



CHENNAI METROPOLITAN WATER SUPPLY & SEWERAGE BOARD



TENDER NO: CMWSSB/CNT/WSS/ICB/JICA/DESAL/CP01/_____/2019-20

**LOAN AGREEMENT NO. ID-P267
JICA FUNDED PROJECT**

REQUEST FOR PROPOSAL DOCUMENT

FOR

**PROJECT FOR CONSTRUCTION OF CHENNAI
SEAWATER DESALINATION PLANT (I)**

**PART-I
(BIDDING PROCEDURE)**

**PROCUREMENT OF DESIGN/ENGINEERING, CONSTRUCTION, COMMISSIONING OF 400 MLD
SEAWATER REVERSE OSMOSIS (SWRO) DESALINATION PLANT AT PERUR, CHENNAI WITH
20 YEARS OF OPERATION AND MAINTENANCE (DBO BASIS)**

INTERNATIONAL COMPETITIVE BIDDING

PROJECT MANAGEMENT CONSULTANTS

SMEC International Pty Ltd.
NJS Engineers India Pvt. Ltd.
Tata Consulting Engineers Ltd.
SMEC India Pvt. Ltd.

**SUPERINTENDING ENGINEER
(CONTRACTS & MONITORING)
CHENNAI METROPOLITAN
WATER SUPPLY & SEWERAGE
BOARD**

Date of Issue of Request of Proposal: xx/xx/xx

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Invitation for Bids

Invitation for Bids

Date : Feb 2021
Tender Number : CMWSSB/CNT/WSS/ICB/JICA/DESAL/CP01/_____/2020-21
Employer : Chennai Metropolitan Water Supply and Sewerage Board (CMWSSB)
Country : India
JICA Loan No : ID-P267
Project Name : Project for Construction of Chennai Seawater Desalination Plant (I)
Contract Name : Procurement of Design/Engineering, Construction, Commissioning of 400 MLD Seawater Reverse Osmosis (SWRO) Desalination Plant at Perur, Chennai with 20 years of Operation and Maintenance (DBO Basis)

1. The Government of India (GoI) for Government of Tamil Nadu (GoTN) for Chennai Water Supply and Sewerage Board (CMWSSB) has received a loan from Japan International Cooperation Agency (JICA) towards the cost of Project for Construction of Chennai Seawater Desalination Plant (I), which includes 5 Packages i.e. 400 MLD Desalination Plant, Pumping Stations and Reservoirs, Product Water Transmission Mains, Improvement of the Existing Water Distribution Networks and Installation of External Power Transmission Line. It is intended that part of the proceeds of this loan will be applied to eligible payments under the Contract for Procurement of Design/Engineering, Construction, Commissioning of 400 MLD Seawater Reverse Osmosis (SWRO) Desalination Plant at Perur, Chennai with 20 years of Operation and Maintenance (DBO Basis) for Package No.CP01.
2. The Chennai Metropolitan Water Supply and Sewerage Board (CMWSSB) now invites sealed Bids from prequalified eligible Bidders for the design, execution and completion of 400 MLD Seawater Reverse Osmosis (SWRO) Desalination Plant at Perur, Chennai with 20 years of Operation and Maintenance (DBO Basis) for Package No.CP01 ("the Works").
3. It is not permissible to transfer this Invitation for Bids to any other firm.
4. A firm will be selected under Least Cost Selection (LCS) Method and procedures described in this RfP, in accordance with the applicable Guidelines for procurement under Japanese ODA Loans. Only Prequalified Bidders can download the RfP document from <https://tntenders.gov.in> e-procurement portal. For any further information, Bidders can contact the office of Superintending Engineer (Contracts & Monitoring), CMWSSB during the office hours, between 10:30 hrs to 17:45 hrs on all working days

Superintending Engineer (Contracts and Monitoring),
CMWSSB, No.1, Pumping Station Road,
Chintadripet, Chennai 600 002.
Telephone: 044 28451300 Extn: 209, Facsimile: 044 28458181,
E-mail: secandm@cmwssb.in
Website: www.chennaietrowater.tn.nic.in

5. Please inform us in writing at the following address, upon receipt:

- a) that you have received the Letter of Invitation; and
 - b) whether you intend to submit a proposal alone or intend to enhance your experience by requesting permission to associate with other firm(s).
6. Bids must be delivered to the address above on or before [*insert time*] on [*insert date*] and must be accompanied by a Bid Security of [*insert fixed amount (same as that stated in Clause 21.1 of the Bid Data Sheet (BDS))*].
 7. Bids will be opened in the presence of Bidders' representatives who choose to attend at [*insert time and date*] at the office of:

Superintending Engineer (Contracts and Monitoring),
CMWSSB, No.1, Pumping Station Road,
Chintadripet, Chennai 600 002.
Telephone: 044 28451300 Extn: 209, Facsimile: 044 28458181,
E-mail: secandm@cmwssb.in
Website: www.chennaietrowater.tn.nic.in

Yours Sincerely,

CMWSSB Board.

PART 1 BIDDING PROCEDURES

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Section I. Instructions to Bidders

The Instructions to Bidders governing this bidding process are the “Instructions to Bidders included in **Option A**, Single-Stage Two-Envelope Bidding, Section I,” of the Standard Bidding Documents for Procurement of Electrical and Mechanical Plant, and for Building and Engineering Works, Designed by the Contractor (SBD (Design Build)) (Trail Version) published by JICA in July 2015. Those Instructions to Bidders are available on the JICA’s web site shown below:

http://www.jica.go.jp/english/our_work/types_of_assistance/oda_loans/oda_op_info/guide/tender/index.html

A copy of the Instructions to Bidders is not attached to these Bidding Documents.

Section II. Bid Data Sheet

A. General	
ITB 1.1	The number of the Invitation for Bids is : CMWSSB/CNT/WSS/ICB/JICA/DESAL/CP01/_____/2020-21
ITB 1.1	The Employer/Client is: Chennai Metropolitan Water Supply and Sewerage Board (CMWSSB)
ITB 1.1	The name, identification and number of the lot(s) (contract(s)) comprising this ICB is: Name: Procurement of Design/Engineering, Construction, Commissioning of 400 MLD Seawater Reverse Osmosis (SWRO) Desalination Plant at Perur, Chennai with 20 Years of Operation and Maintenance (DBO Basis). Tender No.: CMWSSB/CNT/WSS/ICB/JICA/DESAL/CP01/_____/2020-21 Number of the lot(s): 1 No.
ITB 2.1	The Borrower is: President of India
ITB 2.1	The number of the Loan Agreement is: ID-P267 The amount of a Japanese ODA Loan is JPY 73, 404 Million The signed date of the Loan Agreement is: 29/03/2018
ITB 2.1	The name of the Project is: Project for Construction of Chennai Seawater Desalination Plant (I)
ITB 2.2	The applicable Guidelines for Procurement under Japanese ODA Loans are those published in: April 2012
ITB 3.1(c)	A list of debarred firms and individuals is available at the World Bank's website: www.worldbank.org/debarr
ITB 4.5	This bidding is subject to prequalification.

B. Bidding Documents	
ITB 7.1	<p>For clarification purposes only, the Employer's address is:</p> <p>Attention: Superintending Engineer (Contracts and Monitoring)</p> <p>Mailing Address: Office of Superintending Engineer (Contracts and Monitoring), Chennai Metropolitan Water Supply and Sewerage Board (CMWSSB) No.1, Pumping Station Road, Chintadripet, Chennai 600 002 Telephone: 044 28451300 Extn: 209, Facsimile: 044 28458181 E-mail: secandm@cmwssb.in</p>
ITA 7.1	<p>Responses to any request for clarification, if any, will be published on the Employer's web page indicated below.</p> <p>Web page: www.chennaietrowater.tn.nic.in</p>
ITB 7.4	<p>A pre-bid meeting will take place at the following date, time and place:</p> <p>Date: xx/xx/xxxx</p> <p>Time: xx:00 AM</p> <p>Place: Office of Superintending Engineer (C&M), CMWSSB, No.1, Pumping Station Road, Chintadripet, Chennai 600 002</p> <p>A site visit on xx/xx/xxx conducted by the Employer will be organized.</p>
ITB 8.2	Addenda, if any, will be published on the Employer's web page.
C. Preparation of Bids	
ITB 10.1	The language of the Bid is: English.
ITB 11.2 (I)	The Bidder shall submit with its Technical Bid the following additional documents: None
ITB 11.3 (d)	The Bidder shall submit with its Price Bid the following additional documents: None
ITB 13.1	Alternative Bids are invited/permitted in accordance with: ITB13.3
ITB 13.4	N/A
ITB 16.1 (b)	The period following completion of the Works during which spare parts, special tools etc. shall be available, is for twenty (20) years.
ITB 18.1	Bidders shall quote for the entire Works on a single responsibility basis.

ITB18.7	<p>Evaluated Bid Price (Award Criteria for Contract) will be inclusive of all taxes.</p> <p>Add the following text to ITB Clause No. 18.7:</p> <p>“The Accepted Contract Amount shall be deemed to include all taxes, duties, levies, cess, royalty to Government, GST and other charges imposed on the production, manufacture, sale and transport of the Contractor's Equipment, Plant, Materials and supplies to be used on or furnished under the Contract and on the services performed under the Contract.</p> <p>Unless explicitly mentioned in the Contract, Employer doesn't ensure any tax benefits (reduced tax rate/ tax waivers) under Custom Duty, GST, any Cess, etc. during the time of submission of bids. Bidders are advised to consider the actual tax rates (without considering any waiver) while estimating the Contract Price. Any lawful exemption obtained during the contract period the benefit need to be passed on to the Employer.</p>
ITB 19.1	<p>The currency(ies) of the Bid shall be as described below:</p> <p>The unit rates and prices shall be quoted by the Bidder in the Price Schedule separately in the following currencies:</p> <p>(i) for those inputs to the Works that the Bidder expects to supply from within the Employer's country, in Indian Rupees (INR), and further referred to as “the local currency”; and</p> <p>(ii) for those inputs to the Works that the Bidder expects to supply from outside the Employer's country (referred to as “the foreign currency requirements”), in USD.</p>
ITB 20.1	The Bid validity period shall be 180 days.
ITB 20.3 (a)	The Bid Price shall be adjusted by the following factor: NIL
ITB 20.3 (b)	The fixed portion of the Bid Price shall be adjusted by the factor: NIL
ITB 21.1	<p>Bid must be accompanied by Bid Security as specified below:</p> <p>Bank Guarantee in the name of The Managing Director, Chennai Metropolitan Water Supply and Sewerage Board for an amount of INR _____ (INR _____ Million)</p>
ITB 21.2 (d)	NONE
ITB 21.7	<p>In case the JV is not legally incorporated, the Bid Security can be submitted by Lead Member or Lead Partner on behalf of the JV.</p> <p>Employer will get the Bank Guarantee submitted for Bid Security verified from the bank. In case the verification reveals that the submitted Bank Guarantee is fraudulent, Employer reserves the right to reject the bid.</p>

ITB 22.1	In addition to the original of the Bid, the number of copies is: Two Copies , clearly marking the Original and Copies.
ITB 22.2	The written confirmation of authorization to sign on behalf of the Bidder shall consist of: Original Power of Attorney (legally valid).
D. Submission and Opening of Bids	
ITB 24.1	<p>For Bid submission purposes only, the Employer's address is: Attention: Superintending Engineer (Contracts and Monitoring) Mailing Address: Office of Superintending Engineer (Contracts and Monitoring), Chennai Metropolitan Water Supply and Sewerage Board (CMWSSB) No.1, Pumping Station Road, Chintadripet, Chennai 600 002 Telephone: 044 28451300 Extn: 209, Facsimile: 044 28458181 E-mail: secandm@cmwssb.in</p> <p>The deadline for Bid submission is: Date: xx/xx/2021 Time: xx:00 PM</p>
ITB 27.1	<p>The Technical Bid opening shall take place at: Office of Superintending Engineer (Contracts and Monitoring), Chennai Metropolitan Water Supply and Sewerage Board (CMWSSB) No.1, Pumping Station Road, Chintadripet, Chennai 600 002 Telephone: 044 28451300 Extn: 209, Facsimile: 044 28458181 E-mail: secandm@cmwssb.in</p> <p>Date: xx/xx/2021 Time: xx:00 PM</p>
E. Evaluation, and Comparison of Bids	
ITB 37.1	<p>The currency that shall be used for Bid evaluation and comparison purposes to convert all Bid Prices expressed in various currencies into a single currency is: Indian Rupees (INR)</p> <p>The source of exchange rate shall be: Reserve Bank of India. The date for exchange rate shall be the date 28 days prior to the date of technical bid opening specified in ITB 27.1.</p>

Section III. Evaluation and Qualification Criteria

Evaluation and Qualification Criteria

1. Evaluation

1.1 Technical Evaluation

In addition to the criteria listed in ITB 35.1 (a) – (b) the following factors shall apply:

1.1.1 Personnel

The Bidder must demonstrate that it has the personnel for the key positions that meet the following requirements: **(TO BE DISCUSSED WITH CMWSSB)**

No.	Position	Minimum Qualification	Min. Total Experience (Years)	Experience in Similar Works (Years)	Number Reqd.
1	Construction Project Manager	Post-Graduate in Civil Engineering	15	7	1
2	Deputy Construction Project Manager	Graduate in Civil Engineering	10	3	2
3	Engineering Manager (Lead Design & Technical Engineer)	Graduate Degree in Mechanical (1) and Electrical (1) Engineering	10	5	2 (one each)
4	Sr. Quality Assurance / Quality Control Engineer	Graduate in any Engineering Discipline	8	4	2
5	Health & Safety Engineer (Accident Prevention officer)	Diploma in construction safety accredited by BSS / Certified	5	3	2
6	Lead Process Design (Reverse Osmosis)	Graduate in Civil/Chemical/Mechanical Engineering	10	5	1
7	Environmental Expert*	Post-Graduate in Environmental Engineering / Science	10	1	1

The Bidder shall provide details of the proposed personnel and their experience records in Forms PER-1 and PER-2 in Section IV, Bidding Forms.

1.1.2 Equipment

The Bidder must demonstrate that it has the key construction equipment and

facilities listed hereafter, but not limited to: **(TO BE DISCUSSED WITH CMWSSB)**

No.	Equipment Type and Characteristics	Minimum Number required
1	Crane or Hydra (10 ton)	4
2	Loader cum Back hoe ((0.7m ³))	4
3	Excavators (1m ³)	4
4	Tipper / Dumper Trucks (10 ton)	4
5	D G Set (30 kVA)	4
6	Dewatering pumps-10 HP	20
7	Batching Plant	2

The Bidder shall provide further details of proposed items of equipment using Form EQU in Section IV, Bidding Forms.

1.1.3 Others

NIL

1.2 Economic Evaluation

Any adjustments in price that result from the procedures outlined below shall be added, for purposes of comparative evaluation only, to arrive at an “Evaluated Bid Price.” Bid Prices quoted by Bidders shall remain unaltered.

In addition to the criteria listed in ITB 38.2 (a) – (c) the following criteria shall apply.

1.2.1 Quantifiable nonmaterial nonconformities

Pursuant to ITB 34.3 and ITB 38.2 (d), the cost of all quantifiable nonmaterial nonconformities or omissions (minor omissions or missing items) shall be evaluated. The Employer will make its own assessment of the cost of any nonmaterial nonconformities and omissions for the purpose of ensuring fair comparison of Bids.

1.2.2 Other Factors

The following factors and methods will apply under ITB 38.2 (f):

(a) Operating and Maintenance Costs

Since the operating and maintenance costs of the facilities being procured form a major part of the life cycle cost of the facilities, these costs will be evaluated according to the principles given hereafter, including the cost of spare parts for the initial period of operation stated below and based on prices furnished by each Bidder in Price Schedules, as well as on past experience of the Employer or other employers similarly placed. Such costs shall be added to the Bid Price for evaluation.

All operation and maintenance costs during initial performance test and process proving tests shall be a part of the plant commissioning and so the costs should be

included in the **Capital Works cost**.

The operating and maintenance costs factors for calculation of the life cycle cost are:

- (i) Number of years for life cycle Twenty (20) years of operation and maintenance including one year of Defect liability Period.
- (ii) Annual Operation & Maintenance costs [as per the priced Price Schedules of the Bidder, including cost of spare parts for the 20 years period of Operation and Maintenance.]
- (iii) a rate of 8% (eight percent), to be used to discount to present value all annual future costs calculated under (ii) above for the period specified in (i).

(b) Specific additional criteria

The following additional criteria will be used in the evaluation:

- **The Electricity Cost:**

- i. The estimated total cost of the electricity required at and consumed by the Plant and equipment during the 20 Years of Operation & Maintenance including one year of DLP:
 - a) The power consumed by the equipment supplied as a part of the facilities, based on calculations of the operating efficiencies and power consumption of all electrically operated Plant and equipment under working condition.
- ii. The Evaluation shall further be considered as:

Based on the equipment selected, the bidder shall provide net guaranteed power consumption during operation and maintenance. This net guaranteed power consumption shall be multiplied by the current rate of electricity charges of INR 7.50 per kWh and shall be added to the overall operation and maintenance cost provided by the bidder; which then will be used to determine Present Value (PV) (O&M) for each year and for the total duration of O&M including DLP period.

1.2.3 Award Criteria for Multiple Contracts (ITB 38.4)

Not Applicable

1.3 Alternative Completion Times

Not Used

1.4 Alternatives Technical Solutions (TO BE DISCUSSED WITH CMWSSB)

Alternatives technical solutions, if invited in accordance with ITB 13.3, will be evaluated as follows:

Bidders may propose **only one alternative process solutions** for the treatment and desalination of the seawater and submit an alternative technical bid along **with the base technical bid** with the Employer's proposed processes. However, bidders must provide proper justification of the alternative process selection in terms of the technical and economic advantages with lower capital and operational costs. In that case the bidder shall provide a detailed comparative study of the alternative technical solution with the proposed processes of the Employer. Along with alternative technical bid, the bidder shall also submit alternative price bid in separate envelope.

The viability of the base and alternative technical bids for 400 MLD SWRO plant shall be evaluated by the Engineer and Employer's representatives. The acceptance of the alternative technical bid is solely on the discretion of the Employer and bidders shall not be allowed to further discuss on this if it is not selected for any reason thereof. In case the alternative technical bid of a bidder is accepted by the Employer, the bidder will be informed accordingly and then only the alternative price bid of that bidder shall be opened on the price bid opening day. In case the alternative technical bid does not pass by the Employer during evaluation then its base technical bid will be evaluated. In any case the bidder who has quoted lowest evaluated bid shall be considered.

2. Qualification

(i) Exchange Rate for Qualification Criteria

Wherever a Form in Section IV, Bidding Forms, requires a Bidder to state a monetary amount, Bidders should indicate the USD equivalent using the rate of exchange determined as follows:

- (a) For turnover or financial data required for each year - Exchange rate prevailing on the last day of the respective calendar year or fiscal year, as applicable.
- (b) Value of single Contract - Exchange rate prevailing on the date of the Contract.

Exchange rates shall be taken from the publicly available source **identified in BDS 37.1** or in case such rates are not available in the source identified above, any other publicly available source acceptable to the Employer. Any error in determining the exchange rates may be corrected by the Employer.

2.1 Eligibility

Eligibility and Qualification Criteria			Compliance Requirements				Documentation
No.	Factor	Requirement	Single Entity	Joint Venture (existing or intended)			Submission Requirements
				All Members Combined	Each Member	One Member	
2.1.1	Nationality	Nationality in accordance with ITA 4.4.	Must meet requirement	N/A	Must meet requirement	N/A	Forms ELI –1 and 2 ⁽ⁱ⁾ with attachments
2.1.2	Conflict of Interest	No conflicts of interests in ITA 4.2 and 4.3.	Must meet requirement	N/A	Must meet requirement ⁽ⁱⁱ⁾	N/A	Application Submission Form
2.1.3	JICA Ineligibility	Not having been declared ineligible by JICA as described in ITA 4.5.	Must meet requirement	N/A	Must meet requirement ⁽ⁱⁱ⁾	N/A	Application Submission Form Form ACK
Note for the Applicants:							
(i) ELI – 2 is required only if the Applicants is a JV.							
(ii) This requirement also applies to subcontractors if proposed by the Applicant under 4.2(b) below.							

2.2 Historical Contract Non-Performance and Litigation

Eligibility and Qualification Criteria			Compliance Requirements				Documentation
No.	Factor	Requirement	Single Entity	Joint Venture (existing or intended)			Submission Requirements
				All Members Combined	Each Member	One Member	
2.2.1	History of non-performing Contracts	Non-performance of a contract ⁽ⁱ⁾ did not occur as a result of contractor's default since 1 st January 2015.	Must meet requirement ⁽ⁱⁱ⁾	N/A	Must meet requirement ⁽ⁱⁱ⁾	N/A	Form CON
2.2.2	Pending Litigation	Applicant's financial position and prospective long-term profitability still sound according to criteria established in 3.1 below and assuming that all pending litigation will be resolved against the Applicant.	Must meet requirement ⁽ⁱⁱ⁾	N/A	Must meet requirement ⁽ⁱⁱ⁾	N/A	Form CON
2.2.3	Litigation History	No consistent history of court orders ⁽ⁱⁱⁱ⁾ against the Applicant since 1 st January 2015.	Must meet requirement ⁽ⁱⁱ⁾	N/A	Must meet requirement ⁽ⁱⁱ⁾	N/A	Form CON
Notes for the Applicants (i) Non-performance, as decided by the Employer, shall include all contracts: (a) where non-performance was not challenged by the contractor, including through referral to the dispute resolution mechanism under the respective contract, and (b) that were so challenged but fully settled against the contractor. Non-performance shall not include contracts where Employer's decision was overruled by the dispute resolution mechanism.							

Eligibility and Qualification Criteria			Compliance Requirements			Documentation	
No.	Factor	Requirement	Single Entity	Joint Venture (existing or intended)			Submission Requirements
				All Members Combined	Each Member	One Member	
<p>Moreover, non-performance must be based on all information on fully settled disputes or litigation, i.e. dispute or litigation that has been resolved in accordance with the dispute resolution mechanism under the respective contract and where all appeal instances available to the applicant have been exhausted.</p> <p>(ii) This requirement also applies to contracts executed by the Applicant as a JV member.</p> <p>(iii) The Applicant shall provide accurate information on the related Application Form about any litigation resulting from contracts completed or ongoing under its execution over the last five (5) years. A consistent history of court orders against the Applicant or any member of a joint venture may result in failure of the Application.</p>							

2.3 Financial Situation and Capabilities

Eligibility and Qualification Criteria			Compliance Requirements				Documentation
No.	Factor	Requirement	Single Entity	Joint Venture (existing or intended)			Submission Requirements
				All Members Combined	Each Member	One Member	
2.3.1	Financial Performance	The financial statements (audited balance sheets) for the last five (5)years shall be submitted and must demonstrate the current soundness of the Applicant’s financial position and indicate its prospective long-term profitability.					
		A)As the minimum requirement, i) Applicant’s total profit after tax (PAT) in the last 3 (three) years is not negative.	Must meet requirement	N/A	Must meet requirement	N/A	Form FIN – 1 with attachments
		ii) Applicant’s profits after tax (PAT) in any 2 (two) consecutive years during the last 5 (five) years are not negative.	Must meet requirement	N/A	Must meet requirement	N/A	Form FIN – 1 with attachments
		B)As the minimum requirement, Applicant’s net worth calculated as the difference between total assets and total liabilities should be positive during the last five (5) years.	Must meet requirement	N/A	Must meet requirement	N/A	Form FIN – 1 with attachments
2.3.2	Average Annual Turnover	Minimum average annual turnover of USD 325 million, calculated as total certified	Must meet requirement	Must meet requirement	Must meet not less than 25%	Lead member in JV must	Form FIN –2

Eligibility and Qualification Criteria			Compliance Requirements				Documentation
No.	Factor	Requirement	Single Entity	Joint Venture (existing or intended)			Submission Requirements
				All Members Combined	Each Member	One Member	
		payments received for contracts in progress and/or completed, within the last 5 years divided by 5 years. The average annual turnover includes Construction, Equipment & O&M Turnover			of the requirement	meet not less than 50% of the requirement	
2.3.3	Financial Capabilities	A) The Applicant shall demonstrate, to the satisfaction of the Employer that it currently (as of the Application submission deadline), has access to, or has available, liquid assets, unencumbered real assets, lines of credit, and other financial means (independent of any contractual advance payment) sufficient to meet the construction cash flow requirements estimated as amount in USD 62 million for the subject contract(s) net of the Applicant's all other	Must meet requirement	Must meet requirement	N/A	N/A	Form FIN– 3 and FIN-4

Eligibility and Qualification Criteria			Compliance Requirements				Documentation
No.	Factor	Requirement	Single Entity	Joint Venture (existing or intended)			Submission Requirements
				All Members Combined	Each Member	One Member	
		commitments, both current and future.					
		<p>B) The Applicant should have a minimum available bid capacity of USD 650 million consisting of executing capacity and existing commitments.</p> <p>Available Bid Capacity = $A \times N \times M - B$, where</p> <p>A=Max value of works executed during one financial year in the last five years.</p> <p>N= Number of years prescribed for completion of the works for which bids are invited=Three and half years/Forty two months</p> <p>M=2.5</p> <p>B=value of the existing commitments in all ongoing Engineering works (excluding O&M cost) to be</p>	Must meet requirement	Must meet requirement	Must meet not less than 25% of the requirement	Lead member in JV must meet not less than 50% of the requirement	Form FIN– 2 and FIN-4

Eligibility and Qualification Criteria			Compliance Requirements				Documentation
No.	Factor	Requirement	Single Entity	Joint Venture (existing or intended)			Submission Requirements
				All Members Combined	Each Member	One Member	
		completed during the next three years. Note: Price for previous financial years shall be updated to the present price level @ 5% p.a.					
2.3.4	Financial Performance (Insolvency)	The Applicant should not be currently in the process of financial restructuring under Corporate Debt Restructuring (CDR) i.e. at the time of the bids submission and up till the contract award (in case the applicant is chosen for contract award).	Must meet requirement	N/A	Must meet requirement	N/A	Form FIN – 5

2.4 Subcontractors/manufacturers

Subcontractors/manufacturers for major items of supply or services identified in the prequalification document must meet or continue to meet the minimum criteria specified therein for each item.

Subcontractors/manufacturers for the following additional major items of supply or services must meet the following minimum criteria, herein listed for that item:

Item No.	Description of Item	Minimum Criteria to be met
1		
2		
3		
...		

Failure to comply with this requirement will result in the rejection of the Subcontractor.

In the case of a Bidder who offers to supply and install major items of the Works under the Contract that the Bidder did not manufacture or otherwise produce, the Bidder shall provide the manufacturer's authorization, using Form MAN provided in Section IV, Bidding Forms, showing that the Bidder has been duly authorized by the manufacturer or producer of the related plant and equipment or component to supply and/or install that item in the Employer's country. The Bidder is responsible for ensuring that the manufacturer or producer complies with the requirements of ITB 4 and ITB 5 and meets the minimum criteria listed above for that item.

Section IV. Bidding Forms

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SCHEDULE NO. 2: CIVIL WORKS	ERROR! BOOKMARK NOT DEFINED.
SCHEDULE NO. 3: ERECTION, TESTING, PRE-COMMISSIONING & COMMISSIONING	ERROR! BOOKMARK NOT DEFINED.
SCHEDULE NO. 4: DESIGN & DOCUMENTATION	ERROR! BOOKMARK NOT DEFINED.
SCHEDULE NO. 5: DUTIES & TAXES	ERROR! BOOKMARK NOT DEFINED.
SCHEDULE NO. 6: OPERATION & MAINTENANCE	ERROR! BOOKMARK NOT DEFINED.
SCHEDULE NO. 7 – ASSET REPLACEMENT SCHEDULE	ERROR! BOOKMARK NOT DEFINED.
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LETTER OF TECHNICAL BID

Date: *[insert date of Bid submission]*

Loan Agreement No.: *[insert number]*

IFB No.: *[insert number]*

Alternative No.: *[insert identification No. if this is a Bid for an alternative]*

To: *[insert full name of Employer]*,

We, the undersigned, declare that:

- (a) We have examined and have no reservations to the Bidding Documents, including Addenda issued in accordance with Instructions to Bidders (ITB 8): *[insert the number and issuing date of each Addendum]*;
- (b) We, *including* any Subcontractors/ manufacturers, for any part of the Contract, meet the eligibility requirements in accordance with ITB 4 and ITB 5;
- (c) We, including any Subcontractors/ manufacturers, for any part of the Contract, have no conflict of interest in accordance with ITB 4;
- (d) We offer to *[insert the services that apply, i.e., design, manufacture, test, deliver, install, pre-commission and commission]*, in conformity with the Bidding Documents, the following Works: *[insert a brief description of the Works]*;
- (e) Our Bid shall be valid for a period of *[specify the number of calendar days]* days from the date fixed for the Bid submission deadline in accordance with the Bidding Documents, and it shall remain binding upon us and may be accepted at any time before the expiration of that period;
- (f) We are *not* participating, as a Bidder or as a Subcontractor/ manufacturers, in more than one Bid in this bidding process in accordance with ITB 4.2 (c), other than alternative Bids submitted in accordance with ITB 13; and
- (g) We hereby certify that we have taken steps to ensure that no person acting for us or on our behalf will engage in any type of fraud and corruption.

Name of the Bidder**[insert complete name of the Bidder]*

Name of the person duly authorized to sign the Bid on behalf of the Bidder** *[insert complete name of person duly authorized to sign the Bid]*

Title of the person signing the Bid *[insert complete title of the person signing the Bid]*

Signature of the person named above *[insert signature of person whose name and capacity are shown above]*

Date signed [*insert date of signing*] day of [*insert month*], [*insert year*]

*: In the case of the Bid submitted by a Joint Venture specify the name of the Joint Venture as Bidder

**: Person signing the Bid shall have the power of attorney given by the Bidder to be attached with the Bid.

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LETTER OF PRICE BID

Date: *[insert date of Bid submission]*

Loan Agreement No.: *[insert number]*

IFB No.: *[insert number]*

Alternative No.: *[insert identification No. if this is a Bid for an alternative]*

To: *[insert full name of Employer]*,

We, the undersigned, declare that:

- (a) We have examined and have no reservations to the Bidding Documents, including Addenda issued in accordance with Instructions to Bidders (ITB 8): *[insert the number and issuing date of each Addendum]*;
- (b) We offer to *[insert the services that apply, i.e., design, manufacture, test, deliver, install, pre-commission and commission]*, in conformity with the Bidding Documents, the following Works: *[insert a brief description of the Works]*;
- (c) The total price of our Bid, excluding any discounts offered in item (d) below is:

In case of only one lot, total price of the Bid *[insert the total price of the Bid in words and figures, indicating the various amounts and the respective currencies]*

[In case of multiple lots, insert the total price of each lot]
[In case of multiple lots, insert the total price of all lots (sum of all lots)];
- (d) The discounts offered and the methodology for their application are: The discounts offered are: *[specify in detail each discount offered]*

The exact method of calculations to determine the net price after application of discounts is shown below: *[specify in detail the method that shall be used to apply the discounts]*;
- (e) Our Bid shall be valid for a period of *[specify the number of calendar days]* days from the date fixed for the Bid submission deadline in accordance with the Bidding Documents, and it shall remain binding upon us and may be accepted at any time before the expiration of that period;
- (f) If our Bid is accepted, we commit to obtain a Performance Security in accordance with the Bidding Documents.
- (g) We understand that this Bid, together with your written acceptance thereof included in your Letter of Acceptance, shall constitute a binding Contract between us, until a formal Contract is prepared and executed; and
- (h) We understand that you are not bound to accept the lowest evaluated Bid or any other Bid that you may receive.

Name of the Bidder*[*insert complete name of the Bidder*]

Name of the person duly authorized to sign the Bid on behalf of the Bidder** [*insert complete name of person duly authorized to sign the Bid*]

Title of the person signing the Bid [*insert complete title of the person signing the Bid*]

Signature of the person named above [*insert signature of person whose name and capacity are shown above*]

Date signed [*insert date of signing*] day of [*insert month*], [*insert year*]

*: In the case of the Bid submitted by a Joint Venture specify the name of the Joint Venture as Bidder

**: Person signing the Bid shall have the power of attorney given by the Bidder to be attached with the Bid.

SCHEDULE OF ADJUSTMENT DATA**TABLE A. LOCAL CURRENCY**

[In this Table A, the Employer shall indicate the necessary information in columns (a), (b), (c) and (d), and shall also provide a fixed value in A and a range of values in B, C, D and E of column (f). For very large and/or complex works contracts, it may be necessary to specify several families of price adjustment formulae for the different works involved and to prepare the corresponding adjustment tables.]

