



## **MORBI MUNICIPAL CORPORATION**

**Tender for Design, Engineering,  
Procurement, Construction, Operation &  
Maintenance of Refuse Transfer Station  
(RTS) in East Zone of Morbi Municipal  
Corporation**

### **Volume III: Employer's Requirements, Scope of Work & Technical Specifications**

**2026**

#### **Morbi Municipal Corporation (MRMC)**

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## **Structure of the Bidding Documents**

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1	Volume – I	Instruction to Bidders (ITB)
2	Volume – II	Conditions of Contract
<b>3</b>	<b>Volume – III</b>	<b>Employer's Requirements, Scope of Work &amp; Technical Specifications</b>
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# **1 Introduction**

## **1.1 Background of the Project**

- a. Morbi Municipal Corporation (MRMC) is responsible for providing municipal solid waste (MSW) management services within its jurisdiction, in accordance with the provisions of the Solid Waste Management Rules, 2016, as amended from time to time. With the upgradation of Morbi Municipality into Morbi Municipal Corporation and the subsequent expansion of its jurisdiction to include adjoining areas, the quantum of municipal solid waste generation and the spatial spread of collection activities have increased significantly.
- b. At present, municipal solid waste collected from various wards and collection routes is transported using a fleet of small and medium-sized vehicles to designated processing and disposal facilities. Direct long-haul transportation of un-compacted waste results in inefficiencies in terms of fuel consumption, vehicle productivity, traffic congestion, and environmental impacts. In order to address these challenges and to optimise the waste collection and transportation system, MRMC proposes to establish a New Refuse Transfer Stations (RTS) at Morbi.
- c. The proposed Refuse Transfer Stations shall act as an intermediate facility where municipal solid waste collected by primary and secondary collection vehicles shall be received, consolidated, and compacted before being transported in larger capacity vehicles to the designated waste processing and/or disposal facilities. The project also includes comprehensive Operation and Maintenance (O&M) of the RTS for a period of five (5) years, ensuring sustained performance, regulatory compliance, and service continuity.

## **1.2 Objectives of the Refuse Transfer Station**

The primary objectives of establishing the Refuse Transfer Stations at Morbi are as follows:

- To improve the efficiency and effectiveness of municipal solid waste transportation by reducing the number of trips made by small collection vehicles to distant processing and disposal sites.
- To enable compaction of municipal solid waste, thereby increasing payload efficiency and reducing transportation costs, fuel consumption, and greenhouse gas emissions.
- To support compliance with the Solid Waste Management Rules, 2016, by ensuring safe, hygienic, and covered handling and transportation of municipal solid waste.
- To strengthen the overall integrated solid waste management system of Morbi city by creating critical intermediary infrastructure between waste collection points and final treatment/disposal facilities.

## 2 Employer's Requirements

### 2.1 Project Overview

- a. Morbi Municipal Corporation (MRMC) proposes to develop New Refuse Transfer Stations (RTS). The project is conceived to enhance the efficiency of municipal solid waste transportation by introducing an intermediate facility for consolidation and compaction of waste.
- b. The proposed RTS shall receive municipal solid waste collected from various wards and collection routes using small and medium-sized vehicles. The waste shall be unloaded at the RTS, and mechanically compacted into closed containers, which shall then be transported using high-capacity vehicles to the designated waste processing and/or disposal facilities identified by MRMC.
- c. The project shall be implemented under an Engineering, Procurement and Construction (EPC) model, followed by comprehensive Operation and Maintenance (O&M) for a period of five (5) years. The selected contractor shall be responsible for design (where applicable), construction, supply and installation of equipment, testing and commissioning of the RTS, and for ensuring efficient and compliant operations throughout the O&M period.

### 2.2 Key Features of the Proposed RTS

The salient features of the proposed Refuse Transfer Station include the following:

- a. **Adequate Handling Capacity:** The facility shall be designed to handle the projected quantity of municipal solid waste generated within the service area, including peak-hour loads, with suitable provision for operational flexibility.
- b. **Mechanized Compaction System:** The RTS shall be equipped with stationary/static compactors and compatible closed containers to achieve effective compaction of municipal solid waste, thereby increasing transportation efficiency and reducing the number of trips to processing or disposal sites.
- c. **Efficient Traffic and Operational Layout:** The site layout shall provide separate and streamlined circulation for incoming collection vehicles and outgoing long-haul transportation vehicles, ensuring safe and smooth operations.
- d. **Environmental Control Measures:** The facility shall incorporate appropriate measures for leachate collection and management, odour control, dust suppression, noise mitigation, and regular housekeeping in compliance with the Solid Waste Management Rules, 2016 and applicable guidelines.
- e. **Weighing and Monitoring Systems:** Provision shall be made for weighbridge facilities, record-keeping, and monitoring systems to track waste quantities handled at the RTS and to support transparent and accountable operations.
- f. **Health, Safety and Occupational Welfare:** The design and operation of the RTS shall include adequate safety provisions, personal protective equipment (PPE), fire-fighting systems, signage, and emergency response arrangements to safeguard workers and visitors.
- g. **Utility and Ancillary Infrastructure:** The RTS shall include necessary utilities such as power supply with backup, water supply, drainage, lighting, administrative and control rooms, washing facilities for vehicles and containers, and maintenance areas.



- h. **Comprehensive O&M Framework:** The project includes five (5) years of comprehensive operation and maintenance, including transportation of compacted municipal solid waste from the RTS to the designated processing and/or disposal facility identified by MRMC

### 2.3 Integration with City Solid Waste Management System

- a. The proposed Refuse Transfer Station shall function as an integral element of Morbi city's overall solid waste management system. It shall interface seamlessly with existing primary and secondary collection systems and with downstream waste processing and disposal facilities identified by MRMC.

### 2.4 Project Location for RTS in East Zone of MRMC

- a. The proposed Refuse Transfer Station (RTS) is planned at **21, Mahendranagar**, located within the jurisdiction of Morbi Municipal Corporation. The Geo-coordinates of the site are as following;
- Lat-Long: 22°49'55.6"N, 70°52'19.6"E

**Important Note:** MRMC reserves the right to change the project site prior to execution of the contract. The Selected Bidder shall be bound to execute the work at the changed location without any additional cost due to relocation.

