

CITY OF CAPE TOWN

WATER AND SANITATION

CONTRACT NO. 10Q/2017/18

DESIGN – BUILD - OPERATE OF A 5M3/HR SWRO DATA COLLECTION PLANT FOR THE CITY OF CAPE TOWN

SCHEDULE 27: INFORMATION TO BE PROVIDED WITH THE TENDER

The following information shall be provided with the Tender:

- a) The various technical details and data required by the Technical Data Sheets and information required in the Returnable Schedules.
- b) Drawings (Section C3.2)

Drawings and samples that may be required to be furnished by the Tenderer shall be duly marked so as to connect them with the tender to the satisfaction of the Employer's Agents. Particulars of the drawings to be furnished with the tender are given in the Specification and the Schedules.

If the tender is accepted, the drawings shall be re-submitted for approval and after being approved will form part of the contract.

- c) Quality assurance plan.
- d) Power usage (kWh/m³ treated)
- e) Chemical usage (Rx/m³ treated)

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The tenderer shall complete the following data sheets providing full details of the equipment offered.

Data Sheet No.1 Pre-treatment Membrane Filters

Item No.	Description	Tenderer's Offer
	Ultra-filtration membrane manufacturer	.....
	Membrane material	.....
	Membrane model No.	.....
	Number of modules	.....
	Nominal pore size	.....
	Design flux (L/m ² /h)	.....
	Maximum	.....
	Minimum	.....
	Max. operating transmembrane pressure (TMP)	.....
	Typical operating TMP range	.....
	Maximum backpulse TMP (if applicable)	.....
	Brochures attached (Yes/No)	.....
	Backwash pump	.....
	No. of units provided	.....
	Manufacturer	.....
	Model No.	.....
	Duty	.....
	kW	.....
	Backwash frequency	.....
	Chemical cleaning frequency	.....
	interval	.....
	downtime	.....
	Membrane integrity system details	.....

Data Sheet No.2 Reverse Osmosis (RO)

Item No.	Description	Tenderer's Offer
	Membrane manufacturer	.....
	Material of membranes	.....
	Brochures attached (Yes/No)	.....
	Design flux (L/m ² /h)	.....
	Number of pressure vessels	.....

Item No.	Description	Tenderer's Offer
	Number of membranes per pressure vessel	.....
	Maximum pressure in vessel (bar)	.....
	Raw water flow (L/s)	.....
	Permeate flow (L/s)	.....
	Reject brine flow (L/s)	.....
	Total dissolved salts of treated water (mg/L)	.....
	Total dissolved salts of reject brine (mg/L)	.....
	Overall recovery (%)	.....
	Salt rejection (%)	.....
	RO permeate flowmeter	
	Manufacturer	.....
	Model No.	.....
	pH of final treated water leaving RO tank	.....

Data Sheet No.3 Chemicals

Item No.	Description	Tenderer's Offer
	Chemical 1 (if required)	.....
	Min. Dosage (mg/L)	.....
	Max. Dosage (mg/L)	.....
	Storage Tank Capacity (L/h)	.....
	Material of construction	.....
	Metering pump Manufacturer	.....
	Model No.	.....
	Pump capacity (L/h)	.....
	Chemical 2 (if required)	.....
	Min. Dosage (mg/L)	.....
	Max. Dosage (mg/L)	.....
	Storage Tank Capacity (L/h)	.....
	Material of construction	.....
	Metering pump Manufacturer	.....
	Model No.	.....
	Pump capacity (L/h)	.....
	Chemical 3 (if required)	.....
	Min. Dosage (mg/L)	.....
	Max. Dosage (mg/L)	.....
	Storage Tank Capacity (L/h)	.....
	Material of construction	.....
	Metering pump Manufacturer	.....
	Model No.	.....
	Pump capacity (L/h)	.....

Data Sheet No.4 Disk Filters

Item No.	Description	Tenderer's Offer
	Number	
	Material of construction	.....
	Manufacturer	.....
	Model No.	.....
	Capacity	.....
	Diameter	.....
	Height	.....

Data Sheet No.5 UV System

Item No.	Description	Tenderer's Offer
	Type	
	Manufacturer	.....
	Model No.	.....
	Capacity	.....
	Lamp Type	
	Manufacturer	
	Model No.	.....
	Ballast	
	Manufacturer	
	Model No.	
	Requires air conditioning (Y/N)	

Data Sheet No.6 Energy Recovery system

Item No.	Description	Tenderer's Offer
	Type	.....
	Manufacturer	.....
	Model No.	.....
	Capacity	.....
	Energy Recovery Pumps	.....
	Manufacturer	.....
	Model No.	.....
	No of pumps	.....
	Manufacturer's brochures attached (Yes/No)	.....
	Design flow (L/s) and head (m)	.....

Data Sheet No.7 High Pressure Pipework

Item No.	Description	Tenderer's Offer
	Material of construction	.....
	PREN number	.....
	Flow	.....

Data Sheet No.8 Intermediate Tanks

Item No.	Description	Tenderer's Offer
	Storage vessel	
	Capacity	.....
	Material of construction	.....
	Diameter	.....
	Height	.....
	Mixers	.....
	Type	.....
	Manufacturer	
	Model No.	
	Capacity (W/m3)	
	Control valves	
	Manufacturer	.....
	Model No.	.....
	Solenoid valves	
	Manufacturer	.....
	Model No.	.....
	Oxygen meter	
	Manufacturer	.....
	Model No.	.....
	On-line pH meter	.....
	Manufacturer	.....
	Model No.	.....

