against confirmation of orders and after submission of Performance Bank Guarantee.
 - b) 25% of the contract value will be paid on receiving of all the material at site after pre-dispatch inspection (wherever necessary) and certification of the equipment/items to be supplied.
 - c) 25% of the contract value will be paid on completion of erection of ETP at site.
 - d) 20% of the contract value will be paid on completion of hydraulic and dynamic testing, equipment confirmation and plant operation and result confirming to the standard as mentioned in the tender document.
 - e) Balance 10% payment will be made after completion of the work in all respect duly certified by the IITBRP's authorized representative.
7. Construction/fabrication/erection of the ETP should be as per the commitment from the date of receipt of initial payment against acceptance of order.

8. Validity of the tender bid should be available up to 1 year. The tender bid shall remain valid for acceptance for 12 months from the date of opening. The contractor shall, upon acceptance of the bid, be bound to execute and complete the contract at the quoted price, and no revision or escalation of the quoted amount shall be permitted for the entire duration of the contract.

9. The contractor shall be fully responsible for construction, fabrication, erection, and commissioning of the “Effluent Treatment Plant” (ETP) at IITB Research Park Building. The address will be specified in the Purchase Order, including safety, insurance, labor, and compliance with laws

12. Late / delayed tender offers will not be considered at all.

13. Any non-fulfilment of the stipulation given above will make the bid invalid.

14. If the tenders received are not sealed properly, they will not be considered at all.

15. Purchase Committee, IITBRP reserves the right to accept or reject any or all the bids either in full or part without assigning any reason thereof.

16. The contractor shall be entirely responsible for all taxes duties, license fees etc., incurred until completion of the contract.

17. The construction/fabrication/erection and commissioning period of the ETP as agreed to should not be extended under normal conditions. Suitable penalty for non-execution of the order may be enforced to the extent of 1% of the Contract Value for every week extended. In case of the delay beyond scheduled period due to some unforeseen reason, written permission is required from the PIC/CEO, IITBRPF with proper justification to avoid penalty.

18. The contractor shall provide maintenance and servicing during the warranty period of eighteen (18) months. All defects shall be rectified within seven (7) days of notification. Servicing shall be performed by the manufacturer or authorized agency at no additional cost to IITBRPF."

20.SCOPE OF WORK & IMPORTANT INSTRUCTIONS

A) WORK AND SITE

The work involves setting up a 57 KLD Effluent Treatment Plant (ETP) at IITB Research Park. Tenderers are required to inspect the site prior to submitting their bids to fully understand the nature of the work, site conditions, material availability, water, and logistical constraints.

The contractor shall complete the work strictly in accordance with the specifications, drawings, and terms provided in the Tender Documents and within the stipulated contract period. provided in the Tender Documents and attached drawings. Any clarifications can shall be discussed during the pre-bid meeting at IITBRPF. The contractor, upon award of the tender, shall execute a separate and distinct agreement with IITBRPF, which will govern all obligations, notwithstanding anything contained in the Tender Documents. The satisfaction of work shall be evaluated objectively against the defined technical and quality standards in the Tender Documents and to the satisfaction of IITBRPF.

B) SCOPE OF WORK

The Scope of work consists of construction civil work, Supply & installation of electro mechanical equipment, Piping work, Hydraulic testing, electrical & instrumentation work, set up of laboratory,

trial run and commissioning and handholding support for 1 year related to 57 KLD- Effluent Treatment Plant. This specification covers the minimum requirements for the design, engineering, material Procurement, civil construction, fabrication, painting, assembly, Inspection, supply, shipment, erection and commissioning of Wastewater treatment and recycle plant. The recovered water is proposed to be used for flushing purpose.

C) RATES :

The contract shall be for overall work as per the scope of work as described in tender document. The Contractor shall be paid for the actual rates finalized in the agreement (to be signed during award of work). That rates quoted shall include labour, materials, tools and plants, equipments, applications, transports, taxes, charges, levies, contractor's supervision, overheads, pollution, PF, ESI and other legislations and all charges necessary for the satisfactory completion of the work. Rates for the work should include all such expenses. Rate in Rupees shall be quoted and the tender shall remain good and open for acceptance for a period of 1 year from the date of opening of tender. IITBRPF shall make arrangement in regard to electricity and water supply required for the execution of the works ETP COMPANY has to pay for the same on actual consumption

D) MATERIALS

All materials supplied by the contractor and brought on the site shall be got tested frequently to check up to conform to the specifications. All tests as may be necessary shall be performed at the contractor's expenses and he shall make all necessary arrangements for conducting the tests in the approved laboratories or as directed by the IITBRPF.

21) TIME OF COMPLETION AND DEFECT LIABILITY PERIOD

All works specified herein shall be completed in all respects to the entire satisfaction of IITBRPF within an overall period of 120 days (approximately 4 months) from the date of the letter for commencement of work. This period includes:

- Civil Works (below ground): 45–60 days
- Procurement & Supply of Mechanical/Electrical/Plumbing (MEP) Materials: 45–60 days
- Installation Works at Site: 21–30 days
- Testing & Commissioning: 10–15 days

Civil works shall be executed in parallel with the procurement and supply of mechanical systems to optimize the timeline. If the work extends beyond 120 days, a penalty of 1% of the contract value will be levied for each week of delay.

The contractor's/vendor's responsibility shall, however, not end until the Defect Liability Period of 18 months from the date of completion is over. If any defect during this period is notified, the contractor shall rectify it at their own cost.

22) ACCEPTANCE OF TENDERS

The acceptance of tender shall rest with the IITBRPF, which does not bind itself to accept the lowest tender and reserves to itself the authority to reject any or all the tenders received without assigning any reasons thereto. All tenders, in which any of the prescribed conditions are not full- filled or are incomplete in any respect, are liable to be rejected. The IITBRPF also reserves the right of accepting the whole or any part of the tender and the Contractor shall be bound to perform the same at the quoted rates.