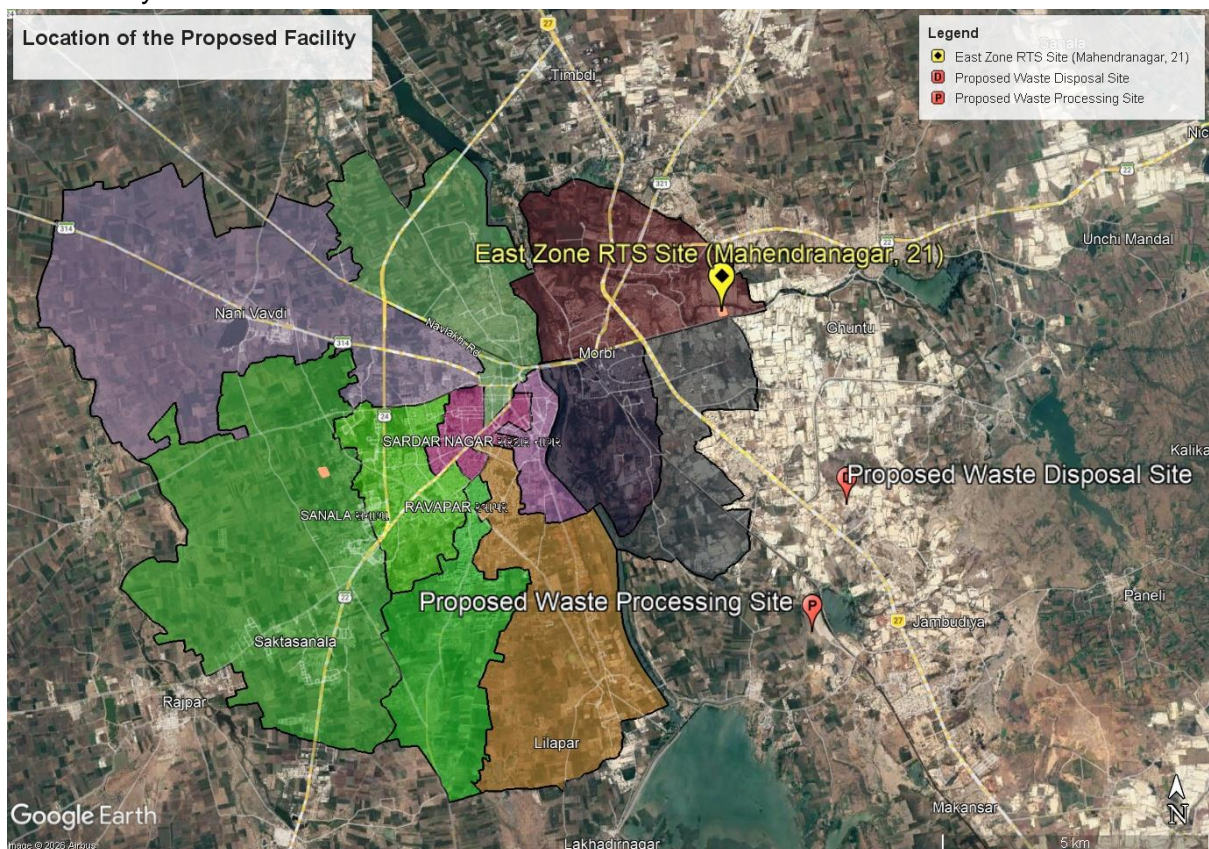


Figure 1: Location of the Proposed RTS in **East Zone** of MRMC

- b. Approx. **10,000 Sqm** area shall provide by MRMC to accommodate the proposed entire RTS infrastructure.
- c. The site shall be handed over to the selected contractor for execution of the project as per the terms and conditions of the Contract.



- d. The bidder shall be deemed to have inspected the site and satisfied itself with respect to site conditions, layout feasibility, and boundary constraints prior to submission of the bid.

## 2.5 Design Considerations

- a. The Refuse Transfer Stations (RTS) shall be designed based on the present and projected municipal solid waste (MSW) quantities generated within the service area of Morbi Municipal Corporation (MRMC), including the contributing wards / areas proposed to be served by the RTS.
- b. The waste handled at the RTS shall primarily comprise non-hazardous municipal solid waste, including segregated, partially segregated or mixed fractions of municipal solid waste collected through door-to-door and secondary collection systems. The waste characteristics shall be generally consistent with urban Indian MSW, comprising biodegradable (wet) waste, recyclable dry waste, and inert fractions, as per prevailing SWM practices in Morbi.
- c. For design purposes, the incoming waste density shall be considered in the range typical for un-compacted MSW delivered by small and medium collection vehicles, while the compacted waste density shall be achieved as per the performance capability of the stationary compactors. The design shall also account for peak-hour variations, seasonal fluctuations, and short-term surges in waste quantities.
- d. The Contractor shall ensure that the RTS systems and equipment are capable of handling variations in waste composition and moisture content without compromising operational efficiency or environmental compliance.
- e. **The RTS shall be designed to cater to the current and future waste generation within the East zone area of MRMC over the design period. The waste to be handled per year shall be as following;**

O&M Year	Estimated Quantity of Waste to be handled per day (Tons per day)	Estimated Quantity of Waste to be handled per month (Tons per month)	Estimated Quantity of Waste to be handled per year (Tons per annum)
1	100	3000	36,500
2	105	3150	38,325
3	110	3300	40,150
4	116	3480	42,340
5	122	3660	44,530

**Note:** It is assumed that the waste shall increase at the rate of 5% per annum.

- f. The capacity planning shall consider average daily waste quantities, peak daily and peak hourly loads, equipment redundancy and downtime for maintenance, and operational efficiency during peak collection hours.
- g. The Refuse Transfer Station shall be designed for operate for 16 hours (2 shifts), with flexibility to operate up to 24 hours a day, depending on MRMC's collection schedules and operational requirements. The design shall account for peak unloading hours corresponding to primary and secondary collection timings, multiple operational shifts

for compaction and container evacuation, adequate lighting, safety provisions, and manpower facilities for night-time operations.

- h. The civil, structural, and infrastructural components of the RTS shall be designed for a minimum design life of 20 to 30 years, considering normal wear and tear, environmental exposure, and operational loads.
- i. Mechanical equipment and vehicles shall be of proven design and quality, suitable for intensive municipal service. While individual equipment may have shorter service lives, the overall system design shall facilitate periodic replacement or refurbishment without major disruption to RTS operations.
- j. The Contractor shall ensure that materials, workmanship, and construction practices adopted are appropriate for achieving the intended design life and durability of the facility.
- k. The RTS layout and design shall incorporate provisions for future expansion, to the extent feasible within the available land and planning constraints. Such provisions may include space for installation of additional stationary compactors, additional container parking and manoeuvring areas, flexibility in internal circulation and utility networks and scalability of electrical, water, and drainage systems.
- l. The planning approach shall ensure that future capacity augmentation can be undertaken with minimal disruption to ongoing operations and without requiring major reconfiguration of the facility.

## **2.6 Applicable Codes, Standards and Guidelines**

- a. The design, engineering, procurement, construction, installation, testing, commissioning, operation, and maintenance of the Refuse Transfer Stations (RTS) shall comply with the latest editions (including amendments and revisions) of the codes, standards, rules, and guidelines listed herein, unless otherwise specified in the Contract.

### **2.6.1 Solid Waste Management Rules, 2016**

- a. The Project shall be planned, designed, executed, and operated in full compliance with the Solid Waste Management Rules, 2016, notified by the Government of India under the Environment (Protection) Act, 1986, including all subsequent amendments, notifications, and clarifications issued from time to time.
- b. Key compliance aspects shall include, but not be limited to:
  - Scientific handling, storage, transportation, and transfer of municipal solid waste
  - Covered and secured transportation of waste to prevent spillage, littering, and odour nuisance
  - Prevention of environmental pollution and protection of public health
  - Occupational safety and welfare of workers engaged in waste handling
  - Maintenance of records and submission of reports to the Urban Local Body and regulatory authorities

### **2.6.2 CPHEEO Manual and MoHUA Guidelines**

- a. The planning, design, and operational framework of the RTS shall be in accordance with CPHEEO Manual on Municipal Solid Waste Management, issued by the Central

Public Health and Environmental Engineering Organisation (CPHEEO), Government of India; and guidelines, advisories, and model documents issued by the Ministry of Housing and Urban Affairs (MoHUA) under national programmes such as Swachh Bharat Mission (Urban), Smart Cities Mission, and other relevant initiatives.

