बृहन्मुंबई महानगरपालिका
Municipal Corporation of Greater Mumbai




Mithi River Water Quality Improvement Project

Package 3: Dry Weather Flow Interception at Tidal Outfalls (including Gate Pumps), Transfer Sewer, Training of River (Retaining wall and Service Road), Beautification including Promenades and Allied Works from Prem Nagar Outfall, Kurla to Mahim Causeway.

Design Build Operate Contract

Volume 2F -Technical Specifications for Operations and Maintenance

Employer:
Municipal Corporation of Greater Mumbai
Municipal Head Office Building, Mahapalika Marg,
Fort, Mumbai - 400 001.

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India

Technical Specifications

1. General
2. Operation and Maintenance
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    - Operating of pumping facility in monsoon period
    - Operating of pumping facility in non-monsoon period
    - Maintaining records
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    - Minimum staff requirement during Operation and Maintenance to be supplied by contractor
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1. GENERAL

This section covers activities involved in Operation and Maintenance of the Proposed Storm Water Pumping Stations at 26 locations

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2. OPERATION AND MAINTENANCE

Scope of Work

The contractor is to Operate and Maintain entire Storm Water Pumping Station facility for a period of Ten years during monsoon period and non monsoon period. During Operation and Maintenance of the Storm Water Pumping Stations in each monsoon and non monsoon period, the Contractor shall monitor and record the performance of Pumps and DG sets as well as that of all individual equipments and accessories installed and operated in the storm water pumping station. Various components of storm water pumping station which will be operated and maintained by the contractor for a period of seven years shall include all the components i.e. Civil structures, Waterways, Buildings and overall pumping station premises, Mechanical and Electrical equipments & accessories (Major Equipments and Other Equipments) of the Storm Water Pumping Station described elsewhere in this document but not limited to the following:-

1. List of major equipment

Sr. No.	Equipments (Mechanical, Electrical, Instrumentation)	Quantity
1	Main pumps with submersible motors	As required
2	DG set	As required
3	NGR/NIS panel	As required
4	DG HT panel	As required
5	Pump HT panel	As required
6	Soft starter	As required
7	Auto-synchronization panel	As required
8	PLC SCADA system complete including local control panels, level sensors, transmitters, relays, UPS system etc.	As required

9	Gates	As required
10	Sluice gates	As required
11	Screens	As required
12	Screen cleaning equipment	As required

2. List of Other equipments

Sr. No.	Equipments (Mechanical, Electrical, Instrumentation)	No.
1	Level sensor	As required
2	Battery & Battery charger	As required
3	Fuel transfer system	As required
4	DG set (Aux.)	As required
5	AMF Panel	As required
6	Cables (HT/LT)	As required
7	Transformer	As required
8	LT panels	As required
9	EOT pump house	As required
10	EOT DG house	As required
11	EOT sluice gates	As required
12	EOT gates	As required
13	EOT workshop	As required
14	Drainage pump	As required
15	Ventilation system & AC	As required
16	Lightning protection System	As required
17	Earthing system	As required
18	Safety equipment	As required
19	Fire Fighting System	As required

3. Repair and maintenance of following

i. Inlet Channel

ii. Pump bays and sluice gate structure

iii. Pump house superstructure

iv. Discharge channels and Outlet bay, Downstream area of outlet bay

v. D.G. house structure

vi. Diesel engine driven Main and Auxiliary Power Generating sets, control panels and relatedinstrumentation, DG chimneys, Hot air exhaust etc.

vii. Main Electrical panel room, PLC-SCADA room and operations room

viii. Internal and external sewage network including accessories, Internal and external watersupply network including accessories, water tanks and pumps

ix. Internal and external sewage network including accessories, Internal and external watersupply network including accessories, water tanks and pumps

x. Bulk Diesel storage tanks, Day tanks and Pumps, related instrumentation

xi. Equipment and panel base frames including foundations

xii. Entire Pumping station premises including roads, pathways, gangways, boundary wall, entry-exit gates, gratings, hand-railings, platforms, internal and external lighting including lighting fixtures, ACDBs and street poles, safety grills / barbed wire fencing, room air conditioners and room ventilation, garden, maintenance platforms, approach ladders, safety ladders etc.

xiii. Office Furniture and office accessories, air conditioners, doors, windows, ventilators,

xiv. All toilets, toiletries, sanitary wear and accessories installed in toilets,

4. Painting / of equipments, mounting frames, Hand railings, rolling shutters, Grills etc by scrapping and removing rust if any and apply one coat of primers and two coats of enamel paints every year.