(a)	(b)	(c)	(d)	(e)	(f)	(g)
Index code	Index description	Source of index	Base value and date	Bidder's Related Currency amount	% Range of Weighting	Bidder's Proposed weighting
	A. Nonadjustable B. Labour C. Cement D. Steel E. Equipment F. Machinery	To be added	To be added		0.15 0.10-0.15 0.05-0.10 0.05-0.10 0.30 - 0.35 0.20 – 0.25	A: 0.15 B: C: D: E: F:
Total						1.00

The Bidder shall fill in column (e) and specify a value within the ranges given by the Employer in B, C, D and E of column (f), so that the total weighting equals 1.00.

TABLE B. FOREIGN CURRENCY (FC)

[In this Table B, the Employer shall indicate the necessary information in columns (a) and (b), and shall also provide a fixed value in A and a range of values in B, C, D and E of column (g). For very large and/or complex works contracts, it may be necessary to specify several families of price adjustment formulae for the different works involved and to prepare the corresponding adjustment tables.]

Currency: USD

(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)
Index code	Index description	Source of index	Base value and date	Bidder's Related Source currency in type/ amount	Equivalent in FC for payment	% Range of Weighting	Bidder's Proposed weighting
	A. Nonadjustable B. Equipment C. Machinery D. Filters E. Others	To be added	To be added			0.25 0.25-0.30 0.25-0.30 0.10-0.15 0.05-0.10	A: 0.25 B: C: D: E:
Total							1.00

The Bidder shall indicate the type of currency and columns (c), (d), (e) and (f), and specify a value within the ranges given by the Employer in B, C, D and E of column (g), so that the total weighting equals 1.00.

Bidders may be required by the Employer to justify, to the Employers satisfaction, their foreign currency requirement and to substantiate that the amounts included in the unit rates and prices and shown in the Schedule of adjustments data are reasonable, in which case a detailed breakdown of the foreign currency requirement shall be provided by Bidders.

PRICE SCHEDULES

INCLUDED SEPARATELY

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SCHEDULE OF PAYMENT¹

[If the Contract includes a Schedule of Payment specifying the installments in which the Contract Price will be paid, specify and describe the plan of Payment in conformity with Price Schedule. For the details, refer to GC 14. 4]

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¹ The Schedule should be established so as not to impose great cash flow burden on the Contractor.

TECHNICAL PROPOSAL²

[List the items comprising Technical Proposal. Typical items are as following;]

- Technical Schedules
- Site Organisation
- Operation and Maintenance (O&M) Plan
- Personnel
- Contractor's Equipment
- Spare Parts
- Proposed Subcontractors for Major Items of Plant Design, Supply and Installation Services
- [Others]

² As other conceivable items, "Training program for operating staff", "Description of the technology" or "Procedure for carrying or test on completion, including commissioning and trial operation" can be considered from the nature of the Contract.

TECHNICAL SCHEDULE-1- CONSTRUCTION PROGRAMME

The Bidder shall submit a realistic construction programme which he proposes to adopt for executing the Works. This shall be in sufficient detail so as to show the order and duration of key activities required to carry out the Works (including each stage of mobilization of labour, setting up of site offices/ workshops/ consents and approvals, procurement, manufacture, pre-delivery inspection and testing, delivery to Site, construction, erection, testing and commissioning).

The Bidder should pay particular attention to ensuring that the proposed programme is integrated with the Method Statement.

The construction programme shall be developed and presented on a commercially available project management software (such as Primavera, MS Project or equivalent), together with bar charts and CPM diagrams which clearly illustrate the critical path to achieve the desired results.

TECHNICAL SCHEDULE-2-PROPOSED PLANT DETAILS**(To be completed by the Bidder)**

The Technical Schedules are given below which are to be filled by the Contractor. This will be used for Evaluation of the Technical bids. All columns and rows are to be filled. For any other additional information, please create row in the specific section and insert the information. Please read the technical specifications in Part2 before filling the Schedules.

1.0 Intake Works

S. No.		Items – for 400 MLD Plant	Unit	Description For 200 MLD
(a)		Sea Water Intake System		
	i)	Design Capacity of total offshore intake	MLD	
	ii)	Sea Water Offshore intake pipe details <ul style="list-style-type: none"> • MOC • No. of Pipes and Screen Head (2 pipes and heads required) • Length of Intake pipe from seashore • Pipe thickness (pressure rating) 		
	iii)	Offshore Velocity Cap Type Head <ul style="list-style-type: none"> • Head Diameter • Height above seabed • Height below seabed • MOC 		
	iv)	Offshore Screen <ul style="list-style-type: none"> • No. of screens • Size (Opening) • Height • MOC (<i>Super Duplex Steel required</i>) • Velocity Cap type Head Diameter • Velocity of Water at screen • Max head loss across bar screen 		
	v)	Seawater Intake Well	(m x m x m)	

S. No.		Items – for 400 MLD Plant	Unit	Description For 200 MLD
		<ul style="list-style-type: none"> • Dimension of the Well • MOC of Well • Chambers in the Well (<i>min 2 Chambers required</i>) • Type of gates used (<i>Sluice gates required – stop logs not acceptable</i>) • MOC of gates • Bottom level in Chart Datum • Seawater level in the Well (min/average/max) 		
	vi)	Pigging System <ul style="list-style-type: none"> • Dimension of the Pig • MOC of Pig • No. of Pigs • Pumps Details (flow, press) for the Pigging System • MOC of pumps 		
(b)		Sea Water Outfall System		
	i)	Design Capacity of total offshore Outfall	MLD	
	ii)	Sea Water Offshore Outfall pipe details <ul style="list-style-type: none"> • MOC • No. of Pipes • Length of Outfall pipe from seashore • Pipe thickness (pressure rating) 		
	iii)	Offshore Diffuser <ul style="list-style-type: none"> • No. of Diffusers • Size (Opening) • MOC • Distance between diffusers • Max Velocity 		

S. No.		Items – for 400 MLD Plant	Unit	Description For 200 MLD
	iv)	Outfall Tank <ul style="list-style-type: none"> • Dimension of the tank • MOC of tank • Chambers in the tank • Type of gates used • <i>MOC of gates</i> 		
(c)		Travelling Band Screens (Onshore)		
	i)	Total Quantity (Working + Standby)	Nos.	
	ii)	Capacity of Each Screen	MLD	
	iii)	MOC of the Screen		
	iv)	Mesh width	mm	
	v)	Flow rate for screen cleaning	m ³ /hr	
(d)		Sea Water Intake Pumps		
	i)	Type of pump		
	ii)	Total Quantity (working + standby)	Nos.	
	iii)	Capacity of each Pump	m ³ /hr	
	iv)	Materials of Construction <ul style="list-style-type: none"> • Casing • Shaft • Impeller 	-	
	v)	Performance criteria <ul style="list-style-type: none"> • Efficiency of Pump • Motor KW & rpm • Noise level • Vibration level 		

2.0 Pretreatment

Any additional information is to be given such as alternate technology. Please create space below the table and insert the information

S. No.		Items – for 200 MLD Plant Stream	Unit	Description For 200 MLD
a)		Hypo Storage and Dosing System		
	i)	Chemical dosage (range)	mg/l	
	ii)	Number of dosing Tanks	No.	
	iii)	Capacity of dosing tanks	m ³	
	iv)	Material of dosing tank		
	v)	Number of dosing pumps (Working + Standby)	Nos.	
	vi)	Type of dosing pumps		
	vii)	Material of dosing pumps <ul style="list-style-type: none"> • Casing • Shaft • Impeller 		
	viii)	Capacity of dosing pump	LPH@ MWC	
	ix)	Days of chemical storage (<i>min 30 days</i>)	days	
	x)	Size of the storage tank	m ³	
	xi)	Material of transfer tank		
	xii)	Number of transfer pumps (Working + Standby)	Nos.	
	xiii)	Type of transfer pumps		
	xiv)	Material of transfer pumps		
	xv)	Capacity of transfer pump	LPH@ MWC	

S. No.		Items – for 200 MLD Plant Stream	Unit	Description For 200 MLD
b)		Sulphuric Acid Storage and Dosing System		
	i)	Chemical dosage	mg/l	
	ii)	Number of Dosing Tanks	No.	
	iii)	Capacity of dosing tanks	M ³	
	iv)	Material of Dosing Tank		
	v)	Number of dosing pumps (Working + Standby)	Nos.	
	vi)	Type of Dosing Pumps <ul style="list-style-type: none"> • Casing • Shaft • Impeller 		
	vii)	Material of dosing pumps		
	viii)	Capacity of dosing pump	LPH@ MWC	
	ix)	Days of Chemical storage (<i>min 30 days</i>)	days	
	x)	Size of the storage tanks	m ³	
	xi)	Material of storage tanks		
	xii)	Number of transfer pumps (Working + Standby)	Nos.	
	xiii)	Type of transfer pumps		
	xiv)	Material of transfer pumps <ul style="list-style-type: none"> • Casing • Shaft • Impeller 		
	xv)	Capacity of transfer pumps	LPH@ MWC	

S. No.		Items – for 200 MLD Plant Stream	Unit	Description For 200 MLD
c)		Ferric Chlorite Storage and Dosing System		
	i)	Chemical dosage	mg/l	
	ii)	Number of Dosing Tanks	No.	
	iii)	Capacity of Preparation & Dosing Tanks	m ³	
	iv)	Material of Dosing Tanks		
	v)	Internal Coating of Tanks (<i>Acid resistant tiles required</i>)		
	vi)	No. of Agitators		
	vii)	MOC of Agitators		
	viii)	Number of dosing pumps (Working + Standby)	Nos.	
	ix)	Type of Dosing Pumps		
	x)	Material of dosing pumps <ul style="list-style-type: none"> • Casing • Shaft • Impeller 		
	xi)	Capacity of dosing pump	LPH@ MWC	
	xii)	Days of chemical storage (<i>min 30 days</i>)	days	
	xiii)	Number of storage tanks (<i>min 2 required</i>)		
	xiv)	Size of the storage tanks	m ³	
	xv)	Material of storage tanks		
	xvi)	Number of transfer pumps (Working + Standby)	Nos.	
	xvii)	Type of transfer pumps		

S. No.		Items – for 200 MLD Plant Stream	Unit	Description For 200 MLD
	xviii)	Material of transfer pumps <ul style="list-style-type: none"> • Casing • Shaft • Impeller 		
	xix)	Capacity of transfer pumps	LPH@MWC	
d)		Poly-electrolyte Storage and Dosing System		
	i)	Chemical dosage	Mg/I	
	ii)	Number of Dosing Tanks	No.	
	iii)	Capacity of dosing tanks	M3	
	iv)	Material of Dosing Tank		
	v)	Internal Coating of Tanks		
	vi)	No. of Agitator		
	vii)	MOC of Agitator		
	viii)	Number of dosing pumps (Working + Standby)	Nos.	
	ix)	Type of Dosing Pumps		
	x)	Material of dosing pumps <ul style="list-style-type: none"> • Casing • Shaft • Impeller 		
	xi)	Capacity of dosing pump	LPH@MWC	
	xii)	Days of Chemical storage (<i>min 30 days</i>)	days	
	xiii)	Storage area for solid chemical bags	m2	

S. No.		Items – for 200 MLD Plant Stream	Unit	Description For 200 MLD
e)		Flash Mixer		
	i)	Number of mixing chambers		
	ii)	Volume of each chamber	cu m	
	iii)	SWD of chamber	m	
	iv)	Number of mixers in each chamber		
	v)	Velocity gradient	1/sec	
	vi)	MOC of Mixer <ul style="list-style-type: none"> • Casing • Shaft • Impeller 		
	vii)	Motor RPM	rpm	
	viii)	Residence Time (<i>min. 20 seconds</i>)	Sec.	
f)		Flocculation Tanks		
	(i)	MOC of flocculation tanks		
	(ii)	Raw Water Flow	m ³ /day	
	(iii)	Nos. of flocculation tanks	Nos.	
	(iv)	Residence time of Flocculator	min	
	(v)	Type of internal coating		
	(vi)	Number of Flocculators (mixers)		
	(vii)	Velocity gradient of mixer	1/sec	

S. No.		Items – for 200 MLD Plant Stream	Unit	Description For 200 MLD
	(viii)	MOC of Mixer <ul style="list-style-type: none"> • Casing • Shaft • Impeller 		
	(ix)	Motor RPM	rpm	
g)		Lamella Settler		
	(i)	MOC of Settler		
	(ii)	Raw Water Flow	m ³ /day	
	(iii)	Nos. of settlers	Nos.	
	(iv)	MOC of tube media		
	(v)	Design Flow Through each settler	m ³ /hr	
	(vi)	Effective surface area per tube media	m ²	
	(vii)	Size of the module L m x B m x H m	m x m x m	
	(viii)	Thickness of the tube plates		
	(ix)	Degree of inclination of the tube	degree	
	(x)	Settling velocity	m/hr	
	(xi)	Surface loading rate in modules ($max \leq 1$)	m ³ /m ² /hr	
	(xii)	Free board of Tube Settler tank	m	
	(xiii)	Hoppers per tube settler tank	Nos.	
	(xiv)	Straight height of hopper	m	
	(xv)	Hydraulic retention time	Hrs	
	(xvi)	Details of structural member for tube media support		
h)		Dissolved Air Flotation		
	(i)	Raw Water Flow	m ³ /day	

S. No.		Items – for 200 MLD Plant Stream	Unit	Description For 200 MLD
	(ii)	Ferric chloride dose rate	mg/l	
	(iii)	Max polymer dose rate	mg/l	
	(iv)	Expected TSS removal	%	
	(v)	Expected TOC Removal	%	
	(vi)	No. of static mixer		
	(vii)	MOC of static mixer		
	(viii)	MOC of DAF		
	(ix)	Nos. of DAF units	Nos.	
	(x)	DAF surface loading rate (≤ 25 m/hr)	m/hr	
	(xi)	DAF area per cell	m ²	
	(xii)	DAF cell dimensions	m	
	(xiii)	DAF Recycle Rate (<i>within 10–15%</i>)	%	
	(xiv)	No. of Recirculation Pumps (duty + standby)		
	(xv)	Material of pumps <ul style="list-style-type: none"> • Casing • Shaft • Impeller 		
	(xvi)	Discharge flow rate	m ³ /hr	
	(xvii)	Discharge pressure	m	
	(xviii)	DAF Air Dose Rate	mg/l	
	(xix)	No. of Air Compressor		
	(xx)	Air loading rate	g air /m ³	
	(xxi)	Delivery pressure	m	
	(xxii)	Air Saturator Efficiency	kPa	

S. No.		Items – for 200 MLD Plant Stream	Unit	Description For 200 MLD
	(xxiii)	Air Saturator Pressure (Gauge)	m	
	(xxiv)	Float Removal mechanism		
i)		Gravity Dual Media Filters		
	(i)	Total Raw Water Flow to DMF	m ³ /day	
	(ii)	MOC of DMF		
	(iii)	Expected TSS removal (> 98% required)	%	
	(iv)	Expected TOC removal	%	
	(v)	Type of filters (Constant head / flow)		
	(vi)	Nos. of DMF filter units	Nos.	
	(vii)	Design Flow through each unit	m ³ /hr	
	(viii)	Effective surface area per filter unit	m ²	
	(ix)	Size of each filter L m x B m x H m	m x m x m	
	(x)	Surface loading rate ($\max < 8 \text{ m/h @ } N-2 \text{ filters}$)	m ³ /m ² /h	
	(xi)	Type of underdrain system		
	(xii)	Number of valves/gates per filter		
j)		Backwash Pump		
	(i)	Type of Pump		
	(ii)	No. of pumps		
	(iii)	Capacity of each pump with VFD	m ³ /hr	
	(iv)	Discharge head	m	
	(v)	Material of pumps <ul style="list-style-type: none"> • Casing • Shaft • Impeller 		

S. No.		Items – for 200 MLD Plant Stream	Unit	Description For 200 MLD
	(vi)	Rate of backwash water flow rate (<i>range 24-40 m/h</i>)	m/h	
	(vii)	Water + air backwash included (<i>If yes – additional pump with low flow required</i>)	Yes / No	
	(viii)	Performance Criteria <ul style="list-style-type: none"> • Efficiency of Pump • Motor KW & rpm • Noise level • Vibration level 		
k)		Backwash Blower		
	(i)	Type of blower		
	(ii)	No. of blowers		
	(iii)	Capacity of each blower	Nm ³ /hr	
	(iv)	Material of blower		
	(v)	Rate of backwash air flow rate	m/h	
	(vi)	Discharge head	m	
	(vii)	Variable speed drive	Yes /No	
	(viii)	Performance Criteria <ul style="list-style-type: none"> • Efficiency of blower • Motor KW & rpm • Noise level • Vibration level 		
l)		Filter media		

S. No.		Items – for 200 MLD Plant Stream	Unit	Description For 200 MLD
	(i)	Bed thickness <ul style="list-style-type: none"> • Anthracite • Sand • Garnet • Gravel 	mm	
	(ii)	Effective size <ul style="list-style-type: none"> • Anthracite • Sand • Garnet • Gravel 	mm	
	(iii)	Uniformity coefficient <ul style="list-style-type: none"> • Anthracite • Sand • Garnet • Gravel 		
	(iv)	Specific gravity <ul style="list-style-type: none"> • Anthracite • Sand • Garnet • Gravel 		
m)		Backwash/ RO Feed Tank - For 200 MLD		
	(i)	MOC of Tank		
	(ii)	Number of Tanks		
	(iii)	Capacity of each Tank		
	(iv)	Partition in Tanks (<i>two chambers</i>)		
	(v)	Provision of valves/gates for online cleaning of the Backwash tanks included	Yes / NO	

4. RO Desalination System

Any additional information is to be given such as alternate technology. Please create space below the table and insert the information

S. No.	Items for 200 MLD Stream		Unit	Description For 200 MLD
(a)				
		RO Feed Booster Pump		
	(i)	Type of Pump		
	(ii)	No. of pumps (working + standby)		
	(iii)	Capacity of each pump	m ³ /hr @ mWC	
	(iv)	Discharge head	m	
	(v)	VFD included	(Yes/ No.)	
	(vi)	Material of pumps <ul style="list-style-type: none"> • Casing • Shaft • Impeller 		
	(vii)	Performance Criteria <ul style="list-style-type: none"> • Efficiency of Pump • Motor KW & rpm • Noise level • Vibration level 		
(b)		ERD Feed Booster Pump		
	(i)	Type of Pump		
	(ii)	No. of pumps (working + standby)		
	(iii)	Capacity of each pump	m ³ /hr @ mWC	
	(iv)	Discharge head	m	
	(v)	VFD included	(Yes/ No.)	

S. No.	Items for 200 MLD Stream		Unit	Description For 200 MLD
	(vi)	Material of pumps <ul style="list-style-type: none"> • Casing • Shaft • Impeller 		
	(vii)	Performance Criteria <ul style="list-style-type: none"> • Efficiency of Pump • Motor KW & rpm • Noise level • Vibration level 		
(c)		Cartridge Filter in high pressure line	For 200 MLD	
	(i)	Total Flowrate	m ³ /hr, /MLD	
	(ii)	Total units of duty Cartridge Filter		
	(iii)	Total units of standby Cartridge Filter		
	(iv)	Number of filter elements in each unit		
	(v)	Design flow rate of each filter unit	m ³ /hr	
	(vi)	Head loss	mwc	
	(vii)	Type of cartridge		
	(viii)	Cartridge filter nominal pore size	micron	
	(ix)	Unit Diameter	mm	
	(x)	Unit Height on Straight	mm	
	(xi)	Filtration rate	m ³ /m ² /hr	
	(xii)	Material of construction <ul style="list-style-type: none"> • Housing • Internals • Filter elements 		
(d)		High Pressure Pump	For 200 MLD	

S. No.	Items for 200 MLD Stream		Unit	Description For 200 MLD
	(i)	Type of Pump		
	(ii)	No. of pumps (working + standby)		
	(iii)	Capacity of each pump	m ³ /hr @ mWC	
	(iv)	Discharge head	m	
	(v)	VFD included (Yes/ No.)		
	(vi)	Material of pumps <ul style="list-style-type: none"> • Casing • Shaft • Impeller 		
	(vii)	Performance Criteria <ul style="list-style-type: none"> • Efficiency of Pump • Motor KW & rpm • Noise level • Vibration level 		
(e)		ERD Feed Recirculation Pump	For 200 MLD	
	(i)	Type of Pump		
	(ii)	No. of pumps (working + standby)		
	(iii)	Capacity of each pump	m ³ /hr @ mWC	
	(iv)	Discharge head	m	
	(v)	VFD included (Yes/ No.)		
	(vi)	Material of pumps <ul style="list-style-type: none"> • Casing • Shaft • Impeller 		

S. No.	Items for 200 MLD Stream		Unit	Description For 200 MLD
	(vii)	Performance Criteria <ul style="list-style-type: none"> • Efficiency of Pump • Motor KW & rpm • Noise level • Vibration level 		
(f)		Energy Recovery Device		
	(i)	Type of Isobaric Energy Recovery System – <i>(ERI preferred)</i>	-	
	(ii)	Number of ERD systems per RO train	Nos.	
	(iii)	Total number of ERD systems in one stream	Nos.	
	(iv)	Efficiency of single ERD	%	
	(v)	Noise Level	dB	
	(vi)	Salinity Increase in Pre-treated water at inlet of RO Membrane	%	
	(vii)	Over-flush of ERD	%	
	(viii)	Lubrication flow	%	
	(ix)	Material of Construction <ul style="list-style-type: none"> • Casing • Rotor • Shaft • Other parts in contact with seawater/concentrate 		
(g)		RO System (for 200 MLD Stream)	For 200 MLD	
	g1	General		
	(i)	Net permeate output (<i>min 402000 m3/day to cover potable water demand in the plant</i>)	m3/day	
	(ii)	Gross permeate output <i>The gross permeate shall have enough</i>	m3/day	

S. No.	Items for 200 MLD Stream		Unit	Description For 200 MLD
		<i>additional margin of surplus capacity to cover the internal use of service water plus potable water demand of the Perur Desalination plant with all its related systems. The contractor shall confirm internal consumption as per detailed design. Minimum 1.0% additional flow (i.e. 404000 m³/day).</i>		
	(iii)	Number of duty RO trains	No.	
	(iv)	Number of standby RO trains	No.	
	(v)	Size of each train (height x width x length)	m*m*m	
	(vi)	Train configuration		
	(vii)	Details of RO membrane pressure vessels		
	(viii)	RO membrane models (HR/LE)		
	(ix)	If mixed membrane – HR:LE ratio		
	(x)	RO Manufacturer (<i>Manufacturer Assurance needed for supply of membrane in time</i>)		
	(xi)	Number of pressure vessels per Trains		
	(xii)	Number of RO elements per pressure vessel		
	(xiii)	Design Recovery Rate	%	
	(xiv)	Design average flux rate	l/(m ² *h)	
	(xv)	Design fouling factor	-	
	(xvi)	Design salt passage increase rate per year	%	
	(xvii)	Design flux decrease rate per year	%/annum	
	g2	Maximum seawater condition		
	(i)	Seawater temperature (<i>max temp – 32°C</i>)	deg C	
	(ii)	Seawater TDS (<i>max design TDS – 39 g/l; Plant should be able to operate at 41g/l</i>)	mg/l	

S. No.	Items for 200 MLD Stream		Unit	Description For 200 MLD
	(iii)	Final production rate	m ³ /d	
	(iv)	Final product water TDS (<i>must be ≤ 450 mg/l</i>)	mg/l	
	(v)	Average membrane age (<i>manufacturer's guarantee needed</i>)	Years	
	(vi)	Membrane replacement rate (<i>manufacturer's guarantee needed</i>)	%/annum	
	g3	Average Condition		
	(i)	Seawater temperature (<i>max temp – 28°C</i>)	deg C	
	(ii)	Seawater TDS (<i>average TDS – 36 g/l</i>)	mg/l	
	(iii)	Final product production	m ³ /d	
	(iv)	Final product water TDS	mg/l	
	(v)	Average membrane age (<i>manufacturer's guarantee needed</i>)	Years	
	(vii)	Membrane replacement rate (<i>manufacturer's guarantee needed</i>)	%/annum	
	g4	Antiscalant Storage and Dosing System		
	i)	Chemical dose rate	mg/l	
	ii)	Number of dosing tanks	No.	
	iii)	Capacity of dosing tanks	m ³	
	iv)	Material of dosing tanks		
	v)	Number of dosing pumps (Working + Standby) (<i>two dosing points</i>)	Nos.	
	vi)	Type of dosing pumps		
	vii)	Material of dosing pumps		
	viii)	Capacity of dosing pump	LPH@ MWC	
	ix)	Days of Chemical storage (<i>min 30 days</i>)	days	

S. No.	Items for 200 MLD Stream		Unit	Description For 200 MLD
		<i>required)</i>		
	g5	Sodium Bisulphite Storage and Dosing System		
	i)	Chemical dose rate	mg/l	
	ii)	Number of dosing tanks	No.	
	iii)	Capacity of dosing tanks	M ³	
	iv)	Material of dosing tanks		
	v)	Number of dosing pumps (Working + Standby) (<i>two dosing points</i>)	Nos.	
	vi)	Type of dosing pumps		
	vii)	Material of dosing pumps		
	viii)	Capacity of dosing pump	LPH@ MWC	
	ix)	Days of Chemical storage (<i>min 30 days required</i>)	days	
	g6	Permeate Storage Tank		
	(i)	Number of permeate tanks	No.	
	(ii)	Net volume of permeate tank (<i>5 ML required</i>)	m ³	
	(iii)	Material of Construction <ul style="list-style-type: none"> • Shell plate • roof plate • bottom/annular plate • girder / rafter • column • Inside Protection 		
	(iv)	Water level in the permeate tank (<i>w.r.t CD</i>)		
	(v)	Permeate draw-back facilities in case of shut-down provided	Yes/No	
	g7	Flushing Pump	For 200 MLD	

S. No.	Items for 200 MLD Stream		Unit	Description For 200 MLD
	(i)	Type of Pump		
	(ii)	No. of pumps (working + standby)		
	(iii)	Capacity of each pump	m ³ /hr @ mWC	
	(iv)	Discharge head	m	
	(v)	VFD included (Yes/ No.)		
	(vi)	Material of pumps <ul style="list-style-type: none"> • Casing • Shaft • Impeller 		
	(vii)	Performance Criteria <ul style="list-style-type: none"> • Efficiency of Pump • Motor KW & rpm • Noise level • Vibration level 		
	g8	RO Clean In Place System		
	(i)	Number of cleaning tanks	Nos.	
	(ii)	Net volume of each cleaning tanks	m ³	
	(iii)	Max. pressure vessel cleaned at once	Nos.	
	(iv)	MOC of CIP tanks		
	(v)	MOC of agitator	-	
	(vi)	Type of Cleaning Pumps		
	(vii)	No. of pumps (working + standby)		
	(viii)	Capacity of each pump	m ³ /hr @ mWC	
	(ix)	Discharge head	m	
	(x)	VFD included (Yes/ No.)		

S. No.	Items for 200 MLD Stream		Unit	Description For 200 MLD
	(xi)	Material of pumps <ul style="list-style-type: none"> • Casing • Shaft • Impeller 		
	(xii)	Performance Criteria <ul style="list-style-type: none"> • Efficiency of Pump • Motor KW & rpm • Noise level • Vibration level 		
	(xiii)	Cartridge filter units for CIP	Nos.	
	(xiv)	Nominal pore size of filters	µm	
	(xv)	Material of Construction <ul style="list-style-type: none"> • Housing Internals • Filter elements 		
	g9	CIP Citric Acid Storage and Dosing System		
	i)	Chemical dose rate	mg/I	
	ii)	Number of Dosing Tanks	No.	
	iii)	Capacity of dosing tanks	M3	
	iv)	Material of Dosing Tank		
	v)	Number of dosing pumps (Working + Standby)	Nos.	
	vi)	Type of Dosing Pumps		
	vii)	Material of dosing pumps		
	viii)	Capacity of dosing pump	LPH@ MWC	
	ix)	Days of Chemical storage (<i>min 30 days required</i>)	days	

S. No.	Items for 200 MLD Stream		Unit	Description For 200 MLD
	x)	No. of storage tanks (<i>min two tanks required</i>)	No.	
	xi)	Size of the storage tanks	m ³	
	xii)	Material of storage tanks		
	xiii)	Number of transfer pumps (Working + Standby)	Nos.	
	xiv)	Type of transfer pumps		
	xv)	Material of transfer pumps <ul style="list-style-type: none"> • Casing • Shaft • Impeller 		
	xvi)	Capacity of transfer pumps	LPH@ MWC	
	g10	CIP Caustic Storage and Dosing System		
	i)	Chemical dose rate	mg/l	
	ii)	Number of Dosing Tanks	No.	
	iii)	Capacity of dosing tanks	M ³	
	iv)	Material of Dosing Tank		
	v)	Number of dosing pumps (Working + Standby)	Nos.	
	vi)	Type of Dosing Pumps		
	vii)	Material of dosing pumps		
	viii)	Capacity of dosing pump	LPH@ MWC	
	ix)	Days of Chemical storage (<i>min 30 days required</i>)	days	

S. No.	Items for 200 MLD Stream		Unit	Description For 200 MLD
	x)	No. of storage tanks (<i>min two tanks required</i>)	No.	
	xi)	Size of the storage tanks	m ³	
	xii)	Material of storage tanks		
	xiii)	Number of transfer pumps (Working + Standby)	Nos.	
	xiv)	Type of transfer pumps		
	xv)	Material of transfer pumps <ul style="list-style-type: none"> • Casing • Shaft • Impeller 		
	xvi)	Capacity of transfer pumps	LPH@ MWC	
	g11	CIP HCl Storage and Dosing System		
	i)	Chemical dose rate	mg/I	
	ii)	Number of Dosing Tanks	No.	
	iii)	Capacity of dosing tanks	M ³	
	iv)	Material of Dosing Tank		
	v)	Number of dosing pumps (Working + Standby)	Nos.	
	vi)	Type of Dosing Pumps		
	vii)	Material of dosing pumps		
	viii)	Capacity of dosing pump	LPH@ MWC	
	ix)	Days of Chemical storage (<i>min 30 days required</i>)	days	
	x)	No. of storage tanks (min two tanks required)	No.	