23) REJECTION OF TENDERS

The tenders received after due date of submission shall be rejected. The contractor should fill in the rates in figures as well as in words for sub-total & Total Price. The tenders, which do not fulfil this requirement, are liable to be rejected. No alterations be made by the Contractor in the notice to the tender, instructions to the contractors, the contract form, conditions of contract, the specifications or the quantities accompanying the same shall be recognized and if any such alterations are made or any special conditions are attached, the tender is liable to be rejected.

24)COMPENSATION FOR DELAY / LIQUIDATED DAMAGES The contractor must strictly adhere to the time schedule specified in the tender, which will commence from the 7th day after receiving the order to start work. The work must progress diligently, as time is deemed essential to the contract.

If the contractor delays the commencement or completion of the work, they will be liable to pay compensation at the rate of 1% (or a lesser amount as determined by IITBRPF) of the estimated project cost for each week of delay.

The contractor must complete the work within 4 months of the written commencement order. Failure to meet this timeline may result in additional compensation at the same rate for incomplete work.

Before imposing penalties, IITBRPF will issue a 10-day written notice. The total compensation under this clause will not exceed 10% of the estimated project cost.

25) TERMINATION OF CONTRACT

IITBRPF may terminate the contract by written notice if the contractor fails to perform, exhibits substandard workmanship, or breaches material terms. Before termination, IITBRPF shall provide a 10-day notice to remedy the breach. Termination shall not affect IITBRPF's right to recover losses, enforce contractual remedies, or claim damages under applicable law. Termination may be invoked at any time, regardless of the project completion date, if the breach is not rectified within the notice period.

27) FINAL CERTIFICATE

Within 30 days of completing the work, the contractor must notify IITBRPF in writing of such completion. IITBRPF, along with its consultant, will inspect the work within 30 days of receiving the notice. If upon such inspection no defects are found, a completion certificate will be issued by IITBRPF. If any defects, deficiencies, or incomplete items are noticed, are identified, a provisional completion certificate will be issued, outlining:

(a) Defects and/or incomplete items to be rectified by the contractor and.

(b) The time period within which such rectification or completion shall be carried out, which shall normally be **30 days** or such extended period as may be specified by IITBRPF. Items for which payment will be made at reduced rates.

The work will not be considered complete, nor will any certificate (provisional or final) be issued until the contractor has:

1. Removes all scaffolding, surplus materials, rubbish, huts, and sanitary arrangements used for the execution of the work; and .
2. Cleans all the site and all installed works, including all structures, equipment, and appurtenances, woodwork, doors, windows, walls, floors, and any other parts of the building to the satisfaction of IITBRPF.

Final completion and release of retention money and/or Performance Bank Guarantee shall be effected only after satisfactory rectification of all defects and completion of all outstanding works as certified by IITBRPF.

In the event the contractor fails to comply with the above requirements within the stipulated time, IITBRPF shall be at liberty to carry out such removal, cleaning, or rectification through its own agency or otherwise, at the risk and cost of the contractor, and the expenses so incurred shall be recoverable from the contractor or adjusted against any amounts due.

28) **WORK TO BE DONE WITH GOOD WORKMANSHIP.** The contractor shall execute all work in a professional and workmanlike manner, strictly following standard engineering practices. and All works shall strictly comply with the specifications, quality, and quantities stated in this tender document. Any deviation from these standards identified by IITBRPF will be treated as a breach of contract.

29) ALTERATIONS IN SPECIFICATIONS & DESIGNS

IITBRPF reserves the right to make alterations, omissions, additions, or substitutions to the original specifications, equipment, designs, or instructions as deemed necessary during the progress of the work. The contractor must execute such changes as directed in writing by IITBRPF. These changes shall not invalidate the contract, and the contractor shall perform the additional or altered work under the same terms and conditions as the main work.

30) Rates of Additional/Substituted Items

If any item(s) not detailed in the drawings or the specifications of the contract documents is required by IITBRPF for execution alongside the normal works under this contract, the Contractor shall be obligated to carry out such work(s). Any refusal by the Contractor to execute such work(s) shall be deemed a breach of the agreement.

31) Rates of Additional/Substituted Items

(i) If the rates for additional, altered, or substituted work are specified in the contract, the Contractor must execute the work at the same rates as specified in the contract.

(ii) If the rates for such work are not explicitly provided in the contract, the rates shall be derived

from those specified for a similar class of work in the contract.

(iii) If the rates for the additional, altered, or substituted work cannot be determined using the methods outlined in sub-clauses (i) to (ii), IITBRPF shall determine its rate based on prevailing market rates at the time the work was executed.

32) Removal of Defective or Inferior Work

If IITBRPF finds that any work has been executed with unsound, substandard, or unskillful workmanship, or if any materials or articles provided by the Contractor are of inferior quality or fail to meet the contract specifications, the Contractor shall, upon receiving written notice from IITBRPF, rectify or remove the defective work and reconstruct it, as required. This shall be done at the Contractor's own cost, even if the defective work had been inadvertently approved, certified, or paid for.

If the Contractor fails to comply within the period specified by IITBRPF, the Contractor shall be liable to pay a compensation of 1% of the estimated cost of the particular work for each day of delay, up to a maximum of 10 days. If the Contractor does not act within this timeframe, IITBRPF reserves the right to rectify, remove, or re-execute the defective work, or replace the materials/articles, at the Contractor's risk and expense.