   All the consumables including diesel used for power generation, grease, lubricants, paint, construction materials, spares required for operating and maintaining the Storm Water Pumping Station during Operation and Maintenance period shall be supplied by the contractor. Also other consumables such as office consumables and office stationery, toilet accessories and toiletries, consumables for area cleaning, sweeping and maintaining hygiene inside the entire plant premises, gardening consumables and accessories, water supply and sewerage shall also be provided by the Contractor. All these provisions will have to be made by the Contractor during tenure of the Contract at his own cost and no separate payments will be made to the Contractor on these accounts.

6. All charges towards usage of electricity, water, communication (telephones, internet etc.), electricity generation, deployment of manpower / specialist/security guards etc. shall also be borne by the Contactor.
7. The contractor shall ensure proper running of the plant to give the desired performance. The contractor shall also be responsible for overall maintenance of the plant i.e. civil, electrical, mechanical, instrumentation installations including pumps and D.G. sets. The contractor shall also be responsible for all repairs of equipment/machinery including replacement of damaged / defective parts or equipment as a whole.
8. The Contractor shall also be responsible for cleaning debris, floating / suspended materials, silt, deposits etc. in the Inlet bay area on a regular basis to ensure smooth passage of incoming water towards and through the screen. The screens shall also be cleaned on regular basis mechanically or manually to prevent blockage of screens especially during pumping operation. It shall be the responsibility of the Contractor to collect, remove screenings including debris, deposits, silt, suspended / floating material, rags, tree branches, dead animal bodies and other screenings and to ensure that removed screenings are disposed off as per MCGM"s debris management plan including transporting to the specified location or dumping ground within municipal limits as directed by Engineer. No separate payments will be made to the Contractor for these works.
9. The scope shall also include cleaning of inlet channel, areas in front of and behind the screens, distribution channel, sluice gate area, pump bays, discharge channels at regular intervals whenever required thereby ensuring that these areas are kept free from deposits, debris, silt etc. The Contractor shall also be responsible for keeping the desilted areas on the downstream of Gates and Outlet bay free from deposits / obstructions.
10. The contractor shall monitor the operation of the D.G., Pumps and maintain all the operation records in SCADA system. This operation record should be in excel format so that it can be verified easily. The contractor shall take necessary actions to ensure smooth and satisfactory performance/running of the plant.

11. The contractor shall implement plant maintenance programme provided by MCGM. It shall be absolutely contractor's responsibility to look after all sorts of maintenance whether preventive or break down. The contractor shall maintain the operational activity record as per standard practice in the formats provided by MCGM.

12. The contractor shall be responsible to carry out day to day as well as periodic maintenance necessary to ensure smooth and efficient performance/running of all equipment/instruments installed plant. The contractor shall maintain these records in the formats provided by MCGM in soft copy as well as hard copy.

13. The entire pumping station and premises shall be maintained in hygienic and pleasant manner by carrying out required cleaning and periodic repairs for all the structures, internal roads, Water Supply, Drainage, Fire fighting, Electrical systems, etc within Pumping Station premises. The approach road, street lighting and storm water drains shall be maintained as per MCGM specifications during the entire O&M period. The required repairs shall be carried out promptly by the contractor. On failure, the Engineer-in-charge shall give a written notice to the contractor. If the contractor fails to comply or make good the defects, the Engineer-in-charge may carry out the work at risk and cost of the contractor and such failure will be considered as non performance on the Contractors part.

14. After successful completion of Operation and Maintenance period, the contractor shall hand over entire Storm Water Pumping Station Facilities including all Civil, Mechanical and Instrumentation works in good running condition to the entire satisfaction of the Engineer.

15. Tests if any demanded by the Engineer to establish good running condition of the Storm Water Pumping Station shall also be carried out by the Contractor without any extra cost to the satisfaction of the Engineer. Only after fulfilling all above requirements, the Engineer will issue certificate of successful completion and the Storm Water Pumping Station facility shall be taken over by MCGM.