S. No.	Items for 200 MLD Stream		Unit	Description For 200 MLD
	xi)	Size of the storage tanks	m3	
	xii)	Material of storage tanks		
	xiii)	Number of transfer pumps (Working + Standby)	Nos.	
	xiv)	Type of transfer pumps		
	xv)	Material of transfer pumps <ul style="list-style-type: none"> • Casing • Shaft • Impeller 		
	xvi)	Capacity of transfer pumps	LPH@ MWC	
		Other related items		
	i)	A membrane test stand in accordance with ASTM D 4194-03 will be provided	Yes/No	
	ii)	Sample collection station from each vessel provided	Yes/No	

5. Post Treatment

S. No.	Item for 200 MLD Stream		Unit	Description
(a)		Limestone Filter (LSF)	For 200 MLD	
	(i)	Treated water flow rate <i>The net production shall have enough additional margin of surplus capacity to cover the internal potable water demand of the Perur Desalination plant with all its related systems. The contractor shall confirm internal consumption as per detailed design. Minimum 0.5% additional flow (402000 m3/day).</i>	m3/d	
	(ii)	Limestone building bypass	%	
	(iii)	Material of the Limestone Filter		
	(iv)	No. of filter modules per stream		
	(v)	Net surface area per module	m ²	
	(vi)	Limestone bed Module length	m	
	(vii)	Limestone bed Module width	m	
	(viii)	Limestone bed thickness	m	
	(ix)	Media Contact time	min	
	(x)	Module surface loading rate	m ³ /m ² .h	
	(xi)	Module surface loading rate N-1	m ³ /m ² .h	
	(xii)	CO2 consumption	g/m ³	
	(xiii)	CO2 daily consumption	T/day	
	(xiv)	Total hardness in water after remineralization (80 mg/l as CaCO ₃ required)	mg/l CaCO ₃	
	(xv)	Calcium hardness addition in product water	mg/l CaCO ₃	
	(xvi)	Type of CO ₂ dosing system		
	(xvii)	MOC of CO ₂ pipe, valves, and Static Mixer		
	(xviii)	Capacity of CO ₂ – storage tank	days	

	(xix)	MOC of CO ₂ tank		
(b)		LSF Backwash Pump		
	(i)	Type of Pump		
	(ii)	No. of pumps		
	(iii)	Capacity of each pump with VFD	m ³ /hr	
	(iv)	Discharge head	m	
	(v)	Material of pumps <ul style="list-style-type: none"> • Casing • Shaft • Impeller 		
	(vi)	Rate of backwash water flow rate	m/h	
	(vii)	Performance Criteria <ul style="list-style-type: none"> • Efficiency of Pump • Motor KW & rpm • Noise level • Vibration level 		
(c)		LSF Backwash Blower		
	(i)	Type of blower		
	(ii)	No. of blowers		
	(iii)	Capacity of each blower	Nm ³ /hr	
	(iv)	Variable speed drive included	Yes/No	
	(v)	Discharge head	m	
	(vi)	Material of blower		
	(vii)	Rate of backwash air flow rate	m/h	
	(viii)	Performance Criteria <ul style="list-style-type: none"> • Efficiency of blower • Motor KW & rpm 		

		<ul style="list-style-type: none"> Noise level Vibration level 		
(d)		Hypochlorite Storage and Dosing System		
	i)	Chemical dose rate	mg/I	
	ii)	Number of Dosing Tanks	No.	
	iii)	Capacity of dosing tanks	M3	
	iv)	Material of Dosing Tank		
	v)	Number of dosing pumps (Working + Standby)	Nos.	
	vi)	Type of Dosing Pumps		
	vii)	Material of dosing pumps		
	viii)	Capacity of dosing pump	LPH@ MWC	
	xvi)	Days of Chemical storage (<i>min 30 days</i>)	days	
	xvii)	Size of the storage tanks	m3	
	xviii)	Material of storage tanks		
	xix)	Number of transfer pumps (Working + Standby)	Nos.	
	xx)	Type of transfer pumps		
	xxi)	Material of transfer pumps <ul style="list-style-type: none"> Casing Shaft Impeller 		
	xxii)	Capacity of transfer pumps	LPH@ MWC	
(e)		pH Adjustment - Caustic Storage and Dosing System		
	i)	Chemical dose rate	mg/I	

	ii)	Number of Dosing Tanks	No.	
	iii)	Capacity of dosing tanks	M3	
	iv)	Material of Dosing Tank		
	v)	Number of dosing pumps (Working + Standby)	Nos.	
	vi)	Type of Dosing Pumps		
	vii)	Material of dosing pumps		
	viii)	Capacity of dosing pump	LPH@ MWC	
	ix)	Days of Chemical storage (<i>min 30 days</i>)	days	
	x)	Size of the storage tanks	m3	
	xi)	Material of storage tanks		
	xii)	Number of transfer pumps (Working + Standby)	Nos.	
	xiii)	Type of transfer pumps		
	xiv)	Material of transfer pumps <ul style="list-style-type: none"> • Casing • Shaft • Impeller 		
	xv)	Capacity of transfer pumps	LPH@ MWC	

6.0 Sludge Treatment

S. No.		Item for 400 MLD Stream	Unit	Description
(a)		Neutralization Sump		
	(i)	No. of Sumps		
	(ii)	Construction Material		
	(iii)	Area (L x B)	m2	
	(iv)	Tank volume	m3	

	(v)	Water height	m	
	(vi)	Free board	m	
	(vii)	Pumps vault size	m x m x m	
(b)		Neutralization Effluent Pumps		
	(i)	Type of Pump		
	(ii)	No. of pumps		
	(iii)	Capacity of each pump with VFD	m ³ /hr	
	(iv)	Discharge head	m	
	(v)	Material of pumps <ul style="list-style-type: none"> • Casing • Shaft • Impeller 		
	(vi)	Rate of backwash water flow rate	m/h	
	(vii)	Performance Criteria <ul style="list-style-type: none"> • Efficiency of Pump • Motor KW & rpm • Noise level • Vibration level 		
(c)		Waste Sludge Balancing Tank		
	(i)	Tank type		
	(ii)	No. of tanks		
	(iii)	Construction Material		
	(iv)	Tank area	m x m	
	(v)	Tank volume	m ³	
	(vi)	Water height	m	
(d)		Submersible Mixer		
	(i)	Manufacturer		

	(ii)	Type		
	(iii)	Model		
	(iv)	Quantity		
	(v)	Material of construction:		
	(vi)	Casing		
	(vii)	Impeller		
	(viii)	Shaft		
	(ix)	Mechanical seal		
	(x)	Guide mechanism with winch		
	(xi)	Impeller Diameter	mm	
	(xii)	Rotation speed	Rpm	
	(xiii)	Immersion depth	mm	
	(xiv)	Absorbed power	kW	
	(xv)	Motor rating	kW	
	(xvi)	Maximum Lifting weight	Kgs	
(e)		Thickener Feed Pumps		
	(i)	Type of Pump		
	(ii)	No. of pumps		
	(iii)	Capacity of each pump with VFD	m ³ /hr	
	(iv)	Discharge head	m	
	(v)	Material of pumps <ul style="list-style-type: none"> • Casing • Shaft • Impeller 		
	(vi)	Rate of backwash water flow rate	m/h	
	(vii)	Performance Criteria		

		<ul style="list-style-type: none"> • Efficiency of Pump • Motor KW & rpm • Noise level • Vibration level 		
(f)		Static Mixer after polymer dose		
	(i)	Number of duty units	-	
	(ii)	Number of standby units	-	
	(iii)	Manufacturer	-	
	(iv)	Type	-	
	(v)	Design flow of one unit	m ³ /h	
	(vi)	Pressure loss at design flow	m	
	(vii)	Maximum flow of one unit	m ³ /h	
	(viii)	Pressure loss at maximum flow	m	
	(ix)	Material of housing	-	
	(x)	Materials of internals	-	
(g)		Polyelectrolyte Storage and Dosing System for Thickener and BFP		
	i)	Chemical dose rate	mg/l	
	ii)	Number of Dosing Tanks	No.	
	iii)	Capacity of dosing tanks	m ³	
	iv)	Material of Dosing Tank		
	v)	Number of dosing pumps (Working + Standby)	Nos.	
	vi)	Type of Dosing Pumps		
	vii)	Material of dosing pumps		

	viii)	Capacity of dosing pump	LPH@ MWC	
	ix)	Days of Chemical storage	days	
		Poly solution Agitator:		
	x)	Manufacturer		
	xi)	Model		
	xii)	Type		
	xiii)	Quantity (Duty + Standby)	Nos	
	xiv)	Motor rating	kW	
	xv)	Motor speed	rpm	
	xvi)	Mixer speed		
	xvii)	Impeller material		
	xviii)	Shaft material		
(h)		Thickener		
	(i)	Manufacturer		
	(ii)	Type		
	(iii)	Quantity	Nos	
	(iv)	Size (Diameter x SWD x FB)	m	
	(v)	Scraper speed	rpm	
	(vi)	<ul style="list-style-type: none"> • Torque rating • Design output torque • Shut-off torque 	N-m	
	(vii)	Feed rate per thickener	m ³ /hr	
	(viii)	Feed well size	mm	
	(ix)	Walkway (width x Height)	mm	
	(x)	Weir plate size(Thick x width)	mm	

		Surface Preparation & Protection:		
	(i)	Wetted parts		
	(ii)	Exposed parts		
		Material of Construction:		
	(i)	Bridge and Superstructure		
	(ii)	Feed well		
	(iii)	Walkway Gratings		
	(iv)	Squeegees		
	(v)	Weir plate		
	(vi)	Clamps & Hardware		
		Automatic lifting Device-provided		
	(i)	Motor rating	KW	
	(ii)	Motor speed	rpm	
	(iii)	Motor Make		
	(iv)	Protection		
(i)		Thickened Sludge Holding Tank		
	(i)	Tank type		
	(ii)	No. of tanks		
	(iii)	Construction Material		
	(iv)	Tank area	mxm	
	(v)	Tank volume	m ³	
	(vi)	Water height	m	
		Submersible Mixer/Agitator		
	(i)	Manufacturer		
	(ii)	Type		

	(iii)	Model		
	(iv)	Quantity		
	(v)	Material of construction:		
	(vi)	Casing		
	(vii)	Impeller		
	(viii)	Shaft		
	(xi)	Mechanical seal		
	(x)	Guide mechanism with winch		
	(xi)	Impeller Diameter	mm	
	(xii)	Rotation speed	Rpm	
	(xiii)	Immersion depth	mm	
	(xiv)	Absorbed power	kW	
	(xv)	Motor rating	kW	
	(xvi)	Maximum Lifting weight	kgs	
(j)		Thickener Feed Pumps		
	(i)	Type of Pump		
	(ii)	No. of pumps		
	(iii)	Capacity of each pump with VFD	m ³ /hr	
	(iv)	Discharge head	m	
	(v)	Material of pumps <ul style="list-style-type: none"> • Casing • Shaft • Impeller 		
	(vi)	Rate of backwash water flow rate	m/h	
	(vii)	Performance Criteria <ul style="list-style-type: none"> • Efficiency of Pump 		

		<ul style="list-style-type: none"> • Motor KW & rpm • Noise level • Vibration level 		
(k)		BFP		
	(i)	Manufacturer		
	(ii)	Type		
	(iii)	Model		
	(iv)	Number of BFPs		
	(v)	Feed rate per BFP	m ³ /h	
	(vi)	Dewatered sludge cake thickness (>25% dried solids required)	% dried solids	
	(vii)	Noise level (dBA) at 1 m distance from the machine	dBA	
	(viii)	Pressure roll configuration		
	(ix)	Feed pressure required	Kg/cm ²	
	(x)	Overall dimension of each BFP (LxB)	mm x mm	
	(xi)	Weight per BFP	Kgs	
	(xii)	Wash water requirement		
	(xiii)	No. of belt wash headers		
	(xiv)	Belt tension device		
		Material of Construction:		
	(i)	Structural Frame		
	(ii)	Dispersion device		
	(iii)	Adjustable Wedge		
	(iv)	Pressure rolls		
	(v)	Filtration belts		
	(vi)	Doctors blade		

	(vii)	Roller bearings		
	(viii)	Drainage pan		
	(ix)	Washing belt		
	(x)	Y strainer		
	(xi)	Washer nozzle		
		Belt Press Drives		
	(i)	Manufacturer		
	(ii)	Motor Make /Model		
	(iii)	Motor rating (Main Drive)	kW	
	(iv)	Motor speed	rpm	
	(v)	Insulation class		
	(vi)	Enclosure		
	(vii)	Voltage & Frequency	V / Hz	
		Conveyor Drive		
	(i)	Motor Make		
	(ii)	Motor rating	kW	
	(iii)	Motor speed	rpm	
	(iv)	Make of Motor		
	(v)	Insulation class		
	(vi)	Enclosure		
	(vii)	Voltage & Frequency	V / Hz	
		Belt Conveyor system		
	(i)	Make		
	(ii)	Model		
	(iii)	Type		

	(iv)	Quantity		
	(v)	Capacity	Kg/hr	
	(vi)	Length of conveyor	m	
	(vii)	Angle of Inclination	Degree	
	(viii)	Belt width	M	
	(ix)	Jointing detail/type		
	(x)	Belt rating		
	(xi)	Belt speed	rpm	
	(xii)	Belt scraper-Type / No.		
(l)		BFP Building		
	(i)	Ground Floor		
	(ii)	Polymer tank and storage area	m x m = m ²	
	(iii)	Thickened sludge Pump room area	m x m = m ²	
	(iv)	Truck loading area	m x m = m ²	
		1st Floor		
	(i)	BFP machine floor area	m x m = m ²	
	(ii)	Electrical room area	m x m = m ²	
	(iii)	Local control room area	m x m = m ²	
(m)		Crane – BFP Building		
	(i)	Manufacturer		
	(ii)	Type and class		
	(iii)	Safe working Load	tonne	
	(iv)	Hoist speed high/low	m/min	
	(v)	Long Travel speed	m/min	
	(vi)	Cross travel speed	m/min	

	(vii)	Span	metres	
		Hoisting Rope:		
	(i)	- Diameter	mm	
	(ii)	- Construction		
	(iii)	-Quality of steel		
	(iv)	- Minimum Breaking Load	Kgs	
	(v)	- Factor of safety		
		Motors for Hoist/Long travel/cross travel :		
	(i)	Make		
	(ii)	Type		
	(iii)	Rating	kW	
		Details of Brakes for Hoist/cross travel/Long travel:		
	(i)	Make		
	(ii)	Design Holding Torque	N-m	
	(iii)	Net weight	Tons	

7.0 Miscellaneous

The following are the general technical schedules for different types of equipment including valves and actuators. The Contractor shall provide details of all equipment separately in the respective schedules given below for 200 MLD Stream.

7.1 Service Water System

(a)		Service Water Pumps		For 200 MLD
	(i)	Type of Pump		
	(ii)	No. of pumps		
	(iii)	Capacity of each pump	m ³ /hr	
	(iv)	Discharge head	m	
	(v)	Variable Speed Drive included	Yes/No.	
	(vi)	Material of pumps <ul style="list-style-type: none"> • Casing • Shaft • Impeller 		
	(vii)	Performance Criteria <ul style="list-style-type: none"> • Efficiency of Pump • Motor KW & rpm • Noise level • Vibration level 		
(b)		Service Water Tanks		
	(i)	No. of service water tanks		
	(ii)	Capacity of each service water tank	m ³	
	(iii)	Tank dimensions (LxBxH)	m x m x m	
		Tank location – Roof of <ul style="list-style-type: none"> • Admin building • BFP building • Chemical buildings • 	m x m x m	

7.2 Valves

S. No.	Item	Unit	Description
(a)	Valve		

S. No.	Item		Unit	Description
	(i)	Type		
	(ii)	Position of valve (location)		
	(iii)	Manufacturer		
	(iv)	Model		
	(v)	Service		
	(vi)	Quantity		
	(vii)	Size	mm	
	(viii)	Rating	bar	
	(ix)	Test pressure	bar	
	(x)	Body material		
	(xi)	Disc material		
	(xii)	Sealing face material		
	(xiii)	Shaft material		
	(xiv)	Gear Reducers :		
	(xv)	Manufacturer		
	(xvi)	Material		
	(xv)	Flange Drilling standard		

7.3 Valve Actuators

S. No.	Item		Unit	Description
(a)		Valve Actuator		
	(i)	Manufacturer		
	(ii)	Type		
	(iii)	Model		

S. No.	Item		Unit	Description
	(iv)	Service		
	(v)	Quantity		
	(vi)	Motor rating	kW	
	(vii)	Design Torque	Kg-m	
	(viii)	Time for full open to full close	min	

7.4 Non Return Valves

S. No.	Item		Unit	Description
		Non-return valves		
	(i)	Manufacturer		
	(ii)	Type		
	(iii)	Model		
	(iv)	Service		
	(v)	Quantity	nos.	
	(vi)	Size	mm	
	(vii)	Rating	Bar	
	(viii)	Test Pressure	Bar	
	(ix)	Design standard		
	(x)	Material of construction:		
		• Body		
		• Disc/plates		
		• Spring		
		• Shaft		
	(xi)	Flange drilling standard		

7.5 Sluice Valves

S. No.	Item		Unit	Description
(a)		Sluice Valves		
	(i)	Manufacturer		
	(ii)	Type		
	(iii)	Model		
	(iv)	Service		
	(v)	Number		
	(vi)	Size		
	(vii)	Rating		
	(viii)	Test pressure		
	(ix)	Body material		
	(x)	gate material		
	(xi)	Sealing face material		
	(xii)	Shaft material		
	(xiii)	Gear Reducers :		
	(xiv)	Manufacturer		
	(xv)	Material		
	(xvi)	Flange Drilling standard		

7.6 Sluice Valve Actuators

S. No.	Item		Unit	Description
(a)		Sluice Valve Actuators		
	(i)	Manufacturer		
	(ii)	Type		

S. No.	Item		Unit	Description
	(iii)	Number		
	(iv)	Motor rating	kW	
	(v)	Design Torque	Kg-m	
	(vi)	Time for full open to full close	Min	
		(# Bidder to provide above details for each size, type of Valve, Actuator and Service)		

7.7 Sampling Pumps

S. No.	Item		Unit	Description
(a)		Manufacturer		
	(i)	Type		
	(ii)	Service/Location		
	(iii)	Quantity		
	(iv)	Capacity	m ³ /hr	
	(v)	Head	M	
	(vi)	Efficiency	%	
	(vii)	Power absorbed	kW	
	(viii)	Speed	Rpm	
	(ix)	Motor rating	kW	

7.8 Air-Conditioning Equipment

S. No.	Item		Unit	Description
(a)	Air-conditioner			
	(i)	Make		
	(ii)	Model		

S. No.	Item		Unit	Description
	(iii)	Type		
	(iv)	Capacity	TR	
	(v)	Quantity	nos.	
	(vi)	Motor Rating	kW	
(b)		Air-Ducting		
	(i)	Material		
	(ii)	Size		
	(iii)	Quantity		
	(iv)	Whether all the required accessories are provided	Yes/No	

7.9 Fire Fighting Pumps at Intake Well

S. No.	Item		Unit	Description
	vi)	Type of pump		
	vii)	Total Quantity (working + standby)	Nos.	
	viii)	Capacity of each Pump	m ³ /hr	
	ix)	Materials of Construction <ul style="list-style-type: none"> • Casing • Shaft • Impeller 	-	
	x)	Performance criteria <ul style="list-style-type: none"> • Efficiency of Pump • Motor KW & rpm • Noise level • Vibration level 		

8.0 Plant Guarantees**8.1 Plant Process Guarantees**

S. No.	Item		Unit	Description
(a)	Product Water Quality at all Feed Seawater Conditions			
	(i)	Faecal Coliforms: (Required counts 0 /100 ml)	Counts/ 100 ml	
	(ii)	Total Coliforms: (Required counts 0 /100 ml)	Counts/ 100 ml	
	(iii)	Residual Chlorine (Required >0.5 mg/L)	mg/L	
	(iv)	Trihalomethane (Required ≤ 0.25 mg/L)	mg/L	
	(v)	TDS (Required ≤ 450 mg/L)	mg/L	
	(vi)	Boron (Required < 1 mg/L)	mg/L	
	(vii)	Total Hardness (> 80 mg/l as CaCO ₃)	mg/l as CaCO ₃	
	(viii)	pH	6.5 – 8.0	
	(ix)	LSI		
(b)	Thickener Sludge/ Supernatant			
	(i)	Thickened Sludge solid concentration (Required within 3 -5%)	%	
	(ii)	Supernatant TSS: (Required <200 mg/L)	mg/L	
(c)	BFP Sludge/ Wash water			
	(i)	BFP Sludge solid concentration (Required $\geq 25\%$)	%	
	(ii)	Rate of washwater flow rate	m ³ /hr	
	(iii)	The solid constituents for landfill must meet the local and national regulatory discharge limit.	Yes/No.	

	(iv)	Wash water flow per ton of solid in feed	m ³ /ton of solid	
(d)	Wastewater discharge to sea			
	(i)	Max TSS	mg/L	
	(ii)	Max TDS	mg/L	
	(iii)	Max Iron	mg/L	
	(iv)	Max Arsenic	mg/L	
	(v)	Other metal ions	mg/L	
	(vi)	The wastewater constituents for sea discharge must meet the local and national regulatory discharge limit.	Yes/No.	

TECHNICAL SCHEDULE-3- INSTRUMENTATION CONTROL & AUTOMATION SYSTEM

(to be completed by the Bidder)

For 400 MLD Seawater Desalination Plant

Item	Unit	Description
General		
List of Collaboration Companies		
List of Long lead items		
Major OEM		
OEM's Origin		
Collaborating Companies scope briefly		
Detail Design Engineering Scope briefly (Collaborating Consultants / Companies)		
Distributed Control System		
Make		
Type / Model		
Origin		
Life Cycle		
Life Cycle expectancy		
Warranty details		
Service Support		
Collaborations (If any)		
Desalination SWRO reference		
DCS Desalination templates compatibility		
Technical Support		
Spares Support		
Software Details (List all software and brief functionality)		
License Details (Period, tags)		
Server Details		
Controller Details		

IO Details		
High-Level System Architecture		
Engineering Documentation		
Commissioning Collaboration		
Communication System		
Make		
Origin		
Life Cycle		
Life Cycle expectancy		
Communication (All levels), (Specify the type of communication, etc.)		
Communication Redundancy Scheme		
Communication Backbone Drawing		
Hardware Details		
FO Cable Details		
Condition Monitoring System		
Make		
Type / Model		
Origin		
Life Cycle		
Life Cycle expectancy		
Warranty details		
Service Support		
Collaborations (If any)		
Desalination SWRO reference		
Technical Support		
Spare Support		
Monitoring Analysis Software features		
License Details		
Field Sensor		
Data Interface equipment		

IO Details		
High-Level System Architecture		
Engineering Documentation		
Commissioning Collaboration		
Billing System		
Make		
Type / Model		
Origin		
Life Cycle		
Life Cycle expectancy		
Warranty details		
Service Support		
Collaborations (If any)		
Desalination SWRO reference		
Technical Support		

For 400 MLD Desalination Plant

Bidders are required to copy the schedule for different type of meters / analyser / items

Item	Unit	Description
Level Measuring System Make / Origin Accuracy Origin		
Ultrasonic Level Transmitter Make / Origin Accuracy Sensor type		
Conductivity type Level Switch Make Origin No. of electrodes Accuracy	Nos.	
Pressure Gauges Make / Origin Accuracy		

Item	Unit	Description
Over range Protection Blow out Protection Fill Fluid Process Connection Type		
Differential Pressure Measuring System Make / Origin Accuracy Manifold Sensor Type		
Open Channel Flow Measuring System Make / Origin Accuracy Sensor Type Sensor Mounting		
Electromagnetic Flowmeter Make / Origin Accuracy Electrode Types Grounding Electrode Type Accuracy for Potable Water Billing Flow meter		
Ultrasonic Flowmeter Make / Origin Accuracy Measurement Technology		
Insertion Type Flowmeter Make / Origin Accuracy Specific Application Area		
Turbidity Analyser Make / Origin Type Measurement Technology Calibration Methods / Type Calibration Frequency Reagents used if any Accuracy Debubbler Self-Diagnostics Features Light Source Cleaning Features		

Item	Unit	Description
Maintenance Features (Viper / Air) Mode of Sampling		
Ammonia Analyser Make / Origin Type Measurement Technology Calibration Method / Type Calibration Frequency Reagents used if any Mode of Sampling Accuracy		
TOC Analyser Make / Origin Type Measurement Technology Calibration Method / Type Calibration Frequency Reagents used if any Mode of Sampling Response Time Continuous Online Measurement / Semi-Automatic Measurement Accuracy		
Boron Analyser Make / Origin Type Measurement Technology Calibration Method / Type Calibration Frequency Reagents used if any Mode of Sampling Response Time Continuous Online Measurement / Semi-Automatic Measurement Accuracy		
Residual Chlorine Analyser Make / Origin Type Automatic temperature/pH compensation Measurement Technology Calibration Method / Type Calibration Frequency		

Item	Unit	Description
Reagents used if any Mode of Sampling Response Time Continuous Online Measurement / Semi-Automatic Measurement Accuracy		
SDI Measurement Make / Origin Type Measurement Technology Calibration Method / Type Calibration Frequency Reagents used if any Mode of Sampling Response Time Continuous Online Measurement / Semi-Automatic Measurement Automatic temperature/pH compensation Accuracy		
pH Measurement Make / Origin Type Buffer Measurement Technology Calibration Method / Type Calibration Frequency Reagents used if any Mode of Sampling Response Time Continuous Online Measurement / Semi-Automatic Measurement Automatic temperature/pH compensation Accuracy		
Temperature Measurement Make / Origin Sensor Type Accuracy		
Conductivity Measurement Make / Origin Sensor Type Accuracy		

Item	Unit	Description
Response Time		
Alkalinity Analyser Make / Origin Type Measurement Technology Calibration Method / Type Calibration Frequency Reagents used if any Mode of Sampling Response Time Continuous Online Measurement / Semi-Automatic Measurement Accuracy		
ORP Measurement Make / Origin Sensor Type Calibration Method / Frequency Accuracy Response Time		
TSS Measurement Make / Origin Type Automatic temperature/pH compensation Measurement Technology Calibration Method / Type Calibration Frequency Reagents used if any Mode of Sampling Response Time Continuous Online Measurement / Semi-Automatic Measurement Accuracy		
Rotameter Make Type Accuracy		
PLC, Instrument Control Panel with LCD touch screen, Power Supply, Switches, Pushbuttons etc.		

Item	Unit	Description
Make / Model		
Type		
LCD touch screen	mm	
Model	pixels	
Dimension	Nos.	
Definition		
Quantities		
PLC:		
Make / Model		
I / O modules	Nos.	
Model	Nos.	
Quantity approx. for:	Nos.	
Intake Works	Nos.	
Pretreatment	Nos.	
RO System	Nos.	
Post Treatment	Nos.	
Sludge Treatment	Nos.	
Substation		
Product water and CW Tanks		
Analogue Input modules	Nos.	
Model	Nos.	
Quantity approx. for:	Nos.	
Intake Works	Nos.	
Pretreatment	Nos.	
RO System	Nos.	
Post Treatment	Nos.	
Sludge Treatment	Nos.	
Substation		
Product water and CW Tanks		
Analogue output modules	Nos.	
Model	Nos.	
Quantity approx.. for:	Nos.	
Intake Works	Nos.	
Pretreatment	Nos.	
RO System	Nos.	
Post Treatment	Nos.	
Sludge Treatment	Nos.	
Substation		
Product water and CW Tanks	Nos.	
Communication module		

Section IV: Bidding Forms

TECHNICAL SCHEDULE-4-ELECTRICAL WORKS

For 400 MLD Desalination Plant

*Bidders are required to copy the schedule for different type of meters / analyser / items***33 kV Metal clad Switchgear**

Item	Unit	Description
Switchgear Reference Manufacturer Type reference Applicable standard		
Switchgear Details Rated voltage Rated short-time withstand current (1 second) Impulse withstand voltage Power frequency withstand voltage Busbar current rating Enclosure Protection	kV kA kV kV A IP	
Operating Mechanism Rated voltage of shunt trip coil Rating of shunt trip coil	V W	

3.3 KV Metal clad Switchgear

Item	Unit	Description
Switchgear Reference Manufacturer Type reference Applicable standard		
Switchgear Details Rated voltage Rated short-time withstand current (1 second) Impulse withstand voltage Power frequency withstand voltage Busbar current rating Enclosure Protection	kV kA kV kV A IP	
Operating Mechanism Rated voltage of shunt trip coil Rating of shunt trip coil	V W	

Power Transformers

Item	Unit	Description	
		Main	Auxiliary
Transformer Reference			
Manufacturer			
Applicable standard			
Transformer type designation			
Rated power	kVA		
Voltage ratio	kV		
Phases	No		
Frequency	Hz		
Minimum Impedance Voltage at 75°C	%		
Rated kVA on principal tap	kVA		
No load loss on principal tap	W		
Load loss on principal tap and rated kVA	W		
Dimensions- width	mm		
-height	mm		
- depth	mm		
Weight	kg		
Guaranteed maximum temperature rise over 50° C ambient			
(a) oil by thermometer	degrees C		
(b) winding by resistance	degrees C		

LV Switchgear and Control gear

Item	Unit	Description
Main Switchboard Reference		
Manufacturer/assembler		
Applicable standard		
Dimensions-width	mm	
-height	mm	
- depth	mm	
Enclosure protection rating	IP	for seconds

Item	Unit	Description
Busbar current rating	A	
Short-time withstand current for 1 Sec	kA	
Short circuit certifying authority		
Air Circuit Breakers		
Manufacturer		
Applicable standard		
Type designation	V	
Rated voltage	A	
Rated current	kA	for seconds
Short-time current and duration		
Fused Switches		
Manufacturer		
Applicable standard		
Type designation		
Motor Control Equipment		
Direct on line starters		
Manufacturer		
Rated voltage	V	
Type		

Provide details of each Control MCC/control panel proposed for the Works.

Filter Console and DAF Control Panels

Item	Unit	Description
Control panels Reference		
Manufacturer/assembler		
Applicable standard		
Dimensions - width	mm	
- height	mm	
- depth	mm	
Enclosure protection rating	IP	for seconds
Busbar current rating	A	
Short-time withstand current for	kA	

Item	Unit	Description
1 Sec Short circuit certifying authority		
Fused Switches Manufacturer Applicable standard Type designation		
Motor Control Equipment Direct on line starters Manufacturer Rated voltage Type	V	
PLC Manufacturer Applicable standard Type designation		

Provide details of each Control panel proposed for the Works.

Power Capacitors MV

Item	Unit	Description
Power Capacitors Reference Manufacturer Applicable standard Rating Voltage Frequency Connection Discharge resistors provided No of stages	kVAr V Hz Phase yes/no No	

Power Capacitors LV

Item	Unit	Description
Power Capacitors Reference		

Item	Unit	Description
Manufacturer		
Applicable standard		
Rating	kVAr	
Voltage	V	
Frequency	Hz	
Connection	Phase	
Discharge resistors provided	yes/no	
No of stages	No	

Power and Control Cables

Item	Unit	Description
33 kV Power Cables		
Manufacturer		
Applicable standard		
Conductors -	material	
cross-sectional area	mm ²	
Cable construction		
Armouring		
3.3 kV Power Cables		
Manufacturer		
Conductors -	material	
cross-sectional area	mm ²	
Cable construction		
Armouring		
650/1 100 V Power Cables		
Manufacturer		
Type		
Construction		
Standard		

Control Cables

Item	Unit	Description
Control Cables		
Manufacturer		
Applicable standard		
Type		
Construction		
Standard		

Cable Ladder and Tray

Item	Unit	Description
Cable Ladder		
Manufacturer		
Applicable standard		
Applicable standard		
Ladder type		
Duty		
Rung type	mm	
Ladder material	mm	
Ladder finish		
Ladder widths		
Ladder supports and fixings		
- type		
- material		
- finish		
Cable Tray		
Manufacturer		
Cable tray type		
Material		
Finish		
Tray widths	mm	
Cable tray supports and fixings		
- type		
- material		

Item	Unit	Description
- finish		

Uninterruptible Power Supply

Item	Unit	Description
Ups Details Manufacturer Type reference Rated output of UPS Mains input to static bypass switch (voltage and phases) UPS output (voltage and phases)	 kVA V/ phase V/ phase	
Battery Details Manufacturer Type reference Battery type Is battery maintenance free Is battery sealed or vented Minimum bridging time of system for each provided	 yes/no yes/no	

Battery and Battery Charger

Item	Unit	Description
Battery Charger Details Manufacturer Type reference Rated output of Battery Charger Mains input to static bypass switch (voltage and phases) Battery Charger output (voltage and phases)	 kVA V/ phase V/ phase	
Battery Details Manufacturer Type reference Battery type		

Item	Unit	Description
Is battery maintenance free	yes/no	
Is battery sealed or vented	yes/no	
Minimum bridging time of system for each provided		

415 V Non-Segregated Busducts

Item	Unit	Description
Manufacturer's name & address		
Applicable Standards		
Type of busduct		
Material and cross section of busbars	mm ²	
Rated voltage	Volts	
Maximum voltage at which busduct can operate continuously	Volts	
Continuous current rating of busbars	Amps	
Short circuit current ratings & duration	KA/Sec	
Momentary current rating (peak)	KA	
Temperature rise over the ambient temperature	°C	
Busbars	°C	
Enclosures		
Material of support insulators		
No. & arrangement of support insulators		
Material of gaskets		
One minute power frequency withstand voltage	KV	
Conductor Clearance		
Phase to phase	mm	
Phase to earth	mm	
Phase to Neutral	mm	
Average weight per meter of busduct	Kg	
Material & thickness of Busduct	mm	
Shape & size of enclosure	mm	

LIGHTING

Item	Unit	Description
Lighting distribution board Make Applicable standard Type of construction Degree of protection		
Lighting Panel Make Applicable standard Enclosure Degree of protection Indoor Outdoor		
Miniature Circuit Breakers Make Type designation Applicable standard Rated current, voltage Breaking capacity of 0.6 pf		
Isolator Make Type designation		
Fuses Make Type Applicable standard		
Conductor Make Type and duty Applicable standard		
Synchronous timer Make Type Applicable standard		
Lighting fixtures and Accessories Make of lighting fixtures & accessories Catalogue for each type of fixtures attached as Annexure No.		
Switches Make		

Item	Unit	Description
Type Catalogue attached as annexure No.: Applicable standard		
Receptacles/sockets Make Type Applicable standard		
Junction boxes Make Type Material Applicable standard		
Terminal Blocks Make Type Rating		
Rigid steel Conduits/Fittings & accessories Make Material Applicable standard		
Hume Pipes Make Applicable standard		
Flexible Steel standard Make Applicable standard		
Lighting wires Make Applicable standard		
Lighting Poles Make Applicable standard Type Pole height		
Lighting masts Make Type Overall height Applicable standard Catalogue attached as annexure no.		
Type test report & all items for station lighting enclosed as annexure no.		

MOTORS

Item	Unit	Description
Manufacturer & Country of origin		
Equipment Motor type (Sq. Cage/ Slip ring/DC etc.) Type of duty		
Frame size		
Applicable standard to which motor conforms		
Standard confirms rating at 50 deg. C ambient temperature		
Max. power input to the driven equipment at design duty point	KW	
Max. power input to the driven equipment over entire operating range (KW)(For HT motors only) (a)At rated speed (b)At 103 % speed		
Stator winding insulation (a) Class & type (b) Tropicalized (c) Temperature rise over specified ambient of 50 deg		
Direction of rotation as viewed from non driving end		
Full load current at rated voltage & frequency		
Power Factor at rated load		
Starting current at 100 % voltage 85 % voltage		
Torques (kg-meter) at Starting Pull-up Pull-out		

Item	Unit	Description
Type of Construction of rotor		
Rotor insulation		
Type of enclosure and method of cooling		
Degree of protection		
Rated voltage and frequency		
Efficiency at design duty point (with out -ve tolerance) Efficiency at 100 % full load		
Power factor at design duty point		
Type of mounting		
Type of terminal box for stator leads		
Bearing type DE NDE		
Type test certificates enclosed as Annexure No.:		

Please add an additional item as per contract.