- b. These documents shall be referred to for:
- Selection and design of Refuse Transfer Stations
  - Capacity planning and equipment configuration
  - Environmental safeguards and best operational practices
  - Performance benchmarks and service quality standards

### **2.6.3 BIS, NBC and Relevant Indian Standards**

- a. All civil, structural, mechanical, electrical, and ancillary works shall conform to the relevant standards and codes issued by the Bureau of Indian Standards (BIS), including but not limited to applicable IS codes for materials, construction practices, equipment, and safety.
- b. In addition, the following shall apply:
- National Building Code (NBC) of India, including provisions related to structural design, fire and life safety, accessibility, and building services
  - Applicable Indian Electricity Rules, Central Electricity Authority regulations, and safety codes
  - Motor Vehicles Act, Central Motor Vehicle Rules (CMVR), and ARAI standards for vehicles and transport equipment
  - Fire safety norms and guidelines issued by the competent Fire Authority
- c. Where Indian Standards are not available for any particular component or system, internationally accepted standards shall be followed with prior approval of Morbi Municipal Corporation.

### **2.6.4 General Provision**

- a. Compliance with the above codes and standards shall not relieve the Contractor of its responsibility to ensure safe, efficient, durable, and fully functional performance of the RTS throughout the Contract Period. The Contractor shall also comply with any additional standards or directions issued by Morbi Municipal Corporation or statutory authorities during the execution and O&M phases.

### **3 Scope of Work - General**

#### **3.1 Project Delivery Model (EPC + O&M)**

- a. The project shall be implemented under a single-package Engineering, Procurement and Construction (EPC) model, followed by comprehensive Operation and Maintenance (O&M) for a period of five (5) years from the date of successful commissioning of the Refuse Transfer Station (RTS).
- b. Under this delivery model, the Contractor shall have single-point responsibility for design finalisation (where applicable), engineering, and statutory compliance, procurement, supply, installation, testing, and commissioning of all works, equipment, and vehicles, operation and maintenance of the RTS including waste handling, compaction, and transportation to designated processing / disposal facilities and achieving performance standards throughout the O&M period
- c. The EPC and O&M phases shall be inseparable and shall be governed by the same Contract, with clearly defined milestones and performance obligations.

#### **3.2 Scope Boundary and Interface Conditions**

- a. The scope of the Contractor shall include all works, services, equipment, manpower, consumables, and statutory compliances required to deliver a fully functional RTS, whether or not specifically mentioned in individual clauses, but necessary for successful completion of the Project.

##### **3.2.1 Key interface conditions include:**

- a. The site shall be made available by Morbi Municipal Corporation (MRMC) free of cost and free of encumbrance for construction of the project facilities and operations, thereof, for the period as mentioned in the Tender.
- b. The Contractor shall coordinate with MRMC and designated authorities for approvals, inspections, and utility connections.
- c. The Contractor shall ensure seamless interface between civil / structural, mechanical, & electrical works, compaction equipment, containers, hook loader vehicles, container handling systems, RTS operations, upstream waste collection system & its door to door waste collection vehicles and downstream processing / disposal facilities.
- d. No claim shall be entertained on account of interface issues between different components of the Project.

## **4 Scope of Work - Engineering, Procurement & Construction (EPC)**

### **4.1 Site Development and Enabling Works**

- a. The Contractor shall carry out all site development works, including but not limited to site clearing, grading, levelling, and preparation, construction of internal roads, pavements, and circulation areas suitable for heavy vehicles, boundary fencing, gates, security arrangements, access control, storm water drainage and site drainage systems and other temporary facilities required during construction. All works shall be executed in accordance with approved drawings, specifications, and applicable standards.

### **4.2 Survey, Investigations and Detailed Engineering**

- a. The Contractor shall undertake or validate all necessary surveys and investigations, including:
  - Topographical survey and site verification
  - Geotechnical investigations for foundations and pavements (where required)
  - Utility surveys and interface checks
- b. Based on the above, the Contractor shall prepare and submit:
  - Detailed engineering drawings and design calculations for all civil works
  - Equipment layout and integration drawings
  - work schedules
- c. All drawings and designs shall be subject to approval by MRMC / Engineer-in-Charge prior to execution.

### **4.3 Civil and Structural Works**

- a. The civil and structural scope shall include construction of all RTS infrastructure, including but not limited to:
  - Main tipping and compaction platform buildings
  - Foundations and RCC structures for stationary compactors
  - Ramps, unloading bays, kerbs, and safety barriers
  - Administrative office room
  - Weighbridge foundations and approaches
  - Wash area, service area, leachate tank, grease trap, and drainage structures
  - Generator room and electrical room
  - Toilets, staff facilities, and other ancillary structures
- b. All works shall conform to approved drawings, relevant BIS codes, and municipal standards.

#### 4.4 Supply, Installation and Commissioning of Mechanical Equipment

- a. The Contractor shall procure, supply, install, test, and commission the following minimum mechanical equipment:

Sn.	Equipment	Working	Standby	Total
1	Stationary / Static Compactors	1	1	2
2	Closed Containers	3	1	4
3	Hook Loader Vehicles	2	1	3

- b. The equipment shall be
- New, unused, and of proven performance
  - Fully compatible with each other
  - Capable of achieving the required compaction density and throughput
  - Supplied with all safety systems, accessories, tools, and documentation
- c. Installation shall be carried out strictly as per manufacturer recommendations and approved layouts.

#### 4.5 Electrical, Instrumentation and Utility Systems

- a. The Contractor shall design, supply, install, and commission all electrical and utility systems, including:
- Power distribution panels and cabling
  - Electrical supply to compactors, lighting, weighbridges, and buildings
  - DG set and backup power systems
  - Internal and external lighting
  - Water supply systems for washing, sanitation, and firefighting
  - Instrumentation and monitoring systems as required
- b. All electrical works shall comply with statutory safety regulations and approved standards.

#### 4.6 Environmental Control Systems

- a. The Contractor shall provide and integrate all environmental control systems necessary for compliant RTS operation, including:
- Leachate collection, storage, and disposal systems
  - Odour control and disinfectant spraying systems
  - Wash water and wastewater management systems
  - Dust and noise control measures
  - Green belt and housekeeping provisions
- b. The systems shall comply with SWM Rules, 2016, GPCB norms, and directions of MRMC.



#### **4.7 Testing, Trial Run and Commissioning**

- a. Upon completion of installation, the Contractor shall:
  - Carry out testing and inspection of all civil, mechanical, and electrical systems
  - Conduct trial runs of compactors, containers, and hook loader vehicles under load conditions
  - Demonstrate end-to-end RTS operations including waste reception, compaction, and transportation
- b. Successful commissioning shall be certified only after the RTS operates satisfactorily for the prescribed trial period.

#### **4.8 As-Built Drawings and Document submission**

- a. The Contractor shall submit complete documentation, including:
  - As-built drawings for all civil, structural, mechanical, and electrical works
  - Operation and Maintenance manuals for all equipment and systems
  - Warranty certificates and test reports
  - Spare parts lists and maintenance schedules
- b. Submission and approval of documentation shall be a mandatory pre-condition for completion of EPC phase.

## **5 Scope of Work – Operation & Maintenance**

### **5.1 General O&M Obligations**

- a. The Contractor shall be responsible for comprehensive Operation and Maintenance (O&M) of the Refuse Transfer Station (RTS) for a period of five (5) years from the date of successful commissioning, or as specified in the Contract.
- b. The O&M scope shall include operation, routine and periodic maintenance, manpower deployment, safety and environmental management, compliance with statutory requirements, and uninterrupted service delivery. The Contractor shall ensure that the RTS functions efficiently, safely, and in full compliance with applicable laws, rules, and directions of Morbi Municipal Corporation (MRMC).
- c. The Contractor shall have single-point responsibility for achieving the prescribed performance standards throughout the O&M period.

