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Department of Agriculture
BUREAU OF SOILS AND WATER MANAGEMENT
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BSWM- BIDS AND AWARDS COMMITTEE SUPPLEMENTAL BID BULLETIN NO. 1

CONTRACT: Replacement And Installation Of Membrane/Filter Of The Submerged Membrane Bioreactor (SMBR) System Of Bureau Of Soils And Water Management For CY 2023-IB NO: BSWM-2023-11-066

This Addendum is being issued in accordance with Section 22.5.2 of the IRR of RA 9184, to clarify and modify some provisions of the Bidding Document. **THIS SHALL FORM AN INTEGRAL PART OF THE BID DOCUMENT.** Likewise, the succeeding agreements and reminders were discussed during the Pre-Bid Conference held last November 20, 2023 at the BSWM Convention Hall and via Videoconferencing-Zoom.

AMENDMENTS OF THE BIDDING DOCUMENT:

Additional requirement as part of technical proposal:

1. Certificate as Authorized Distributorship
2. Certificate of 100% Availability of Stocks
3. Certificate of Site Inspection

Schedule of Site Inspection:

November 22, 2023, 2:00PM,
BSWM, Diliman, Quezon City

Please coordinate with **Mr. Crisaldo C. Solano**, Head, BSWM Building and Ground Administration at 8-529-7640 loc 106 or email us at bac@bswm.da.gov.ph.

Delivery Requirement:

Within 7 calendar days from the receipt of NTP.

Revised Terms of Reference attached as Annex A.

For guidance and information of all concerned.

(Sgd)DENISE A. SOLANO
BAC Chairperson



Revised Terms of Reference

Replacement and Installation of Membrane/Filter of the Submerged Membrane Bioreactor (SMBR) System of Bureau of Soils and Water Management

A. BACKGROUND

The Bureau of Soils and Water Management (BSWM) has acquired a Submerged Membrane Bioreactor (SMBR) Wastewater Treatment System in March 7, 2016 to treat its sewage and the wastewater being generated by its laboratory. The membranes installed in BSWM SMBR system is of polymeric material which has a life cycle of between three (3) to five (5) years.

From 2019, three (3) years after its installation, the internal Results of Laboratory Analysis (ROLA) of BSWM, particularly the Total Suspended Solids (TSS), indicated damages in the membranes. In addition to this, from 2021, the Thermotolerant (Fecal) Coliform level of the permeate already failed the effluent standards. This confirmed the damages in the installed membranes. Furthermore, during the inspection conducted last year, it was determined that most of the membranes are already damaged.

B. OBJECTIVE

Since the normal life cycle of the currently installed membranes is only between three (3) to five (5) years and the SMBR system has been continuously running for more than seven and a half years, the membranes are already due for replacement. The objective of replacing the existing membranes is to ensure that the TSS and Fecal Coliform will always pass the effluent standard. An upgrade to a more robust material is recommended to prolong/extend its lifespan to within five (5) to ten (10) years.

C. JUSTIFICATION

Why replace the existing polymeric membrane with **Silicon Carbide (SiC) Submerged Flat-Sheet Ultrafiltration Membranes**?

Silicon Carbide (SiC) is the most robust membrane material available in the market today. It is an inert material and will not react to any chemicals at the full pH range (1 to 14). The SiC membrane, also has the lowest iso-electric point and highest hydrophilicity (most hydrophilic) among all the membrane material available. It also has the longest warranty among all the membrane materials in the market. Compared to polymeric membranes, Silicon Carbide membranes will last three to five times longer. Silicon carbide membranes is also the easiest and most flexible membrane to clean. It can withstand almost all chemicals unlike polymeric membranes. Polymeric membranes will be damaged by strong acid, base, or disinfectants.

COMPARISON OF SILICON CARBIDE MEMBRANE WITH POLYMERIC MEMBRANE

NO.	ITEM	MEMBRANE MATERIAL		REMARKS
		SiC	POLYMERIC	
1	Capex (replacement of existing membranes)	< ₱ 3.0 M	> ₱ 3.5 M	Capex for SiC membrane is lower because of its higher flux rate capability (meaning, a lot less membrane to purchase).

2	Operating Cost (Electricity)	₱	₱₱	SiC membrane is <u>hydrophilic</u> while polymeric membrane is <u>hydrophobic</u> . Because of this characteristic, SiC membrane has lower operating (electricity) cost compared to polymeric membrane. Hydrophobic means more energy consumption in filtration per unit volume.
3	Maintenance Cost	₱	₱₱	SiC membrane can operate at 4 to 7 times the flux rate of polymeric membrane, the quantity of SiC membranes are also 4 to 7 times less than polymeric membranes. This translates to less cleaning chemicals and maintenance cost.
4	Membrane Life Span	> 15 years	3 – 5 years	All polymeric membranes have a life span of 3 to 5 years. This makes it a consumable for MBR systems. SiC membrane can last for more than 15 years.
5	Warranty	5 years	1 year	SiC membrane's warranty is five years. Furthermore, SiC membranes can last for more than 15 years
6	Flux Rate @ 10,000 mg/l MLSS and 35°C water temperature	85 liters/m ² -hour	15 liters/m ² -hour	SiC membrane's flux rate is the highest in the world (4 to 7 times more compared to polymeric membranes).
7	Solids Loading Tolerance	~ 50,000 mg/l	~ 12,000 mg/l	SiC membrane can be operated at much higher Mixed Liquor Suspended Solids (MLSS) in the bioreactor. The advantage of being able to operate at higher MLSS gives the MBR plant more flexibility. This means that it is more resistant to shock loadings from the fluctuating raw wastewater quality.
8	pH Tolerance	2 to 12	4 to 10	SiC membrane can be operated and maintained at a wider pH range. This means that it is more resistant to acids and alkalis compared to polymeric membranes. In addition to this, SiC membranes can be cleaned using strong acids and alkalis. This is not the case with polymeric membranes.
9	Temperature Tolerance	2°C to 60°C	15°C to 35°C	SiC membrane can be operated at colder and hotter temperatures compared to polymeric membranes. If the water temperature reaches more than 35°C, polymeric membranes will be damaged. SiC membranes can tolerate up to 60°C.
10	Oil and Grease Tolerance	~ 400 mg/l	~ 50 mg/l	SiC membrane is highly resistant in oil and grease (typical content of raw sewage). Polymeric membrane will be damaged by high oil and grease content in the raw sewage.
11	Intermittent Operation and Drying of the Membranes	Allowed	Not Allowed	SiC membrane can be operated intermittently and can be dried without damaging the membrane structure. On the other hand, Polymeric membrane will be damaged when it dries out after operation.