TECHNICAL SCHEDULE-5-DESALINATION PLANT OPERATING DETAILS

(to be completed by the Bidder)

Item	Unit	Description
Maximum Feed Seawater Flow Rate	MLD	
Minimum Feed Seawater Flow Rate	MLD	
	MLD	
Product Flow Rate	MLD	
Product Flow Rate		
Electrical loads	kVA	
(1) Total connected load (Please provide details of the loads in excel sheet)	kVA	
(2) Maximum running load	kVA	
(3) Average running load	kW	
(4) Expected maximum demand for 20 minute period when the work is operating at full capacity	--	
(5) Average power factor		
Chemical usage	Tonnes/year	
(1) Hypochlorite for Shock Chlorination	Tonnes/year	
(2) Hypochlorite for Pre Chlorination	Tonnes/year	
(3) FeCl ₃ solution dosing (40%)	Tonnes/year	

Item	Unit	Description
(4) Anionic Polymer dosing (Food grade)	Tonnes/year	
(5) Cationic Polymer for Thickener (Non Food grade)	Tonnes/year	
(6) Cationic Polymer for BFP (Non Food grade)	Tonnes/year	
(7) Antiscalant	Tonnes/year	
(8) Sodium Bisulphite	Tonnes/year	
(9) Any other chemical for biofouling control	Tonnes/year	
(10) CO2 for remineralization	Tonnes/year	
(11) CaCO3 for remineralization	Tonnes/year	
(12) Hypochlorite for Post Chlorination	Tonnes/year	
(13) NaOH for pH adjustment pre/post RO system	Tonnes/year	
(14) Acetic Acid for CIP	Tonnes/year	
(15) HCL for CIP	Tonnes/year	
(16) NaOH for CIP	Tonnes/year	
(17) HCL for Neutralization after CIP	Tonnes/year	
(18) NaOH for Neutralization after CIP		
(19) Any other chemical		
	%/year	
	%/year	
Spares required per annum	%/year	
<i>(Contractor to furnish the details)</i>	%/year	
(1) Mechanical (percent of total mechanical items values)		
(2) Electrical (percent of total electrical items values)		
(3) Instrumentation (percent of total Instrumentation Items values)		
(4) Laboratory (percent of total laboratory items values)		

METHODOLOGY FOR BID EVALUATION

Under Clause 38 of ITB, the bid price for Capital and O&M costs shall be used and the following Methodology will be adopted to find the lowest evaluated cost of the plant. Only Price Bids of Technically Qualified bidders shall be evaluated.

a) Determination/Evaluation of Capital Cost

Total cost of the 400 MLD seawater desalination plant will be evaluated based on technical requirements as well as price quoted by each bidder.

b) Determination/Evaluation of O&M Cost of Plant

The procedure for evaluation of Operation Cost of Plant is as follows,

- The Bidder shall indicate the no. of units (KWH) of electrical energy consumption required for guaranteed performance of the Seawater Desalination Plant for full throughput of the rates quoted. Electrical energy cost within the quoted electrical energy consumption will be paid by the Employer directly or reimbursed later to the Contractor.
- The Bidder shall quote guaranteed quantity/rate of chemical and material consumptions for each year of the O & M period of twenty (20) years considering inflation (if so provided in quoted rates).
- The Present Value (PV) for all the material consumptions shall be calculated by the Employer for twenty (20) years of O & M. Additionally for the electrical energy consumption PV shall be calculated for twenty (20) years of O & M for comparison of different bids. The unit cost (Rs /KWH) of the electrical energy consumption as indicated in the Bid documents by the Employer will be taken for bid evaluation. The interest rate 8% per annum to be taken for (PV) calculations.
- The PV of the required operation cost for twenty (20) years of O&M of 400 MLD DSP to the Employer shall be calculated for each of the bidders.

c) Final Determination of bids

- Computed evaluated cost (a) and present worth (b) will be considered for comparison by differential and to determine the lowest evaluated bid.

TECHNICAL SCHEDULE-6-QUALITY ASSURANCE & QUALITY CONTROL PLAN

The Bidder shall provide copies of the company's standard rules and regulations regarding quality assurance and quality control procedures for works in general and works of a similar nature.

The Bidder shall provide its proposed Quality Assurance and Quality Control Plan in detail so as to demonstrate the procedures and tests that will be used to ensure that the quality concerns and requirements as set forth in Clause 3.8, Quality Assurance as given in Part 2, Particular Process Requirements are satisfactorily met.

The proposed plan will describe but not limited to:

- the type, frequency and procedure of tests to be done on sites
- type, frequency and procedure of tests to be done in pipe manufacturing units at site, if applicable
- type, frequency and procedure of tests to be done at manufacturers' locations outside the sites
- all parameters to be measured in these tests; permissible limits of such parameters; details of laboratories to be established at sites; details of testing equipment & machines and their calibration schedules
- details of the Bidder's internal systems for assuring quality control at the manufacturers' works outside the sites
- details of qualifications and experience of the Quality Control professionals to be deployed for the entire project
- the systems of Quality Audit to be instituted for systematic and professional management as well as adherence with the highest standards of quality of all construction works

All the tests of samples taken from the site are proposed to be done through recognized test houses of international standards and number of samples and frequency of sampling of materials brought to the site and the products manufactured at site shall be as per Specifications. All such samples shall be taken in the presence of Employer's authorized representatives or the Engineer.

The Bidder shall provide separate descriptions of its proposed QA/QC plan during the construction phase, and the subsequent operations and maintenance phase. This will be an initial QA/QC plan which will address to basic requirements of Quality control and Quality assurance of the works.

TECHNICAL SCHEDULE-7-ENVIRONMENTAL AND SOCIAL MANAGEMENT PLAN

The Bidder shall provide his Environmental and Social Management Plan (ESMP) in detail so as to demonstrate the procedures that will be used to ensure that the environmental and social concerns and requirements.

After award of contract and before start of work, Contractor shall review the available Environmental and Social Management Plan (ESMP) for the project available below with CMWSSB. The contractor shall duly update the ESMP to ensure compliance with all applicable legislation and regulations of State/ Central Government and also with JICA Environmental and Social guidelines. The ESMP shall incorporate the requirements stipulated in the Project's EIA Report and conditions of approval from State/ Centre Regulatory agencies. The ESMP shall also clearly define roles, responsibilities, reporting requirement and budgetary allocations for implementation of mitigation measures. The revised ESMP shall be submitted by the Contractor to CMWSSB for necessary approval before initiating any ground work.

The ESMP shall identify the potential environmental and social impacts from the various construction and operations and maintenance activities to be undertaken in the Contract and set out in detail the approach he will adopt in mitigating these impacts to ensure that the residual impacts are minor and confined to a short period.

While preparing the proposed ESMP the Bidder shall consider but not be limited to the following:

- The Bidder shall pay attention to the methods of materials delivery, storage, usage and disposal; equipment usage; and site activities to ensure they have minimal impact on the environment, workforce and community,
- The Bidder shall propose only environmentally safe products and practices in performing his works, and
- The Bidder shall comply with all the statutes regarding environmental and social impacts.

The Bidder shall provide separate descriptions of its proposals for minimizing any adverse environmental and social impacts/ effects during the construction phase and the subsequent operations and maintenance phase.

1. Environmental Management Plan for the Proposed DSP and associated Offshore Intake and Outfall Pipelines

S No.	Project-related Issues	Mitigation Measures to be taken	Responsibilities	
			Planning and Execution	Supervision/ Monitoring
A.	Pre-Construction Stage			
A.1	Assure compliance with relevant construction field legislation	All clearances required and Environmental and social aspects from other departments shall be ensured and made available before the start of work. Acquire construction permit and Provide Water management guidelines. The project requires Consent to Establish (CtE) under the Water and Air Act from the Tamil Nadu State Pollution Control Board.	CMWSSB/ Contractor	Project head/ Incharge CMWSSB
A.2	Utility Relocation	<ul style="list-style-type: none">Identify the common utilities that would be affected, such as telephone cables, electric cables, electric poles, water pipelines etc.,Affected utilities shall be relocated with prior approval of the concerned agencies before construction starts.Alternate temporary arrangement for crossing over shall be provided.	Planning - CMWSSB Execution - Contractor	Project head/ Incharge CMWSSB
A.3	Supply of Material and resources	Procurement of construction material only from permitted sites and licensed/ authorized quarries. Identify locally available resources/ materials and eco-friendly materials.	Contractor	Project head/ Incharge CMWSSB

S No.	Project-related Issues	Mitigation Measures to be taken	Responsibilities	
			Planning and Execution	Supervision/ Monitoring
A.4	Water	The Contractor will be responsible for arranging an adequate supply of water of the required quantity for the entire construction period. Groundwater extraction not permitted in the area. The contractor will minimize the wastage of water during construction.	Contractor	Project head/ Incharge CMWSSB
A.5	Appointment of Environment Health & Safety Officer	The contractor will appoint qualified and experienced Environmental Engineer, who will dedicatedly work and ensure implementation of EMP, including Occupational health and safety issues at the camp, construction work sites.	Contractor	Project head/ Incharge CMWSSB
A.6	Other Construction Vehicles, Equipment and Machinery	All vehicles, equipment and machinery to be procured for construction/ protection work will conform to the relevant Bureau of Indian Standard (BIS) norms/ CPCB standards. The discharge standards promulgated under the Environment Protection Act, 1986 and Motor Vehicles Act, 1988 will be strictly adhered to. Soundproof DG set as per regulations will be used at the project site. The contractor will maintain records of Pollution Under Control (PUC) certificates for all vehicles used during the contract period, which will be produced to the Project Implementation Unit for verification whenever required.	Contractor	Project head/ Incharge CMWSSB
A.7	Risk Assessment and preparation of management plans ²	Risk and hazards associated with different construction activities shall be identified by the contractor and accordingly management plans shall be prepared for implementation on site such as	Contractor	Project head/

S No.	Project-related Issues	Mitigation Measures to be taken	Responsibilities	
			Planning and Execution	Supervision/ Monitoring
		<ul style="list-style-type: none"> • Construction Labour Management Plan; • Traffic Management Plan; • Health and Safety Management Plan; • Construction material Management Plan; • Air pollution control Plan; • Construction Waste Management Plan; • Spillage Management Plan; • Marine environment Management Plan; • Tree plantation Programme; • Environmental Monitoring Plan including marine water and sediment quality monitoring; • Emergency Response Plan; and Construction Demobilization Plan. 		Incharge CMWSSB

S No.	Project-related Issues	Mitigation Measures to be taken	Responsibilities	
			Planning and Execution	Supervision/ Monitoring
A.8	Disaster Management Plan ¹	<p>The CMWSSB shall identify the key risks associated with each component/ activities for entire project life cycle (construction, operations, & decommissioning) and shall prepare Disaster Management Plan (DMP) for the proposed plant.</p> <ul style="list-style-type: none"> • Further the DMP for the plant should be synchronized with the district Disaster Management Plan (DMP) for off-site emergencies. • Contractor shall ensure the availability of required resources for the implementation of DMP at site and incapacitate local communities in handling disaster and emergency response 		Project head/ Incharge CMWSSB
A.9	Land Acquisition/ Resettlement & Rehabilitation (R&R)	<p>R&R issue is not involved in the proposed land. However, the site has tree plantation, which needs to be cleared.</p> <p>These trees to be cleared in accordance with the provisions given under Government order (G.O.157) dated 29.4.2016</p> <p>The plan is to be prepared for clearing the trees, i.e. cutting Schedules, coordination with the Forest Department and/ or, TN-Newsprint and Papers, Total value of the trees, Budget allocations, compensation to the landowner, auction systems and management of tree cutting for pulps, waste management, construction vehicle and equipment managements etc., for Perur DSP site.</p>	CMWSSB/ Prospective Tree cutting contractor	Project head/ Incharge CMWSSB

¹ Required approvals and permits is also need during operations and decommissioning phase therefore CMWSSB needs to ensure the required compliance

Sr. No.	Project Activity	Relevant Environmental components likely to be impacted	Nature of Impact	Likely Impacts and their significance in the absence of Mitigation Measures	Proposed Mitigation Measures	Responsibilities		
						Planning	Execution	Monitoring
B	Construction Phase							
B.1	Trenching for Intake and outfall pipelines	Marine water quality	Short Term, Localised, Reversible	<ul style="list-style-type: none">– Increase in turbidity affecting the Photosynthetic process affecting the aquatic productivity.– Suspended Particles will affect the filter feeders, and adult fish will migrate from	<ul style="list-style-type: none">– Check turbidity levels with baseline levels as a reference during the entire monitoring programme– Use of good engineering tools like cutter suction dredger for trenching to be used– Controlled method of dredging with the latest technology which will limit the plume generation– Discharge of waste into the sea will be prohibited	Contractor	Contractor	CMWSSB

Sr. No.	Project Activity	Relevant Environmental components likely to be impacted	Nature of Impact	Likely Impacts and their significance in the absence of Mitigation Measures	Proposed Mitigation Measures	Responsibilities		
						Planning	Execution	Monitoring
				the site of impact – Change in marine water quality due to aqueous discharges (oily waste, sanitary wastes) from dredgers, barges and workboats	Oil Spill control measures will be adopted – Ensure slop tanks will be provided to barges/ workboats for collection of liquid/ solid waste & Marine environmental monitoring program – Silt fences (Pollution Control Equipment) are utilized for controlling turbid water during the construction of trenches for the pipelines			
		Marine ecology	Short Term Localised Reversible	– Trenching will disturb the sea bed resulting in loss of seagrass beds	To complete the trenching works in the shortest duration. – Environmental education on the marine ecosystem as well			

Sr. No.	Project Activity	Relevant Environmental components likely to be impacted	Nature of Impact	Likely Impacts and their significance in the absence of Mitigation Measures	Proposed Mitigation Measures	Responsibilities		
						Planning	Execution	Monitoring
				and associated benthic communities – Boat movement and fishing activity will be restricted – The decrease in DO levels – Increase in noise levels – Removal of benthic communities – Increase in species	as the habitat of sea turtles to workers, labourers, and surrounding villagers. – Preparation of reports of Sea turtle sightings in and around the seashore in Perur to relevant official entities and NGOs. – Avoidance of installations of intake/ outfall pipelines during the sea turtles egg laying seasons. – Actions to be taken in cases where sea turtles are observed in and around the seashore in Perur such as to contact to relevant NGOs and official entities handling sea turtle			

Sr. No.	Project Activity	Relevant Environmental components likely to be impacted	Nature of Impact	Likely Impacts and their significance in the absence of Mitigation Measures	Proposed Mitigation Measures	Responsibilities		
						Planning	Execution	Monitoring
				diversity and density in areas adjoining dredging site – Smothering or blanketing of sub-tidal communities.	conservations and monitoring for getting necessary instructions. – Temporary suspension of the constructions for DSP. – Announcement of the existence of sea turtles to the contractor(s), construction workers/labourers and surrounding communities.			
		Mangrove area	Long Term Localised Non-Reversible	– Impact on nearby mangrove	– No mangroves were observed at the proposed project site The impact is not envisaged	Contractor	Contractor	CMWSSB
B.2	Seawater Intake head	Entrapment of fishes and other organisms	Continuou s	– Impact on Fish and Fish larvae	– Deep Water Intake having velocity cap and screen is proposed.	Contractor	Contractor	CMWSSB

Sr. No.	Project Activity	Relevant Environmental components likely to be impacted	Nature of Impact	Likely Impacts and their significance in the absence of Mitigation Measures	Proposed Mitigation Measures	Responsibilities		
		Entrainment of smaller organisms such as fish larvae.				Planning	Execution	Monitoring
B.3	Fishing	Fishermen and fishing travellers	Short Term Localised Reversible	<ul style="list-style-type: none"> Impact on fishing due to Construction works During the trenching for laying the submarine pipeline, the fisherman will 	<ul style="list-style-type: none"> The intake velocity is limited to 0.12 m/s The bar screen of 0.1 m width is to be installed <p>Above are the design consideration included in the project</p>	Contractor	CMWSSB	CMWSSB

Sr. No.	Project Activity	Relevant Environmental components likely to be impacted	Nature of Impact	Likely Impacts and their significance in the absence of Mitigation Measures	Proposed Mitigation Measures	Responsibilities		
						Planning	Execution	Monitoring
				not be allowed to cross over the areas where trenching is being done. This is a short term impact and completely reversible as there will not be any prohibition of fisherman crossing the areas above the path where the	<ul style="list-style-type: none"> fishermen aware of ongoing activities Necessary marker buoys will be installed Interactions will be initiated with a fishing community prior to commencement of construction Construction shall be limited to as per development plan. Proper Planning execution of offshore construction activities to ensure the completion of construction as per schedule Ensure slop tanks will be provided to barges/ workboats 			

Sr. No.	Project Activity	Relevant Environmental components likely to be impacted	Nature of Impact	Likely Impacts and their significance in the absence of Mitigation Measures	Proposed Mitigation Measures	Responsibilities		
						Planning	Execution	Monitoring
				submarine pipeline is laid	for collection of liquid/ solid waste – Trenching will be done only in small stretches, and so fishing activities can continue as normal in all other areas except where the active trenching/ laying of the pipeline is being done. There will not be any prohibition of fisherman crossing the areas above the submarine pipeline are laid below the sea bed.			
B.4	Outfall diffuser	Marine water quality	Continuous	– Increased Salinity	– Faster dilution of moderately high salinity levels to ambient levels.	Contractor	Contractor	CMWSSB

Sr. No.	Project Activity	Relevant Environmental components likely to be impacted	Nature of Impact	Likely Impacts and their significance in the absence of Mitigation Measures	Proposed Mitigation Measures	Responsibilities		
						Planning	Execution	Monitoring
					<ul style="list-style-type: none"> Brine diffuser with high brine diffusion efficiency has been proposed. Monitoring of marine water quality for timely action during exceedance of specified value. 			
		Chlorine concentration		<ul style="list-style-type: none"> Chlorine concentration to be maintained below 0.2 ppm 	<ul style="list-style-type: none"> Chlorine dosing rate to intake seawater is designed for elimination of marine growth at intake and inside pipeline. Residual Cl₂ concentration will be approximately 0.2 ppm at the outlet of the pre-treatment system by consuming Cl₂ in the intake and pre-treatment processes. 			

Sr. No.	Project Activity	Relevant Environmental components likely to be impacted	Nature of Impact	Likely Impacts and their significance in the absence of Mitigation Measures	Proposed Mitigation Measures	Responsibilities		
						Planning	Execution	Monitoring
					<ul style="list-style-type: none"> To protect the RO membrane from chlorine attack, Sodium Bisulphite (SBS) is injected for removing Cl₂ at the inlet of the RO membrane. Accordingly, the brine has no chlorine as calculated in the above equation. RO reject contains an excess SMBS which can reduce the Cl₂ concentration in the discharge. During regular operation, the Cl₂ concentration of the discharge from DSP can be maintained less than 0.2 ppm. 			

Sr. No.	Project Activity	Relevant Environmental components likely to be impacted	Nature of Impact	Likely Impacts and their significance in the absence of Mitigation Measures	Proposed Mitigation Measures	Responsibilities		
						Planning	Execution	Monitoring
B.5	Vehicle movement	Air quality	Short Term Localised Reversible	<ul style="list-style-type: none"> Negative Impact of Air quality 	<ul style="list-style-type: none"> Periodic inspection of exhaust gases of dump trucks, other trucks and heavy equipment to be used. Water spraying for heavy vehicles, equipment and trucks operation on-site in dry season to avoid dust uplift and air pollution. Trucks carrying construction material/ demolition debris to be adequately covered to avoid the dust pollution and to avoid the material spillage; The contractor shall ensure that batching plant has closed 	Contractor	Contractor	CMWSSB

Sr. No.	Project Activity	Relevant Environmental components likely to be impacted	Nature of Impact	Likely Impacts and their significance in the absence of Mitigation Measures	Proposed Mitigation Measures	Responsibilities		
						Planning	Execution	Monitoring
					belt conveyor; – DG set shall have adequate stack height as per TNPCB requirement; – Excavated soil shall be covered to avoid dust emissions.			
B.6	Manpower for Construction works	Water Quality	Short Term Localised Reversible	– Negative Impact of water quality	– Construction office will be provided with an adequate number of toilets as per labour laws and connected with a septic tank or modular STP for treatment of wastewater.	Contractor	Contractor	CMWSSB

Sr. No.	Project Activity	Relevant Environmental components likely to be impacted	Nature of Impact	Likely Impacts and their significance in the absence of Mitigation Measures	Proposed Mitigation Measures	Responsibilities		
						Planning	Execution	Monitoring
					<ul style="list-style-type: none"> Once the construction is over, Septic tank to be removed and closed. 			
B.7	Noise and Vibration	Noise Quality	Short Term Localised	<ul style="list-style-type: none"> Negative Impact of noise quality 	<ul style="list-style-type: none"> PPEs to be provided to all labours working at the site. Servicing of all vehicles and machinery shall be done regularly as per the manufacturer's guidelines and during routine servicing operations, the effectiveness of exhaust silencers will be checked and if found defective will be replaced. Batching plant shall be located minimum 1 km away from the nearby settlement and noise barriers shall be provided 	Contractor	Contractor	CMWSSB

Sr. No.	Project Activity	Relevant Environmental components likely to be impacted	Nature of Impact	Likely Impacts and their significance in the absence of Mitigation Measures	Proposed Mitigation Measures	Responsibilities		
						Planning	Execution	Monitoring
					<p>around batching plant in case of nearby settlement is located much closer to the batching plant site;</p> <ul style="list-style-type: none"> – DG set shall have acoustic enclosure. – Maintenance of vehicles, equipment and machinery shall be regular and up to the satisfaction of the Engineer to keep noise levels at the minimum. – The contractor should maintain the proper records for all the constructions vehicles and have the valid fitness certificate, NOC, insurance etc. 			

Sr. No.	Project Activity	Relevant Environmental components likely to be impacted	Nature of Impact	Likely Impacts and their significance in the absence of Mitigation Measures	Proposed Mitigation Measures	Responsibilities		
						Planning	Execution	Monitoring
					<ul style="list-style-type: none"> The construction activities shall be carried out in a planned manner restricting high noise generating construction activities only during daytime; Acoustic measures to be provided to reduce noise propagation to noise generating machinery during operations. Regular monitoring shall be conducted at site during operations. 			
B.8	Solid waste management	Soil Quality	Short Term Localised Reversible	– Impacts due to disposal of solid waste	– Periodical de-sludge activities for toilets in construction sites	Contractor	Contractor	CMWSSB

Sr. No.	Project Activity	Relevant Environmental components likely to be impacted	Nature of Impact	Likely Impacts and their significance in the absence of Mitigation Measures	Proposed Mitigation Measures	Responsibilities		
						Planning	Execution	Monitoring
					<p>by the use of public services or by the service providers.</p> <ul style="list-style-type: none"> Waste oil (from hydraulic systems, etc.) collection and treatment by solid waste collection companies. Storage at DSP site to be provided with secondary containment (Dike) for avoiding any spillages. Surplus soil management by back-filling. Being a greenfield project, Construction waste and debris waste generation are minimal. The minor quantity generated will be utilized within the DSP for various construction works 			

Sr. No.	Project Activity	Relevant Environmental components likely to be impacted	Nature of Impact	Likely Impacts and their significance in the absence of Mitigation Measures	Proposed Mitigation Measures	Responsibilities		
						Planning	Execution	Monitoring
B.9	Handling of Hazardous Waste	Human safety and property loss	Short Term Localised	<ul style="list-style-type: none"> Fire accidents due to hazardous material handling 	<ul style="list-style-type: none"> Hazardous materials such as lubricants, paints, compressed gases, varnishes etc., will be stored and disposed of as per the Hazardous Wastes (Management, Handling) Rules 2016 India Hazardous wastes will be disposed off through approved TNPCB/ CPCB authorised recycler/ disposal .agency. Copy of the agreement should be maintained with inventories. 	Contractor	Contractor	CMWSSB

Sr. No.	Project Activity	Relevant Environmental components likely to be impacted	Nature of Impact	Likely Impacts and their significance in the absence of Mitigation Measures	Proposed Mitigation Measures	Responsibilities		
						Planning	Execution	Monitoring
					<ul style="list-style-type: none"> Regular audit of hazardous waste generated and records and records A suitable site should be identified for the safe storage and handling of chemicals and other hazardous materials with paved surface and proper display of requirements and marking as protected area. Secondary containment shall be provided for hazardous chemicals such as diesel, lubricants, paints etc. 			

Sr. No.	Project Activity	Relevant Environmental components likely to be impacted	Nature of Impact	Likely Impacts and their significance in the absence of Mitigation Measures	Proposed Mitigation Measures	Responsibilities		
						Planning	Execution	Monitoring
					<ul style="list-style-type: none"> Material safety data sheets (MSDS) of all the hazardous chemicals shall be properly displayed at storage areas as well as handling areas. 			
B.10	Transportation of Construction material and mobilization of construction machinery and vehicular movement within site ⁴			–	<ul style="list-style-type: none"> Contractor shall ensure that traffic management plan for onsite and offsite vehicular movement is in place to the satisfaction of the CMWSSB Engineers; Routes for use by construction traffic within site to be planned with proper signage to minimize encountering of construction workers with vehicles. The routes for movement of heavy 	Contractor	Contractor	CMWSSB

Sr. No.	Project Activity	Relevant Environmental components likely to be impacted	Nature of Impact	Likely Impacts and their significance in the absence of Mitigation Measures	Proposed Mitigation Measures	Responsibilities		
						Planning	Execution	Monitoring
					<p>machinery shall be designated to avoid the soil compaction in other areas;</p> <p>– All vehicles deployed at site shall be pollution under control (PUC) certified;</p> <p>– Holding area shall be provided within the site for vehicles waiting to deliver loads at site so as to avoid queuing outside the site;</p> <p>– Proper clearance to be obtained from the concerned authorities and sent to the CMWSSB before commencement of works;</p>			

Sr. No.	Project Activity	Relevant Environmental components likely to be impacted	Nature of Impact	Likely Impacts and their significance in the absence of Mitigation Measures	Proposed Mitigation Measures	Responsibilities		
						Planning	Execution	Monitoring
					<ul style="list-style-type: none"> Modern machineries such as JCBs, backhoes etc., shall be used to increase work efficiency and minimize the construction period. Regular maintenance shall be done. 			
B.11	Barricading site			–	<ul style="list-style-type: none"> Contractor shall ensure that the construction area is barricaded properly. The construction site should be barricaded at all time in with adequate marking, flags, reflectors etc. to isolate it from other operating areas. Barricading the onshore pipeline route prior to construction activities. 	Contractor	Contractor	CMWSSB

Sr. No.	Project Activity	Relevant Environmental components likely to be impacted	Nature of Impact	Likely Impacts and their significance in the absence of Mitigation Measures	Proposed Mitigation Measures	Responsibilities		
						Planning	Execution	Monitoring
B.12	Site preparation-excavation and levelling			–	<ul style="list-style-type: none"> Disturbance to land surface contours to be kept to minimum. Contractor shall try to maintaining the natural drainage pattern existing onsite; Adequate drains and slopes to be laid across the proposed Project site prior to start of excavation work to ensure adequate cross drainage. 	Contractor	Contractor	CMWSSB
B.13	Top Soil Protection			–	<ul style="list-style-type: none"> Topsoil removed prior to commencement of construction activities shall be stored separately, protected and reused for landscape 	Contractor	Contractor	CMWSSB

Sr. No.	Project Activity	Relevant Environmental components likely to be impacted	Nature of Impact	Likely Impacts and their significance in the absence of Mitigation Measures	Proposed Mitigation Measures	Responsibilities		
						Planning	Execution	Monitoring
					<p>development within the project area.</p> <ul style="list-style-type: none"> Land disturbance shall be restricted to the footprint of the Project components and remaining area will be kept undisturbed to the extent possible. All excavations should be closed before the start of rainy season. 			
B.14	Storage of construction material			–	<ul style="list-style-type: none"> Contractor shall identify designated covered area for storage of construction material with proper marking and measures to avoid dust emissions. 	Contractor	Contractor	CMWSSB

Sr. No.	Project Activity	Relevant Environmental components likely to be impacted	Nature of Impact	Likely Impacts and their significance in the absence of Mitigation Measures	Proposed Mitigation Measures	Responsibilities		
						Planning	Execution	Monitoring
					<ul style="list-style-type: none"> Construction material stored in open shall be covered in order to avoid wind-blown dust emissions. 			
B.15	Removal of temporary construction structures and demobilization of construction machinery			–	<ul style="list-style-type: none"> Contractor to prepare site restoration plans, the plan is to be implemented by the contractor prior to demobilization. On completion of the works, all temporary structures will be cleared away, all rubbish cleared, excreta or other disposal pits or trenches filled in and effectively sealed off and the site left clean and tidy, at the contractor's expenses, 	Contractor	Contractor	CMWSSB

Sr. No.	Project Activity	Relevant Environmental components likely to be impacted	Nature of Impact	Likely Impacts and their significance in the absence of Mitigation Measures	Proposed Mitigation Measures	Responsibilities		
						Planning	Execution	Monitoring
					to the entire satisfaction of the engineer			
B.16	Compliance to Permits			–	Contractor shall ensure all compliance conditions given in CRZ clearance, Consent to Establish are compiled and compliance monitoring reports are submitted to agencies on regular basis.	Contractor	Contractor	CMWSSB
B.17	Chance found archaeological property	–	–	–	All fossils, coins, articles of value of antiquity, structures and other remains or things of geological or archaeological interest discovered on the site shall be the property of the Government and shall be dealt	Contractor	Contractor	CMWSSB

Sr. No.	Project Activity	Relevant Environmental components likely to be impacted	Nature of Impact	Likely Impacts and their significance in the absence of Mitigation Measures	Proposed Mitigation Measures	Responsibilities		
						Planning	Execution	Monitoring
					<p>with as per provisions of the relevant legislation.</p> <p>— The contractor will take reasonable precautions to prevent his workmen or any other persons from removing and damaging any such article or thing. He will, immediately upon discovery thereof and before removal, acquaint the Engineer of such discovery and carry out the SC's instructions for dealing with the same, waiting which all work shall be stopped.</p> <p>— The Engineer will seek direction from the Archaeological Survey of</p>			

Sr. No.	Project Activity	Relevant Environmental components likely to be impacted	Nature of Impact	Likely Impacts and their significance in the absence of Mitigation Measures	Proposed Mitigation Measures	Responsibilities		
						Planning	Execution	Monitoring
					India (ASI) before instructing the Contractor to recommence the work at the site			
C	Operation Phase							
C.1	Potable water production	Water Quality	Localised Reversible	– Impact on offshore water quality	– Periodical maintenance of Screens, Lamella, DAF, DMF, Membrane, CIP systems of DSP operation, filter backwashing, Belt filter press washing and Sewage Treatment Plant (STP) based on relevant O&M manuals and instructions of such facilities.	O&M Contractor	O&M Contractor	CMWSSB
		Noise Quality	Localised Reversible	– Due to the operation of Blowers, DG sets	– Provision of acoustic enclosures for equipment – Personal Protecting Equipment (PPE).			

Sr. No.	Project Activity	Relevant Environmental components likely to be impacted	Nature of Impact	Likely Impacts and their significance in the absence of Mitigation Measures	Proposed Mitigation Measures	Responsibilities		
						Planning	Execution	Monitoring
		Ecosystem	Localised Reversible	—	<ul style="list-style-type: none"> Chlorine from DSP shall be maintained less than 0.2 ppm at diffuser of the outfall. Implementation of environmental education on the marine ecosystem as well as the habitat of sea turtles to workers and labourers in DSP, and surrounding villagers. Preparation of reports of Sea turtle sightings in and around the seashore in Perur to relevant official entities and NGO. Collaboration and consultation with other plants in the vicinity for conservation 			

Sr. No.	Project Activity	Relevant Environmental components likely to be impacted	Nature of Impact	Likely Impacts and their significance in the absence of Mitigation Measures	Proposed Mitigation Measures	Responsibilities		
						Planning	Execution	Monitoring
					activities as directed by Government authorities time-to-time.			
C.2	Compliance to Permits			–	– Contractor shall ensure all compliance conditions given in CRZ clearance, Consent to Operate are compiled and compliance monitoring reports are submitted to agencies on regular basis.	Contractor	Contractor	CMWSSB

The approvals and permits are also needed during operations and decommissioning phase therefore CMWSSB needs to ensure the required compliance.

2. ENVIRONMENTAL MONITORING PLAN (EMoP)

The environmental monitoring program helps in signaling the potential problems resulting from the proposed project activities and will allow for prompt implementation of corrective measures. The environmental monitoring will be required during both construction and operational phases. The following parameters are proposed to be monitored by prospective Contractor.

- Terrestrial Water Quality (Ground water and Surface water)
- Air Quality
- Noise Intensity
- Soil Quality
- Marine Water Quality
- Marine Ecological Monitoring
- Marine Sediment Quality

Environmental monitoring during the pre-construction phase is important to set up the baseline data and to predict the deviation from baseline data and adverse impacts during construction and operations phases.