16. The data recorded in SCADA system to cover following minimum information:-

    i. Daily operational log of Main submersible pumps and D.G. sets.
    ii. Records of water level on the upstream and downstream side of Gates.
    iii. Record of Operation of Gates (Opening and closing times)

17. Following record shall be maintained in separate register.

a) Record of tides

b) Record of storm water discharge

c) Record of Diesel consumption

d) Record of power consumption

e) Performance data of all equipments.

f) Record of problems faced and troubleshooting activities

g) Record of all repairs, maintenance and replacements of parts/equipments including Spares consumed

h) Any other allied works required by Engineer during O&M.

i) Record of manpower deployed at site

1. The contractor shall prepare proper equipment wise log books and submit a daily, weekly and monthly report of plant regarding functioning of all units of plant.
2. It is Contractor's responsibility to renew of various statutory permissions, NOCs, approvals such as factory license, required permissions from electrical inspector, MPCB,CCOE (explosives) etc. Permissions from all the concerned authorities required for equipments, structures and pumping station as a whole from time to time. **All the charges/Fees related to the same shall be borne by the contractors.** It is also responsibility of contractor to renew such permissions well in advance.
3. Desilting in front of screen area 35 m from gates and individual pump sumps every year before monsoon. Silt removed shall be disposed off by the successful contractor only.
4. Removal, Collection and disposal arrangement for Deposits, debris, silt, suspended and floating matter, Screenings etc. from Silt trap in front of Screen, Screens face, Inlet channel and Gates area.

   Structural painting including each equipment with entire plant (by maintaining existing color shade) shall have to be carry out by contractor within two years from award of work. Failure will penalize 5% of material cost per year accordingly till start of work and will be recovered from due payment of the contractor.

Operation of the pumping facility in monsoon period:

1. It is suggested that operation of pump(s) during flood relieving is always supported byfollowing inputs recorded and available in PLC-SCADA system,
   a) Record of tide levels downstream of Gates
   b) Position of Gates (whether open or closed)
   c) Record of Storm water level in the drains / inlet channel upstream of Gates
2. It is expected that the pumps are operated during rising tide level when Gates are to be kept in closed position and when level in nalla is rising. Operation of pumps at low tide and the Gates are open, will not be considered for payment unless there are specific instructions from the authorized MCGM personnel to operate the pumps.
2 During Monsoon period, sequencing of pumps and DG sets is to be done in such a manner that all the pumps and DG sets are operated for equal period. Each pump shall be operated for maximum 20Hours and overall operation of pumps i.e. If MCGM officials instruct to operate the pumping station and to maintain level even after 120 hours, extra payment shall be made.
3. Any change / rectification / fine tuning in the operational logic based on gathered data and earlier experience gained or as per specific instructions given by the Engineer shall be carried out by the Contractor during the period of Operation and Maintenance.
4. Payment for operation of the pumps will be made as per actual pump operating hours.

Operation of pumping facility during non-monsoon period:

1. The gates shall be closed during non monsoon period and all the interceptors shall be opened.
2. The Contractor shall ensure all the dry whether flow to be diverted into adjacent sewer line.
3. Each pump shall be operated during non monsoon period maximum for three hours for maintenance unless there is specific instruction from Engineer in Charge.
3 Payment for operation of the pumps will be made as per actual pump operating hours.
4 If MCGM officials instruct to operate the pumping station and to maintain level in non monsoon period, extra payment shall be made.

Maintaining of the Records:

1. All the information pertaining to Operation and Maintenance of the pumping facility shall be recorded in SCADA on continuous basis and shall be made available in printed formats to MCGM for verification of pump operating hours including for payment purpose.
2. The contractor shall implement plant maintenance programme provided by Consultant. It shall be absolutely contractor's responsibility to look after all sorts of maintenance whether preventive or break down. The contractor shall maintain the operational activity record as per standard practice in the formats provided by MCGM.
3. Various formats for recording information will be provided by MCGM. These formats are subject to change, based on discussions between MCGM and the contractor
4. The records maintained by the contractors as per # 2.2 and # 2.3 above shall be produced periodically to the Engineer-in-charge for proper monitoring as desired by him.