33) Inspection of Works

All works under execution, in progress, or completed under this contract shall be open for inspection and supervision by the IITBRPF team at any time. The Contractor must ensure their presence or that of a responsible, duly authorized agent during normal working hours and at other times, as required. Instructions or orders given to the Contractor's authorized agent shall hold the same authority as if issued directly to the Contractor.

34) Work Not to Be Covered Without Prior Permission

The Contractor shall provide at least seven days' prior written notice to the IITBRPF before covering or placing any work beyond the reach of measurement. This will allow the work to be measured and its dimensions verified before it is concealed. If any work is covered without prior notice or written consent from the IITBRPF, the Contractor shall, at their own expense, uncover the work to facilitate proper measurement. Failure to do so will result in no payment or allowance for the concealed work or the materials used.

35) Liability for Defective or Damaged Work

If the Contractor, their workers, or agents cause damage to Research Park building, road, fence, enclosure, grassland, or cultivated ground adjacent to the worksite, or if the completed work suffers damage due to defects, shrinkage, or faults, the Contractor shall repair the damage at their own expense. If the Contractor fails to do so, the IITBRPF may arrange for repairs to be carried out by other means and recover the cost from the Contractor's payments or PBG

36) Supply of Materials, Tools, and Equipment

The Contractor shall, at their own cost, provide all materials, labor, tools, equipment (including all machinery and systems related to the ETP plant where applicable), scaffolding, and temporary works necessary for the proper execution of the project. This includes items specified in the contract documents or required to meet IITBRPF's expectations. The Contractor shall maintain sufficient

stock of materials, including approved Ordinary Portland Cement (OPC) and reinforcement steel, to ensure uninterrupted progress. Substitution of materials, such as using other grades of cement, will not be permitted.

Additionally, the Contractor shall supply personnel and materials required for setting out works, as well as for measurements and inspections, without additional charges.

The Contractor shall procure all third-party materials and equipment only after obtaining prior written approval from IITBRPF for the proposed vendor and specifications. Any material or equipment procured without such approval will be rejected and removed from the site at the Contractor's cost.

This requirement does not relieve the Contractor from the final guarantee as to materials, apparatus, workmanship, and performance of the equipment and services supplied. The Contractor shall guarantee the equipment and all component parts against defective workmanship and improper materials for the agreed period following the date of delivery of the equipment or from commencement of operation as agreed. The Contractor shall replace or repair (including uncovering, removal, procurement, reinstallation, and any construction work necessary) any defective components at their own cost during the guarantee period at a time suitable to IITBRPF.

37) Subletting of Work

The Contractor shall assign or sublet the contract with prior written approval from IITBRPF. Any attempt to do so without approval, or in the event of the Contractor's insolvency or initiation of insolvency proceedings, shall result in immediate termination of the contract. Upon such termination, the Contractor's PBG shall be forfeited and retained by IITBRPF, and all associated consequences will apply as if the contract were rescinded.

38) Compliance with Labor Laws

The Contractor shall adhere to all applicable labour laws, including but not limited to the Minimum Wages Act, 1948, the Contract Labour (Regulation and Abolition) Act, 1970, the Building and Other Construction Workers (Regulation of Employment and Conditions of Service) Act, 1996, and other applicable Central and State labour laws, along with all rules, notifications, and amendments issued thereunder from time to time.

39) Health and Sanitation Arrangements

The Contractor shall ensure compliance with all directions issued by the competent health authorities relating to the protection of workers' health and the provision of adequate sanitary and welfare arrangements for labourers employed directly or indirectly on the project. Such measures shall be implemented to maintain proper health, hygiene, and safety standards at the worksite.

The Contractor shall be solely responsible for ensuring compliance with all statutory requirements relating to ESIC, gratuity, and other applicable labour laws for workers engaged at the site. IITBRPF shall not be held liable for any default, penalty, claim, or non-compliance arising in this regard

40) DEFECTS AFTER COMPLETION

Any defects, shrinkage, settlement, or other faults arising within the "Defects Liability Period", caused by materials or workmanship, shall be rectified by the contractor at their own cost upon receiving written instructions from IITBRPF. The contractor must complete the necessary

corrections within the reasonable time specified in the instructions.

If the contractor fails to comply, IITBRPF reserves the right to engage third parties to rectify such defects, shrinkage, settlement, or faults. All costs, damages, losses, or expenses incurred as a result, whether directly or incidentally, shall be borne by the contractor. These amounts may be recovered by IITBRPF from any amounts due to the Contractor or by encashment of the Performance Bank Guarantee (PBG).

41) Variation in Prices and Wages

The rates quoted by the Contractor shall remain firm throughout the contract period, and no escalation in the cost of materials or labor will be permitted.

42) Insurance for Damage to Persons and Property

The Contractor shall bear full responsibility for any injury to persons or animals, or for any damage to property, arising out of or in connection with the acts, negligence, or operations of the Contractor, its subcontractors, agents, or employees in the execution of this Contract, whether such injury or damage is caused by carelessness, accident, or any other cause whatsoever.

This responsibility shall extend to damage caused to adjacent or nearby buildings, roads, streets, footpaths, bridges, or any other infrastructure, as well as to the Contract Works themselves, including damage resulting from weather conditions such as rain. The Contractor shall indemnify and keep IITBRPF fully indemnified and harmless against all losses, expenses, claims, demands, damages, or compensation arising therefrom under any applicable law or otherwise.

The Contractor shall make good all such damage at its own cost, ensure that the entire Contract Works are completed in sound and satisfactory condition, and shall be solely responsible for settling and satisfying all third-party claims relating to property damage or injury covered under this clause.