Pre-construction phase baseline monitoring for all the aforesaid monitoring parameters are required to be carried out by the prospective contractor for 3 month duration.

The results of monitoring will be required to be provided to JICA on a quarterly basis during the construction phase and biannually during the operation of the desalination plant until the two years after the completion of the project.

3.1 Environmental Monitoring Plan

Environmental Item	Monitoring Item	Location	Frequency	Responsible Organization
Construction Phase				
Air Pollution*	Visual inspection of discharge conditions of exhaust gases (such as black smoke) of dump trucks, other trucks and heavy equipment and maintenance of the inspection logbook.	Construction site	Daily	Contractors

Environmental Item	Monitoring Item	Location	Frequency	Responsible Organization
	<ul style="list-style-type: none"> Visual inspection on soil dust diffusions in dry season for water spraying. 	Construction site	Daily (Dry Season only)	Contractors
Water Quality	<ul style="list-style-type: none"> Visual inspection of sewage water leakage (overflow), bad odour, the emergence of vector flies and de-sludge activities for the on-site toilets 	Construction site	Once/month	Contractors
	<ul style="list-style-type: none"> Checking Turbidity levels with baseline levels turbid water in the sea during installations of intake/outfall pipelines 	Intake/outfall installation sea areas	Daily for the installation period	Contractors
Wastes	<ul style="list-style-type: none"> Waste composition, quantity, transportation and treatment methods 	Construction site	Once/month	Contractors
Soil Contamination	<ul style="list-style-type: none"> Visual inspection of leakage conditions of oil and fuel leakages (from Engine, hydraulic power units and fuel tanks) of dump trucks, other trucks and heavy equipment 	Construction site	Daily	Contractors
Noise and Vibration*	<ul style="list-style-type: none"> Visual inspection (common sensation) of silencer conditions of dump trucks, other 	Construction site	Daily	Contractors

Environmental Item	Monitoring Item	Location	Frequency	Responsible Organization
	trucks and heavy Equipment			
Ecosystem	<ul style="list-style-type: none"> Visual inspection on turbid water in the sea during installations of intake/outfall pipelines 	Intake/outfall installation sea areas	Daily for the installation period	Contractors
	<ul style="list-style-type: none"> Implementation of environmental education on the marine ecosystem and sea turtles. 	Construction site and surrounding communities	Twice/year	Contractors/ CMWSSB
	<ul style="list-style-type: none"> Information on Sea turtle sightings in and around the seashore in Perur 	Construction site	In the event of Sightings	Contractors/ CMWSSB
	<ul style="list-style-type: none"> Actions on sea turtle sighting (construction suspensions periods, records of the announcements and relevant entities contacted) taken by CMWSSB 	Construction site and surrounding communities	In the event of Sightings	CMWSSB
Land Acquisition/ /Resettlement	<ul style="list-style-type: none"> Implementation of tree cutting action plan (Pre-Construction Stage) 	Construction site	Once/week	Contractors/ CMWSSB
Living and Livelihood	<ul style="list-style-type: none"> Checking Turbidity levels with baseline levels turbid water in the sea during installations of intake/outfall pipelines 	Intake/outfall installation sea areas	Daily for the installation period	Contractors

Environment al Item	Monitoring Item	Location	Frequency	Responsible Organizati on
	<ul style="list-style-type: none"> · Pipelines installation schedules · Installation (Construction) Management 			
Social Infrastructure and Services	<ul style="list-style-type: none"> · Implementation of construction vehicle management plans 	Constructi on site	Daily	Contractor s
	<ul style="list-style-type: none"> · Implementation of meetings with communities 	Constructi on site and surroundin g communiti es	Where necessar y	CMWSSB / Contractor s
Risk of infectious diseases such as HIV/ AIDS	<ul style="list-style-type: none"> · Implementation of Health and Sanitation education on STD. 	Constructi on site and surroundin g communiti es	Once/ year	
Working Conditions/ Work Safety	Visual inspection on the utilization of PPE by workers/labours	Constructi on site	Daily	CMWSSB/ Contractors
Accidents	Implementation of Traffic safety education	Constructio n site and surroundin g Communiti es	Once/ year	CMWSSB/ Contractor s
General Environment [#]	Site conditions	Constructio n site and the coast	Every year	CMWSSB

Environmental Item	Monitoring Item	Location	Frequency	Responsible Organization
Operational Phase				
Water Quality	Water quality of Raw seawater and Potable water in DSP	DSP	Daily	DSP Operator
	Concentration of Brine diffusion	Seawater at the nearest beach	Daily	DSP Operator
	· Visual inspection of sewage leakage (overflow), bad odour, the emergence of vector flies of Sewage Treatment Plant (STP)	DSP	Once/month	DSP Operator
	· Operational Inspection in accordance with instructions on the STP as suggested by the STP construction sub-contractor including Inlet and outlet quantity and quality monitoring	DSP	Daily	DSP Operator
Ecosystem	· Implementation of Meetings on environmental education.	DSP and surrounding communities	Once/year	DSP Operator/ CMWSSB
	· Information on Sea turtle sightings in and around the seashore of Perur	DSP and surrounding communities	In the event of Sightings	DSP Operator/ CMWSSB
	Actions (Records of the announcements and	DSP and surrounding	In the event of	CMWSSB

Environment al Item	Monitoring Item	Location	Frequency	Responsible Organizati on
	relevant entities contacted) taken by CMWSSB	g communiti es	Sightings	

Note # - A close and continuous monitoring during construction phase through reputed institutions such as NCSCM, Anna University, Chennai/ NIOT, Chennai/ IIT Madras to review the mitigation measures periodically and to take mitigation measures in the event of any adverse impacts to the coast.

It stipulates the post-clearance monitoring, which is required to be submitted half-yearly compliance reports in respect of the stipulated terms and conditions of the clearance to regulatory authorities i.e., MoEF & CC and TNPCB. The monitoring activities specified in CRZ clearances are furnished in tables below:

3.2 Monitoring Activities requested by CZMAs

CZMA	Monitoring Activity	Frequency
Kancheepuram District (KDCZMA)	Post-project marine quality Including water quality and biological characteristics	Continuous
	Marine biodiversity	Twice in a year
	The concentration of toxic trace metals in the reject water	Periodical
	A moored data buoy shall be maintained in the vicinity of the effluent discharge to continuously monitor the changes in the selected physicochemical parameters (salinity, temperature, DO, current, etc.).	Periodical during the construction and operation phases
	The high salinity rejects water may be periodically monitored for the physiochemical and toxic trace metal contents through appropriate standard procedures.	Periodical
Tamil Nadu State (TNSCZMA)	Marine water at the outfall area	Every Quarter
	Periodical report on the site conditions to take mitigation measures on the event of any adverse impacts on the coast	Every Year
	Impact on the corals*, marine organisms, Turtle nesting etc. should be evaluated and monitored	Not specified

	through experts (ecologists).	
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3.3 Marine Environmental Monitoring proposed in EIA Report

Marine environmental monitoring activities of Seawater & Sediment Quality, Marine Benthic Fauna, and Intake Seawater outfall have been proposed as shown in Table below

Monitoring	Purpose	Parameter	Frequency
Seawater & Sediment Quality	To monitor impacts on seawater and sediment quality	Measurements of levels of nutrients and heavy metals in water and sediment samples collected from sides at risk of pollution	Each season: April (Fair Weather), July (SW monsoon) and November (NE monsoon)
Marine Benthic Fauna	To determine the composition and distribution of major groups of fauna	Benthic fauna composition in the water outfall region	Each season as indicated above
Intake	To determine the incidence of entrapment and mortality of marine fauna	Screens on pump stations and the effectiveness of management measure	Each season as indicated above
	To determine the impact of entrainment within and external ponds/storage sump/well to assess the loss of fishery	Record an abundance of fauna within the pond/storage sump/well	Each season as indicated above
Seawater outfall	To determine the effect of increased temp/salinity on the plankton	Monitor abundance and distribution of both phytoplankton and zooplankton near the outfall	Each season as indicated above
		Monitor abundance and distribution of benthic animal communities near the outfall	Each season as indicated above

3. ENVIRONMENTAL SAMPLING AND ANALYSIS PROGRAMME

The following Environmental sampling program shall be carried out as a minimum requirement by the Bidder before the commencing construction activity. Bidder to submit the Approach and methodology of environmental monitoring to Employer's representative for review and approval.

Bidder shall submit results of the Sampling program to the Employer's representative for approval. The initial environmental monitoring shall be carried for a duration of three months. Thereafter during construction period monthly reports to be submitted to Employer's representative. The consolidated six-monthly reports are required to be submitted to MoEF &CC and TNPCB as part of regulatory compliance.

SAMPLING PROGRAM – PART A

A1. AMBIENT AIR QUALITY

Parameters	No. of Locations	Frequency of monitoring per week (days)	Total Samples per week	Total samples per Month	Method
SO ₂ (24 hrly)	5	2	10	40	West and Gaeke
NO _x (24 hrly)	5	2	10	40	Arsenite modified J and H
RSPM 10µm (24 hrly)	5	2	10	40	HVS
PM 2.5µm (24 hrly)	5	2	10	40	HVS with cyclone
CO (8 hourly)	5	2	10	40	As per MOEF Guidelines
Volatile organic compounds (VOCs) 24 hourly	5	2	10	40	As per MOEF Guidelines
Hydro carbon (HC) 24 hourly	5	2	10	40	Gas Chromatographer

A2. METEOROLOGY

Parameter	No. of Location	Frequency	Days	Total samples per Month	Method
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<ul style="list-style-type: none"> - Wind speed - Wind direction - Relative humidity - Temperature, - Rainfall 	1	1 hourly continuous	Monthly	1	Automatic weather station and as per IMD specification & MoEF Guidelines
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A3. NOISE LEVEL

Parameters	No. of locations and Frequency	Minimum no. of sample per month
Equivalent noise level (Leq) for day time and night time (Ld, Ln, and Ldn).	5 locations & hourly intervals at each location	5

A4. WATER QUALITY

Parameters	No. of Location	Frequency	Minimum No. of samples per month
(As per IS 10500) Colour, Odour, Temp, pH, turbidity, Total Hardness (Mg & Ca), TDS, total alkalinity, chloride, sulphate, nitrate, fluoride, Na, K, Calcium, Magnesium, phenolic compounds, Mineral oil, Cyanides, Anionic detergents, Residual chorine, Boron, Cadmium, Arsenic, Copper, Lead, Manganese, Iron, Chromium VI, Selenium, Zinc, Aluminium, Mercury, Pesticides, Total coliform, E-coli	2 groundwater + 3 surface water	5	5

A5. SOIL QUALITY

Parameters	No. of Location and Frequency	Frequency	Total No. of samples per month
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Bulk density, Salinity, Porosity, Texture Class (Percent wise silt, clay & sand), pH, Electrical conductivity, Cation exchange capacity, Sodium, Potassium, Nitrogen, Magnesium, Phosphorous, Sodium Absorption Ratio (SAR), Water holding capacity, Iron, Copper, Zinc, Manganese, Nickel, Permeability, physiochemical analysis and relevant metals.	5	Monthly	5
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Note: Soil samples shall be collected from three different depths, i.e., 30 cm, 60 cm and 90 cm and homogenized samples to be used for analysis.

SAMPLING PROGRAM – PART B

B1. MARINE WATER QUALITY:

Sr. No.	Parameters	Number of Locations	Minimum Number of Samples per month
1.	Salinity	5	5
2.	Electrical Conductivity		
3.	Temperature		
4.	Turbidity		
5.	Suspended Solids		
6.	pH		
7.	Dissolved Oxygen (DO)		
8.	Biological Oxygen Demand (BOD)		
9.	Nitrates as NO ₃ -2		
10.	Ammonical Nitrogen		
11.	Nitrites as NO ₂ -2		
12.	Total Nitrogen		
13.	Inorganic Phosphate		
14.	Total Phosphate		
15.	Silicates		
16.	Phosphates as PO ₄ -2		
17.	Chlorides as Cl-		
18.	Sulphates as SO ₄ -2		

Sr. No.	Parameters	Number of Locations	Minimum Number of Samples per month
19.	Total Nitrogen		
20.	Heavy Metals		
20.1	• Zinc		
20.2	• Mercury		
20.3	• Cadmium		
20.4	• Lead		
20.5	• Copper		
20.6	• Iron		
21.	Oil and Grease		
22.	TOC/DOC		
23.	Petroleum Hydrocarbons		

B2. SEDIMENT QUALITY:

The sediment samples will be collected using a suitable grab. After collection, the samples shall be sieved and subjected to Physico-chemical analysis. The samples collected will be tested for the following parameters:

Sr. No.	Parameters	Number of Locations	Minimum Number of Samples per month
1.	pH	4 & 1 from dredged material during project construction	5
2.	Texture		
3.	Oil & Grease		
4.	Petroleum Hydrocarbons		
5.	Organic Matter		
6.	Total Volatile Solids		
7.	Chlorides as Cl-		
8.	Phosphates as PO ₄ -2		
9.	Nitrites as NO ₂ -2		
10.	Nitrates as NO ₃ -2		
11.	Sulphates as SO ₄ -2		
12.	Sodium		
13.	Potassium		
14.	Magnesium		
15.	Total Kjeldahl Nitrogen		
16.	Heavy Metals		
16.1	Zinc		

Sr. No.	Parameters	Number of Locations	Minimum Number of Samples per month
16.2	Nickel		
16.3	Cadmium		
16.4	Copper		
16.5	Lead		
16.6	Mercury		
16.7	Iron		

B3. BIOLOGICAL PARAMETERS:

The marine water and sediment samples shall be collected as analyzed for the following biological parameters:

B3.1 List of Biological Parameters for Marine Water Samples

Sr. No.	Parameters	Number of Locations	Minimum Number of Samples per month
1.	Primary Productivity	5	5
2.	Chlorophyll -a		
3.	Phaeophytin		
4.	Total Biomass		
5.	Oxidizable particulate organic carbon		
6.	Phytoplanktons		
6.1	Abundance		
6.2	Number and name of groups		
6.3	Total number and name of the species of each group present		
6.4	Density (total numbers of individual species present)		
6.5	Total biomass		
7.	Zooplanktons		

Sr. No.	Parameters	Number of Locations	Minimum Number of Samples per month
7.1	Abundance		
7.2	Number and name of groups		
7.3	Total number and name of the species of each group present		
7.4	Density (total numbers of individual species present)		
8.	Bacteriological parameters		

B3.2 List of Biological Parameters for Sediment Samples

Sr. No.	Parameters	Number of Locations	Minimum Number of Samples per month
1.	Benthic Organisms	5	5
2.	Meio fauna		
3.	Microfauna		
4.	Macrofauna		
5.	Abundance		
6.	Number and name of each group present		
7.	Total number and name of species of each group present		
8.	Density (total numbers of individuals of each species)		

4. PROPOSED MONITORING FORMS

The template of Environmental Monitoring Forms which are to be required to be used during pre-construction stage, Construction stage and Operation phase of the project are furnished in Tables below.

4.1 Pre-Construction Phase (Tree cutting)

The latest results of the below-monitoring items shall be submitted to the lenders as part of the Progress Report throughout the pre-construction phase.

5.1.1 Air Pollution

-Exhaust Gases

Date	Type of Construction Vehicles/ Equipment	Fleet/ Registration Number	Exhaust Gases Discharge Conditions				Frequency
(Day, Month, Year)			Items	Yes	No	If Yes, Measures Taken	Daily
			Black Smoke				
			White Smoke				
			Others (Specify)				

Logbook: to be prepared and recorded by the contractor(s) which is submitted to CMWSSB monthly.

If any problem arises, such vehicles and equipment to be sustained to use or be replaced by appropriate ones.

-Soil Dust (Dry Season only)

Date	Location	Dust and dried sandy soil stirred up by construction activities				Frequency
(Day, Month, Year)	Construction Site including access roads	Items	Yes	No	If Yes, Measures Taken (such as water supplying)	Daily
		Dusts				
		Dried Sandy Soil				
		Others (Specify)				

Log Book: to be prepared and recorded by the contractor(s) which is submitted to CMWSSB monthly.

5.1.2 Land Acquisition/ Resettlement (Progress of the tree cutting)

Items	Implementation (as of)						Frequency
Cutting Schedule	1. As scheduled ()	2. Delayed (months)	3. Postponed ()				Once/ week
Total Value of Trees	1. Decided (Rs)	2. Under evaluation ()	3. No action ()				
Budget Allocation	1. Allocated by ()	2. Under discussion ()	3. No action ()				
Compensation to Land owner	1. Compensated ()	2. Under preparation ()	3. No action ()				
Auction for tree cutting	1. Conducted (when)	2. Under preparation ()	3. No action ()				
Waste Management	1. Properly Managed ()	2. Under preparation ()	3. No action ()				

Progress of the **preparation** and implementation shall be submitted to CMWSSB monthly

4.2 Construction Phase Monitoring Form

The latest results of the below-monitoring items shall be submitted to the lenders as part of the Quarterly Progress Report throughout the construction phase

5.2.1 Air Pollution**- Exhaust Gases**

Date	Type of Construction Vehicles/ Equipment	Fleet/ Registration Number	Exhaust Gases Discharge Conditions				Frequency
(Day, Month, Year)			Items	Yes	No	If Yes, Measures Taken	Daily
			Black Smoke				
			White Smoke				
			Others (Specify)				

Log Book: to be prepared and recorded by the contractor(s) which is submitted to CMWSSB monthly. If any problem arises, such vehicles and equipment to be sustained to use or be replaced by appropriate ones.

- Soil Dust (Dry Season only)

Date	Location	Dust and dried sandy soil stirred up by construction activities				Frequency
(Day, Month, Year)	Construction Site including access roads	Items	Yes	No	If Yes, Measures Taken (such as water supplying)	Daily
		Dusts				
		Dried Sandy Soil				
		Others (Specify)				

Log Book: to be prepared and recorded by the contractor(s) which is submitted to CMWSSB monthly.

5.2.2 Water Quality

- On-site toilets

Date	On-site Toilet Number/location	Sewerage water Conditions				Frequency
(Day, Month, Year)		Items	Yes	No	If Yes, Measures Taken	Daily
		Black (sewage)water leakage				
		Bad odour				
		Emergency of Flies				
		Others (Specify)				

Log Book: to be prepared and recorded by the contractor(s) which is submitted to CMWSSB monthly.

- Turbidity (Seawater Turbidity during the installation of intake/outfall pipelines)

Date	Location of installation of Intake/ Outfall (GPS position)	Turbid water Conditions				Frequency
(Day, Month, Year)	Intake () Outfall () GPS Position	Items	Yes	No	If Yes, Measures Taken	Daily
		Silts				
		Sea sands				
		Bottom sediments				

		Others (Specify)				
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Log Book: to be prepared and recorded by the contractor(s) which is submitted to CMWSSB monthly.

5.2.3 Soil Contamination

- Oil and Fuel leakage (spill)

Date	Type of Construction Vehicles/ Equipment	Fleet/ Registration Number	Oil/Fuel Leakage Conditions				Frequency
(Day, Month, Year)			Items	Yes	No	If Yes, Measures Taken	Daily
			Engine oil				
			Hydric power unit oil				
			Fuel				
			Others (Specify)				

Log Book: to be prepared and recorded by the contractor(s) which is submitted to CMWSSB monthly. If any problem arises, such vehicles and equipment to be sustained to use or be replaced by appropriate ones.

5.2.4 Wastes

- Construction Wastes and Debris

Waste Composition	Waste Quantity (ton/ month)	Transportation, Disposal/Treatment Methods (Specify: ex. Registered Service Provider, Officially final disposal site, registered treatment facility (or company))				Frequency
		Transport	Disposal	Treatment	Remarks	
Construction Debris						
Surplus Soil						
Toxic and Chemical Waste						
Other (specify)						

5.2.5 Noise and Vibration**- Noise from Construction Vehicles and Equipment**

Visual Inspection Date	Type of Construction Vehicles/ Equipment	Fleet/ Registration Number	Condition of Silencer equipped with construction vehicles/Equipment				Frequency
(Day, Month, Year)			Items	Yes	No	If Yes, Measures Taken (such as water sprinkling)	Daily
			Properly Equipped				
			Damaged				
			Large noise discharge				
			Others (Specify)				

Log Book: to be prepared and recorded by the contractor(s) which is submitted to CMWSSB monthly. If any problem arises, such vehicles and equipment to be sustained to use or be replaced by appropriate ones.

5.2.6 Ecosystem**- Turbidity**

Date	Location of installation of Intake/outfall (GPS position)	Turbid water Conditions				Frequency
(Day, Month, Year)	Intake () Outfall () GPS Position	Items	Yes	No	If Yes, Measures Taken	Daily
		Silts				
		Sea sands				
		Bottom sediments				
		Others (Specify)				

- Environmental Education on Marine ecosystems and Sea Turtles

Date	Venue	Agenda	Lecturer	Number of Participants	Materials paraded	Frequency
(Day, Month, Year)				Community ()		Twice/year
				Worker/ Labor ()		
				Others (Specify)		
				Total ()		

Participant list and educational materials shall be attached

- Sea Turtles Sightings

Item	Sighting Report					Frequency
Sea turtles	Time/ Date	Place (In or around Perur DSP construction site)	Sighted by whom (ex, Villager, Worker/labour, rumour and others)	Description of the Sighting	Actions were taken to the sightings	In the event of sighting *
					See the Actions on Sea Turtle	

*During the egg-laying season of sea turtles, hearing survey on the sighting shall be done in the surrounding communities twice of the season

- Actions on Sea Turtle Sightings

Item	Sighting Report			Frequency
Actions on Sea turtle sighting	Construction Suspension Periods	Records of the announcements	Relevant entities contacted	In the event of Sighting

5.2.7 Living and Livelihood**- Seawater Turbidity during the installation of intake/outfall pipelines**

Date (Day, Month, Year)	Location of installation of Intake/outfall (GPS position)	Turbid water Conditions				Frequency
		Items	Yes	No	If Yes, Measures Taken	
	Intake () Outfall () GPS Position	Silts				Daily
		Sea sands				
		Bottom sediments				
		Others (Specify)				

- Pipelines installation schedules and Installation (Construction) Management

Date (Day, Month, Year)	Location	Management				Compensation budget and status (Specify)	Frequency Daily during the installation
		Type Space used (1. Paddy Field, 2. Farmland, 3. Others)	Area (m ²)	Duration of use	Condition of Space		

5.2.8 Social Infrastructure and Services

- Road Traffic

Date	Location	Construction Vehicle Management				Frequency
		Traffic Control (Specify the details)				Daily
		Time Restriction	Avoidance of Rush Hour	Avoidance of Rush Hour	Others (Specify)	
(Day, Month, Year)						

Log Book: to be prepared and recorded by the contractor(s) which is submitted to CMWSSB monthly.

- Commercial Activities (for the transmission pipelines installations)

Date	Location	Management				Frequency
		Traffic Control (Specify the details)				Daily during the installation
		Diversion Route	Time Restriction	No Control	Others (Specify)	
(Day, Month, Year)						

- Meetings with surrounding Communities (for the transmission pipelines installations)

Date	Location / Community	Meeting Venue	Number of Participants	Agenda	Opinions Requests	Counter measures	Frequency
(Day, Month, Year)			Community ()				Where necessary
			Officials ()				
			Others (Specify)				
			Total ()				

Participant list and meeting minutes shall be attached

5.2.9 Risks of Infectious diseases such as HIV/AIDS

- Health and Sanitation Education

Date	Venue	Agenda	Lecturer	Number of Participants	Materials paraded	Frequency
(Day, Month, Year)				Community ()		Once/year
				Worker/Labor ()		
				Others (Specify)		
				Total ()		

Participant list and educational materials shall be attached

5.2.10 Working Conditions/Work safety for the construction

- Personnel Protective Equipment (PPE)

Date	Monitoring Item	If any problems, measures are taken	Frequency
(Day, Month, Year)	PPE: such as Helmet, Gloves, Masks, shoes) -		Daily

Log Book: to be prepared and recorded by the contractor(s) which is submitted to CMWSSB monthly.

5.2.11 Accidents**- Meetings with surrounding Communities**

Date	Venue	Agenda	Lecturer	Number of Participants	Materials paraded	Frequency
(Day, Month, Year)				Community ()		Once/year
				Worker/Labor ()		
				Others (Specify)		
				Total ()		

4.3 Operation Phase Monitoring Form

The latest results of the below-monitoring items shall be submitted to the Employer on a biannual basis.

4.3.1 Water Quality**- Seawater and Potable Water**

S. No.	Constituents	Seawater	Product Water	Frequency
1	Silt Density Index	✓		Daily
2	pH	✓	✓	Daily
3	Total Dissolved Solids	✓	✓	Daily
4	Temperature	✓	✓	Daily
5	Electrical conductivity	✓	✓	Daily

6	Turbidity	✓	✓	Daily
7	Residual chlorine	✓	✓	Daily
8	Boron content	✓	✓	Daily
9	Langelier index	-	✓	Daily
10	Oxidation-reduction potential	✓	-	Daily
11	Alkalinity	✓	✓	Daily
12	Chloride	✓	✓	Daily
13	Hardness	✓	✓	Daily

Operational Monitoring Report on the Seawater and Product Water monitored at DSP can be attached.

- Brine Concentration

Date	Sampling Location	Brine Concentration (ppt)	Remarks	Frequency
				Daily

- Domestic Wastewater (Sewage Treatment Plant)

Monitoring Item	Method	If any negative results measures – Action to be taken	Frequency
Bad Odor	Visual Inspection (Common sensation)		Once/month
Water Leakage	Visual Inspection		
Generation of flies	Visual Inspection		
Other necessary actions to be monitored as per the instruction and manuals on the operation and maintenance of aerated sewage treatment facilities (STP) is to be installed.			Once/month (or instructions of the Contractor of STP)

4.3.2 Ecosystem

- Environmental Education on Marine Ecosystems and Sea Turtles

Date	Venue	Agenda	Lecturer	Number of Participants	Materials provided	Frequency
(Day, Month, Year)				Community ()		Once/year
				Worker/Labor ()		
				Others (Specify)		
				Total ()		

Participant list and educational materials shall be attached

- Sea Turtles Sightings

Item	Sighting Report					Frequency
Sea turtles	Time/Date	Place (In or around Perur DSP site)	Sighted by whom (ex, Villager, Worker/labour, rumour and others)	Description of the Sighting	Actions were taken to the sightings	In the event of Sighting*
					See the Actions on Sea Turtle Sightings (specified below)	

*During the egg-laying season of sea turtles, hearing survey on the sighting shall be done in the surrounding communities twice of the season

- Actions on Sea Turtle Sightings

Item	Sighting Report			Frequency
Actions on Sea turtle sighting	Construction Suspension Periods	Records of the announcements	relevant entities contacted)	In the event of Sighting

5. EIA MONITORING FORMAT FOR EIA AND CZMAS RECOMMENDATIONS

6.1 Construction Phase

Environmental Items	Monitoring Items	Parameters	Frequency	Recommended by	Monitoring Results
General Environment	Site conditions	Any adverse impacts on the coast	Every Year	Tamil Nadu State CZMA	

6.2 Operation Phase

Environmental Items	Monitoring Items	Parameters	Frequency	Recommended by	Monitoring Results
Water Quality	Seawater & Sediment Quality	Nutrients and heavy metals	Each season: April (Fair Weather), July (SW monsoon) and November (NE monsoon)	EIA Report	
Ecosystem	Marine Benthic Fauna	Benthic fauna composition	Each season as indicated above	EIA Report	
Ecosystem	Intake entrapment of marine fauna	Screens on pump stations and Effectiveness of management measure	Each season as indicated above	EIA Report	
Ecosystem	Entrainment of marine fauna	Abundance of fauna within the pond/ storage sump/well	Each season as indicated above	EIA Report	
Ecosystem	Seawater outfall	Abundance and distribution of both phytoplankton and zooplankton	Each season as indicated above	EIA Report	
Ecosystem		Abundance and	Each season as indicated above	EIA Report	

Environmental Items	Monitoring Items	Parameters	Frequency	Recommended by	Monitoring Results
		distribution of benthic animal communities			
Water Quality/ Ecosystem	Post-project marine quality	Marine quality including water quality and biological characteristic.	Continuous	Kancheepuram District CZMA	
Ecosystem	Marine biodiversity	Not specified	Twice in a year	Kancheepuram District CZMA	
Water Quality	Reject water	Concentration of toxic trace metals	Periodical	Kancheepuram District CZMA	
Water Quality	Changes in the selected physiochemical parameters	Salinity, temperature, DO, current etc.	Periodical during the construction and operation phases	Kancheepuram District CZMA	
Water Quality	The high salinity reject water (maybe monitored through appropriate standard procedures)	Physiochemical and toxic trace metal contents	Periodical	Kancheepuram District CZMA	
Water Quality	Marine water	Parameter is not specified/ to be monitored at the outfall area	Every Quarter	Tamil Nadu State CZMA	
General Environment	Site conditions	Any adverse impacts on the coast	Every Year	Tamil Nadu State CZMA	
Ecosystem	Impact on marine organisms, Turtle nesting	Marine organisms, Turtle nesting etc.	Not specified (to be monitored by experts)	Tamil Nadu State CZMA	

Environmental Items	Monitoring Items	Parameters	Frequency	Recommended by	Monitoring Results
	etc.				

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TECHNICAL SCHEDULE-8-SAFETY PLAN

The Bidder shall provide his proposed Safety Plan in detail so as to demonstrate compliance with the requirements set forth in Clause 3.9, Part 2, Particular Process Requirements.

The Safety Plan shall include a policy statement signed by the CEO or equivalent authority of the Organization declaring that Safety and loss prevention shall be given the highest practicable priority in all aspects of the Contract.

The Bidder shall describe his proposed Safety Plan which shall be developed to ensure zero fatal accidents and zero hazardous incidents/occurrences in all construction works, including descriptions of the company's standard policies and procedures regarding its site organization and procedures, methods and frequency of conducting safety audits at the Site(s), record keeping and reporting, providing safety training for its personnel, issue and mandatory use of safety equipment, and details of the qualifications and experience of the Bidder's proposed safety officers to be deployed at the Site(s).

The Bidder shall provide separate descriptions of its proposed Safety Plan during the construction phase, and the subsequent operations and maintenance phase.

This will be an initial Safety Plan which will address to the safety of all persons entitled to be at site including the Employer's personnel.

TECHNICAL SCHEDULE-9 -FUNCTIONAL GUARANTEES OF THE PLANT AND EQUIPMENT

1. GENERAL

This document sets out the functional guarantees required to be provided by the Bidder for assessing the performance of the 400 MLD seawater desalination plant and facilities, and which shall be used by the Employer to evaluate its satisfactory performance during the Process Proving Test and during the O&M period.

The Bidder shall complete the following sections and provide values for the product water output, pre-treated seawater at every treatment units and at RO feed, electrical energy usage, and chemical usage for the quantities of water produced on a daily basis, based on the performance criteria set out in the Particular Specifications, and **the raw water quality parameters provided in Part 2 A1 Project Requirements.**

Notes:

- 1) The values provided in this Schedule will also be used to assist the Employer in determining the typical annual running costs for operation and maintenance of the Works; the estimated costs derived from this information will be used to assist in evaluating the Bids.
- 2) If, during operation and maintenance of the seawater desalination plant and facilities, the raw water quality parameters exceed those listed in the Part 2 A1 Project Requirement, the Employer shall not reimburse to the Contractor the additional treatment costs incurred, if any, to produce the product water of the required quality and quantity. If there is excessive increase in O&M cost due to the worst water quality out of the Contract, the Employer may discuss with the Contractor and make a payment based on the actual observations. The Bidder should evaluate the historical seawater quality at the Perur site at his own resources before bidding for the project. He may discuss about this during pre-bid meeting to make it clear.

2. FUNCTIONAL GUARANTEES

2.1 Overall Performance of the Plant

The maximum continuous output which will be achieved during the Process Proving Tests after plant commissioning and during O&M of the plant is Guaranteed to meet the following performance standards:

The continuous net output of product water at the seawater desalination plant shall be not less than:

_____ MLD, and based on a raw water input of

_____ MLD (seawater) and

	_____ % plant availability (minimum 97%)
--	------------------------------------------

2.2 Electrical Energy Usage per Unit of Treated Water Output

The energy required for operating and maintaining the constructed seawater desalination plant and facilities during the Process Proving Tests after plant commissioning is guaranteed to be as given here, based on the minimum and maximum range of raw seawater qualities as per the data furnished in the Project Requirements and Particular Specifications.	<p>(i) Not more than _____ kWh per million liters (ML) of product water output, based on the values provided for the minimum raw seawater quality.</p> <p>(ii) Not more than _____ kWh per million liters (ML) of product water output, based on the values provided for the maximum raw seawater quality.</p> <p>(iii) Not more than _____ kWh per million liters (ML) of product water output, based on the values provided for the average raw seawater quality.</p>
------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------	-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------

2.3 The guaranteed maximum Energy consumption per m3 every year during O&M period shall not be more than as follows:

	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10
Specific Energy Consumption, kWh/m3 of Product water										
	Year 11	Year 12	Year 13	Year 14	Year 15	Year 16	Year 17	Year 18	Year 19	Year 20
Specific Energy Consumption, kWh/m3 of Product water										

Bidder shall be required to demonstrate the example of the power consumption at their plants constructed elsewhere with the similar processes.