### **5.2 Operation of Refuse Transfer Station**

- a. The Contractor shall operate the RTS on a 24x7 basis or as directed by MRMC, including operations on holidays and during adverse weather conditions. The operational responsibilities shall include, but not be limited to:
  - Receiving municipal solid waste delivered by small and medium collection vehicles at the RTS
  - Regulating entry, unloading, and internal movement of vehicles
  - Operating stationary compactors for compaction of waste
  - Loading compacted waste into closed containers
  - Transportation of compacted waste using hook loader vehicles to the designated processing and/or disposal facility identified by MRMC
  - Ensuring timely evacuation of containers so that no backlog, overflow, or spillage occurs at the RTS
- b. All operations shall be carried out in a safe, hygienic, and environmentally compliant manner.

### **5.3 Manpower Deployment**

- a. The Contractor shall deploy adequate and competent manpower for smooth RTS operations, including operators, drivers, supervisors, technicians, housekeeping staff, and safety personnel.
- b. Key requirements include:
  - Deployment of trained and experienced personnel for equipment and vehicle operation
  - Provision of uniforms, identity cards, and personal protective equipment (PPE)
  - Ensuring attendance and continuity of workforce across all shifts
  - Replacement of absentee staff without disruption to operations
  - No additional payment shall be made for deployment of manpower beyond what is required to meet performance obligations.

Table 1: Manpower Requirement for RTS O&amp;M

Sn.	Category / Designation	No. of Personnel per Shift	No. of Shifts per Day	Total Manpower	Key Responsibilities
1	RTS In-Charge	1	1	1	Overall RTS supervision, coordination with MRMC, reporting, compliance
2	Shift Supervisor	1	2	2	Shift-wise operations, vehicle movement control, safety supervision
3	Stationary Compactor Operator	1 operator per working compactor during day shifts. 1 operator for night shift.	3	5	Operation of compactors, waste compaction, safety checks
4	Hook Loader Driver	1 driver per working vehicle in one shift	1	2	Transportation of compacted waste to processing/disposal site
5	Helper / Assistant (Vehicle)	1 helper per working vehicle in one shift	1	2	Assisting vehicle operation, container handling
6	Weighbridge Operator / Data Entry Operator	1	3	6	Recording waste quantities, MIS and reporting
7	Mechanic / Maintenance Technician	1	1	1	Preventive and breakdown maintenance
8	Electrician	1	1	1	Electrical systems, lighting, panels, DG set
9	Housekeeping / Sanitation Staff	2 worker per shift during day time. 1 worker during night shift.	3	5	Cleaning of platforms, roads, wash areas
10	Security Guard	1	3	3	Site security, access control
	<b>Total Workforce</b>			<b>28</b>	

#### **5.4 Preventive and Breakdown Maintenance**

- a. The Contractor shall be responsible for complete preventive and breakdown maintenance of all RTS assets, including stationary compactors, containers, hook loader vehicles, electrical systems, utilities, weighbridges, and ancillary facilities
- b. Maintenance obligations shall include the following:
  - Preparation and implementation of preventive maintenance schedules as per manufacturer recommendations
  - Maintenance of daily logbooks and equipment history sheets
  - Prompt rectification of breakdowns to ensure minimum downtime
  - Provision and replacement of spare parts, consumables, lubricants, fuel, and tools
  - Maintaining minimum equipment availability and uptime as specified in the Contract
  - Completion of minor repairs within 24 hours and major repairs within 7 days, failing which penalties shall apply
- c. In the event of major breakdowns, the Contractor shall make alternate arrangements to ensure continuity of waste transfer operations at no additional cost to MRMC.

#### **5.5 Housekeeping, Odour and Vector Control**

- a. The Contractor shall maintain high standards of cleanliness and hygiene at the RTS at all times.
- b. The scope shall include:
  - Daily cleaning of tipping floors, platforms, unloading areas, internal roads, operational areas, ramps, staircases, and buildings
  - Regular washing of vehicles, containers, and equipment
  - Operation of wash areas, grease traps, and wastewater management systems
  - Spraying of eco-friendly disinfectants and deodorants on outgoing vehicles and operational areas
  - Vector control measures to prevent breeding of flies, rodents, and other pests
- c. All housekeeping and environmental control measures shall be carried out using eco-friendly methods and materials, as far as practicable.

#### **5.6 Health, Safety and Occupational Measures**

- a. The Contractor shall ensure strict compliance with health, safety, and occupational welfare requirements, including:
  - Provision and enforcement of PPE usage
  - Installation and maintenance of fire-fighting systems and safety signage
  - Training of staff in safe operating procedures and emergency response
  - Compliance with applicable labour laws, Factory Act provisions (where applicable), and safety regulations

- b. The Contractor shall be solely responsible for safety of personnel, visitors, and property at the RTS.

### **5.7 Statutory Compliance**

- a. The Contractor shall comply with all statutory, environmental, and regulatory requirements, including but not limited to Solid Waste Management Rules, 2016, directions of GPCB, Motor Vehicles Act and CMVR requirements for vehicles, and Labour laws, insurance, and welfare regulations.
- b. Failure to comply with statutory obligations shall be treated as a material breach of Contract.

### **5.8 Reporting**

- a. The Contractor shall maintain and submit daily, weekly, monthly, and annual reports as prescribed by MRMC, including waste quantities handled and transported, equipment and vehicle performance, manpower deployment records and maintenance logs.

### **5.9 Handover at End of O&M Period**

- a. At the end of the O&M period, the Contractor shall:
  - Hand over the RTS facility, equipment, and systems in good working condition, subject to normal wear and tear
  - Submit a comprehensive handover report including asset condition, maintenance history, and pending issues (if any)
  - Provide updated drawings, manuals, and documentation
- b. The handover shall be carried out as per the exit management provisions defined in the Contract, to the satisfaction of Morbi Municipal Corporation.

## **6 Civil and Structural Works Specifications**

**All civil and structural works for the Refuse Transfer Station (RTS) at Morbi shall be designed, constructed, and completed in accordance with the Tender specifications, approved drawings, standard technical specifications of Government departments such as R&B Department (GoG) or CPWD (GoI), applicable BIS codes, National Building Code (NBC), and directions of Morbi Municipal Corporation (MRMC) / Engineer-in-Charge. The works shall be suitable for continuous heavy-duty municipal operations and designed for long-term durability.**

### **6.1 Earthwork and Site Grading**

- a. The Contractor shall carry out all earthwork and site grading necessary for development of the RTS, including:
  - Clearing of vegetation, debris, and unsuitable material from the site
  - Excavation to required levels for foundations, pavements, drains, and utilities
  - Filling, backfilling, and compaction using approved materials
  - Site grading to achieve proper surface drainage and prevent water stagnation
- b. Compaction of filled areas shall be carried out to the specified density as per relevant IS codes. Finished ground levels shall be as per approved drawings and shall ensure safe vehicular movement.