Maintenance schedule and Preventive Maintenance activities:

The Contractor shall have to carry out preventive maintenance of all the equipments as per the maintenance program given by consultant for Ten years Operation and Maintenance period of the Contract.

Minimum Staff requirement during Operation and Maintenance period to be supplied bycontractor:

Details of minimum staff required to be employed for the operation and maintenance of the pumping station during monsoon and non-monsoon period will be given by Consultant.. However, additional staff, if required for proper operation and maintenance, will be provided by the contractor without any additional charges.

Sr. No.	Personnel	No. of Employee		Main Task of the Personnel
		Monsoon period	Non-Monsoon Period	
1	Plant Manager (B.E.- Mechanical or Electrical Engineering with 7 years of experience)	To be given by Consultant	To be given by Consultant	Coordination of activities for satisfactory performance of operation and maintenance and reporting to the Engineer-in-charge and responsible for the proper functioning & maintenance, data collection etc.
2	Assistant Engineer (B.E.- Mechanical or Electrical Engineering with 5 years of experience)	To be given by Consultant	To be given by Consultant	Responsible for daily O&M, electrical and mechanical equipment and Data Collection.
3	Junior Engineer (Diploma/B.E.- Civil Engineering with 2 years of experience)	To be given by Consultant	To be given by Consultant	Responsible for daily O&M, civil units and data collection.
4	Junior Engineer (Diploma/B.E. Mechanical or Electrical Engineering with 2 years of experience)	To be given by Consultant	To be given by Consultant	Responsible for daily O&M, electrical and mechanical equipment and data collection.
5	Operators/Pump attendant (ITI Qualified with 5 years of experience)	To be given by Consultant	To be given by Consultant	Execution of specific tasks as indicated by the JE (E&M) for operating the different equipment installation
6	Electrician (ITI Qualified with 5 years of experience)	To be given by Consultant	To be given by Consultant	Responsible for maintenance of electrical equipment.
7	Fitter (Mech.) (ITI Qualified with 5 years of experience)	To be given by	To be given by	Responsible for maintenance of mechanical equipment.

8	Sweeper/Casual labour	To be given by Consultant	To be given by Consultant	Assistance to operator for cleaningplant premises, structures and equipments.
9	Watchman	To be given by Consultant	To be given by Consultant	To protect the plant from the trespassers, animals etc.
10	Gardener	To be given by Consultant	To be given by Consultant	To maintain the garden/landscapingof the plant.

*** Reliever ***

3. GENERAL AND FINANCIAL TERMS AND CONDITIONS:-

1. After commissioning of each pumping station and after certified by PMC, contractor to get acquainted with the O & M process. The successful contractor is to keep their staff engaged continuously without any break for Operation, Maintenance and Monitoring of the pumping plant for a period of Seven years on 24 hours x 365 days basis. The above mentioned period will be called as Overlapping Period. During this period, the successful contractor should closely inspect the pumping station and inform in writing, the missing things such as, inoperative equipments, Drawings, documents, etc. to Dy. Ch. E. (M&E) SWD Projects within seven days.
2. During entire Operation and Maintenance period of 10 years, it will be Contractor's responsibility to ensure availability of the entire installation for operation.
3. Plant and equipment covered under this contract shall be totally attended by the contractor including any Trouble Shooting to ensure smooth and trouble free operation.
4. Replenishment of all spares, Replacement of damaged parts of any equipment, including if necessary, the entire equipment as and when necessary will be done by the Contractor, to the satisfaction of the Engineer of the Contract. Any kind of spares required during the entire Operation and Maintenance of seven years shall be supplied, replaced and replenished by the contractor at no extra cost to MCGM.
5. All sorts of Tool & tackles, machinery including special tools and tackles required for proper and effective operation & Maintenance of the plant, shall be arranged by the contractor at his own cost.
6. For effective maintenance, the contractor shall employ sufficient staff with proper

qualification. For guidance of the contractor the existing pattern and numbers of minimumstaff to be engaged is described in this chapter. However the contractor shall provide any otherexpertise, labors, operators etc if so desired during entire period of operation and maintenance period.