2.4 Performance of Pretreatment Units

Lamella Filter	(i) Reduction of TSS: _____ %
	(ii) Reduction of TOC: _____ %

DAF	(iii) Reduction of TSS: _____ %
	(iv) Reduction of TOC: _____ %
Dual Media Filter	(v) Reduction of TSS: _____ %
	(vi) Reduction of TOC: _____ %

The silt density index (SDI) of the Pre-treated or RO feed seawater quality before Cartridge Filter must be < 3.0 @ 95%ile and < 4.0 @ 100%ile all the time.

2.5 RO Permeate

S. No.	Items	Conditions	Values
(i)	Total Dissolved Solids	Not more than	mg/l
(ii)	Boron	Not more than	mg/l
(iii)	pH	Not more than	

2.6 Product Water Quality

Product water quality after remineralization, disinfection and pH correction shall comply with IS 10 500 / 2012 and shall be with the following requirements:

Main potable water requirement:

Parameter	Unit	Value
True color	Hazen	<5.0
pH	-	6.5-8.5
Turbidity	NTU	< 1.0
TDS	mg/l	< 450
Chloride	mg/l	< 250
Free Chlorine	mg/l	> 0.5
Boron	mg/l	< 1.0
Total Hardness	mg/l as CaCO ₃	80
LSI		Positive

2.7 Wastewater Discharge to Sea

Total Dissolved Solids (TDS) <i>Should correlate with EIA dispersion guidelines</i>	Not more than _____ mg/l
Total Suspended Solids (TSS) <i>Should correlate with EIA dispersion guidelines</i>	Not more than _____ mg/l

Individual Metal Concentration All metal concentrations should correlate EIA dispersion guidelines	Fe: not more than _____ mg/l As: not more than _____ mg/l Hg: not more than _____ mg/l etc.
-------------------------------------------------------------------------------------------------------	------------------------------------------------------------------------------------------------------

2.8 Chemical Consumption

The consumption rates of Chemicals required for Operation and Maintenance of the constructed 400 MLD seawater desalination plant and facilities during the Process Proving Tests after plant commissioning and then after O&M period are guaranteed to be less than as follows, based on the minimum and maximum range of raw water qualities as per the data furnished in the Project Requirements and Particular Specifications, Part-2.

S. No.	Chemicals	Maximum Rate of Consumption
(i)	Hypochlorite for Shock Chlorination	_____ Kg /ML product water
(ii)	Hypochlorite for Pre Chlorination	_____ Kg /ML product water
(iii)	FeCl ₃ solution dosing (40%)	_____ Kg /ML product water
(iv)	Anionic Polymer dosing for flocculation (Food grade)	_____ Kg /ML product water
(v)	Cationic Polymer for Thickener (Non Food grade)	_____ Kg /ML product water
(vi)	Cationic Polymer for BFP (Non Food grade)	_____ Kg /ML product water
(vii)	Antiscalant	_____ Kg /ML product water
(viii)	Sodium Bisulphite	_____ Kg /ML product water
(ix)	CO ₂ for remineralization	_____ Kg /ML product water
(x)	CaCO ₃ for remineralization	_____ Kg /ML product water
(xi)	Hypochlorite for Post Chlorination	_____ Kg /ML product water
(xii)	NaOH for pH adjustment pre/post RO system	_____ Kg /ML product water
(xiii)	Acetic Acid for CIP	_____ Kg /ML product water

S. No.	Chemicals	Maximum Rate of Consumption
(xiv)	HCL for CIP and Neutralization	_____ Kg /ML product water
(xv)	NaOH for CIP and Neutralization	_____ Kg /ML product water
(xvi)	Any other chemical	_____ Kg /ML product water

2.9 The guaranteed maximum Chemical consumption every year during O&M period producing the net 400 MLD product water shall not be more than as follows:

S. No.	Chemicals	Units	Maximum Consumption as supplied per year
(i)	Hypochlorite for Shock Chlorination (10.3%)	m3	
(ii)	Hypochlorite for Pre Chlorination (10.3%)	m3	
(iii)	FeCl3 solution dosing (40%)	m3	
(iv)	Anionic Polymer dosing for flocculation (Food grade) (100%)	tonnes	
(v)	Cationic Polymer for Thickener (Non Food grade) (100%)	tonnes	
(vi)	Cationic Polymer for BFP (Non Food grade) (100%)	tonnes	
(vii)	Antiscalant (100%)	m3	
(viii)	Sodium Bisulphite (35%)	m3	
(ix)	CO2 for remineralization (100%)	tonnes	
(x)	CaCO3 for remineralization (100%)	tonnes	
(xi)	Hypochlorite for Post Chlorination	m3	
(xii)	NaOH for pH adjustment pre/post RO system (50%)	m3	
(xiii)	Citric Acid for CIP (100%)	tonnes	
(xiv)	HCL for CIP and Neutralization(33%)	m3	
(xv)	NaOH for CIP and Neutralization (50%)	m3	
(xvi)	Any other chemical		

TECHNICAL SCHEDULE-10 STATEMENT OF DEVIATIONS FROM THE TECHNICAL SPECIFICATIONS

The Bidder shall describe all proposed deviations from the specifications and Drawings set out under Part 2 Technical Specifications, clause by clause, in this Schedule.

The Bidder should note that the specifications given in the Bid Document are the minimum acceptable, and that only standard that is better / higher than the ones referred to in the Bid Document will be acceptable. Acceptance of the Bid shall not be construed as approval by the Employer of any deviations from the Technical Specifications. All details will be subject to the approval of the Engineer during execution of the Contract

Sub Section Number	Title of Subsection	Clause No.	Specification as per Bid Document	Deviation & Specifications Proposed with standard code reference	Reasons for Deviation

The Bidder hereby certifies that the above-mentioned deviations are the only deviations from the technical specifications set forth under Part-2: Technical Specifications, and that he accepts all the remaining technical requirements of the Bid Document.

TECHNICAL SCHEDULE-11 -STATEMENT OF COMPLIANCE WITH THE BIDDING DOCUMENTS

The Bidder shall describe all proposed deviations from the Statements and the Conditions of Contract set out under Part 3 documents giving references to the Clause, paragraph and page number, along with a description of the proposed deviation and the reason for proposing such deviation. Acceptance of any deviation is solely on the discretion of the Employer.

Title of Subsection	Clause Number	As mentioned in Bid Document	As offered in Bid Document	Reasons for Deviation

The Bidder hereby certifies that the above mentioned deviations are the only deviations from the Contractual Requirements set forth under Part 1 and Part 3: General Requirement, and that he accepts all the remaining general requirements of the Bid Document. **In case there is no deviation, the same needs to be mentioned clearly and signed below.**

SITE ORGANIZATION

The Bidder shall submit the following details:

- Organization Chart during Design Build Period
- Organization Chart during Operation Service Period
- CV's of the personnel for the key positions as described in Section III Evaluation and Qualification Criteria (Clause 1.1.1)

Site Organization will be evaluated based upon the completeness & organization charts to provide the required positions and experience to execute the works and of Key Positions in compliance with Evaluation Criteria in Section III (Clause 1.1.1)

OPERATION AND MAINTENANCE (O&M) PLAN

The Bidder shall submit an Operations and Maintenance Plan (O&M Plan) for the 400 MLD Desalination Plant. The O&M plan shall meet the requirements of Volume II, Part-2, A-13 Operation and Maintenance and shall include the following components

- A. Staffing Plan and Staffing Skills
 - 1. Complete Staffing Plan.
 - 2. Comprehensive Training Programme for O&M and in assessing deterioration in plant facilities and equipment
 - 3. Programme for maintaining staff health and personal hygiene
 - 4. Continuous security employing Guard staff.
 - 5. Provide staff with adequate Personal Protective Equipment.
- B. Identification of planned Annual Maintenance Contracts (AMC) for contracted maintenance services on specialty equipment including AMC Contracts with the PLC and SCADA system suppliers for the duration of the seven-year O&M Period.
- C. Identify insurance policies to be taken that shall be in the joint names of the Contractor and the Employer.
- D. Programme for Maintenance of Stores of materials, consumables, special tools and spare parts.
- E. Description of the Bidder's proposed Operations & Maintenance Manual, that shall include the following:
 - 1. Operations
 - a. Equipment Operations including Normal Startup/Shut down and routine operation as well as emergency operation
 - b. Chemical Feed Systems including maintaining sufficient chemical inventory and chemical dose control
 - c. Water Quality Monitoring and compliance with treatment requirements
 - d. Regular Documentation of Operation
 - 2. Maintenance
 - a. Preventive or routine maintenance
 - b. Corrective or Remedial maintenance
 - c. Concurrent Maintenance on standby or idle units allowing full plant operations during the maintenance activity.
 - d. Manufacturer's Operations and Maintenance Instructions
 - 3. Update O&M Manual as required to reflect changes in plant or facility operations or maintenance.
- F. Maintenance responsibilities shall include the following:

1. Maintain facility in clear and safe working order including adequate ventilation and lighting.
2. Maintain yard gardens landscaping, road, exterior lighting, earthen shoulders and drains
3. Maintain equipment servicing and lubrication schedule including acceptable lubricants
4. Maintain recommended cleaning, care and maintenance of materials and finishes and make timely repairs of internal and external finishes.
5. Maintain adequate sampling and testing of water quality parameters

G. Maintenance Management System incorporating:

1. Preparation of Work Orders and documentation of completion.
2. Repair history of all mechanical, electrical, instrumentation control equipment and communication instruments.
3. Daily log of operations
4. Hourly readings of key operational parameters that provide timely confirmation of successful treatment.
5. Sea-water and clear water quality test results on turbidity, residual chlorine levels, etc. (every 6 hours)
6. Daily list of alarms with time tag;

H. Reporting

1. Monthly Reports concisely summarizing key operational condition and key maintenance performed as well as identification of O&M issues that may require CMWSSB action.
2. Monthly Report shall be in a format acceptable to CMWSSB.

I. Documents

1. Maintain key and relevant documents on-site;
 - a. Name plate data of installed equipment
 - b. Copy of all Warranties, Bonds and AMC Service Contract
 - c. Copy of Approved GA Drawings Drawing/Shop Drawings (Good for Construction Drawings)
 - d. Complete set of electrical schematics and wiring diagrams
 - e. Name and Contact information of authorized service and maintenance firms
 - f. Copies of all Pre-Commissioning, Commissioning, Trial Operation Tests and Test after Completion

Evaluation of the Bidder's proposed O&M Plan will be based upon the thoroughness of the Plan, compliance with requirements included in **Part 2 -Employer's Requirements** and the extent to which the Bidder's Plan indicates management of plant operations to optimize

power consumption and chemical usage and ensure satisfactory operation and maintenance of the whole works at all times. Non submission of the O&M Plan will be construed as the bidders bid is non-responsive and will be rejected during technical evaluation.

FORM PER -1: PROPOSED PERSONNEL

Date: [insert day, month, year]

Bidder's Legal Name: [insert full name]

Joint Venture Party Legal Name: [insert full name]

IFB No.: [insert number]

Page [insert page number] of [insert total number] pages

[The Bidder shall provide the names of suitably qualified personnel to meet the specified requirements stated in Section III, Evaluation and Qualification Criteria, Clause 1.1.1 for Single-Stage Bidding or Clause 1.1 for Two-Stage Bidding.]

1.	Title of position*
	Name
2.	Title of position*
	Name
3.	Title of position*
	Name
4.	Title of position*
	Name

*As listed in Section III.

FORM PER -2: RESUME OF PROPOSED PERSONNEL

Date: [insert day, month, year]

Bidder's Legal Name: [insert full name]

Joint Venture Party Legal Name: [insert full name]

IFB No.: [insert number]

Page [insert page number] of [insert total number] pages

[The Bidder shall provide the data on the experience of the personnel indicated in Form PER-1, in the form below.]

Name of Bidder

Position		
Personnel information	Name	Date of birth
	Professional qualifications	
Present employment	Name of employer	
	Address of employer	
	Telephone	Contact (manager / personnel officer)
	Fax	E-mail
	Job title	Years with present employer

[Summarize professional experience over the last 20 years, in reverse chronological order. Indicate particular technical and managerial experience relevant to the project.]

From	To	Company / Project / Position / Relevant technical and management experience

FORM EQU: EQUIPMENT

Date: [insert day, month, year]

Bidder's Legal Name: [insert full name]

Joint Venture Party Legal Name: [insert full name]

IFB No.: [insert number]

Page [insert page number] of [insert total number] pages

[The Bidder shall provide adequate information to demonstrate clearly that it has the capability to meet the requirements for the key equipment listed in Section III, Evaluation and Qualification Criteria, Clause 1.1.2 for Single-Stage Bidding or Clause 1.2 for Two-Stage Bidding. A separate Form shall be prepared for each item of equipment listed, or for alternative equipment proposed by the Bidder.]

Item of equipment		
Equipment information	Name of manufacturer	Model and power rating
	Capacity	Year of manufacture
Current status	Current location	
	Details of current commitments	
Source	Indicate source of the equipment	
	<input type="checkbox"/> Owned <input type="checkbox"/> Rented <input type="checkbox"/> Leased <input type="checkbox"/> Specially manufactured	

Omit the following information for equipment owned by the Bidder.

Owner	Name of owner	
	Address of owner	
	Telephone	Contact name and title
	Fax	Telex
Agreements	Details of rental / lease / manufacture agreements specific to the project	

**FORM SUB: PROPOSED SUBCONTRACTORS FOR MAJOR ITEMS
OF PLANT AND INSTALLATION SERVICES**

A list of major items of Plant and Installation Services is provided below.

The following Subcontractors and/or manufacturers are proposed for carrying out the item of the facilities indicated. Bidders are free to propose more than one for each item.

Major Items of Plant and Installation Services	Proposed Subcontractors/Manufacturers	Nationality

FORM MAN: MANUFACTURER'S AUTHORIZATION

[The Bidder shall require the Manufacturer to fill in this Form in accordance with the instructions indicated. This letter of authorization should be signed by a person with the proper authority to sign documents that are binding on the Manufacturer.]

Date: *[insert date (as day, month and year) of Bid Submission]*

IFB No.: *[insert number of bidding process]*

To: *[insert complete name of Purchaser]*

WHEREAS

We *[insert complete name of Manufacturer or Manufacturer's authorized agent]*, who are official manufacturers of *[insert type of goods manufactured]*, having factories at *[insert full address of Manufacturer's factories]*, do hereby authorize *[insert complete name of Bidder]* to submit a Bid the purpose of which is to provide the following goods, manufactured by us *[insert name and/or brief description of the goods]*, and to subsequently negotiate and sign the Contract.

We hereby extend our full guarantee and warranty in accordance with Clause 11, Defect Liability, of the General Conditions of Contract, with respect to the goods offered by the above firm.

Name: *[insert complete name of person signing the Bid]*

In the capacity of *[insert legal capacity of person signing the bid]*

Signed: *[insert signature of person whose name and capacity are shown above]*

Duly authorized to sign the bid for and on behalf of:

[insert complete name of Bidder]

Dated on _____ day of _____, _____ *[insert date of*

signing]

³FORM SPA: SPARE PARTS

[The Employer shall specify what information is required to provide for Spare Parts as per Employer's Requirements and the Bidder shall insert information.]

Required items of Spare Parts	Proposed items of Spare Parts

³ The Employer may also require bidder to propose and provide information for recommended spare parts for his reference, which are not to be included into the Price Schedules and evaluated. If the Employer does so, he should specify here which parts of spare parts are evaluated or not.

BIDDER'S QUALIFICATION FORMS

Bidder's Qualification following Prequalification

To establish its qualification to perform the Contract in accordance with Section III, Evaluation and Qualification Criteria, the Bidder shall update the information requested in the corresponding Information Sheets included hereunder:

1. Update of Information

In accordance with Section III, Evaluation and Qualification Criteria, Clause 2.1, the Bidder shall update the information given during the corresponding prequalification exercise to demonstrate that he continues to meet the criteria used at the time of prequalification using the following forms included hereunder:

(a) Eligibility

Form ELI - 1: Bidder Information Form
Form ELI - 2: JV Member Information Form
Form ELI - 3: Subcontractor Information Form

(b) Historical Contract Non-Performance

Form CON: Historical Contract Non-Performance & Litigation

(c) Financial Situation

Form FIN - 1: Financial Situation
Form FIN - 2: Average Annual Turnover

2. Financial Resources

Bidders shall also provide information on their financial resources, to meet the requirement in Section III, Evaluation and Qualification Criteria, Clause 2.2, using the following forms:

Form FIN - 3: Financial Resources
Form FIN - 4: Current Contract Commitments
Form FIN - 5: Financial Performance

FORM ELI - 1: BIDDER INFORMATIONDate: *[insert day, month, year]*IFB No.: *[insert number]*Page *[insert page number]* of *[insert total number]* pages*[The Bidder shall provide the following information.]*

1. Bidder's legal name: <i>[insert full name]</i>
2. In case of JV, legal name of the representative member and of each member: <i>[insert full name of each member in the JV and specify the representative member]</i>
3. Bidder's actual or intended country of registration: <i>[insert country of registration]</i>
4. Bidder's actual or intended year of incorporation: <i>[insert year of incorporation]</i>
5. Bidder's legal address in country of registration: <i>[insert street/number/town or city/country]</i>
6. Bidder's authorized representative information Name: <i>[insert full name]</i> Address: <i>[insert street/number/town or city/country]</i> Telephone/Fax numbers: <i>[insert telephone/fax numbers, including country and city codes]</i> Email Address: <i>[insert E-mail address]</i>
7. Attached are copies of original documents of: <input type="checkbox"/> Articles of Incorporation (or equivalent documents of constitution or association), and/or documents of registration of legal entity named above, in accordance with ITB 4.3. <input type="checkbox"/> In case of JV, letter of intent to form JV or JV agreement, in accordance with ITB 4.1.
8. Included are the organizational chart, a list of Board of Directors, and the beneficial ownership.

FORM ELI - 2: BIDDER'S PARTY INFORMATIONDate: *[insert day, month, year]*IFB No.: *[insert number]*Page *[insert page number]* of *[insert total number]* pages

[The following form is additional to Form ELI-1, and shall be completed to provide information relating to each JV member (in case the Bidder is a JV) as well as any specialist Subcontractor proposed to be used by the Bidder for any part of the Contract resulting from this process.]

1. Bidder's legal name: <i>[insert full name]</i>
2. Bidder's Party legal name: <i>[insert full name of Bidder's Party]</i>
3. Bidder's Party country of registration: <i>[insert country of registration]</i>
4. Bidder's Party year of incorporation: <i>[insert year of incorporation]</i>
5. Bidder's Party legal address in country of registration: <i>[insert street/number/town or city/country]</i>
6. Bidder's Party authorized representative information Name: <i>[insert full name]</i> Address: <i>[insert street/number/town or city/country]</i> Telephone/Fax numbers: <i>[insert telephone/fax numbers, including country and city codes]</i> E-mail address: <i>[insert E-mail address]</i>
7. Attached are copies of original documents of <input type="checkbox"/> Articles of Incorporation (or equivalent documents of constitution or association), and/or registration documents of the legal entity named above, in accordance with ITB 4.3.
8. Included are the organizational chart, a list of Board of Directors, and the beneficial ownership.

FORM ELI -3: SUBCONTRACTOR INFORMATION FORM

Date: [insert day, month, year]

IFP No.: [insert number]

Page [insert page number] of [insert total number] pages

[The following form is additional to Form ELI-1 and ELI-2 (if applicable), and shall be completed to provide information relating to the Subcontractor (if any) proposed to be used by the Applicant for the execution of the key activities. The documents listed/ stated as required shall be submitted as attachments hereto.]

Applicant's legal name: [insert full name]
Subcontractor's legal name: [insert full name of Subcontractor's Party]
Subcontractor's country of registration: [insert country of registration]
Subcontractor's year of incorporation: [insert year of incorporation]
Subcontractor's legal address in country of registration: [insert street/number/town or city/country]
Subcontractor's authorized representative information Name: [insert full name] Address: [insert street/number/town or city/country] Telephone/Fax numbers: [insert telephone/fax numbers, including country and city codes] E-mail address: [insert E-mail address]
<ol style="list-style-type: none"> 1. Attached are copies of original documents of Articles of Incorporation (or equivalent documents of constitution or association), and/or registration documents of the legal entity named above. 2. Included are the organizational chart, a list of Board of Directors, and the beneficial ownership.

FORM CON: HISTORICAL CONTRACT NON-PERFORMANCE

[The following table shall be filled in for the Bidder and for each member of a JV.]

Date: *[insert day, month, year]*
 Bidder's Legal Name: *[insert full name]*
 Joint Venture Party Legal Name: *[insert full name]*
 IFB No.: *[insert number]* Page *[insert page number]* of *[insert total number]* pages

1. History of Non-Performing Contracts

Non-Performing Contracts			
<input type="checkbox"/> Contract non-performance did not occur since 1 st January <i>[insert year]</i> , in accordance with the Prequalification criteria, or Section III, Evaluation and Qualification Criteria, Sub-Factor 2.2.1, as appropriate.			
<input type="checkbox"/> Contract(s) not performed since 1 st January <i>[insert year]</i> , in accordance with the Prequalification criteria, or Section III, Evaluation and Qualification Criteria, Sub-Factor 2.2.1, as appropriate, is(are) indicated below:			
Year	Non- performed portion of Contract	Contract Identification	Total Contract Amount (current value, currency, exchange rate and USD equivalent)
<i>[insert year]</i>	<i>[insert amount and percentage]</i>	<ul style="list-style-type: none"> Contract Identification: <i>[indicate complete Contract name, number, and any other identification]</i> Name of Employer: <i>[insert full name]</i> Address of Employer: <i>[insert street/city/country]</i> Reason(s) for non-performance: <i>[indicate main reason(s)]</i> 	<i>[insert amount]</i>

2. Pending Litigation

Pending Litigation				
<input type="checkbox"/> No pending litigation in accordance with the Prequalification criteria, or Section III, Evaluation and Qualification Criteria, Sub-Factor 2.2.2, as appropriate.				
<input type="checkbox"/> Pending litigation in accordance with the Prequalification criteria, or Section III, Evaluation and Qualification Criteria, Sub-Factor 2.2.2, as appropriate, is indicated below:				
Year of dispute	Amount in dispute (currency)	Outcome as Percentage of Net Worth	Contract Identification	Total Contract Amount (current value, currency, exchange rate and USD equivalent)
[insert year]	[insert amount]	[insert percentage]	<ul style="list-style-type: none"> Contract Identification: [indicate complete Contract name, number, and any other identification] Name of Employer: [insert full name] Address of Employer: [insert street/ city/ country] Matter in dispute: [indicate main issues in dispute] Status of dispute: [indicate if it is being treated by the Adjudicator, under Arbitration or being dealt with by the Judiciary] 	[insert amount]

3. Litigation History

Litigation History

<input type="checkbox"/> No court/arbitral award decisions against the Bidder since 1 st January [insert year], in accordance with the Prequalification criteria, or Section III, Evaluation and Qualification Criteria, Sub-Factor 2.2.3, as appropriate.		
<input type="checkbox"/> Court/arbitral award decisions against the Bidder since 1 st January [insert year], in accordance with the Prequalification criteria, or Section III, Evaluation and Qualification Criteria, Sub-Factor 2.2.3, as appropriate, are indicated below:		
Year of award	Contract Identification	Total Contract Amount (current value, currency, exchange rate and USD equivalent)
[insert year]	<ul style="list-style-type: none"> Contract Identification: [indicate complete Contract name, number, and any other identification] Name of Employer: [insert full name] Address of Employer: [insert street/city/country] Matter in dispute: [indicate main issues in dispute] Party who initiated the dispute: [indicate "Employer" or "Contractor"] Status of dispute: [indicate if it is being treated by the Adjudicator, under Arbitration or being dealt with by the Judiciary] 	[insert amount]

FORM FIN - 1: FINANCIAL SITUATION

[The following table shall be filled in for the Bidder and for each member of a JV.]

Date: [insert

day, month, year]

Bidder's Legal Name:

[insert full name]

Joint Venture Party Legal Name: [insert full name]

IFB No.:

[insert number] Page [insert page number]

of [insert total number] pages

1. Financial data

Type of Financial information in (currency)	Historic information for previous [insert number] years (amount, currency, exchange rate, USD equivalent)				
	Year 1	Year 2	Year 3	Year 4	Year 5
Statement of Financial Position (Information from Balance Sheet)					
Total Assets (TA)					
Total Liabilities (TL)					
Net Worth (NW)					
Current Assets (CA)					
Current Liabilities (CL)					
Information from Income Statement					
Total Revenue (TR)					
Profits Before Taxes (PBT)					
Profits After Taxes (PAT)					

2. Financial documents

The Bidder and its Parties shall provide copies of the financial statements for [number of years] years pursuant to the Prequalification Criteria or Section III, Evaluation and Qualifications Criteria, Sub-factor 2.3.1. The financial statements shall:

- (a) reflect the financial situation of the Bidder or in case of JV member, of each member, and not an affiliated entity (such as parent company or group member).
 - (b) be independently audited or certified in accordance with local legislation.
 - (c) be complete, including all notes to the financial statements.
 - (d) correspond to accounting periods already completed and audited.
- ☐ Attached are copies of financial statements⁴ for the [number of years] years required above; and complying with the requirements.

⁴ If the most recent set of financial statements is for a period earlier than 12 months from the date of Bid, the reason for this should be justified.

FORM FIN - 2: AVERAGE ANNUAL TURNOVER

[The following table shall be filled in for the Bidder and for each member of a JV.]

Date: [insert day, month, year] Bidder's Legal Name: [insert full name]
 Joint Venture Party Legal Name: [insert full name]
 IFB No.: [insert number] Page [insert page number] of [insert total number] pages

Annual Turnover Data (Construction only)			
Year	Amount and Currency	Exchange rate	USD equivalent
[indicate year]	[insert amount and indicate currency]	[insert applicable exchange rate]	[insert amount in USD equivalent]
Average Annual Construction Turnover *			

* Total USD equivalent for all years divided by the total number of years, in accordance with the Prequalification criteria, or Section III, Evaluation and Qualification Criteria, Sub- Factor 2.3.2, as appropriate.

FORM FIN - 3: FINANCIAL RESOURCES

[The following table shall be filled in for the Bidder and for each member of a JV.]

Date: *[insert day, month, year]*
 Bidder's Legal Name: *[insert full name]*
 Joint Venture Party Legal Name: *[insert full name]*
 IFB No.: *[insert number]* Page *[insert page number]* of *[insert total number]* pages

[Specify proposed sources of financing, such as liquid assets, unencumbered real assets, lines of credit, and other financial means, net of current commitments, available to meet the total construction cash flow demands of the subject Contract or Contracts as indicated in Section III, Evaluation and Qualification Criteria, Sub-Factor 2.2, as appropriate.]

Financial Resources		
No.	Source of financing	Amount (USD equivalent)
1		
2		
3		

FORM FIN - 4: CURRENT CONTRACT COMMITMENTS

[The following table shall be filled in for the Bidder and for each member of a JV.]

Date: *[insert day, month, year]*

Bidder's Legal Name: *[insert full name]*

Joint Venture Party Legal Name: *[insert full name]*

IFB No.: *[insert number]*

Page *[insert page number]* of *[insert total number]* pages

[Bidders and each member of a JV should provide information on their current commitments on all Contracts that have been awarded, or for which a letter of intent or acceptance has been received, or for Contracts approaching completion, but for which an unqualified, full completion certificate has yet to be issued, in accordance with Section III, Evaluation and Qualification Criteria, Clause 2.2, as appropriate.]

Current Contract Commitments					
No.	Name of Contract	Employer's Contact Address, Tel, Fax	Value of Outstanding Work [Current USD Equivalent]	Estimated Completion Date	Average Monthly Invoicing Over Last Six Months [USD/month]
1					
2					
3					
4					
5					

FORM FIN - 5: FINANCIAL PERFORMANCE

[The following table shall be filled in for the Applicant and for each JV member if the Applicant is a JV.]

Date: [insert day, month, year]

Applicant's Legal Name: [insert full name]

JV Member's Legal Name: [insert full name]

Tender No. [insert number]

Page [insert page number] of [insert total number] page

To Whom So Ever It May Concern

This is to certify that our Firm (name of the Applicant / JV member) is currently not in the process of financial restructuring under Corporate Debt Restructuring (CDR) i.e., at the time of the proposal submission and up till the contract award (in case, our firm is chosen for contract award).

Duly Signed by the Company Secretary as well as the Authorized Signatory.

FORM ACK

Acknowledgement of Compliance with Guidelines for Procurement under Japanese ODA Loans

A) I, *[insert name and position of authorized signatory]*, being duly authorized by *[insert name of Bidder/members of joint venture ("JV")]* (hereinafter referred to as the "Bidder") to execute this Acknowledgement of Compliance with Guidelines for Procurement under Japanese ODA Loans, hereby certify on behalf of the Bidder and myself that all information provided in the Bid submitted by the Bidder for *[insert Loan No and name of the Project]* is true, correct and accurate to the best of the Bidder's and my knowledge and belief. I further certify, on behalf of the Bidder, that:

- (i) the Bid has been prepared and submitted in full compliance with the terms and conditions set forth in the Guidelines for Procurement under Japanese ODA Loans (hereinafter referred to as the "Guidelines"); and
- (ii) the Bidder has not, directly or indirectly, taken any action which is or constitutes a corrupt, fraudulent, collusive or coercive act or practice in violation of the Guidelines and is not subject to any conflict of interest as stipulated in the relevant section of the Guidelines.

- B) *<If debarment for more than one year by the World Bank Group is NOT imposed, use the following sentence B).>*
- C) I certify that the Bidder has NOT been debarred by the World Bank Group for more than one year since the date of issuance of Invitation for Bids⁵.

<If debarment for more than one year by the World Bank Group has been imposed BUT three (3) years have passed since the date of such debarment decision, use the following sentence B').>

- B') I certify that the Bidder has been debarred by the World Bank Group for a period more than one year BUT that on the date of issuance of Invitation for Bids at least three (3) years had passed since the date of such debarment decision. Details of the debarment are as follows:

name of the debarred firm	starting date of debarment	ending date of debarment	reason for debarment

- D) I certify that the Bidder will not enter into a subcontract with a firm which has been

⁵ The starting date should be revised to "request for price quotation," if the Borrower is selected through the International Shopping"; to "appointment", if a contractor is selected through the Direct Contracting; or "Commencement of actual selection/bidding process", if the Borrower wishes to adopt procurement procedures other than ICB, Limited International Shopping, International Shopping, or Direct Contracting.

debarred by the World Bank Group for a period more than one year, unless on the date of the subcontract at least three (3) years have passed since the date of such debarment decision.

- E) I certify, on behalf of the Bidder, that if selected to undertake services in connection with the Contract, the Bidder shall carry out such services in continuing compliance with the terms and conditions of the Guidelines.
- F) I further certify, on behalf of the Bidder, that if the Bidder is requested, directly or indirectly, to engage in any corrupt or fraudulent action under any applicable law, such as the payment of a rebate, at any time during a process of public procurement, negotiations, execution or implementation of contract (including amendment thereof), the Bidder shall report all relevant facts regarding such request to the relevant section in JICA (details of which are specified below) in a timely manner.

JICA's information desk on fraud and corruption (A report can be made to either of the offices identified below.)

- (1) **JICA Headquarters:** Legal Affairs Division, General

Affairs Department URL:

<https://www2.jica.go.jp/en/odainfo/index.php>

Tel: +81 (0)3 5226 8850

- (2) **JICA Delhi office**

16th Floor, Hindustan Times Building, Kasturba Gandhi Marg

New Delhi 110 001

Tel: +91-11-4909-7000

The Bidder acknowledges and agrees that the reporting obligation stated above shall NOT in any way affect the Bidder's responsibilities, obligations or rights, under relevant laws, regulations, contracts, guidelines or otherwise, to disclose or report such request or other information to any other person(s) or to take any other action, required to or allowed to, be taken by the Bidder. The Bidder further acknowledges and agrees that JICA is not involved in or responsible for the procurement process in any way.

- G) If any of the statements made herein is subsequently proven to be untrue or incorrect based on facts subsequently determined, or if any of the warranties or covenants made herein is not complied with, the Bidder will accept, comply with, and not object to any remedies taken by the Employer and any sanctions imposed by or actions taken by JICA.

