o/c

Consortium Partners
SMEC International Pty. Ltd. (ACN-065440619/FCRN-F01483)
NJS Engineers India Pvt Ltd, India (CIN - U74210PN2007PTC129798)
Tata Consulting Engineers Limited, India (CIN- U74210MH1999PLC123010)
SMEC (India) Pvt. Ltd. (CIN: U93000DL1997PTC088574)

Ref: SSNT PMC 400 MLD/ CMWSSB / 5061185/ 291

Date: 26th February 2021

To,
The Superintending Engineer (Desalination)
Chennai Metropolitan Water Supply and Sewerage Board,
Urban Administrative Building,
2nd Floor, No.75, Santhome High Road,
Raja Annamalaipuram,
Chennai 600 028, Tamil Nadu, India

Sub: JICA Assisted Project for Construction of 400 MLD Seawater Reverse Osmosis Desalination Plant at Perur **(JICA Loan ID-P267)**
CP1 - Submission of Draft Scope of work for Engagement of Reputed Institutions for Continuous Coastal monitoring – Reg.

Ref
1. Our Letter No. SMEC/ CMWSSB / 5061185/112, dated 14.07.2020
2. Meeting held at 1st Floor Conference Hall, CMWSSB dated 11.06.2020
3. Our Letter No. SMEC/ CMWSSB / 7061563/005, dated 20.01.2020
4. Your Letter no. Lr.no.CMWSSB/SE(Desal)/400 MLD Plant / PMC/2020, dated 13.01.2020
5. Our Contract Agreement with CMWSSB, dated 09.01.2020

Dear Sir,

We are submitting herewith the draft scope of work for engagement of reputed institutions for continuous coastal monitoring as part of the requirement spelt out in CRZ clearance for 400 MLD Perur Desalination plant for your perusal.

Thanking you and assuring you our services at all times.

Yours truly,
For **Consortium of SMEC Pty Ltd -TCE Ltd.-NJS Engineers India Ltd.-SMEC (India) Pvt. Ltd.**

S.Srinivasarao
Project Coordinator

Enclosure:-
a) Draft Scope of Work (3 pages)

SUPERINTENDING ENGINEER (DESAL) 26 FEB 2021 CMWSS BOARD, CHENNAI-7

PMC Chennai Office Address:
13th Floor, Purva Primus, No 236, Okhiyampettai, Old Mahabalipuram Road, Thoraipakkam, Chennai, Tamil Nadu 600097
+91 044 66973300 indiabd@smec.com www.smec.com

Scope of Work for Engagement of Reputed Institutions for Continuous monitoring of Coastal area of 400 MLD Desalinisation Plant, Perur, Chennai, Tamil Nadu

Reference:

1. Letter No. F.No. 11-37/2016-IA-III dated 25/10/2018.
   Government of India, Ministry of Environment & Forest Climate Change (MoEF& CC)
   CRZ Clearance foe setting up of 400MLDcapacity desalinization plant at Perur, East Coast Road, Chennai, Tamil Nadu
2. Letter No. 24117/ EC.3/2017-1, dated 09/01/2018
   Govt. of Tamil Nadu, Environment & Forests (EC-3) Department, Secretariat, Chennai-600009.
3. Letter No. 844/ EC.3/2016-1, dated 14/01/2016
   Govt. of Tamil Nadu, Environment & Forests (EC-3) Department, Secretariat, Chennai-600009.

Refer to the above letters from Govt. of Tamil Nadu, Point No. 3 (g) and (h) vide Ref (2) and Ref (3) as below:

- *"A system shall be evolved for a close and continuous monitoring during the construction and post construction phases through reputed institutions such as National centre for Sustainable Coastal Management (NCSCM), Anna University, Chennai/ NIOT, Chennai/ IIT Chennai. Periodically report shall be furnished to the Tamil Nadu State Coastal Zone Management Authority on the site conditions every year so as to take mitigation measures on the event of any adverse impacts on the coastal".*
- *"The impact on the corals, marine organisms, Turtle nesting, etc., due to the above constructions, in the long run, should be evaluated and monitored through experts, in which, ecologists should be included"*

Objectives:

Following objectives are envisaged for the expert agency:

1. To monitor the Long-term changes in the shoreline of the project site
2. Changes in the marine water quality
3. Impact of the project on marine ecology such as species diversity, changes in migration pattern of turtle, impact on the nesting ground of turtle
4. Changes in fish catch in the area in terms of quantity and species

Scope of Work:

The draft Scope of Work for the engagement of experts from reputed institutions are as below:

Sr. No.	Scope	Timeline and Frequency
1.	**Shore line Changes:**	Yearly reporting

Sr. No.	Scope	Timeline and Frequency
	- Procurement of Shoreline map from National Remote Sensing Agency (NRSA) every six month and observation on any changes through map and ground truthing (Physical observation at site). - This observation should be in 2km upstream and downstream.	Continuous monitoring throughout the period of construction and operation of the project, (i.e. 3 years + 20 years)
2.	**Marine Ecology:** - Sampling and observation on Marine ecology such as diversity index for various species including benthic fauna (Refer Annexure-I for minimum list of parameter) - Observation on the migratory pattern of Turtle - Collection of data for monthly fish catch in the area with the species mix to observe changes in terms of quantum and type of fish catch over the time. - Identification of significant change in fish catch and to delineate the changes with marine water quality	Yearly reporting Fish catch data to be taken from fisheries department
3.	**Marine Water Quality:** - Sampling and reporting of marine water quality (refer Annexure -I for minimum list of parameter)	Yearly reporting.

1) The expert members from reputed institutions has to alert Government authorities through CMWSSB for timely intervention. They also need to advise and support for mitigation of any adverse impact on the environment.
2) The expert members from reputed institutions also to review the Environmental compliance reports submitted by Contractor as part of CRZ clearance and provide recommendations for mitigation of adverse impacts.
3) Quarterly visit of the experts and monitoring and testing of the seawater quality and ecology to establish data for the yearly reporting.

List of Agencies:

The agency should be equipped with necessary competencies for above scope of work. The list of agencies suggested are as below:

1. Department of Earth sciences, Annamalai University
2. National Institute of Ocean Technology, Chennai
3. National Institute of Oceanography, Head Office -Goa (Branches in Kochi and Vishakhapatnam)
4. Department of Environmental Engineering, IIT Madras, Chennai
5. National Environmental Engineering Research Institute (NEERI), Nagpur, Regional office at Chennai

ANNEXURE- 1

I. MARINE WATER QUALITY:

Sr. No.	Parameters	Minimum Number of Locations	Minimum Number of Samples every quarter
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 $PO4^{-2}$		
17.	Chlorides as Cl-		
18.	Sulphates as $SO4^{-2}$		
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.	Petroleum Hydrocarbons		

II. 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 to be tested for the following parameters:

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

III. BIOLOGICAL PARAMETERS:

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

List of Biological Parameters for Marine Water Samples

Sr. No.	Parameters	Minimum Number of Locations	Minimum Number of Samples every quarter
1.	Primary Productivity	5	5
2.	Chlorophyll -a		
3.	Phaeophytin		
4.	Total Biomass		

Sr. No.	Parameters	Minimum Number of Locations	Minimum Number of Samples every quarter
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		
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		

List of Biological Parameters for Sediment Samples

Sr. No.	Parameters	Minimum Number of Locations	Minimum Number of Samples every quarter
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)		