Data Sheet No.9 RO Feed Pumps

Item No.	Description	Tenderer's Offer
	Manufacturer	.....
	Model No.	.....
	Pump type (vertical submersible)	.....
	Type of drive (Direct Coupled, /Spacer Coupled)	.....
	Speed (Variable up to 1500rpm max)	.....
	No. of stages per pump	.....
	Design flow (L/s) and head	.....
	Pump casing type	.....
	Pump casing material	.....
	Manufacturers brochures attached (Yes/No)	.....

Data Sheet No.10 Blended Disposal Water Transfer Pumps

Item No.	Description	Tenderer's Offer
	Manufacturer	.....
	Model No.	.....
	No of pumps	.....
	Manufacturer's brochures attached (Yes/No)	.....
	Design flow (L/s) and head (m)	.....

Data Sheet No.11 Water Quality Monitoring Equipment

Item No.	Description	Tenderer's Offer
	Turbidimeter (on-line)	Manufacturer
		Model No.
	Conductivity meter (on-line)	Manufacturer
		Model No.
	Other on-line equipment	Manufacturer
		Model No.

Data Sheet No.12 Electrical Equipment

Item No.	Description	Tenderer's Offer
	Circuit Breakers	
	Supplier/Manufacturer	.....
	Series / Type	.....
	Variable Speed Drives	
	Supplier/Manufacturer	.....
	Series / Type	.....
	Voltage / Phases	.....
	IP rating	.....
	THDI at full load	.....
	THDV at full load	.....
	Other info.	.....
	Soft Starters	
	Supplier/Manufacturer	.....
	Series / Type	.....
	Voltage / Phases	.....
	IP rating	.....
	THDI at full load	.....
	THDV at full load	.....
	Other info.	.....
	Power Cables	
	Supplier/Manufacturer	
	PLC Equipment	
	Supplier/Manufacturer	.....
	Series / Type	.....
	Instruments	
	Level Transmitters	
	Make	.....
	Model / Series	.....
	Power Supply	.....
	Pressure Transmitters	
	Make	.....
	Model / Series	.....
	Power Supply	.....
	Pressure Switches	
	Make	.....
	Model / Series	.....
	Power Supply	.....
	Flow Switches	
	Make	.....
	Model / Series	.....
	Power Supply:	.....

Item No.	Description	Tenderer's Offer
	Flow Monitoring	
	Make	.....
	Model / Series	.....
	Power Supply	.....

Data Sheet No.13 Schedule of Estimated Energy, Chemical, Plant Operation and Maintenance Costs

(SUBMIT WITH TENDER FORM)

Tenderers shall complete this Schedule.

The tender price for the Offer shall be adjusted to estimate the Life Cycle Cost which shall include the costs involved in operating the Koeberg Data Collection Pilot Plant over a period of 2 years. The operating costs shall include the estimated energy costs, the chemical cost, plant operation and maintenance cost. Follow the set assumptions in estimating the individual loadings and calculate the Life Cycle Cost as shown in Tables A to D.

ASSUMPTIONS

1 Estimated Energy Efficiency Ratio (EEER):

This figure shall be calculated from Table B which the Tenderer must complete and attach to this Schedule:

Electrical energy: R /kWh

Q (treated water production per annum) is ~88ML over two years

N = Savings Factor

2 Estimated Chemical Dosage Rate (ECDR):

The Contractor shall include all membrane cleaning chemicals nominated for use in the plant. Nominate the chemical consumption in kL/ML and unit cost of the chemicals in R/kL, delivered to site.

Enter the information in Table C

3 Estimated Plant Operation and Maintenance Cost (EMC):

The Estimated values, shall include all Labour, Plant Materials, Operator's attendance time and shall be calculated from Table D which the Tenderer must prepare and attach to this Schedule.

The table must set out the Tenderer's estimate of all equipment replacement costs (where applicable), including but not limited to membrane replacement costs at the membrane manufacturer's guaranteed membrane service life; plant operation and maintenance cost.

The Tenderer shall calculate the EMC for 2years operation using a discount rate of 7% per annum. The Principal will rely on this data and will hold the Contractor liable should the data prove to be misleading or deceptive.

No allowance needs to be made for inflation.

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TABLE A – LIFE CYCLE COST ESTIMATION

LOADING FACTORS	
1 USING ESTIMATED ENERGY EFFICIENCY RATIO (EEER)	LOADINGS $EEER \times 0.25 \times$ $CostR/kWh \times N$
Total from Table B	
2 USING ESTIMATED CHEMICAL DOSAGE RATE (ECDR)	CHEMICAL USAGE LOADINGS
Total from Table C	
3 USING ESTIMATED PLANT OPERATION AND MAINTENANCE COST (EMC)	EMC
Total from Table D	
LOADINGS (1+2+3)	
TENDER AMOUNT	
LIFE CYCLE COST = LOADINGS + TENDER AMOUNT	

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TABLE B – ASSESSMENT OF ESTIMATED ENERGY EFFICIENCY RATIO *

Description	Nameplate Rating	No. Off	No. Running at the same time	Actual power kW at duty point of pump, allowing for efficiencies	Operating load, allowing for rating factor and efficiency	Hours of operation/day **	kWh/day
Total kWh							
Volume Produced (ML)							
Estimated Energy Efficiency Ratio, EEER (kWh/ML)							

* Attached all other relevant information and calculations with this Table.

** For those equipment which do not operate on a continuous base, use part of an hour.

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TABLE C – ESTIMATED CHEMICAL DOSAGE RATE (LIST EACH CHEMICAL TO BE USED)

Chemical Usage	ECDR (kL /ML)	B (R/kL)	Q (cost R/kWh)	N	Loading (ECDR x B x Q x N)
Chemical Usage Loading					