Authorized Signatory

[Insert name of signatory; title]

For and on behalf of *[Insert name
of the Bidder]* **Date:**

DRAFT

FORM OF BID SECURITY (BANK GUARANTEE)

[Guarantor letterhead or SWIFT identifier code]

Beneficiary: [Employer to insert its name and address]

IFB No.: [Employer to insert number of Invitation for Bids]

Date: [insert date of issue]

BID GUARANTEE No.: [insert guarantee reference number]

Guarantor: [insert name and address of place of issue, unless indicated in the letterhead]

We have been informed that [insert name of the Bidder, which in the case of a joint venture shall be the name of the joint venture (whether legally constituted or prospective) or the names of all members thereof] (hereinafter called “the Applicant”) has submitted or will submit to the Beneficiary its Bid (hereinafter called “the Bid”) for the execution of [insert description of Contract] under Loan Agreement No. [insert Loan Agreement Number].

Furthermore, we understand that, according to the Beneficiary’s conditions, Bids must be supported by a bid guarantee.

At the request of the Applicant, we, as Guarantor, hereby irrevocably undertake to pay the Beneficiary any sum or sums not exceeding in total an amount of [insert amount in words, (insert amount in figures)] upon receipt by us of the Beneficiary’s complying demand, supported by the Beneficiary’s statement, whether in the demand itself or a separate signed document accompanying or identifying the demand, stating that either the Applicant:

- (a) has withdrawn its Bid during the period of Bid validity set forth in the Applicant’s Letter of Bid (hereinafter called “the Bid Validity Period”), or any extension thereto provided by the Applicant; or
- (b) having been notified of the acceptance of its Bid by the Beneficiary during the Bid Validity Period or any extension thereto provided by the Applicant, (i) fails to execute the Contract Agreement, or (ii) fails to furnish the Performance Security, in accordance with the Instructions to Bidders of the Beneficiary’s Bidding Documents.

This guarantee will expire and shall be returned to the Applicant: (a) if the Applicant is the successful Bidder, upon our receipt of copies of the Contract Agreement signed by the Applicant and the Performance Security issued to the Beneficiary in relation to such Contract Agreement; or (b) if the Applicant is not the successful Bidder, upon the earlier of (i) our receipt of a copy of the Beneficiary’s notification to the Applicant of the results of the bidding process; or (ii) twenty-eight (28) days after the end of the Bid Validity Period.

Consequently, any demand for payment under this guarantee must be received by us at the office indicated above on or before that date.

This guarantee is subject to the Uniform Rules for Demand Guarantees, ICC Publication No. 458⁶.

[signature(s)]

[Note: All italicized text is for use in preparing this form and shall be deleted from the final product.]

⁶ As the case may be, ICC Publication No. 758 (or subsequent ICC Publications) may be used. In such cases, modify the Publication number

Section V. Eligible Source Countries of Japanese ODA Loans

[Specify the Eligible Source Countries.]

PRICE PROPOSAL

PART-1; SECTION-IV

400 MLD CHENNAI SEAWATER DESALINATION PROJECT, PERUR, CHENNAI

PREAMBLE TO PRICE SCHEDULES

1. The Pricing Document shall be read in conjunction with Notice of Invitation to Tender (NIT), Instructions to Bidders and all Tender Documents, Specifications and Drawings as listed in Sub-clause 6.1 of Instructions to Bidders.
2. The Contract is a lump sum priced Contract, adjusted by the Price Variation Formula detailed in Clause 13 of Particular Condition of Contract, Part 3. The Works are divided into Price Schedules each representing one or more groups of inter-related works forming part of the Works. These price schedules shall cover the full compensation of the Contractor to design, construct, manufacture, supply, install, erect, prepare the project documents, commission, perform the tests on completion, defect liability, operate and maintain during the operating period etc.. all scopes of works in strict conformity with the Contract documents.
3. The individual item descriptions within each Price Schedules are indicative only of the Works included in this Contract and shall not be taken as defining the scope of work to be executed either under the Price Schedules or the Contract.
4. The item descriptions, if given, are general summaries only, therefore no omission from, or error in, item descriptions within this Pricing Document shall warrant an adjustment of the Contract Price nor entitle the Contractor to seek an extension of time under the Contract.
5. The lump sum for each Price Schedule shall be held to include all costs on materials, duties, landing charges, shipping costs for transport by air, sea or land (or any combination thereof), insurance, import taxes and duties, unloading, storage, getting into position, hoisting, lowering, distributing to positions, fixing, labour, materials, scaffolding and staging, plant, supervision, overhead charges, profit, making good prior to handing over to the Employer at the project site and anything reasonably to be inferred from the description of the item and indispensably necessary thereto.
6. The activity descriptions for items within Price Schedules shall be deemed to cover all aspects of the relevant item scope, irrespective of the fact that the Contractor may not have inserted an amount against any item description. The Price Value of each Price Schedule shall be deemed inclusive of all of the Contractor's obligations to execute the part of the Works covered by the Price Schedule and to perform all of his other obligations under the Contract in respect thereof. Additional rows have been provided in Price Schedules under each Price Centre to include additional items to be executed to complete the works fully to operate the 400 MLD plant smoothly. The Contractor shall not be entitled to receive any further or additional payment in respect of such Price Centers and Price Schedules.
7. The Schedule of Prices is divided into separate Schedules as follows:
 - Schedule No. 1: Design, Drawing and Documentation
 - Schedule No. 2: Civil Works
 - Schedule No. 3: Mechanical Works
 - Schedule No. 4: Electrical and Instrumentation Works,
 - Schedule No. 5: Laboratory Equipment

Schedule No. 6: Erection, Commissioning and Testing

Schedule No. 7: Process Proving

Schedule No. 8: Operation & Maintenance

Schedule No. 9: Grand Summary of Price Schedules

Schedule No. 9A: Grand Summary of Taxes and Duties

Schedule No. 10: Payment Schedule

Schedule No. 11: Dayworks

Schedule No. 12: Payment Terms

8. The Schedules do not generally give a full description of the Construction details, Plant and Materials to be supplied and the services to be performed under each item. The entered rates and prices shall be deemed to include for the full compliance with all provisions of the conditions of the Contract.
9. Schedule No.6 includes the cost for the installation, erection, commissioning and testing including initial performance test. All the cost of associated civil, mechanical, electrical. ICA and other construction work, items and materials are to be included under this schedule.
10. The Contactor is required to quote price for each and every item in the price schedule. The items and their quantities in this Price Schedule document are indicative only based on the Employer's experience. The Contractor may add the additional items to be costed as given in the schedules to complete the works fully functional as per the contract. He shall quote items and quantities sufficient to cover all plant exigencies to achieve the specified performance of the desalination plant.
11. The Contractor is to fill the costs in the Price Schedule (1-11) and provide the soft copy and hard copy of the excel sheet duly signed and sealed along with the price bid.
12. The Contractor shall provide all the spare parts supplied by the Manufacturer along with the new equipment purchased.

Declaration Sheet

DECLARATION SHEET

I, the undersigned,certify that all the data furnished in preceding schedules and information pertaining to Part-1 to Part-3 of this specification are correct and representation of the offer covered by our Bid Proposal No. dated I hereby certify that I am duly authorized representative of the bidder whose name appears above my signature.

Bidder's Name _____

Authorized representative's Signature _____

Authorized representative's Name _____

Bidder's Intent:

The bidder hereby agrees to comply with the requirements and intent of this specification for the price indicated.

Seal of Company

Signature of the Bidder _____

Name & Address of the Bidder _____

Date : _____

* Note : In case of consortium all the members should sign the bid proposal.

Summary of the Contract Price

Description	Total Cost in LC* (INR)	Total Cost in FC* (USD)
Schedule No. 1: Design, Drawing and Documentation		
Schedule No. 2: Civil, Works		
Schedule No. 3: Mechanical Works		
Schedule No. 4: Electrical and ICA Works,		
Schedule No. 5: Laboratory Equipment		
Schedule No. 6: Erection, Commissioning & Testing		
Schedule No. 7: Process Proving		
Schedule No. 8: Operation & Maintenance		
Schedule No. 9: Grand Summary of Price Schedule		
Schedule No. 9A: Taxes and Duties		

* Total Cost includes all costs including freight, insurance and taxes/duties for delivery to the project site.

Signature of Bidder : _____

Name : _____

Designation : _____

Place : _____

Date : _____

Company Seal

Schedule 1: Survey, Design, Drawings and Documentation

Item	Description for 400 MLD Plant	Quantity 2x200 MLD	Total Price (INR)*
1.1 Survey, Process, Design and Drawings			
1.1.1	Site survey, Bathymetric study, brine diffusion study and Subsoil	LS	
1.1.2	PFD, Mass balance, Process design calculations and P&IDs	LS	
1.1.3	Site layout plan, General arrangement drawings, Hydraulic diagram, Architectural drawings and Site grading plan	LS	
1.1.4	Site drainage, Yard piping and External plumbing etc.	LS	
1.1.5	Single line diagrams, Substations and Electrical drawings	LS	
1.1.6	Instrumentation & Control Systems	LS	
1.1.7	Functional Design Specification (FDS)	LS	
1.1.8	Ancillary Works	LS	
1.1.9	Any other works, as required (Specify items)	-	
	Sub Total Schedule 1.1		
1.2 Structural Designs and Drawings			
1.2.1	Intake and Outfall structures including headers and diffusers	LS	
1.2.2	Intake Pumping station including band screen and pumps	LS	
1.2.3	Pre-treatment Chemical Buildings + Tanks Storage area	LS	
1.2.4	Flash mixing and flocculation		
1.2.5	Lamella Settlers	LS	
1.2.6	DAFs	LS	
1.2.7	DMFs, Backwash tanks and Pump houses	LS	
1.2.8	RO Buildings and ancillary structures	LS	
1.2.9	RO Chemical Buildings	LS	
1.2.10	Permeate tanks and Neutralization tanks	LS	
1.2.11	Remineralization buildings and associate system	LS	
1.2.12	Product Water Tanks	LS	
1.2.13	Clear Water Tank	LS	
1.2.14	Post Treatment Chemical Buildings	LS	
1.2.15	Waste Sludge Balancing Tank with pumping system	LS	
1.2.16	Gravity Thickners	LS	
1.2.17	Sludge Holding Tank and thickened sludge Pump House	LS	
1.2.18	Sludge Treatment Building (BFP Building, along with ploymer dosing systems and BFP feed pumping system)	LS	
1.2.19	Administrative Building	LS	
1.2.20	Control Building with Laboratory	LS	
1.2.21	Warehouse and Workshop		
1.2.22	Sub Stations	LS	
1.2.23	Ancillary works and any other works, as required (Specify items)	LS	
	Sub Total Schedule 1.2		
1.3 Mechanical Designs and Drawings			
1.3.1	Intake Screen and Intake Pumps and Sluice gates	LS	
1.3.2	Flash mixers, flocculators, tubesettlers, valves, gates and dismantling joints at inlet structure, flocculation and Lamella	LS	
1.3.3	Pumps, valves, gates, dismantling joints at DAF	LS	
1.3.4	Backwash pumps at DMF		
1.3.5	Filter media, valves, gates, pipings and underdrain system at	LS	

Item	Description for 400 MLD Plant	Quantity 2x200 MLD	Total Price (INR)*
1.3.6	All mechanical equipment at pretreatment chemical buildings	LS	
1.3.7	All mechanical equipment including valves, gates, dismantling	LS	
1.3.8	All mechanical equipment at RO system	LS	
1.3.9	All mechanical equipment at RO chemical buildings	LS	
1.3.10	All mechanical equipment at CO2 Generator	LS	
1.3.11	All mechanical equipment at Limestone Filters	LS	
1.3.12	All mechanical equipment at post treatment chemical buildings	LS	
1.3.13	Valves, gates, dismantling joints at Product Water Tanks	LS	
1.3.14	Valves, gates, dismantling joints at CWR	LS	
1.3.15	Sludge Balancing Tank with Submersible Pumps	LS	
1.3.16	All mechanical equipment at Sludge Thickeners	LS	
1.3.17	All mechanical equipment at Thickened Sludge Holding Tank	LS	
1.3.18	All mechanical equipment at Belt Filter Press including Feed	LS	
1.3.19	Belt Filter Press and polymer dosing system	LS	
1.3.20	Sludge conveyance system	LS	
1.3.21	Ancillary works and any other works, as required (Specify Items)	LS	
	Sub Total Schedule 1.3		
1.4 Electrical Designs and Drawings			
1.4.1	Electrical Load List	LS	
1.4.2	Typical Earthing Details	LS	
1.4.3	Typical Lighting Fixture Details	LS	
1.4.4	Preliminary Equipment BOQ for DSP, & Sludge treatment	LS	
1.4.5	Relay coordination	LS	
1.4.6	Single Line Diagram	LS	
1.4.7	33/3.3 KV Transformer Sizing Calculation	LS	
1.4.8	3.3/0.433 KV Transformer Sizing Calculation	LS	
1.4.9	HV, MV & LV switchboard detailed design drawings	LS	
1.4.10	Capacitor Bank Sizing Calculation	LS	
1.4.11	Voltage Drop & Cable Sizing Calculation	LS	
1.4.12	Battery Charger Sizing Calculation	LS	
1.4.13	Voltage Dip Calculation for Starting of Highest Rating Motor on	LS	
1.4.14	Cable Routing & Trays Layout Drawing	LS	
1.4.15	Earthing layout Drawing	LS	
1.4.16	Lighting Layout Drawing	LS	
1.4.17	Power & Control Cable Schedule	LS	
1.4.18	Electrical Equipment data Sheet	LS	
1.4.19	Local Control Panel details	LS	
1.4.20	Substation GA Drawing	LS	
1.4.21	Switchgear Room GA Drawing	LS	
1.4.22	PMCC Room GA Drawing	LS	
1.4.23	MCC Room GA Drawing	LS	
1.4.24	Equipment layout design drawings	LS	
1.4.25	Heat dissipation and ventilation system sizing		
1.4.26	Any other works, as required(Specify items)	LS	
	Sub Total Schedule 1.4		

Item	Description for 400 MLD Plant	Quantity 2x200 MLD	Total Price (INR)*
1.5	Instrumentation, Control & Automation		
1.5.1	Instrument Schedule	LS	
1.5.2	PLC IO List	LS	
1.5.3	PLC System configuration	LS	
1.5.4	Instrument control panel design drawings		
1.5.5	Instrument data sheets	LS	
1.5.6	General Arrangement of PLC Panels	LS	
1.5.7	PLC system Power & Control Schematics	LS	
1.5.8	PLC system BOM	LS	
1.5.9	DCS system graphic designs	LS	
1.5.10	Block Logic Daigram	LS	
1.5.11	PLC and DCS System FAT Procedure	LS	
1.5.12	Instrument Cable Schedule	LS	
1.5.13	GA of Junction Boxes	LS	
1.5.14	GA of Pneumatic Control Boxes	LS	
1.5.15	Field instrument layout drawings	LS	
1.5.16	Instrument Hook ups	LS	
1.5.17	Any other works, as required(Specify items)	LS	
	Sub Total Schedule 1.5		
1.6 As			
1.6.1	Civil & Building works	LS	
1.6.2	Mechanical systems	LS	
1.6.3	Electrical system	LS	
1.6.4	Control, Instrumentation & Automation system	LS	
	Sub Total Schedule 1.6		
1.7 Other Documentation			
1.7.1	Process Design Basis Report	LS	
1.7.2	Design Basis Report - Electrical	LS	
1.7.3	Operation & Maintenance Manuals including Trouble Shooting	LS	
1.7.4	Training Programme and Manuals	LS	
1.7.5	Design and Process Details with excel sheets	LS	
1.7.6	Standard Operating Procedures	LS	
1.7.7	Any other document, as required	LS	
	Sub Total Schedule 1.7		
1.8	Bidder shall list here details of additional items required for the complete plant design, drawing and documentation as per the Contract.	LS	
	<i>Schedule 1 (Total Carried to Schedule 7, Grand Summary)</i>		

* The Cost includes all taxes and Duties

Signature of Bidder

Name & Designation

Company Name and Seal

Schedule 2: Civil Works

S. No.	Part	Supply and Construction of the Civil Works for 2 x 200 MLD Plant	Quantity 2x200 MLD	Taxes & Duties	Total Price in INR*
2.1	Intake and Outfall Structures				
	2.1.1	Civil Works for laying of Intake pipelines with Offshore Velocity Cap type Heads with all allied works at offshore intake	Lot		
	2.1.2	Civil Works for laying of Outfall pipeline with Offshore Diffusers and all allied works at brine outfall	Lot		
	2.1.3	Supply and construction of complete Intake Pumping Station including the band screen area and discharge piping to Flash mixer	Lot		
	2.1.4	Supply and construction of structures associated with Pigging System	Lot		
	2.1.5	Supply and construction of Outfall tank	Lot		
	2.1.6	Any other civil works (Specify Items to make complete system)			
	Sub Total of part 2.1				
2.2	Shock Chlorination and Air Impingement System				
	2.2.1	Supply and Construction of Building for shock chlorination dosing pumps, air compressors and air vessels with Hypochlorite storage tank.	Lot		
	2.2.2	Any other civil works (Specify Items to complete the system)			
	Sub Total of part 2.2				
2.3	Chemical Building for Pretreatment				
	2.3.1	Supply and Construction of Chemical Building for pretreatment with RCC solution preparation tanks and storage area for polymers and dosing pumps area for FeCl ₃ , polymer, acid and hypochlorite, bunds, overhead service water tank etc. and other facilities as required.	Lot		
	2.3.2	Any other civil works (Specify Items to complete the system)			
	Sub Total of part 2.3				
2.4	Coagulation and Flocculation System				
	2.4.1	Supply and Construction of Inlet-structure with baffles, flash mixing chambers with weirs, piping, valve & flowmeter chambers and walkway, handrails etc. as applicable	Lot		

S. No.	Part	Supply and Construction of the Civil Works for 2 x 200 MLD Plant	Quantity 2x200 MLD	Taxes & Duties	Total Price in INR*
	2.4.2	Supply and Construction of Flocculation Chambers with hopper drain system, walkway platform, handrails etc. as per Contract and complete in all respect.	Lot		
	2.4.3	Any other civil works (Specify Items to complete the system)			
	Sub Total of part 2.4				
2.5	Lamella Settler				
	2.5.1	Supply and Construction of Lamella Clarifier with tube settlers, hoppers drain system, walkway platform, handrails, pipes, valve & flowmeter chambers etc. as per Contract and complete in all respect.	Lot		
	2.5.2	Any other civil works (Specify Items to complete the system)			
	Sub Total of part 2.5				
2.6	DAF				
	2.6.1	Supply and Construction of DAF structure and building along with tanks, pipes, valve & flowmeter chambers and complete system as per the Contract.	Lot		
	2.6.2	Any other works (Specify Items to complete the system)			
	Sub Total of part 2.6				
2.7	DMF				
	2.7.1	Supply and Construction of DMF structure and building along with media tanks, underdrain system, pipes, valve & flowmeter chambers, inlet channel, filtrate channel and complete system in all respect as per the contract	Lot		
	2.7.2	Any other civil works (Specify Items to complete the system)			
	Sub Total of part 2.7				
2.8	DMF Backwash and RO Feed Tank				
	2.8.1	Supply and Construction of DMF backwash and RO feed tank structures, pumps and blower chambers, RO feed pumping station, any other tanks and valve/flowmeter chambers along with structure as needed.	Lot		
	2.8.2	Any other works (Specify Items to complete the system)			
	Sub Total of part 2.8				
2.9	RO System				

S. No.	Part	Supply and Construction of the Civil Works for 2 x 200 MLD Plant	Quantity 2x200 MLD	Taxes & Duties	Total Price in INR*
	2.9.1	Supply and Construction of Industrial Steel Structures to inhouse RO system along with CIP system with chemical storage and dosing system, MCC and all other areas as per the Contract.	Lot		
	2.9.2	Supply and Construction of permeate tanks as per the Contract.	Lot		
	2.9.3	Supply and Construction of neutralization tank as per the Contract.	Lot		
	2.9.4	Any other civil works (Specify Items to complete the system)			
	Sub Total of part 2.9				
2.10	Chemical Building for RO System				
	2.10.1	Supply and Construction of Chemical Building with chemical tanks and overhead service water tank and with sufficient area to accommodate all the dosing system, bunds, drain etc. and all other features.	Lot		
	2.10.2	Any other civil works (Specify Items to complete the system)			
	Sub Total of part 2.10				
2.11	Post Treatment System				
	2.11.1	Supply and Construction of CO2 storage areas with all pipes, valve/flowmeter chambers and any other structure as needed.	Lot		
	2.11.2	Supply and Construction of RCC Limestone Filter structure with areas for limestone storage and feeding, all pipes, valve/flowmeter chambers and any structure as needed.	Lot		
	2.11.3	Any other civil works (Specify Items to complete the system)			
	Sub Total of part 2.11				
2.12	Chemical Building for Post Treatment				
	2.12.1	Supply and Construction of Chemical Building with all the post treatment chemical tanks and overhead service water tank and with sufficient area to accommodate dosing system, bunds, drain, etc. and all other features.	Lot		
	2.12.2	Any other civil works (Specify Items to complete the system)			
	Sub Total of part 2.12				
2.13	Waste /Sludge Treatment and Conveyance System				

S. No.	Part	Supply and Construction of the Civil Works for 2 x 200 MLD Plant	Quantity 2x200 MLD	Taxes & Duties	Total Price in INR*
	2.13.1	Supply and Construction of Waste Sludge Balance Tank	Lot		
	2.13.2	Supply and Construction of Gravity Thickeners	Lot		
	2.13.3	Supply and Construction of Thickened Sludge Holding tanks	Lot		
	2.13.4	Supply and Construction of Sludge treatment building (BFP building), with sludge feed pump area, chemical storage and dosing areas and all other areas as required.	Lot		
	2.13.5	Any other civil works (Specify Items to complete the system)			
	Sub Total of part 2.13				
2.14	Product Water Tanks				
	2.14.1	Supply and Construction of Product Water Tanks	Lot		
	2.14.2	Any other civil works (Specify Items to complete the system)			
	Sub Total of part 2.14				
2.15	Clear Water Reservoir				
	2.15.1	Supply and Construction of RCC Clear Water Tank	Lot		
	2.15.2	Any other civil works (Specify Items to complete the system)			
	Sub Total of part 2.15				
2.16	Electrical Building and MCC for complete plant				
	2.16.1	Supply and Construction of substation building including Switchyard & Transformer area	Lot		
	2.16.2	Supply and Construction of MCC Rooms for complete plant	Lot		
	2.16.3	Any other civil works (Specify Items to complete the system)			
	Sub Total of part 2.16				
2.17	Administration and Control Buildings				
	2.17.1	Supply and Construction of Administrative building including Canteen area and guest house	Lot		
	2.17.2	Supply and Construction of Plant Control and Laboratory building	Lot		
	2.17.3	Any other civil works (Specify Items to complete the system)			
	Sub Total of part 2.17				
2.18	Warehouse and Workshop				
	2.18.1	Supply and Construction of Warehouse - Industrial Steel Structure	Lot		
	2.18.2	Supply and Construction of Workshop - Industrial Steel Structure	Lot		

S. No.	Part	Supply and Construction of the Civil Works for 2 x 200 MLD Plant	Quantity 2x200 MLD	Taxes & Duties	Total Price in INR*
	2.18.3	Any other civil works (Specify Items to complete the system)			
	Sub Total of part 2.18				
2.19	Sewage Treatment Plant				
	2.19.1	Supply and Construction of sewage treatment plant Building	Lot		
	2.19.2	Supply and Construction of all tanks for the treatment plants	Lot		
	2.19.3	Any other civil works (Specify Items to complete the system)			
	Sub Total of part 2.19				
2.2	Misc. Works at Site				
	2.20.1	Site clearance, filling etc., as specified	Lot		
	2.20.2	Backfilling of the site to bring uniform ground level at CD+6.5	Lot		
	2.20.3	Design and Construction of the min 3m high RCC boundary around the plant site	Lot		
	2.20.4	Supply and Construction of two Plant Gates and Security houses	Lot		
	2.20.5	Any other works (Specify Items to complete the system)			
	Sub Total of part 2.20				
2.21	Roads and Drainage				
	2.21.1	Supply and Construction of all Roads and paths etc. as specified at per the plant layout	Lot		
	2.21.2	Supply and Construction of Site storm water drainage system as required including connection to existing system	Lot		
	2.21.3	Plantation, Landscaping as specified	Lot		
	2.21.4	All yard pipe works not covered above	Lot		
	2.21.5	Supply and Construction of Firefighting Rooms for complete plant	Lot		
	2.21.6	Any other works (Specify Items)			
	Sub Total of part 2.21				

S. No.	Part	Supply and Construction of the Civil Works for 2 x 200 MLD Plant	Quantity 2x200 MLD	Taxes & Duties	Total Price in INR*
2.22	The Bidder shall list here details of any additional items (all area of the works) required in Civil Construction works for the Desalination Plant as per the Contract Specifications				
	2.22.1				
	2.22.2				
	Sub Total of part 2.22				
	Total Schedule 2				
	(Sub Total 2.1 to 2.22)				
	Schedule 2 (Total Carried to Schedule 9, Grand Summary)				

* The Cost includes all taxes and duties

Signature of Bidder

Name & Designation

Company Name and Seal

Schedule 3: Mechanical Works

Item No.	Description of Items to be Procured & Supplied for 2x200 MLD Plant			Local Supply		International Supply	
		Unit	Qty	GST	Total Price* (INR)	Excise Duties	Total CIF Price* (USD)
1	2	3	4	5	6	7	8
3.1	Intake and Outfall (400 MLD)						
3.1.1	2 x 2500 mm OD HDPE	Lot					
3.1.2	2500 mm OD HDPE	Lot					
3.1.3	Isolation Gates for Intake and Outfall	Lot					
3.1.4	Duplex Steel Frame and Cu-Ni Screen with 100 mm C/c opening (2 Screens) for Offshore Velocity Cap type Heads	Lot					
3.1.5	GRP Diffusers	Lot					
3.1.6	Fish net around the intake head	Lot					
	Shock chlorination for offshore Heads including injection system, piping, valves and all allied items.	Lot					
3.1.7	Compressed air system including compressors, pressure vessels, piping etc. for offshore Heads	Lot					
3.1.8	Any other works (Specify Items to complete the system)						
3.2	Intake Pumping Station (400 MLD)						
3.2.1	On shore Travelling band screen with 3mm mesh (3W +1 S)	Lot					
3.2.2	Vertical Turbine Intake Sea Water Pumps (6W+2S) made of Super Duplex with PREN≥41 including Electric Motor complete with intake, outlet and nonreturn valves, dismantling joints, pipings etc.	Lot					

Item No.	Description of Items to be Procured & Supplied for 2x200 MLD Plant			Local Supply		International Supply	
		Unit	Qty	GST	Total Price* (INR)	Excise Duties	Total CIF Price* (USD)
1	2	3	4	5	6	7	8
3.2.3	Pigging Systems complete in all respect for intake pipeline cleaning with pig launching and receiving system having two Pigs	Lot					
3.2.4	Any other works (Specify Items to complete the system)						
3.3	Pre-treatment Chemical Systems (2x200 MLD)						
3.3.1	98% Sulphuric Acid bulk Storage tank : Cylindrical horizontal dished end carbon steel (IS 2062) tanks (2 tanks), internally ebonite Lined & externally coated with epoxy paint, complete with dosing system facility, transfer/unloading pumps, scrubbers,etc. and all other associated structures and features to complete the system.	Lot					
3.3.2	Supply and Construction of GRP tanks for FeCl ₃ and hypochlorite storage (2 tanks for each chemical for total 1 month storage) with transfer/onloading pumps and scrubbers, and all other associated structures and features to complete the system						
3.3.3	FeCl ₃ dosing system with pumps, agitators, valves, strainers, EOT crane and equipment complete in all respect for automatic chemical dosing as per the contract	Lot					
3.3.4	Polymer dosing system with pumps, agitators, valves, strainers, EOT, powder polymer transfer system using ejector and equipment complete in all respect for automatic chemical dosing as per the contract	Lot					
3.3.5	Any other works (Specify Items to complete the system)						

Item No.	Description of Items to be Procured & Supplied for 2x200 MLD Plant			Local Supply		International Supply	
		Unit	Qty	GST	Total Price* (INR)	Excise Duties	Total CIF Price* (USD)
1	2	3	4	5	6	7	8
3.4	Pre-treatment Process Units (2 x 200MLD)						
3.4.1	Coagulation and flocculation system including flash mixer, flocculator mixers complete with all associated piping and valves, gates, sludge disposal facility etc.	Lot					
3.4.2	Lamella Settlers including all associated piping and valves, gates, sludge disposal facility etc.	Lot					
3.4.3	Dissolved Air Floatation, complete with pressurized vessel, recycle pumps and all associated valves, pipes, sludge disposal facility etc. in totality	Lot					
3.4.4	Dual Media Filtration, complete in totality including backwash pumps and blowers, and all associated valves and equipments required for its fully automated operations.	Lot					
3.4.5	Any other works (Specify Items to complete the system)						
3.5	DMF Backwash and RO Feed Tank (2 x 200 MLD)						
3.5.1	DMF backwash and RO feed tank - complete in totality including all valves and gates along with any equipment needed as per the Contract.						
3.5.2	Any other works (Specify Items to complete the system)						
3.6	RO Skids, Chemical Dosing and CIP System (2 x 200 MLD)						
3.6.1	Cartridge Filters including housing and complete with all valves and piping, drain, vents, plugs, foundation bolts, leg supports, static mixers etc.	Lot					
3.6.2	RO skids/trains all items to complete the skids	Nos.					

Item No.	Description of Items to be Procured & Supplied for 2x200 MLD Plant			Local Supply		International Supply	
		Unit	Qty	GST	Total Price* (INR)	Excise Duties	Total CIF Price* (USD)
1	2	3	4	5	6	7	8
3.6.3	Reverse Osmosis 8" membranes	Nos.					
3.6.4	Pressure Vessel for RO membranes including Super Duplex coupling.	Nos.					
3.6.5	Antiscalant, SMBS, Caustic Soda and any other chemicals bulk storage tanks and dosing Systems including pumps, valves, strainers, piping, EOT crane and all other equipment complete in all respect for automated chemical dosing.	Lot					
3.6.6	RO Booster Pumps with Impeller, casing, shaft Super Duplex with PERN \geq 41. Motor, VFD complete with all piping and valves.	Nos.					
3.6.7	RO high pressure pumps with impeller, casing, shaft Super Duplex (2507) with PERN \geq 43. Motor, VFD complete with all piping and valves.	Nos.					
3.6.8	ERD Feed Pumps with Impeller, casing, shaft Super Duplex with PERN \geq 41. Motor, VFD (if required) complete with all piping and valves.	Nos.					
3.6.9	ERD Recirculation Pumps with Impeller, casing, shaft Super Duplex with PERN \geq 43. Motor, VFD (if required) complete with all piping and valves.	Nos.					
3.6.10	Energy Recovery Device (ERD) - pipe headers, flanges, U clamps, fasteners, Victaulic coupling for making connections complete in all respects including anchor foundation bolts etc.	Nos.					