43) Adherence to Drawings and Specifications

The Contractor shall execute the work strictly in accordance with the drawings and specifications provided in the tender document. The IITBRPF's interpretation of these documents shall be final and binding. IITBRPF reserves the right to issue revisions, modifications, or additional instructions to the drawings and specifications at any stage of the project. Any deviations from the drawings by contractor require prior written approval from the concerned authority or IITBRPF. If errors or inconsistencies in the drawings or specifications are identified, the Contractor must promptly notify IITBRPF for clarification or correction. Similarly, local conditions affecting the work must also be brought to the notice of IITBRPF.

If any work is discovered to be non-compliant with the drawings or specifications, the Contractor shall rectify it immediately at no additional cost or time extension. Furthermore, the Contractor shall not proceed with the work without prior written intimation to IITBRPF.

44) Deployment of Qualified Engineers

The Contractor must ensure the continuous presence of one or more qualified, full-time graduate engineers, with expertise in civil, mechanical, and electrical works, at the site during the progress of the work. These engineers shall ensure the proper execution of the work in accordance with the drawings, specifications, and schedule of quantities.

The IITBRPF reserves the right to request the immediate removal of any person employed by the Contractor on the site who, in their opinion, is incompetent or guilty of misconduct. Such individuals shall not be re-employed on the project without IITBRPF's prior approval.

45) The Contractor shall provide and install all necessary hoists, ladders, scaffolding, tools, tackles, plants, all transport for labour, materials and plant necessary for the proper carrying on, execution and completion of the work to the satisfaction of the IITBRPF. The Contractor shall make his own security arrangements to guard the materials and the portion of work under his control site at all times, at his own expenses. It is the responsibility of the contractor to safe storage of all materials till the completion of project and handed over to IITBRPF.

46) Site Cleanliness and Quality Assurance

The Contractor shall maintain cleanliness on the worksite by regularly cleaning as work progresses and removing rubbish and debris as necessary and as directed. Every effort must be made to ensure the quality of mechanical, electrical, and civil works, including the use of high-quality branded items, equipment, and spares.

The Contractor shall provide all necessary facilities, assistance, and opportunities for the inspection of all work completed by their team to the authorized representatives of IITBRPF. No obstruction or hindrance of any kind shall be caused by the Contractor or their workers during such inspections.

47) Dispute Resolution and Arbitration

All disputes or differences arising out of or in connection with this Agreement shall be resolved by arbitration in accordance with the provisions of the Arbitration and Conciliation Act, 1996, and any amendments thereto.

The seat and venue of arbitration shall be Mumbai, and the arbitral proceedings shall be conducted in the English language. The arbitration shall be conducted by a sole arbitrator mutually appointed by the Parties within fifteen (15) days from the date of the first written proposal for appointment made by either Party.

In the event the Parties fail to mutually appoint the sole arbitrator within the said period, the appointment shall be made in accordance with the provisions of the Arbitration and Conciliation Act, 1996.

48) Provision and Use of Personal Protective Equipment (PPE)

The Contractor shall provide and ensure the use of the following personal protective equipment (PPE) by the workforce engaged at the site, as deemed necessary and as directed by authorized officials or consultants:

- Safety Helmets conforming to IS-2925
- Safety Belts conforming to IS-3521
- Safety shoes conforming to IS-1989
- Eye, Ear & Face Protection devices conforming to IS-8520 and IS-8940, IS-5983
- Hand & body protection devices conforming to IS-2573, IS-6994, IS-8807 & IS-8519.
- Rubber gloves for electrical purposes confirming to IS-4770
- Industrial safety gloves (leather & cotton gloves) confirming to IS-6994
- Industrial and safety rubber knee boots confirming to IS- 5557.

49) QUALITY ASSURANCE

The contractor is fully responsible for the quality of all work, including that done by sub-contractors and suppliers. Providing assistance to sub-contractors does not reduce this responsibility. IITBRPF reserves the right to audit the contractor's quality processes at any time.

- b) The contractor must deploy adequate full-time staff to manage and maintain the Quality Assurance and Quality Control system throughout the project. A documented QA/QC manual should be updated regularly.
- c) The contractor shall organize an inspection meeting with IITBRPF before starting major works and submit a Quality Assurance Plan/Inspection Test Plan for IITBRPF's approval within 2 weeks of the Purchase Order/Letter of Intent.
- d) Failure to comply with quality assurance requirements, or rejection during inspection, will lead to rework at the contractor's cost and may result in penalties or termination as per contract terms.

50. INSPECTION AND TESTING

50.1. Factory Inspection & Testing

- a. The responsibility for inspection, certification, etc. of all materials, parts lies with the Contractor. The contractor shall specify all of the inspection and testing requirements in the Quality Assurance plan (QAP)/ Inspection Test plan (ITP) which shall identify the activities requiring the IITBRPF approval, review, witnessing etc.
- b. Inspection and testing requirements shall be in accordance with the applicable standards as listed in this requisition and the data sheets and Vendor's Quality Assurance Plan/ Inspection test plan approved by IITBRPF/ Consultant.

50.2. All equipment shall be inspected for compliance with

- a. Requirements of the IITBRPF/Consultant's specifications, data sheets and correspondence thereafter.
- b. Applicable Codes, standards and specifications, which shall also include sub-referenced standards therein.
- c. QAP/ ITPs produced by the Contractor duly approved by IITBRPF/ Consultant.
- d. IITBRPF's/ Consultant's Inspectors have the right to request additional inspections or tests to ensure that the equipment complies with this specification and all relevant codes and standards.
- e. All equipment shall be presented for inspection in an unpainted state except for the final inspection. All instruments and other equipment necessary for testing shall be supplied by the Vendor and the same shall be checked and certified by the IITBRPF / Consultant's inspector. Any defects found by the I / Consultant's appointed Inspector shall be rectified in his presence. Where this is not possible or practical, check lists shall be prepared and signed by the Inspector stating all "pending items". Copies of these lists shall be sent to the IITBRPF to enable their subsequent checking.
- f. Mill and shop inspection shall not relieve the Contractor from his contractual responsibility for replacing any defective material and for repairing any defective workmanship that may be discovered in the field.
- g. The Contractor shall be responsible for co-coordinating the inspection and testing of sub-vendor supplied equipment, and for ensuring that the IITBRPF / Consultant's representatives are given the necessary access for inspection, and adequate warning of inspection and tests.