### **6.2 Foundations and RCC Structures**

- a. All foundations and reinforced cement concrete (RCC) structures shall be designed and constructed to safely withstand dead loads, live loads, impact loads from vehicle movement, and dynamic loads arising from compaction operations.
- b. The scope shall include foundations for stationary compactors, platforms, buildings, and ancillary structures, RCC columns, beams, slabs, walls, ramps, kerbs, and protective barriers.
- c. Concrete grades, reinforcement detailing, cover, and curing shall conform to applicable BIS standards. Adequate measures shall be taken to ensure structural stability, durability, and resistance to aggressive environmental conditions.

### **6.3 Tipping Platform and Compaction Area**

- a. The tipping platform and compaction area shall be designed as the core operational zone of the RTS and shall include:
  - RCC tipping floors and platforms capable of bearing continuous heavy vehicle loads
  - Adequate platform width and length to allow simultaneous unloading of multiple vehicles as per approved drawings
  - Proper edge protection, wheel stoppers, kerbs, and safety railings
  - Integration of stationary compactor foundations and hopper systems
  - Non-slip surface finish and slope to facilitate cleaning and drainage
  - The layout shall ensure safe unloading, minimal spillage, and efficient compaction operations.



#### **6.4 Internal Roads and Pavements**

- a. Internal roads and pavements within the RTS shall be designed for heavy-duty vehicular traffic, including hook loader vehicles and loaded containers.
- b. The scope shall include:
  - Construction of internal roads with suitable pavement, RCC or flexible pavement, as specified.
  - Ramps and approaches to platforms, weighbridges, and service areas
  - Adequate camber and cross-fall for drainage
  - Road markings, kerbing, and traffic guidance features
- c. Pavements shall be designed to prevent rutting, cracking, and settlement under repetitive heavy loads.

#### **6.5 Buildings, Sheds and Ancillary Structures**

- a. The Contractor shall construct all buildings and ancillary structures required for RTS operations, including but not limited to:
  - Administrative and control rooms
  - Weighbridge rooms and equipment housings
  - Electrical and DG rooms
  - Repair and maintenance sheds
  - Wash areas
  - Toilet blocks
  - Security cabins and entry gates
- a. Buildings shall be designed for functional efficiency, ease of maintenance, and compliance with NBC provisions. Roofing, cladding, finishes, doors, windows, and fittings shall be selected to withstand harsh operating conditions and facilitate easy cleaning.

#### **6.6 General Requirement**

- All civil and structural works shall be executed with high standards of workmanship and quality control. The Contractor shall ensure that the completed facilities are structurally sound, operationally efficient, and suitable for continuous use throughout the design life of the RTS and the O&M period.

### **7 Technical Specification of Machinery**

- a. All mechanical systems and equipment for the Refuse Transfer Station (RTS) at Morbi shall be designed, supplied, installed, tested, commissioned, and maintained to ensure safe, efficient, and uninterrupted handling, compaction, and transfer of municipal solid waste throughout the Contract Period.
- b. All equipment shall be new, unused, of proven design, and suitable for intensive municipal service. Compatibility between all mechanical systems shall be ensured by the Contractor.

## **7.1 General Requirements**

- a. All mechanical equipment shall conform to applicable BIS standards, manufacturer specifications, and statutory requirements.
- b. Equipment shall be capable of continuous operation for multiple shifts per day without overheating, excessive wear, or performance degradation.
- c. Adequate safety devices, interlocks, guards, alarms, and emergency stop systems shall be provided.
- d. Equipment layout shall allow safe operation, inspection, cleaning, and maintenance.
- e. All mechanical installations shall be corrosion-resistant and suitable for a waste-handling environment.

## **7.2 Stationary Compactor Specification**

**Item:** Supply, delivery, testing and commissioning of stationary compactor unit inclusive of hopper & chute

### **7.2.1 General Description**

- a. The Municipal solid waste collected from door to door/littering and transported by Dumper Placers and other smaller vehicles shall be compressed in Stationary Compactors at Transfer Stations to facilitate compression of MSW. The stationary compactors, installed at transfer stations, will fill the garbage in large containers. The stationary compactors should be compatible with containers. Below mentioned is the minimum requirement;
- b. Key requirements include:
  - Robust hopper and charge box arrangement suitable for unloading by small and medium collection vehicles
  - Hydraulic compaction system capable of achieving effective waste density suitable for long-haul transportation
  - Mechanical locking arrangement between compactor and container to ensure safe compaction
  - Control panel with overload protection, alarms, and emergency stop features
  - Safety arrangements to prevent unauthorised access during compaction cycles
- c. The compactors shall be designed for continuous operation with minimal downtime and shall be fully compatible with the specified containers.

## **7.3 Technical Description**

The stationary compactor will have 4 major assemblies whose details are given below.

### **a. Hopper**

- The hopper is a large container wherein incoming MSW will be unloaded directly by vehicles. This should be firmly fixed to the charge box body & supported ensure adequate stability. It would be made of 6mm thick ms sheets the capacity should not be less than 10 CMT. The hopper opening area at the top should be designed in such a way that unloading of minimum two vehicles is possible at a time. The hopper would be well supported by MS structure of appropriate size to take self-weight & Garbage.

**b. Charge Box**

- The unloaded MSW collected in Hopper will be pushed through charge box to compatible with HL containers by to & fro movements of the compactor head, which is attached to charge box. The charge box volume should be minimum 3.0 CMT. The construction of charge box should be with 6mm MS construction with necessary stiffeners. There should be provision for grouting the stationary compactor on the foundation. The charge box must have the provision for mechanically locking the Hook Loader container to it to ensure trouble free operation during the compacting cycle. It shall possess all required safety arrangements.

**c. Control Panel**

- Heavy-duty electrical control panel with IS approved electrical items and wires, switch gears etc. shall be provided and shall be suitable to run minimum 10 KW electric motor with all the required overload protection & alarms.

**d. Hydraulic compacting Mechanism.**

- Entire stationary compactor mechanism must be imported and of reputed manufacturer whose products are well run in country of origin as well as in globe. This will consist of a hydraulic ram that will travel through the charge box length and push the MSW into the container. The ram of hydraulic compacting mechanism should be of suitable size & capable to generate a density of 0.7 to 0.8 T/M<sup>3</sup> compacting garbage. The compaction time of one container shall not be more than 24 – 26 minutes. The hydraulic ram shall be of standard make with standard dimensions having heavy-duty raw materials and capable enough to run for continuous operation of about 16 hr/day. Necessary oil cooler with required mechanism shall also be given for cooling of hydraulic oil.

## **7.4 Containers (Closed Type)**

**Item:** Supply and delivery of heavy duty containers having 20 cum volumetric capacity (compatible with compactor and hook loader)

### **7.4.1 General Description**

- a. The RTS shall be provided with closed containers of specified volumetric capacity, suitable for compaction, storage, and transportation of municipal solid waste.
- b. General requirements include:
  - Structural strength to withstand compaction forces without deformation
  - Leak-proof construction to prevent spillage and leachate leakage during transportation
  - Mechanical locking arrangement compatible with stationary compactors and hook loader vehicles
  - Rear door or discharge mechanism suitable for unloading at processing or disposal facilities
  - Corrosion-resistant construction and protective coatings suitable for MSW handling
- c. Containers shall be designed for repeated loading, unloading, and transportation cycles under harsh operating conditions.

- d. The closed top, rear loading type containers will be compatible with Hook loader as well as stationary compactor to be installed at transfer stations. The container will have rear door opening by ratcheting arrangement for loading refuge at processing site. It shall also have mechanical locking arrangements to lock them with stationary compactor while loading the refuge.