Item No.	Description of Items to be Procured & Supplied for 2x200 MLD Plant			Local Supply		International Supply	
		Unit	Qty	GST	Total Price* (INR)	Excise Duties	Total CIF Price* (USD)
1	2	3	4	5	6	7	8
3.6.11	Cleaning in Place (CIP) system complete in totality with heater, pumps, valves and piping etc. and all equipment needed for fully automated process.	Lot					
3.6.12	Permeate Tank and Flushing system - complete in totality including all pumps, valves, gates, pipes along with any equipment and ancillaries needed as per the Contract.	Lot					
3.6.13	Neutralization system - complete in totality including all valves, gates, pipes, mixers along with any equipment and ancillaries needed as per the Contract.	Lot					
3.6.14	Any other works (Specify Items to complete the system)						
3.7	Post Treatment System (2 x 200 MLD)						
3.7.1	Lime filters along with auto lime charging system complete in all respect for auto operation	Lot					
3.7.2	Lime filters backwash pumping and blower system complete in all respect for auto operation						
3.7.3	CO2 generator and storage vessels	Lot					
3.7.4	CO2 Dosing System comprising of CO2 filter, Flow regulating valve, Automatic shut off valve, Manual shut off valve, Pressure reducing valve, Safety valves, Discharge valve, Limit switches, automatic change over planes, all mounted on a stainless steel base frame CO2 Flow meter System, Mass flow sensor (fully calibrated) assembled to process pipe As per designed pipe size and pressure ranges.	Lot					

Item No.	Description of Items to be Procured & Supplied for 2x200 MLD Plant			Local Supply		International Supply	
		Unit	Qty	GST	Total Price* (INR)	Excise Duties	Total CIF Price* (USD)
1	2	3	4	5	6	7	8
3.7.5	Caustic storage, dosing system with all pumps, valves, pipes, EOT and all equipment for auto chemical dosing	Lot					
3.7.6	Hypochlorite storage, dosing system with all pumps, valves, pipes, EOT and all other equipment for auto chemical dosing	Lot					
		Lot					
3.8	Product Water Tanks, CWR and Outfall Tank	Lot					
3.8.1	Product Water Tanks, CWR and Outfall Tank - all mechanical works complete in totality including all valves, gates, piping along with any equipment needed as per the Contract.	Lot					
3.8.2	Any other works (Specify Items to complete the system)						
3.9	Waste /Sludge Conveyance and Treatment System						
3.9.1	Waste Sludge Balance Tank - all mixer, submersible pumps, valves, static mixer etc.	Lot					
3.9.2	Gravity Thickeners - all mechanical system, including valves, pipes, rotating bridge with mixer and sludge scraping system,	Lot					
3.9.3	Thickened Sludge Holding tank - all mechanical system, including valves, pipes, mixer and BFP feed pumps	Lot					
3.9.4	BFP system - BFP units complete in all respect for auto operation producing 25% consistent solid chips.	Lot					
3.9.5	Chemical dosing system i.e. polymer for thickener and BFP complete in all respect.	Lot					
3.9.6	Any other works (Specify Items to complete the system)	Lot					
3.10	Miscellaneous						

Item No.	Description of Items to be Procured & Supplied for 2x200 MLD Plant			Local Supply		International Supply	
		Unit	Qty	GST	Total Price* (INR)	Excise Duties	Total CIF Price* (USD)
1	2	3	4	5	6	7	8
3.10.1	Mechanical works for Air Compressor, Air Conditioning & Ventilation System including Cooling tower etc. as required in all buildings and covered structures.	Lot					
3.10.2	Fire Detection and Protection System in all building and covered places. Fire Fighting vehicles, pumps, pipes and associated items.	Lot					
3.10.3	Maintenance Bay Equipment (EOT Cranes, Hoist & Monorails etc.) as needed in all buildings and Industrial structures	Lot					
3.10.4	Building Services including domestic water systems. The Bidder shall list here details of any additional items required for a complete installation	Lot					
3.10.5	Workshop items	Lot					
	Mechanical equipment at sewage treatment						
3.10.5	Other Miscellaneous Equipment / Items / System not mentioned above but as required in Employers Requirement Volume- 2	Lot					
3.11	Bidders shall list here details of any additional items required for a complete system for smooth automatic operation of the 2x200 MLD desalination plant						
3.11.1							
3.11.2							
3.11.3							

Item No.	Description of Items to be Procured & Supplied for 2x200 MLD Plant			Local Supply		International Supply	
		Unit	Qty	GST	Total Price* (INR)	Excise Duties	Total CIF Price* (USD)
1	2	3	4	5	6	7	8
3.12	Building Services for water supply and other mechanical works requirements. The Bidder shall list below details of items required for a complete installation at all buildings						
3.12.1							
3.12.2							
3.12.3							
T.	GRAND TOTAL						

Note:

* The Cost includes all taxes, duties, insurance, and transportation etc. charges of equipment delivery at project site. It excludes the exempted Excise Duty admissible under notification 12/2012-Central Excise Dated 17.03.2012. Also refer Instructions to Bidder Clause 14.3 (b).

Signature of Bidder

Name & Designation

Company and Seal

Schedule 4: Electrical and ICA Works

Item No.	Description of Items to be Procured & Supplied for 2x200 MLD Plant			Local Supply		International Supply	
		Unit	Qty	GST	Total Price* (INR)	Excise Duties	Total CIF Price* (USD)
1	2	3	4	5	6	7	8
4.1	Intake and Outfall (400 MLD)						
4.1.1	All electrical works at Intake and Outfall system	Lot					
4.1.2	All instrumentation and control works as per the contract at intake and outfall system including flow meters, air bursting, shock chlorination system and chlorine dosing to intake pump discharge.	Lot					
4.1.3	Any other works (Specify Items to complete the system)						
4.2	Intake Pumping Station (400 MLD)						
4.2.1	All electrical works at Intake pumping station including pigging system	Lot					
4.2.2	All instrumentation control and automation (ICA) works as per the contract including pH, Temp, Chlorine, Conductivity, Turbidity, flowmeters etc. and all other analysers as per the contract	Lot					
4.2.3	Any other works (Specify Items to complete the system)						
4.3	Pre-treatment Chemical Systems (2x200 MLD)						
4.3.1	All electrical works at pretreatment chemical system as per the contract including sulfuric acid, ferric chloride, polymer dosing system	Lot					
4.3.2	All ICA works including flowmeters as per the contract for all pretreatment chemical dosing system	Lot					

Item No.	Description of Items to be Procured & Supplied for 2x200 MLD Plant			Local Supply		International Supply	
		Unit	Qty	GST	Total Price* (INR)	Excise Duties	Total CIF Price* (USD)
1	2	3	4	5	6	7	8
4.3.3	Any other works (Specify Items to complete the system)						
4.4	Pre-treatment Process Units (2 x 200MLD)						
4.4.1	All electrical works as per the contract at pretreatment units including flash mixer, flocculation tanks, lamella settlers, DAF and DMF units	Lot					
4.4.2	All ICA works as per the contract for all pretreatment process units including filter consoles, level & flow meters, sensors and transmitters complete in all respect for auto operation.	Lot					
4.4.3	Any other works (Specify Items to complete the system)						
4.5	DMF Backwash and RO Feed Tank (2 x 200 MLD)	Lot					
4.5.1	All electrical works as per the contract at RO feed tank.	Lot					
4.5.2	All ICA works as per the contract for RO feed Tank	Lot					
4.5.3	Any other works (Specify Items to complete the system)	Lot					
4.6	RO Skids and CIP System (2 x 200 MLD)						
4.6.1	All electrical works as per the contract at RO system including CIP tank, permeate tank neutralization tank etc.	Lot					
4.6.2	All ICA works as per the contract at RO system, CIP tank, permeate tank, neutralization tank including flowmeters, analysers such as chlorine, turbidity, Boron, conductivity, TSS, SDI, ORP etc. as per the contract.	Lot					
4.6.3	Any other works (Specify Items to complete the system)						

Item No.	Description of Items to be Procured & Supplied for 2x200 MLD Plant			Local Supply		International Supply	
		Unit	Qty	GST	Total Price* (INR)	Excise Duties	Total CIF Price* (USD)
1	2	3	4	5	6	7	8
4.7	Post Treatment System (2 x 200 MLD)						
4.7.1	All electrical works as per the contract at CO2 generator, CO2 storage and dosing system and Limestone filters, Caustic dosing storage and system along with auto lime charging system complete in all respect for auto operation	Lot					
4.7.2	All ICA works as per the contract at CO2 system and Limestone filters and Caustic system including flowmeters, analysers such as chlorine, conductivity, hardness, pH etc.	Lot					
4.7.3	Any other works (Specify Items to complete the system)						
4.8	Product Water Tanks, CWR and Outfall Tank						
4.8.1	All electrical works as per the contract at product water tanks, CWR and outfall tanks.	Lot					
4.8.2	All ICA works as per the contract at product water tanks, CWR and outfall tanks.	Lot					
4.8.3	Any other works (Specify Items to complete the system)						
4.9	Waste /Sludge Conveyance and Treatment System						
4.9.1	All electrical works as per the contract at sludge balance tank, thickeners, sludge holding tanks and BFP building including polymer ejector	Lot					
4.9.2	All ICA works including flowmeters and analysers as per the contract at sludge balance tank, thickeners, sludge holding tanks and BFP building including polymer ejector loading system	Lot					
4.9.3	Any other works (Specify Items to complete the system)						

Item No.	Description of Items to be Procured & Supplied for 2x200 MLD Plant			Local Supply		International Supply	
		Unit	Qty	GST	Total Price* (INR)	Excise Duties	Total CIF Price* (USD)
1	2	3	4	5	6	7	8
4.10	Substation						
4.10.1	110 KV/11 KV GIS substation in totality including transformers etc.	Lot					
4.10.2	Auxiliary Transformers for LV Services (11kv/433 V)	Lot					
4.10.3	11 KV Switchgear	Lot					
4.10.4	HV and LV Switchgear.	Lot					
4.10.5	MV & LV Bus Duct	Lot					
4.10.6	Cabling, Grounding & Lightning Protection	Lot					
4.10.7	Communication System	Lot					
4.10.8	Illumination & Power Supply System	Lot					
4.10.9	Control & Instrumentation including all instruments	Lot					
4.10.10	Any other works (Specify Items to complete the system)						
4.11	Miscellaneous						
4.11.1	Electrical and ICA works for Air Compressor, Air Conditioning & Ventilation System including Cooling tower etc. as required in all buildings and covered structures.	Lot					
4.11.2	Fire Detection and Protection System in all building and covered places.	Lot					
4.11.3	Electrical and ICA works at sewage treatment system	Lot					
4.11.4	All electrical and ICA system for the plant security system including gate security, plant monitoring and access system.	Lot					

Item No.	Description of Items to be Procured & Supplied for 2x200 MLD Plant			Local Supply		International Supply	
		Unit	Qty	GST	Total Price* (INR)	Excise Duties	Total CIF Price* (USD)
1	2	3	4	5	6	7	8
4.11.5	All electrical and ICA system at the administrative building and all other buildings	Lot					
4.11.6	All plant lighting system including plant earthing and lightning protection system	Lot					
4.11.7	Other Miscellaneous Equipment / Items / System not mentioned above but as required in Employers Requirement Volume- 2	Lot					
4.12	Bidders shall list here details of any additional items required for a complete electrical and ICA system for smooth and automatic operation of the 400 MLD plant						
4.12.1							
4.12.2							
4.12.3							
	GRAND TOTAL						

Note: * The Cost includes all taxes, duties, insurance, and transportation etc. charges of equipment delivery at project site. It excludes the exempted Excise Duty admissible under notification 12/2012-Central Excise Dated 17.03.2012. Also refer Instructions to Bidder Clause 14.3 (b).

Signature of Bidder

Name & Designation

Company and Seal

Schedule 5: Laboratory Items

Item No.	Description of Items to be Procured			Unit Cost* (INR/USD)	Local Supply		International Supply	
		Unit	Qty		GST	Total Price* (INR)	Excise Duties	Total CIF Price* (USD)
1	2		3	4	5	6=3x4	7	8=3x4
1	Electronic Balance	No	4					
2	Bunsen Electric Heater	No	4					
3	Magnetic Stirrer - 1MLH	No	4					
4	Water bath with 6 to 8 concentric holes and discs, electrically heated	No	2					
5	Muffle Furnace	No	2					
6	Color Comparator –	No	2					
7	Centrifuge system	Set	2					
8	Turbidity meter	No	4					
9	Autoclave	No	2					
10	Coagulation-Flocculation Simulator	No	2					
11	COD Assembly	No	2					
12	Distilled water plant	No	2					
13	ORBECO Analytical System	No	2					
14	ORBECO HELIGE -975MP	No	2					
15	Electric Oven	No	2					
16	BOD Incubator	No	2					
17	TDS meter	No	4					
18	Spectrophotometer- UV-UIS Spectrophotometer Latest Unit	No	2					

Item No.	Description of Items to be Procured			Unit Cost* (INR/USD)	Local Supply		International Supply	
		Unit	Qty		GST	Total Price* (INR)	Excise Duties	Total CIF Price* (USD)
1	2		3	4	5	6=3x4	7	8=3x4
19	Potable kit for pH/ORP/ Cond/TDS/Temp/DO meters		4					
20	Weight Balance	No	4					
21	pH meter- pH Scan2	No	4					
22	Refrigerator and Freezer, 360 lts capacity of approved make	No	2					
23	Burette, Pipette, Flask	Set	50					
24	Measuring Cylinders (1000 ml, 500 ml, 200 ml, 100 ml, 50 ml, 25 ml)	Set	6					
25	Chlorine analyzer (comparator)	No	4					
26	Conductivity meter	No	4					
27	Mercury Ioniser	No	2					
28	Dissolved Oxygen Meter	No	4					
29	Colony counter	No	2					
30	Membrane Filtration Assembly	No	2					
31	Binocular Microscope	No	2					
32	Jar test apparatus	No	2					
33	Sampling Bottles (Reagent Bottles of 250 ml Capacity)	No	100					
34	Wire Baskets		10					
35	Suction Flask (1litre capacity)	No	4					
36	All types of laboratory glassware, accessories and other consumables and reagents for minimum two year requirement.	No	Lot					

Item No.	Description of Items to be Procured			Unit Cost* (INR/USD)	Local Supply		International Supply	
		Unit	Qty		GST	Total Price* (INR)	Excise Duties	Total CIF Price* (USD)
1	2		3	4	5	6=3x4	7	8=3x4
	<i>Total to be carried to Schedule 7 Grand Summary</i>							

Note: * The Cost includes all taxes, duties, insurance, and transportation etc. charges of equipment/items delivery at project site. It excludes the exempted Excise Duty admissible under notification 12/2012-Central Excise Dated 17.03.2012. Also refer Instructions to Bidder Clause 14.3 (b).

Signature of Bidder

Name & Designation

Company and Seal

Schedule 6: Erection, Testing, Pre-Commissioning & Commissioning

Item No.	Description	Amount for Erection, Testing, & Commissioning Local Currency (INR)*	Amount for Erection, Testing, & Commissioning Foreign Currency(USD)*
	1	2	3
1	Intake/Outfall Facilities Offshore with all allied works at offshore intake/outfall		
2	Intake Facilities Onshore along with pumps		
3	Coagulation and flocculation system		
4	Pre-Treatment chemical dosing systems		
5	Lamella Clarifiers		
6	DAFs		
7	DMF with RO feed Tanks		
8	Reverse Osmosis with CIP system and Neutralization Tank		
9	RO Chemical dosing systems		
10	RO permeate tanks		
11	Post Treatment - CO2 Systems and Limestone Filters		
12	Disinfection Chlorination system and pH adjustment		
13	Product water tanks		
14	Clear water tank		
15	Outfall tank		
16	Electrical substations		
17	Workshop and Warehouse		
18	Administrative Building		

Item No.	Description	Amount for Erection, Testing, & Commissioning Local Currency (INR)*	Amount for Erection, Testing, & Commissioning Foreign Currency(USD)*
	1	2	3
19	Control Building		
20	Other Miscellaneous Equipment / Items / System not mentioned above		
21	Other Miscellaneous Civil works / installation works		
22	Initial Performance Test for 15 days		
	<i>Chemical Cost (based on process guarantee)</i>		
	<i>Electrical Cost (based on process guarantee)</i>		
	<i>Labour</i>		
	<i>Misc.</i>		
23	Any other expenses for commissioning		
	GRAND TOTAL (Total from 1-23)		

* The Cost includes all taxes, duties, insurance, transportation etc.

Signature of Bidder

Name & Designation

Company and Seal

Schedule 7: Process Proving of 400 MLD Chennai Seawater Desalination Plant at Perur

Item	Description	Unit	Guaranteed Quantity	Unit Rate (INR)*	GST (INR)	Total Price (INR)*
(1)	(2)	(3)	(4)	(5)	(6)	(7) = (4) x (5)
1	First month					
1.1	Power Usage	kWh/month		7.5*		
1.2	Chemical Usage					
(a)	Hypochlorite for Shock Chlorination	Kg / month				
(b)	Hypochlorite for Pre Chlorination	Kg / month				
(c)	Sulfuric acid for Pre-Chlorination	Kg / month				
(d)	FeCl3 solution dosing (40%)	Kg / month				
(e)	Anionic Polymer dosing for flocculation (Food grade)	Kg / month				
(f)	Cationic Polymer for Thickener	Kg / month				
(g)	Cationic Polymer for BFP (Non Food grade)	Kg / month				
(h)	Antiscalant	Kg / month				
(i)	Sodium Bisulphite	Kg / month				
(j)	Any other chemical for biofouling control	Kg / month				
(k)	CO2 for remineralization	Kg / month				
(l)	CaCO3 for remineralization	Kg / month				
(m)	Hypochlorite for Post Chlorination	Kg / month				
(n)	NaOH for pH adjustment pre/post RO system	Kg / month				
(o)	Citric Acid for CIP	Kg / month				
(p)	HCl for CIP	Kg / month				
(q)	NaOH for CIP	Kg / month				
(r)	HCl for Neutralization after CIP	Kg / month				
(s)	NaOH for Neutralization after CIP	Kg / month				
(t)	Any other Chemical	Kg / month				
1.3	Transportation of Sludge	Per month				

Item	Description	Unit	Guaranteed Quantity	Unit Rate (INR)*	GST (INR)	Total Price (INR)*
(1)	(2)	(3)	(4)	(5)	(6)	(7) = (4) x (5)
1.4	Manpower	Per month				
1.5	Lumpsum O & M Cost (Others) e.g. Asset Replacement	Per year				
	Bidder shall provide a list of Asset Replacement items with cost					
	List of items (Indicate USD where applicable)					
1.6	Sub Total - First year					
2	2nd Month					
2.1	Power Usage	kWh/month		7.5*		
2.2	Chemical Usage					
(a)	Hypochlorite for Shock Chlorination	Kg / month				
(b)	Hypochlorite for Pre Chlorination	Kg / month				
(c)	Sulfuric acid for Pre-Chlorination	Kg / month				
(d)	FeC13 solution dosing (40%)	Kg / month				
(e)	Anionic Polymer dosing for flocculation (Food grade)	Kg / month				
(f)	Cationic Polymer for Thickener	Kg / month				
(g)	Cationic Polymer for BFP (Non Food grade)	Kg / month				
(h)	Antiscalant	Kg / month				
(i)	Sodium Bisulphite	Kg / month				
(j)	Any other chemical for biofouling control	Kg / month				
(k)	CO2 for remineralization	Kg / month				
(l)	CaCO3 for remineralization	Kg / month				
(m)	Hypochlorite for Post Chlorination	Kg / month				
(n)	NaOH for pH adjustment pre/post RO system	Kg / month				
(o)	Citric Acid for CIP	Kg / month				
(P)	HCl for CIP	Kg / month				

Item	Description	Unit	Guaranteed Quantity	Unit Rate (INR)*	GST (INR)	Total Price (INR)*
(1)	(2)	(3)	(4)	(5)	(6)	(7) = (4) x (5)
(q)	NaOH for CIP	Kg / month				
(r)	HCl for Neutralization after CIP	Kg / month				
(s)	NaOH for Neutralization after CIP	Kg / month				
(t)	Any other Chemical	Kg / month				
2.3	Transportation of Sludge	Per month				
2.4	Manpower	Per month				
2.5	Lumpsum O & M Cost (Others) e.g. Asset Replacement	Per year				
	Bidder shall provide a list of Asset Replacement items with cost					
	List of items (Indicate USD where applicable)					
2.6	Sub Total - Second month					
3	3rd Month					
3.1	Power Usage	kWh/month		7.5*		
3.2	Chemical Usage					
(a)	Hypochlorite for Shock Chlorination	Kg / month				
(b)	Hypochlorite for Pre Chlorination	Kg / month				
(c)	Sulfuric acid for Pre-Chlorination	Kg / month				
(d)	FeCl3 solution dosing (40%)	Kg / month				
(e)	Anionic Polymer dosing for flocculation (Food grade)	Kg / month				
(f)	Cationic Polymer for Thickener	Kg / month				
(g)	Cationic Polymer for BFP (Non Food grade)	Kg / month				
(h)	Antiscalant	Kg / month				
(i)	Sodium Bisulphite	Kg / month				

Item	Description	Unit	Guaranteed Quantity	Unit Rate (INR)*	GST (INR)	Total Price (INR)*
(1)	(2)	(3)	(4)	(5)	(6)	(7) = (4) x (5)
(j)	Any other chemical for biofouling control	Kg / month				
(k)	CO2 for remineralization	Kg / month				
(l)	CaCO3 for remineralization	Kg / month				
(m)	Hypochlorite for Post Chlorination	Kg / month				
(n)	NaOH for pH adjustment pre/post RO system	Kg / month				
(o)	Citric Acid for CIP	Kg / month				
(P)	HCl for CIP	Kg / month				
(q)	NaOH for CIP	Kg / month				
(r)	HCl for Neutralization after CIP	Kg / month				
(s)	NaOH for Neutralization after CIP	Kg / month				
(t)	Any other Chemical	Kg / month				
3.3	Transportation of Sludge	Per month				
3.4	Manpower	Per month				
3.5	Lumpsum O & M Cost (Others) e.g. Asset Replacement Bidder shall provide a list of Asset Replacement items with cost	Per year				
	List of items (Indicate USD where applicable)					
3.6	Sub Total - Third Month					

* The Cost includes all taxes, duties, insurance and transportation.

Signature of Bidder

Name & Designation

Company and Seal

Schedule 8: Operation and Maintenance of 400 MLD Chennai Seawater Desalination Plant at Perur

The following O&M expenditure sheet is required to be filled by the Bidders for 20 years of O&M Period (1 to 20 sheets).

Item	Description	Unit	Guaranteed Quantity	Unit Rate (INR)*	GST (INR)	Total Price (INR)*
(1)	(2)	(3)	(4)	(5)	(6)	(7) = (4) x (5)
1	First year					
1.1	Power Usage	kWh/month		7.5*		
1.2	Chemical Usage as supplied					
(a)	Hypochlorite for Shock Chlorination	tonnes /year				
(b)	Hypochlorite for Pre Chlorination	tonnes /year				
(c)	Sulfuric acid for Pre-Chlorination	tonnes /year				
(d)	FeCl ₃ solution dosing (40%)	tonnes /year				
(e)	Anionic Polymer dosing for flocculation (Food grade)	tonnes /year				
(f)	Cationic Polymer for Thickener	tonnes /year				
(g)	Cationic Polymer for BFP (Non Food grade)	tonnes /year				
(h)	Antiscalant	tonnes /year				
(i)	Sodium Bisulphite	tonnes /year				
(j)	Any other chemical for biofouling control	tonnes /year				
(k)	CO ₂ for remineralization	tonnes /year				
(l)	CaCO ₃ for remineralization	tonnes /year				
(m)	Hypochlorite for Post Chlorination	tonnes /year				
(n)	NaOH for pH adjustment pre/post RO system	tonnes /year				
(o)	Citric Acid for CIP	tonnes /year				
(p)	HCl for CIP	tonnes /year				
(q)	NaOH for CIP	tonnes /year				
(r)	HCl for Neutralization after CIP	tonnes /year				
(s)	NaOH for Neutralization after CIP	tonnes /year				
(t)	Any other Chemical	tonnes /year				

1.3	Transportation of Sludge	Per year				
1.4	Manpower	Per year				
1.5	Lumpsum O & M Cost (Others) e.g. Asset Replacement Bidder shall provide a list of Asset Replacement items with cost	Per year				
	List of items (Indicate USD where applicable)					
1.6	Sub Total - First year					

* The Cost includes all taxes, duties, insurance and transportation.

Signature of Bidder

Name & Designation

Company and Seal

The following O&M expenditure sheet is required to be filled by the Bidders for 20 years of O&M Period (1 to 20 sheets).

Item	Description	Unit	Guaranteed Quantity	Unit Rate (INR)*	GST (INR)	Total Price (INR)*
(1)	(2)	(3)	(4)	(5)	(6)	(7) = (4) x (5)
2	Second year					
2.1	Power Usage	kWh/month		7.5*		
2.2	Chemical Usage as supplied					
(a)	Hypochlorite for Shock Chlorination	tonnes /year				
(b)	Hypochlorite for Pre-Chlorination	tonnes /year				
(c)	Sulfuric acid for Pre-Chlorination	tonnes /year				
(d)	FeCl ₃ solution dosing (40%)	tonnes /year				
(e)	Anionic Polymer dosing for flocculation (Food grade)	tonnes /year				
(f)	Cationic Polymer for Thickener	tonnes /year				
(g)	Cationic Polymer for BFP (Non Food grade)	tonnes /year				
(h)	Antiscalant	tonnes /year				
(i)	Sodium Bisulphite	tonnes /year				
(j)	Any other chemical for biofouling control	tonnes /year				
(k)	CO ₂ for remineralization	tonnes /year				
(l)	CaCO ₃ for remineralization	tonnes /year				
(m)	Hypochlorite for Post Chlorination	tonnes /year				
(n)	NaOH for pH adjustment pre/post RO system	tonnes /year				
(o)	Citric Acid for CIP	tonnes /year				
(p)	HCl for CIP	tonnes /year				
(q)	NaOH for CIP	tonnes /year				
(r)	HCl for Neutralization after CIP	tonnes /year				
(s)	NaOH for Neutralization after CIP	tonnes /year				
(t)	Any other Chemical	tonnes /year				
2.3	Transportation of Sludge	Per year				

2.4	Manpower	Per year				
2.5	Lumpsum O & M Cost (Others) e.g. Asset Replacement Bidder shall provide a list of Asset Replacement items with cost	Per year				
	List of items (Indicate USD where applicable)					
2.6	Sub Total - Second year					

* The Cost includes all taxes, duties, insurance and transportation.

Signature of Bidder

Name & Designation

Company and Seal

Schedule 9: Grand Summary of Price Schedule

Schedule	Description	Total Cost Foreign Currency* \$ (USD)	Total Cost Local Currency* ₹ (INR)
1	Design, Drawings and Documentation		
2	Civil Works; Supply		
3	Mechanical Works; Supply,		
4	Electrical & Instrumentation Works; Supply,		
5	Laboratory Equipment/Items		
6	Erection and Commissioning		
7	Process Proving		
8	Operation and Maintenance		
GRAND TOTAL			

* The Cost includes all taxes, duties, insurance and transportation.

Signature of Bidder

Name & Designation

Company and Seal

Schedule 9A: Grand Summary of Taxes and Duties

Schedule	Description	Total Cost Foreign Currency \$ (USD)	Total Cost Local Currency ₹ (INR)
1	Design, Drawings and Documentation		
2	Civil Works; Supply		
3	Mechanical Works; Supply,		
4	Electrical & Instrumentation Works; Supply,		
5	Laboratory Equipment/Items		
6	Erection and Commissioning		
7	Process Proving		
8	Operation and Maintenance		
GRAND TOTAL			

* The Cost includes all taxes, duties, insurance and transportation.

Signature of Bidder

Name & Designation

Company and Seal

Schedule 10: Payment Schedule

(The Bidder shall complete his estimated payment schedule along with his Price Proposal, based on payments being made on a periodic (monthly) basis according to the pre-estimated construction progress. The total amount of payments to be made shall not exceed the quoted Price. The Employer and Contractor shall make necessary adjustments to the payment schedule as the work proceeds based on the actual progress of the Works.)

Payment	Month	Estimated Percent	Estimated Amount	Cumulative %	Milestone
					(Where Applicable)
1 st Payment					
2 nd Payment					
3 rd Payment					
Final Payment					
Total Payments		100%	(Quoted Price)	100%	

Signature of Bidder

Name & Designation:

Company Name and Seal:

Schedule 11: Dayworks

Item	Description	Unit	FC Quantity	LC Quantity	Unit Price		Total Price	
					FC Component (a) (b) (USD)	LC Component (a) (b) (INR)	FC Component (a) (b) (USD)	LC Component (a) (b) (INR)
					(4)	(5)	(6) = (2) x (4)	(7) = (3) x (5)
A1	All Labour							
	Gang supervisor	hour	500	1000				
	Offshore work supervisor	hour	500	500				
	Offshore worker	hour	500	500				
	Labourer	hour		1000				
	Joiner & Carpenter	hour		300				
	Welder	hour		200				
	Steel Fixer	hour		500				
	Steel Erector	hour		500				
	Bricklayer	hour		500				
	Pipelaye	hour		500				
	Concreter	hour		500				
	Motor Driver	hour		500				

Item	Description	Unit	FC Quantity	LC Quantity	Unit Price		Total Price	
					FC Component (a) (b) (USD)	LC Component (a) (b) (INR)	FC Component (a) (b) (USD)	LC Component (a) (b) (INR)
					(4)	(5)	(6) = (2) x (4)	(7) = (3) x (5)
	Plant Operator	hour		500				
	Electrician	hour		500				
	Cable Jointer	hour		500				
	Fitter	hour		500				
	Painter	hour		500				
	Plumber	hour		500				
	Watchman	hour		1000				
	Sum (A1)							
A2	Percentage addition per hour for all categories working outside specified times		Sum	Sum				
 %	x Sum						
	<i>Rates for labour categories outside the above are to be agreed by reference to the above rates.</i>							
	Section A Total {Sum (A1) +Sum (A2)}							

Item	Description	Unit	FC Quantity	LC Quantity	Unit Price		Total Price	
					FC Component (a) (b) (USD)	LC Component (a) (b) (INR)	FC Component (a) (b) (USD)	LC Component (a) (b) (INR)
					(4)	(5)	(6) = (2) x (4)	(7) = (3) x (5)
B1	Design Staff							
	Civil Engineer	hour	300	1000				
	Structural Engineer	hour	200	1000				
	Mechanical Engineer	hour	200	1000				
	Electrical Engineer	hour	200	1000				
	Instrumentation & Control Engineer	hour	200	1000				
	Desalination Process Engineer	hour	300	1000				
	CAD Operator	hour		1000				
	Design Assistant	hour		1000				
			Sum (B1)	Sum (B1)				
B2	Percentage addition per hour for all categories working outside specified times							
 %		x Sum (B1)	x Sum (B1)				

Item	Description	Unit	FC Quantity	LC Quantity	Unit Price		Total Price	
					FC Component (a) (b) (USD)	LC Component (a) (b) (INR)	FC Component (a) (b) (USD)	LC Component (a) (b) (INR)
		(1)	(2)	(3)	(4)	(5)	(6) = (2) x (4)	(7) = (3) x (5)
	<i>Rates for design categories outside the above are to be agreed by reference to the above rates.</i>							
	Section B Total {Sum (B-1) + Sum (B-2)}							
C	All Equipment							
	Backhoe excavator	hour		100				
	8t/10t Road roller	hour		100				
	Dumper truck (10 t)	hour		100				
	Mobile crane (10 t)	hour		100				
	Concrete pump	hour		100				
	Compressor (including all tools)	hour		100				
	Welding set (including consumables)	hour		100				
	Gas cutting set (including consumables)	hour		100				
	Diesel generator (5 kVA)	hour		100				

Item	Description	Unit	FC Quantity	LC Quantity	Unit Price		Total Price	
					FC Component (a) (b) (USD)	LC Component (a) (b) (INR)	FC Component (a) (b) (USD)	LC Component (a) (b) (INR)
		(1)	(2)	(3)	(4)	(5)	(6) = (2) x (4)	(7) = (3) x (5)
	Pump (100 mm)	hour		200				
	Pump (150 mm)	hour		100				
	Concrete mixer (0.25 cu.m)	hour		100				
	Concrete Vibrator	hour		100				
	Total of Working Equipment			Sum (C1)				
	Standing/Idle Equipment							
C2	Standing/idle equipment to be paid at 30% of the rate of working equipment	30 % x		x Sum(C1)				
	<i>Rates for equipment categories outside the above are to be agreed by reference to the above rates.</i>							
	Section C Total {Sum (C-1) +Sum (C-2)}							
D	Materials							
	Cost based on paid invoices			Sum (D)				
	Section D Total {Sum D}							
E	Fee							

Item	Description	Unit	FC Quantity	LC Quantity	Unit Price		Total Price	
					FC Component (a) (b) (USD)	LC Component (a) (b) (INR)	FC Component (a) (b) (USD)	LC Component (a) (b) (INR)
		(1)	(2)	(3)	(4)	(5)	(6) = (2) x (4)	(7) = (3) x (5)
	Total (Section A+B+C+D)			Sum (Total)				
 % of Sum (Total)			Sum (E)				
	Section E Total {Sum E}							
	Total of Schedule 9 (Section A+B+C+D+E)							

Note:

(a): Local and Foreign Currencies shall be in accordance with the Instruction to Bidders (Clause no.15.1)

(b): Include duties & taxes

LC: Local Currency

FC: Foreign Currency

Signature of Bidder

Name & Designation

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Schedule 12: Payment Terms

Electro-mechanical Equipment		
Milestone No.	Description of Milestone	%age Payment
1	Receipt of material on site	70%
2	Completion of Erection on pro-rata basis.	15%
3	Completion of satisfactory Testing & Commissioning	10%
4	On successful Process Proving Test and issue of Commissioning Certificate.	5%

Intake Outfall Offshore Works		
Milestone No.	Description of Milestone	%age Payment
1	Receipt of 100% length of intake and outfall HDPE pipe at site	20%
2	Progress achieved in laying the pipeline on a pro-rata basis as per the estimates submitted by Contractor	60%
3	Completion of satisfactory Testing & Commissioning	15%
4	On successful Performance Test and issue of Commissioning Certificate.	5%

Civil Works		
Milestone No.	Description of Milestone	%age Payment
1	Completion of Sub-structure/piling/raft up to plinth level on pro-rata basis.	20%
2	Completion of super structure on pro-rata basis.	40%
3	Completion of allied items such as handrail, painting, epoxy coat etc. on pro-rata basis.	10%
4	On successful Hydro-test for the said single unit in totality.	10%
5	Completion of satisfactory Testing & Commissioning	15%
6	On successful Performance Test and issue of Commissioning Certificate.	5%

This payment mode of Civil Works will be applicable only for concrete works such as Tanks & Buildings. But this cannot be used for Road Works, Boundary Walls Works, Landscape works, Electrical Works, Instrumentation & Control Works.

Break-up for payments of Design & Drawings also has to be established rationally as this can be one of the major costs over a period of 36 months.