51. PERFORMANCE GUARANTEE

Unless otherwise agreed, all equipment shall be guaranteed as follows:

All equipment shall perform satisfactorily under the operating conditions and provide treated water quality to reuse and shall be fit for the purpose intended. The Contractor shall guarantee following as a minimum at site conditions:

52. DEFECT LIABILITY PERIOD

Defect liability period would be 18 months from successful commissioning and handing over the plant with respect to design deliverables of the plant. All equipment's/supplies to be guaranteed to perform at manufacturer's standards/efficiency, any upgradation/replacements to get desired recovery (>90%) at rated plant capacity will have to be replaced at free of cost from supplier.

53. ANNUAL MAINTENANCE CONTRACT

Non comprehensive Annual Maintenance Contract is part of WWTP(waste water treatment plant) supply and successful bidder to sign contact agreement for operation and maintenance of ZLD(zero liquid discharge).

54. The terms and conditions stated in this tender document are indicative and may be subject to modification, addition, or deletion at the sole discretion of IITB Research Park. The final and binding terms and conditions shall be those incorporated in the formal agreement to be executed with the selected contractor. In case of any conflict between the tender terms and the executed agreement, the provisions of the executed agreement shall prevail.

7. DESIGN PARTICULARS FOR THE TREATMENT UNITS

- **WASTEWATER TREATMENT AND RECYCLE PLANT**

DESIGN PARTICULARS FOR THE TREATMENT UNITS

Design Information

• Type of Industry	:	IITB Research Park
• Sources of Waste water	:	Lab Processing Units
• Qty of Wastewater	:	57 M3 / Day
• Plant Hours of Operation Considered	:	20 Hrs.
• Average Flow	:	2.85 M3 / Hr.
• Design Flow	:	3 M3/Hr.

Drawings:

<https://drive.google.com/drive/folders/137NXgYMR0YICWkZFjfG4NBhGLRiC0-r9?usp=sharing>

Wastewater Quality

The following Wastewater quality & Treated water quality is considered for designing the Wastewater Treatment plant.

Wastewater & Treated Water Quality

The treated water quality at the outlet of the waste water recycling plant based on above Waste water inlet quality shall be as follows:

SLNO	DESCRIPTION	Inlet Parameters (mg/L)	MPCB Consent Limit (mg/L)
1	pH	6.0 – 8.0	5.5 – 9.0
2	Total Dissolved Solids (TDS), mg/l	2100	2100
3	Total Suspended Solids(TSS),mg/l	50 – 100	100
4	Total Hardness (TH),mg/l	350 – 400	
5	Biochemical Oxygen Demand (BOD),mg/l	800 – 1000	100
6	Chemical Oxygen Demand (COD),mg/l	< 3000	250
7	Oil & Grease,mg/l	< 20	10
8	Ammoniacal Nitrogen,mg/l	50 – 60 (assumed)	-
9	Total Kjeldahl Nitrogen (TKN),mg/l	80 – 100 (assumed)	-
11	Silica,mg/l	< 20 (assumed)	-
12	Fluorides	-	-
13	Sulphates	-	1000
14	Nitrate-N	-	-
15	Colour	Light to Medium	-

Note : The recovered water is proposed to be used for Irrigation purpose.

TREATMENT SCHEME

The following treatment scheme envisaged shall consist of following treatment steps:

PRE - TREATMENT SYSTEM

Wastewater generated from Processing units are collected in the Equalization Tank, after passing through a Manually operated Bar Screen followed by Oil & Grease Chamber. Screening is done to retain the large, floating matter using Coarse & Fine Bar Screen. The collected screenings are disposed of manually.

In the Equalization Tank, sufficient retention time is provided to equalize and homogenize the variations in the flow and pollutant concentration. The contents of the EQT are mixed using set of Coarse Bubble diffusers.

The homogenized effluent is pumped to the Primary Chemical Treatment system.

PRIMARY TREATMENT SYSTEM

The Homogenized effluent is pumped to the Primary Flash mixing cum Primary Flocculation tank. In the Primary Flash Mixer Tank suitable grade and quantity of coagulant is dosed to coagulate the colloids present in the raw effluent. A slow speed agitator / Flash Mixer is Considered in the Flash Mixing zone to mix the contents thoroughly for effective coagulation. It is then taken to the flocculation zone where suitable grade and quantity of flocculant is dosed to flocculate the colloids present in the raw effluent. A slow speed Flocculator is Considered in the flocculation zone for effective flocculation. The coagulated/flocculated effluent is then taken by gravity to Primary Settling Tank (PST) where solid-liquid separation occurs.

The settled sludge at the bottom of the Primary Settling Tank (PST) is taken to the Sludge Handling system. The overflow i.e., the primary treated effluent is taken to the biological treatment system

BIOLOGICAL TREATMENT SYSTEM (MBR SYSTEM)

MEMBRANE BIOREACTOR (MBR)

Membrane Bioreactors (MBR) combine conventional biological treatment processes with membrane filtration to provide an advanced level of organic and suspended solids removal, along with the capabilities of advanced level nutrient removal in wastewater. This process used to accomplish carbonaceous and/or nitrogenous oxygen demand reductions.