7. The contractor shall abide by all central/state govt./Semi govt./Local Bodies rules regulations, pertaining to this contract, without any extra cost.
8. It is Contractor's responsibility to renew various statutory permissions, NOCs, approvals, permissions from all the concerned authorities, required for equipments, structures and pumping station as a whole from time to time and pay all the fees related to it. Also contractor shall pay the bills raised by salutatory authorities towards generation charges.
9. The contractor shall provide Round the Clock watch and ward of the entire premises including plants/machinery etc. during the entire period of seven years operation and maintenance. In the event of any damage/loss of life/theft of property, due to negligence on the part of contractor, the contractor shall be solely responsible and liable for compensation and damages, regarding negligence and the decision of Engineer-in-charge shall be final.
10. The site shall be open for inspection by the designated officers/official of the MCGM at all times during the contract period.
11. The staff employed will be provided with all the required safety equipments. It shall be ensured that full safety measures are taken by the staff on duty. Staff employed shall be experienced and trained to handle the respective job/equipment.
12. The Storm Water Pumping station facility and the premises shall not be used by the Contractor for any other purpose than its intended use during the entire period of Operation and Maintenance. Use of the Storm Water Pumping Station facility, structures and or equipments / accessories installed inside the pumping facility by the Contractor for commercial purposes of any nature is not permitted.

4. Schedule of penalty for not meeting the requirements of operation and maintenanceprovisions in this document.

Penalty for Non performance of the pumping station during operation and maintenance Non performance shall be construed when the level in the nalla **(As specified by consultant)** is required to be reduced but it cannot be reduce for reasons attributable to the Contractor due to such as

1. Non-operation of pump(s)
2. Non- operation of DG set(s)
3. Tripping of DG set(s)
4. Non-operation of Gates
5. Non-operation or inefficient operation of screens
6. Non- operation of sluice gates
7. Non- operation of related electrical system
8. Non-operation due to any other reason

The level of nalla shall be measured just upstream of screen and the same shall be recorded on continuous basis in SCADA.

(a) Per hour Operation cost for monsoon / non monsoon months

$$= \frac{\text{(Cost of Labour component + Cost of Maintenance component + Cost of Fuel component) \#}}{\text{120 (total operating hours per month in monsoon)}}$$

Amount quoted for month (wherever escalation is applicable, cost with escalation will be considered) to which the penalty is to be applied.

Penalty amount = 5 x Cost per hour (¯a|| above) x hours of non performance for which penalty is applicable.

Penalty for Breakdown of Equipments:-

a) Breakdown of Major Equipment: If a breakdown of major equipments as listed above in point No. 2.1 (1) occurs and the contractor does not repair the same within 8 days during monsoon or

15 days during non-monsoon period then, a penalty of 25% of the monthly payment of maintenance of pumping station, i.e., 1b & 2b of Schedule of Prices for Operation & Maintenance Works of this Tender Document shall be levied for that month.

b) Breakdown of Equipments other than major equipment: If the breakdown of equipment other than major equipments occurs and the contractor does not repair within 15 days during monsoon or 21 days during non-monsoon period a penalty of 10% of the monthly payment of maintenance of pumping station, i.e., 1b & 2b of Schedule of Prices for Operation & Maintenance Works of this Tender Document shall be levied for that month.

Penalty for not maintaining adequate diesel stock in monsoon period.

The successful contractor shall always maintain total diesel stock of as specified by consultant. litres for main D.G. sets. If total diesel stock for main D.G. sets falls below 10% of total capacity, contractor shall have to recoup the diesel stock within 24 hours otherwise penalty as specified by consultant per day will be levied for each location.

Penalty for not carry out desilting.

If contractor does not carry out Desilting in front of screen area 35 m from gate and individual pump sumps every year before monsoon along with disposal off, the penalty as specified by consultant per year will be levied.

Penalty for not carrying out Structural painting

Please refer Sr. No. 23 of Scope of Work.

Penalty for not carrying out preventive Maintenance

If any maintenance of particular equipment is not carried out as per maintenance programmethen cost given in breakup against that equipment will be deducted plus 10 % will also be deducted as penalty.

Penalty for not providing staff as per contract

If any manpower is short than specified in the tender then payment on prorata basis (daily pay based on monthly pay) of short manpower will be deducted plus 10 % will also be deducted as penalty.

End of Technical Specifications of Operations and Maintenance