D. SCOPE OF WORK

The replacement of the damaged membranes shall include the following works:

1. Removal of the existing damaged membranes, pipes, and supports;
2. Cleaning of the Membrane Tank;
3. Installation of the new membranes, pipings, and pipe supports;
4. Pull-out and disposal of the existing damaged membranes and other debris

Note:

*The replacement of the existing damaged membranes shall be done within **7 calendar days upon issuance of the Notice to Proceed (NTP)** to prevent further discharge of pollutive effluent particularly Thermotolerant (Fecal) Coliform.*

E. TIMETABLE OF THE ACTIVITIES

NO.	ACTIVITIES	NUMBER OF WORKING DAYS															REMARKS
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	
1	SITE INSPECTION	■															
	ACTUAL																
2	MOBILIZATION		■	■													
	ACTUAL																
3	DISMANTLING WORKS			■	■	■	■										
	ACTUAL																
4	MEMBRANE INSTALLATION						■	■	■	■	■	■	■				
	ACTUAL																
5	TESTING & COMMISSIONING WORKS												■	■	■		
	ACTUAL																
6	DEMOBILIZATION													■	■		
	ACTUAL																

F. APPROVED BUDGET FOR THE CONTRACT COST

The total approved budget for the contract (“ABC”) for this procurement is **Two Million Nine Hundred Seventy-Seven Thousand Two Hundred Pesos (Php 2,977,200.00)**.

G. BREAKDOWN OF ESTIMATED EXPENSES

NO.	ITEMS / SPECIFICATION	QTY	UNIT	UNIT PRICE	AMOUNT
1	Submerged Membrane Tower	1	set	2,300,000.00	2,300,000.00
	Membrane Type: Submerged Flat-Sheet				
	Membrane Material: Silicon Carbide (SiC) Ceramic				
	Membrane Pore Size: 0.1 µm				
	Active Membrane Surface				
	Per Module: 6.9 m ²				
	Number of Flat-Sheet				
	Membranes Per Module: 42 pieces				
	Clean Water Permeability: >3,000 LMH/bar				
	MBR Flux Rate: 69 LMH @ 12,500 mg/l MLSS, 25°C				
	Delivery and Installation: Within 15 days from the issuance of NTP				
	Warranty: Five (5) years				
2	Testing & Commissioning	1	lot	60,000.00	60,000.00
3	Total Project Cost, Php				2,360,000.00
4	OCM Plus Margin of Profit (15%), Php				354,000.00
5	Value Added Tax (12%), Php				283,200.00
6	GRAND TOTAL, Php				2,977,200.00

H. SCHEDULE OF PAYMENTS AND WARRANTY

NO.	ITEMS / SPECIFICATION	QTY	UNIT	UNIT PRICE	AMOUNT	PERCENTAGE	WARRANTY
1	Submerged Membrane Tower	1	set	2,300,000.00	2,300,000.00	97.46%	5 years
	Membrane Type: Submerged Flat-Sheet						

	Membrane Material:	Silicon Carbide (SiC) Ceramic						
	Membrane Pore Size:	0.1 μ m						
	Active Membrane Surface							
	Per Module:	6.9 m ²						
	Number of Flat-Sheet							
	Membranes Per Module:	42 pieces						
	Clean Water Permeability:	>3,000 LMH/bar						
	MBR Flux Rate:	69 LMH @ 12,500 mg/l MLSS, 25°C						
	Delivery and Installation:	Within 15 days from issuance of NTP						
	Warranty:	Five (5) years						
2	Testing & Commissioning		1	lot	60,000.00	60,000.00	2.54%	
3	Total Project Cost, Php					2,360,000.00		
4	OCM Plus Margin of Profit (15%), Php					354,000.00		
5	Value Added Tax (12%), Php					283,200.00		
6	GRAND TOTAL, Php					2,977,200.00	100.00%	

I. STATEMENT OF WARRANTY

The Silicon Carbide Submerged Flat-Sheet Ultrafiltration Membranes delivered and installed for this upgrade project shall be warranted against defect in materials and workmanship under normal operating conditions for five (5) years from the date of delivery.

The supplier's liability with respect to defective parts is limited to making good by replacing or repairing defects to be determined by the supplier. This is, provided the BSWM has given immediate written notice upon discovery of such defects. Immediate written notice means within seventy-two (72) hours from which the defect happens.

The supplier will be relieved of its obligation if any arbitrary attempt to rectify has been undertaken by BSWM. Furthermore, this warranty does not cover normal wear and tear and damage due to corrosion or erosion. The supplier's liability is limited to making good the part or parts which are defective and excludes any and every other obligation for loss or damage, direct or consequential.