PRETREATMENT:

- Pre-treatment is critical in MBR plant design to ensure adequate protection of membranes from physical damage. All MBR systems require fine screening and grit removal to prevent membrane damage from abrasive particles common in influent sewage.
- Removal of fibrous or stringy material is also important. This material can become entangled and wrap around the hollow fibers or stuck within the gaps between membrane flat plates. This can plug the membrane scour aeration systems leading to problems with operation of and potential damage to the system.
- If the influent oil and grease concentration exceeds 100 mg/L, or if historic problems with fats, oils and grease (FOG) exist within the community, oil and grease separator is considered to prevent membranes from being coated.

BAR SCREEN :

A mechanically cleaned bar screen with a manually cleaned emergency bypass bar screen or self-cleaning screening device should be provided.

EQUALIZATION TANK:

The sewage from the bar screen chamber is let into the Equalization Tank. This tank is provided for even out the flow variation and to provide a continuous feed into the secondary biological treatment units.

FINE SCREENS:

Fine screens should be located downstream of primary treatment.

Coarse screens followed by fine screens may be used to minimize the complications of fine screening due to high flow restrictions and increased solid waste handling. Fine screens should be rotary drum or traveling band screen with either perforated plate or wire mesh. Fine screens should have an opening size between 0.25 mm – 2.0 mm for hollow-fiber and tubular membranes, or 2.0 – 3.0 mm screening for flat plate membranes.

ANOXIC TANK:

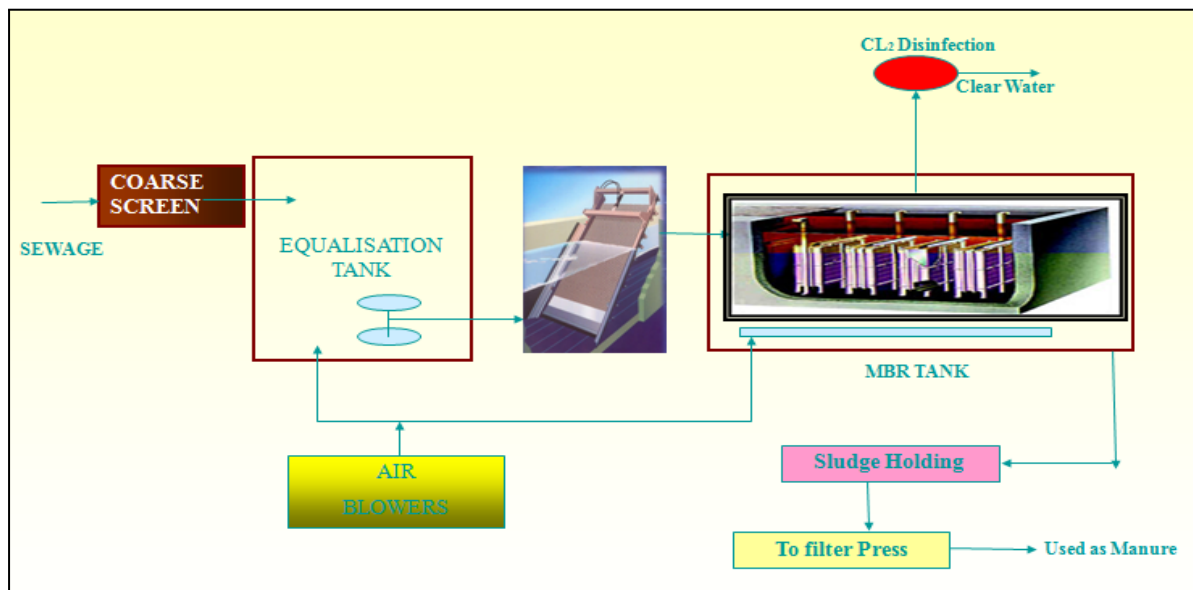
A facility designed for nitrogen or biological nutrient removal should contain a deoxygenation basin, a larger anoxic basin for decreasing dissolved oxygen concentration.

MEMBRANE BIOREACTOR:

MBR type water treatment technology is integrated with membrane separation unit and biological treatment unit. Membrane modules are used instead of secondary sedimentation tank in the bioreactor to maintain high activated sludge concentration and reduce the land area of wastewater treatment facility and the sludge amount through maintaining low sludge load. The MBR membrane can completely block and retain microorganisms in the bioreactor through its filtration function, which achieves the complete separation between the hydraulic retention time and activated sludge age, thus avoiding the sludge expansion problem of conventional activated sludge process.

Compared with conventional biological water treatment technology, MBR technology has the following main characteristics including:

- High treatment efficiency
- Good outlet water quality
- Compact equipment layout
- Small footprint
- Easy automatic control and
- Easy operation management



SUBMERGED OR IMMERSED MBR:

In the submerged MBR process, the membrane is submerged directly in the aeration tank. By applying low vacuum or by using the static head of the mixed liquor, effluent is driven through the membrane leaving the solids behind.



Normally, systems are built with two different compartments.

The first section is the screening stage where the wastewater enters the unit. In this area; heavy solids are first separated subsequently traversing to another compartment which houses the membranes. The initial screening is of high importance, as the larger molecules (scum and grit) will not trap the surface of the membrane and lead to fouling.

In the second compartment, the biological process takes place involving vigorous agitation, coming from air bubbles generated from a blower system. This acts to scour and clean the surface of the membrane to prevent build up of material and also to provide sufficient oxygen concentration for biological action that supports growth of bacteria. Depending on how the system is designed to ensure efficient air to water oxygen transfer, the household MBR is capable to support more than 4000ppm of MLSS level.

A complete unit usually comes equipped with a back flush system whereby discharged wastewater will now move counter flow from the permeate side back again to the system to dislodge trapped material accumulating on the surface. During this process, air scouring will still continue to run to help increase removal efficiency.