## 7.5 Technical Description

Sn.	Parameter	Value
1.	Volumetric Capacity	20cum appx.
2.	Base/Floor	6MM
3.	Floor Plate	as per ISMB 200
4.	Side Panels	4 mm
5.	Rollers with heavy duty bearing	2 no. rear side
6.	Material	as per BIS 2062
7.	Weight	Not less than 3000 Kgs.
8.	Dimensions:	Approx. L: 4000 mm W: 2000 mm H: 2300 mm
9.		

- a. However these dimensions shall be approx. and actual dimensions shall be as per the design of the manufacturer which tenderer has to submit with tender. Further it should match with offered chassis, HLE and Local RTO norms.
- b. The container would be used for storage and transportation of compacted of municipal solid wastes. Container should be of 20 cubic meter volumetric capacities. The lifting hook shall be integrated within the frame and be capable of taking the specified load.
- c. Container should be of 20 CMT. Volumetric capacity and should be strengthen enough to handle the garbage of its maximum capacity. It shall be capable enough to take care the compaction pressure of the Stationary compactor during the compaction process. Material should not deform.
- d. Container shall have its: -
- Bottom plate (i.e. floor) of 6 mm thick M.S. plate.
  - Sides, front and top portion of 4 mm thick M.S. sheet.
- e. There should be optimum number of cross stiffener / cross members. Along the Width of the container with end to end.
- f. There must be. Longitudinal MS Section beneath the floor to strengthen the floor and for roll on roll off operation.
- g. Hooks for container lifting: The hook for lifting the container would be integral to the framework of the container. It shall be provided with the necessary reinforcement to handle the design weight for lifting with adequate factor of safety. The shape and size would be as per the design of the lifting tackle (Hook lifter). Locking of container shall be given so that it can not move out from the hook during any operation. Necessary safety provision shall be provided so that container should not slide from the hook lifter during transportation.

- h. The design of the container shall be suitable for hook lift vehicle for transportation and have arrangement to lock to the hook lift vehicle during transportation. Further container shall have heavy duty rear door opening arrangement by ratchet and lifting cylinder for unloading of refuse at treatment/disposal site.
- i. All the Plate / Sheet Joints at container edge / border must be supported properly should be fully welded by means of proper MIG welding method. All welding work must be finished properly for better look and strength purpose.
- j. Container rear door shall have ratcheting arrangement lock and should be strong enough to handle the rigorous working operation.
- k. Container shall have 2 Nos. of rollers with required pin and bracket arrangement at the rear side of heavy-duty material for roll on and roll off operation.
- l. Container shall have arrangement to collect leachate formed during compaction and smooth valve & related mechanism to empty it.
- m. Container shall have upward sliding door (Guillotine) arrangement. It shall be having proper sealing also.
- n. For fabrication of container normal engineering standards and practice will have to be used by the contractor. Container should have minimum weight of 3000 Kgs.
- o. Container outer sides shall be colored with Green as per our S.W.M. Scheme. Painting: The inside of the containers to be coated with two-coat black colour fibre reinforced plastic resin or equivalent polyurethane resin. Bottom of the container shall also be painted with black anti-corrosive colour. The outside shall be painted "GREEN" (or as per MRMC requirement) with minimum 1 coat of first quality synthetic paint to ensure long lasting structure suitable for use of handling raw garbage under corrosive conditions. Prior to painting coat of anticorrosive zinc riched primer shall be applied as per the paint manufacturing standard. The supplier should paint number on container and messages on the body.
- p. You shall provide M.M.C. Logo and Numbering as per our instruction.
- q. Contractor has to first provide the sample container and on approval of the same balance quantity should be manufactured.
- r. If any suggestion / instruction given by DyMC and / or his authorized representative during inspection, it shall be implemented by you.
- s. All welding work must be MIG welding only. All necessary finishing shall be carried out prior painting. Welding wire shall be of ESAB/ADOR/L&T only.
  - All angle and channels and other raw materials are as per Indian standard IS-2062.
  - All MS material shall be of Tata / SAIL / Jindal / Vishakhapatnam steel/ Essar / Ispat / (for angle/ channel if not available of above brand then it shall be of IS/ISO approved make) only. Contractor has to submit necessary test report and/or invoice copies.
  - Paint must be of standard brand only like Asian, Nerolac, Berger, ICI, and Shalimar only.

Note: Minor changes will be accepted as per manufacturer specification, however final authority for approval of machinery will be the Engineer-in-charge.

Approved Make: Thetford, Hyva, Werner Weber, Pakawaste LTD, or equivalent

## **7.6 Hook Loader Vehicles**

Item: Supply, delivery, testing and commissioning of 20 mt capacity hook loader units on minimum 25 GVW truck chassis with driver cabin

- a. Hook loader vehicles shall be provided for transportation of compacted waste containers from the RTS to designated processing or disposal facilities.
- b. Key requirements include:
  - Vehicle chassis and hook-lift mechanism suitable for handling fully loaded containers
  - Safe and efficient loading, lifting, locking, transportation, and unloading of containers
  - Compliance with Motor Vehicles Act, CMVR, and applicable transport regulations
  - Provision of safety features including reverse alarms, warning lights, and braking systems
- c. The vehicles shall be capable of operating continuously under urban and highway conditions and shall be maintained in road-worthy condition at all times.

### **7.6.1 Hook Loader Truck Chassis**

- a. **Specification**
  - Make and model of chassis: Tenderer has to specify
  - Country of origin for Hook lifter: Tenderer has to specify
- b. **General Description**
  - The chassis shall be rugged and durable, shall incorporate the latest technological features offered by the manufacturer/supplier. The vehicle should have minimum 25 ton pay load (GVW) capacity and 6 X 4 , must be suitable for fixing of Hook lifter equipment as detailed below. Below mentioned are minimum requirements;
- c. **Basic Specification**

Any HCV- 6 x 4 chassis with full forward driver cabin and load should meet the following specification:

  - **Gross vehicle weight:** minimum 25000Kg.
  - **Engine:** Fuel efficient, Turbo charged 4- stroke, 6- cylinder water-cooled, direct injection diesel engine delivering not less than 130 HP at rated RPM & manufacturer's duty point. It must have minimum EURO- III/EURO- IV emission norms as may applicable to AMC, Ahmedabad.
  - **Clutch:** Single plate dry friction type.
  - **Gear Box Type:** Synchromesh
  - **No. Of gears:** 5 forward and 1 reverse or as per CMVR / ARAI approval.
  - **Front Axle:** Heavy duty forged I- reverse. (Or as per approval of ARAI/CMVR)
  - **Rear Axle:** Two live rear axles, single speed fully floating spiral bevel gears. . (Or as per approval of ARAI/CMVR)