TREATED WATER TANK:

The final treated water from the MBR tank after passing through the membrane units is stored in the treated water tank. The tank is designed to hold half day storage.

LIST OF CIVIL AND STRUCTURAL DETAILS

Sl. No	Description	Qty	MOC	Tank Dimensions				
				L / D (M)	W (M)	LD (M)	FB (M)	HT (M)
A	Water Retaining Structure							
1	Screening Chamber	1	RCC	1.50	0.50	0.25	0.50	0.75
2	Oil & Grease Chamber	1	RCC	3.00	1.20	0.90	0.70	1.60
3	Equalization Tank	1	RCC	5.00	3.00	2.50	1.00	3.50
	<u>Other Misc. work</u>							
	1. RCC / BCC Blocks for fixing diffuser 2. Civil foundations for Pumps, Panel, Filters, Air blower, Skid, etc., 3. Internal plant drains facilities, etc.,							

Note:

- The sizes & volume of tanks may vary based on site conditions.

MODULAR TANKS:

MOC : MSERP

Thickness : Plate thickness shall be 20mm with 3mm FRP lining.

a. Primary Flocculation Tank

Capacity : 3 KL, Dim : 3.75m X 0.55m X 1.5M Height

b. Primary Settling Tank

Capacity : 12 KL, Dim : 3.75m X 1.00m X 3.00m Height

c. Anoxic Tank

Capacity : 12 KL, Dim : 3.75m X 1.00m X 3.00m Height

d. MBR Tank-1,

Capacity : 22.5 KL, Dim : 3.75m X 1.35m X 4.50m Height

e. MBR Tank-2,

Capacity : 22.5 KL, Dim : 3.75m X 1.35m X 4.50m Height

f. Treated Water Tank,

Capacity : 31 KL, Dim : 2.70m X 3.30m X 3.50m Height

g. Sludge Holding Tank,

Capacity : 15 KL, Dim : 3.00m X 2.00m X 2.50m Height

● **LAB EQUIPMENT'S**

Intended supplier shall to provide Minimum equipment's required for testing PH, TDS, TSS, COD, BOD, Total hardness including all testing apparatus like beakers, flasks, TDS testing by gravimetric method.

● **ELECTRICAL & PIPING REQUIREMENTS**

- Vendor shall submit the Motor Datasheet with all the data filled by the Motor Manufacturer.
- Single Power supply point -3Ph, 415V, 50Hz provided within the battery limit of the intended vendor. Further distribution & control shall be in the scope of supplier, Supplier shall get drawing approval for MCC Panels [SLD, GA, BOM], Refer annexures for list of approved makes
- Local control panel shall have all necessary standard features viz.
 - Motor ON/OFF push buttons
 - Process interlocking provisions
 - Auto / Manual selection position
 - Motor ON/OFF indication
 - Load manager
 - MPCB's for motor protection
- Local control panel shall be suitable for Safe location near ZLD.
- Electrical Panel:
- The Electrical Panel shall be fabricated from cold rolled MS sheets of minimum 2mm thickness for load bearing members, 1.6mm for non-load bearing members and 3mm for gland plates. Panel shall be suitable for outdoor installation with IP-55 ingress protection. The Electrical panel shall also house the starter and breaker units for the drive motors and these feeders shall be fixed type. Motors rated up to 5KW shall be started direct on line (DOL starter) and 5KW and above shall have Star-Delta starter. Supply for Motor space heater shall be derived from this panel. Suitable power feeders shall be provided for control panel. Electrical Panel shall have Start, Stop Push buttons and Indication provision for all motors/pumps, an auto start to be enabled for blower and Pumps whenever power resumes after immediate interruption. All the pumps to have auto high level and low-level cut offs
- All Power and Control cables shall be 1.1kv grade, XLPE insulated, multi standard conductor, single/multi core, steel armored, extruded PVC inner sheathed and extruded FRLS PVC outer sheathed. Cable of size 6 sq.mm and below shall be of copper conductor. Cable of Size 10 sq.mm and above shall be aluminum conductor conforming to IS 7098 (Part-1) to be laid in GI perforated/ladder cable trays have to be dressed and tagged.
- Detailed P&I diagram to be produced for approvals and on completion of installation and commissioning works as built drawings, set of O&M manuals, SOP's and consumable and spare list to hand over to the in charge at site.
- Complete piping systems to be standardized as per international color codes, flow direction labeling, complete as required at site.

- Complete piping installation with necessary structural supports duly painted including carrying pressure testing for pipes and tanks etc. do be done and test certificates to submitted for records and compliance.
- **QUALITY ASSURANCE**
- The Vendor shall maintain and use a Quality System with best industrial practices and standards to control the work. If the Vendor elects to sub-contract part of the work he shall ensure that only those sub-contractors or suppliers are used who can demonstrate that they operate Quality Systems to meet the requirements.
- The Vendor shall give his sub-contractors or suppliers assistance in attaining the required standard, if necessary. This shall not relieve the Vendor of his responsibility for the quality of the finished work. The Company / Consultant reserve the right to audit the Vendor's Quality System.
- The Vendor shall assign sufficient full-time personnel to the project to ensure the Quality Assurance / Quality Control System, documented in a Quality Assurance / Control Manual, is maintained and kept up-to-date throughout the duration of any purchase order. The Vendor's Quality Assurance / Control System shall become an integral part of any purchase order. Vendor shall organize a prefabrication / inspection meeting with the Company / Consultant. Vendor shall submit QA plan/Inspection test plan for Purchaser's/Consultant's review and approval within 2 weeks from the date of Purchase Order/LOI.
- **INSPECTION AND TESTING**
- a. **Factory Inspection & Testing**
 - A) The responsibility for inspection, certification, etc. of all materials, parts lies with the Vendor. The Vendor shall specify all of the inspection and testing requirements in the Quality Assurance plan (QAP)/ Inspection Test plan (ITP) which shall identify the activities requiring the Company / Consultant's approval, review, witnessing etc.
 - B) Inspection and testing requirements shall be in accordance with the applicable standards as listed in this requisition and the data sheets and Vendor's Quality Assurance Plan/ Inspection test plan approved by Purchaser/ Consultant.
- b. **All equipment shall be inspected for compliance with**
 - Requirements of the Company/Consultant's specifications, data sheets and correspondence thereafter.
 - Applicable Codes, standards and specifications, which shall also include sub-referenced standards therein.
 - QAP/ ITPs produced by the Vendor duly approved by Purchaser/ Consultant.
 - Purchaser's/ Consultant's Inspectors have the right to request additional inspections or tests to ensure that the equipment complies with this specification and all relevant codes and standards.
 - All equipment shall be presented for inspection in an unpainted state except for the final inspection. All instruments and other equipment necessary for testing shall be supplied by the Vendor and the same shall be checked and certified by the Company / Consultant's inspector. Any defects found by the Company / Consultant's appointed Inspector shall be rectified in his presence. Where this is not possible or practical, check lists shall be prepared and signed by the Inspector stating all "pending items". Copies of these lists shall be sent to the Company/Purchaser to enable their subsequent checking.
 - Mill and shop inspection shall not relieve the Vendor from his contractual responsibility for replacing any defective material and for repairing any defective workmanship that may be discovered in the field.
 - The Vendor shall be responsible for co-coordinating the inspection and testing of sub-vendor supplied equipment, and for ensuring that the Company / Consultant's representatives are given the necessary access for inspection, and adequate warning of inspection and tests.
- **PERFORMANCE GUARANTEE**

Unless otherwise agreed, all equipment shall be guaranteed as follows:

All equipment shall perform satisfactorily under the operating conditions and provide treated water quality to reuse and shall be fit for the purpose intended. The Vendor shall guarantee following as a minimum at site conditions:

- **DEFECT LIABILITY PERIOD**

Defect liability period would be one year from successful commissioning and handing over the plant with respect to design deliverables of the plant. All equipment's/supplies to be guaranteed to perform at manufacturer's standards/efficiency, any up gradation/replacements to get desired recovery (>90%) at rated plant capacity will have to be replaced at free of cost from supplier.

- **EXCLUSIONS**

Supplier responsibilities only limited to provide GFC drawings for complete civil package including Structural drawing for underground tanks and coordination with civil contractor during execution stages at site soon award contract for civil vendor

Supplier shall be responsible for facilitating MPCB approval by providing complete documents as required by Pollution Control Boards.

- **ANNUAL MAINTENANCE CONTRACT**

Non comprehensive Annual Maintenance Contract is part of WWTP supply and successful bidder to sign contact agreement for operation and maintaining of ZLD and ETP plants.

- a) **Scope of Work**

The contractor shall be responsible for the **regular operation and maintenance of the 57 KLD plant**, operating in **three shifts per day**, by providing the required manpower including **one skilled operator per shift**, one **reliever**, and **helpers as and when required** for attending service and breakdowns.

An **Engineer shall visit the site once every month** to train operators, verify plant performance, and ensure smooth operation of the system. The scope shall also include **preparation and submission of the monthly CESS report to the Pollution Control Board (PCB)**.

The supplier/vendor shall be responsible for **attending to any breakdowns or technical issues during the operational stage**, ensuring that such issues are resolved promptly **without affecting factory operations**.

The contractor shall ensure **compliance with all applicable safety rules and regulations**, maintain **records, log books, and inventory registers**, and conduct **routine analysis of raw water, effluent water, and treated water**. The contractor shall also report any abnormalities and carry out **preventive and predictive maintenance activities**.

The scope further includes **handling of sludge drying systems, packing, storage, and disposal arrangements as required**.

The Contractor's personnel shall monitor and regulate the inflow of effluents from member companies to ensure that the flow and characteristics remain within the design capacity and permissible limits of the WWTP/ETP. The operator shall coordinate with the respective member companies in case of abnormal discharge, excessive flow, or non-compliant effluent and immediately report such instances to Research Park management.

- b) **Contractors Personnel:**

- i) The contractor shall ensure that **the required staff, as specified in the agreement, are always deployed for plant operations**. In the event that the manpower deployed is found to be less than the required number, **Research Park reserves the right to recover the wages equivalent to the shortfall**.
- ii) It shall be the duty and responsibility of the contractor to **comply with all statutory requirements related to the employment of personnel**, including but not limited to **ESI, PF, insurance, and other applicable labor regulations**.
- iii) The contractor shall provide **uniforms and necessary safety gear** to all personnel engaged for plant operations.
- iv) Any **replacement of operational staff** shall be subject to **interview and approval by Research Park**, and the contractor shall deploy personnel only after such approval.
- v) The **age limit for employment** shall strictly comply with **existing labor laws and regulations**.
- vi) The contractor shall provide **all necessary tools and tackles required for routine maintenance activities**.
- vii) The contractor shall deploy a **competent supervisor or site in-charge** at the premises who shall be responsible for **coordination, discipline, and ensuring compliance of the contractor's personnel with all contractual, statutory, and safety requirements**.
- viii) Research Park reserves the **right to require the removal of any contractor personnel** found to be negligent, unfit, indisciplined, or in violation of safety or site regulations. The contractor shall **replace such personnel immediately at no additional cost**.
- ix) Nothing contained in this Agreement shall be deemed to create any **employer–employee relationship between Research Park and the contractor's personnel**, and all obligations toward such personnel shall remain **solely with the contractor**.