- **Steering:** Power steering. Brakes:
- **Service Brakes:** Dual circuit full air S-Cam brakes, or as per CMVR / ARAI approval.
- **Parking Brakes:** Spring actuated on rear wheels, or as per CMVR / ARAI approval.
- **Engine Exhaust Brake:** Pneumatically operated with foot control valve or as per CMVR / ARAI approval.
- **Frame:** Ladder type heavy duty frame with riveted/bolted cross members. Side members of channel sections, or as per CMVR / ARAI approval.
- **Suspension:** Semi elliptical leaf spring at front and rear with auxiliary springs at rear only or as per CMVR / ARAI approval.
- **Shock absorber:** Hydraulic double acting telescopic type at front or as per CMVR / ARAI approval.
- **Wheels & tyres**
  - **Wheel base:** minimum 4600 mm
  - **Tyres:** 10.00\*20-16PR with diagonal ply. (Or as per approval of ARAI/CMVR)
  - **No. Of wheels:** Front: 2, Rear: 8, Spare: 1 (Lockable)
- **Fuel Tank Capacity:** Minimum 180 liters approximately.
- **Cab:** All steel fully forward control drivers' Cabin with adjustable seats having seats belts. Cab should have all standard accessories like open able side windows, rear view door mirrors, laminated windscreen. Minimum Two speed windshield wipers, fuel gauge multiple warning lamps and buzzer low oil pressure coolant level etc.
- **Electric system:** Voltage: 12/24 volts.
- **Battery Capacity:** 12 volts-180 amps/hr 24 volts-80amps/hr. (Or as per approval of ARAI/CMVR)
- **Alternator Capacity:** minimum 65amps. (Or as per approval of ARAI/CMVR)
- **Head lights:** 2 nos. with Head light protection frame. Turn Signal: Front and rear.
- **Reverse alarm:** 1 No.
- **Painting:** Paint & painting process shall be superior quality to ensure long lasting structure resistant to rust, weathering and breakage.
- **Color shade:** Purchaser choice from standard colors offered by suppliers.

#### **7.6.2 Hook Loader Equipment**

**Item:** Providing & Fixing Of Hook Loader Equipment over Truck Chassis.

##### **a. General description**

- The Hook Loader Equipment mounted on a Truck chassis (HLE) shall be used for lifting, loading the closed containers of various capacities (General 20 cum vol. Capacity) and discharging the contents (solid waste materials like garbage, garden waste, debris and other like refuse materials) by tilting the container at the desired location.
- The hydraulically operated HLE shall be capable of loading/unloading the steel container on/from chassis having, by hooking and rolling on/off principle. HLE shall be

capable enough to handle the load of 20 MT with at least 10% safety factor. Minimum requirements are as under.

**b. Technical Description**

- HLE shall be provided with an arm type hook mechanism for loading and unloading the container.
- The HLE will have a central frame assembly located with an outer structure to handle and to tip the container. It shall have telescope jib with heavy-duty hook, 2 main rams for lifting/tipping, standard containers locking arrangement, hydraulic pump, stabilizers and other by hydraulic elements as per functional need.
- The hydraulic pump will be driven by the vehicle engine gearbox thro the power takes off (PTO) unit.
- A pair of roller assembly located at the rear end of the
- HLE will facilitate and guide the main beam sections of container during loading/unloading of the container.
- Necessary safety locking arrangement (Mechanical/hydraulic) shall be provided to lock the container with the HLE. Tipping operation of the container shall be done after effective locking.
- All safety control like holding valves, check valves/relief valves, Electric Hydraulic/Pneumatic functional interlocking arrangements will be provided for operational reliability.
- It shall have all required hydraulic connections for loading-unloading-locking-emptying of the container.
- All control levers shall be provided at a convenient location in/near driver cabin for easy operation.

**c. Technical Specification**

HLE capacity	20 ton appx.
Container length that can be accommodated (appx)	4000 mm
Hydraulic Pump capacity	As per requirement of system
Operating Pressure (Minimum)	200 bar
Hydraulic Tank capacity(Minimum)	100 Liters.

- d. The hook loader equipment on chassis shall be as per rules & regulation prescribed by local transport authorities
- These specifications only show the requirement in brief. Each tenderer shall attach descriptive literature and specifications along with a detailed description of the machine covering all the salient features.
  - Providing nipples etc to all moving parts with adequate means of lubrication.
  - All reciprocating parts shall be suitably guarded

- The equipment shall be capable of being operated under average conditions for at least 16 hrs. Continuously without any ill effects on its component
- However imported components shall be approved by principals and international organisation with certificates.
- The rear body shall be painted from outside with Asian/ Nerolac / Berger / ICI /Shalimar/Dulux. The colour scheme will be intimated later.
- The under chassis parts and the portion shall be painted with anticorrosive black. Complete unit including cross and super structure member shall be painted with superior quality anti-rust paint. All the paint material shall confirm to ISI specifications and shall be of specified makes. The cabin shall be painted with Asian/ Nerolac / Berger / ICI /Shalimar/Dulux paint externally and internally. The colour scheme will be informed at the time of fabrication
- All welding work must be MIG welding only. All necessary finishing shall be carried out prior painting. Welding wire shall be of ESAB/ADOR/L&T only.
- All angle and channels and other raw materials are as per Indian standard.
- All MS material shall be of Tata / SAIL / Jindal / Vishakhapatnam steel/ Essar /Ispat/Hardox/as suggested in the tender (for angle/ channel if not available of above brand then it shall be of IS/ISO approved make) only. Contractor has to submit necessary test report and/or invoice copies. Paint must be of standard brand only like Asian, Nerolac, Berger, ICI, Dulux and Shalimar only.

### **7.7 Ancillary Mechanical Equipment**

- a. The Contractor shall provide all ancillary mechanical equipment required for smooth RTS operations, including but not limited to:
  - Washing systems for vehicles, containers, and equipment
  - Grease traps and wastewater handling arrangements related to washing operations
  - Handling tools, lifting devices, and maintenance equipment
  - Fire-fighting equipment and emergency response tools
- b. All ancillary systems shall be integrated with the overall RTS layout and operational workflow.

### **7.8 Installation, Testing and Commissioning**

- a. All mechanical equipment shall be installed strictly in accordance with approved drawings and layouts, manufacturer recommendations and applicable safety and statutory requirements.
- b. The Contractor shall carry out testing and trial runs under load conditions to demonstrate satisfactory performance, safety, and compatibility of all mechanical systems prior to commissioning.

### **7.9 Operation, Maintenance and Performance Requirements**

- a. The Contractor shall be responsible for complete operation and maintenance of all mechanical systems during the O&M period, including:
  - Preventive and breakdown maintenance

- Supply and replacement of spare parts, consumables, lubricants, and hydraulic fluids
  - Maintenance of equipment logbooks
  - Ensuring minimum uptime and availability as specified in the Contract
- b. All mechanical systems shall consistently meet the performance requirements defined for the RTS without causing operational bottlenecks or environmental nuisance.

## **8 Electrical, Utilities and Support Systems**

- a. All electrical, utility, and support systems for the Refuse Transfer Station (RTS) at Vajepar (Madhapar), Morbi shall be designed, supplied, installed, tested, commissioned, operated, and maintained to ensure safe, reliable, and uninterrupted functioning of the facility during both the EPC and O&M phases.

### **8.1 Electrical Power Supply and Distribution**

- b. Electrical power shall be provided for operation of stationary compactors, lighting, weighbridges, office facilities, washing systems, and other electrical loads.
- c. The Contractor shall design and install the internal electrical distribution system, including panels, cabling, earthing, and protection systems.
- d. Electrical installations shall comply with the Indian Electricity Rules, Central Electricity Authority (CEA) regulations, and relevant BIS standards.
- e. Adequate earthing and lightning protection systems shall be provided for all electrical installations and structures.

### **8.2 Backup Power Supply (DG Set)**

- a. Provision shall be made for standby power through Diesel Generator (DG) sets or other approved backup systems to ensure uninterrupted RTS operations during power outages.
- b. The DG set capacity shall be adequate to operate critical systems including compactors, lighting, weighbridge, and control rooms.
- c. DG set installation, exhaust, noise control, and fuel storage shall comply with CPCB/GPCB norms.

### **8.3 Lighting Systems**

- a. Adequate internal and external lighting shall be provided to ensure safe operations during night-time and low-visibility conditions.
- b. Lighting shall be provided at tipping platforms, unloading areas, internal roads, weighbridges, wash areas, buildings, and security zones.
- c. Energy-efficient lighting fixtures shall be used, with appropriate protection against dust, moisture, and corrosive environments.

### **8.4 Water Supply System**

- a. Water supply shall be provided for washing of vehicles and containers, housekeeping, sanitation, dust suppression, and fire-fighting requirements.
- b. The Contractor shall install internal plumbing networks, storage tanks, pumps, and distribution systems as required.
- c. Water supply systems shall be designed to minimise wastage and ensure reliable availability during peak operations.

### **8.5 Wastewater, Leachate and Effluent Management**

- a. Wastewater generated from washing, cleaning, and compaction activities shall be collected through a dedicated drainage network.

- b. Leachate generated during waste compaction and transportation shall be properly collected and discharged into designated treatment systems or sewer connections, as approved by MRMC.
- c. Grease traps, inspection chambers, and necessary treatment arrangements shall be provided and maintained.

#### **8.6 Fire Detection, Fire-Fighting and Safety Systems**

- a. Fire detection and fire-fighting systems shall be provided in accordance with NBC and local Fire Authority requirements.
- b. The systems shall include fire extinguishers, hydrants (where applicable), alarm systems, and emergency response equipment.
- c. The Contractor shall ensure regular inspection, testing, and certification of fire safety systems throughout the Contract Period.

#### **8.7 Weighbridge, Monitoring and Control Systems**

- a. Weighbridge systems shall be provided for recording inbound and outbound waste quantities, including associated electrical, control, and data systems.
- b. Monitoring systems such as CCTV, access control, and communication systems shall be installed and maintained as required.
- c. All systems shall be integrated to support transparent monitoring, reporting, and audit requirements of MRMC.

#### **8.8 Support and Ancillary Systems**

- a. The Contractor shall provide and maintain all support systems necessary for RTS operations, including:
  - Control rooms and computer systems
  - GPS-based vehicle tracking systems (where specified)
  - Tools, tackles, and maintenance equipment
  - First-aid and emergency response facilities

#### **8.9 General Requirement**

- a. All electrical and utility systems shall be designed for durability, safety, and ease of maintenance in a harsh waste-handling environment. The Contractor shall ensure continuous availability and functionality of all systems throughout the EPC and O&M periods without causing operational disruption.



## **9 Environmental Management Systems**

- a. The Refuse Transfer Station (RTS) shall be designed, constructed, operated, and maintained in a manner that prevents environmental pollution, protects public health, and ensures compliance with all applicable environmental laws and regulations.
- b. The Contractor shall be solely responsible for implementation and effective functioning of all environmental management measures during both the EPC and O&M phases.

### **9.1 Environmental Compliance**

- a. The Contractor shall ensure compliance with, inter alia:
  - Solid Waste Management Rules, 2016
  - Directions, consents, and guidelines issued by Gujarat Pollution Control Board (GPCB)
  - Environment (Protection) Act, 1986 and allied rules
  - Conditions stipulated by Morbi Municipal Corporation (MRMC) and other statutory authorities
- b. Non-compliance shall be treated as Deficiency of Service and shall attract penalties as per the Contract.

### **9.2 Leachate Collection and Management**

- a. Leachate generated during waste unloading, compaction, storage, and transportation shall be collected through a dedicated drainage and piping system.
- b. Leachate shall be conveyed to the designated leachate tank or discharged into the approved sewer line/treatment system as permitted by MRMC and statutory authorities.
- c. Containers shall be leak-proof, and leachate generated during transportation shall be collected and disposed of in an approved manner.
- d. Leachate management systems shall be operated and maintained at all times to prevent spillage, odour, or contamination of soil and water bodies.

### **9.3 Odour, Air and Dust Control**

- a. The Contractor shall implement effective measures to control odour, air emissions, and dust, including:
  - Regular spraying of eco-friendly disinfectants and deodorants in unloading, compaction, and container handling areas
  - Prompt evacuation of compacted waste to avoid prolonged storage
  - Covered and enclosed compaction and container systems to minimise odour release
  - Dust suppression measures during dry conditions
- b. Odour nuisance beyond the RTS premises shall not be permitted.

### **9.4 Wastewater and Effluent Management**

- a. Wastewater generated from washing of vehicles, containers, platforms, and floors shall be collected through a proper drainage network.

- b. Grease traps, inspection chambers, and pre-treatment systems shall be operated and maintained effectively.
- c. Treated wastewater shall be discharged only into authorised sewer lines or treatment facilities as approved by MRMC and regulatory authorities.
- d. Direct discharge of untreated wastewater onto land or storm drains is strictly prohibited.

### **9.5 Noise and Vibration Control**

- a. Noise generated from compactors, vehicles, DG sets, and other equipment shall be controlled to meet applicable ambient noise standards.
- b. Equipment shall be properly maintained to avoid excessive noise and vibration.
- c. Acoustic enclosures and silencers shall be provided for DG sets and other noise-generating equipment as required.

### **9.6 Housekeeping and Site Cleanliness**

- a. The Contractor shall maintain high standards of cleanliness at all times, including:
  - Daily cleaning of tipping platforms, unloading areas, internal roads, wash areas, and buildings
  - Immediate removal of spilled waste and wash water
  - Regular washing of vehicles and containers
  - Systematic cleaning schedules and records
- b. Poor housekeeping shall be treated as a performance failure.

### **9.7 Vector and Pest Control**

- a. Effective measures shall be implemented to control flies, rodents, insects, and other pests.
- b. Vector control measures shall include regular disinfection, pest control treatments, and elimination of stagnant water.
- c. The Contractor shall engage licensed agencies for pest control, if required.

### **9.8 Green area and Aesthetic Measures**

- a. Green areas provided within the RTS premises shall be maintained in healthy condition.
- b. Landscaping shall be used as a buffer to reduce visual impact, dust, and odour.
- c. Dead or damaged plants shall be replaced promptly.

### **9.9 Environmental Monitoring and Reporting**

- a. The Contractor shall:
  - Maintain records of leachate management, disinfection activities, housekeeping, and pest control
  - Submit periodic environmental compliance reports to MRMC as and when requested.
  - Facilitate inspections by MRMC and regulatory authorities at any time

- b. All deficiencies pointed out during inspections shall be rectified immediately.

#### **9.10 General Environmental Obligation**

- a. The Contractor shall ensure that RTS operations do not cause adverse impact on surrounding areas, public health, or the environment. Compliance with environmental requirements shall be deemed an essential performance obligation under the Contract.

## **10 Health, Safety and Occupational Standards**

- a. The Contractor shall ensure that all activities related to the design, construction, operation, and maintenance of the Refuse Transfer Station (RTS) are carried out in a manner that protects the health and safety of workers, visitors, and the general public.
- b. The Contractor shall have sole responsibility for implementation, monitoring, and enforcement of health, safety, and occupational standards throughout the Contract Period.

### **10.1 General Safety Obligations**

- a. The Contractor shall comply with all applicable safety laws, rules, and regulations, including but not limited to the Factory Act, 1948, Building and Other Construction Workers (Regulation of Employment and Conditions of Service) Act, and relevant labour and safety enactments.
- b. All works shall be executed using safe methods and practices, with due regard to occupational health and safety.
- c. The Contractor shall not permit any unsafe condition or unsafe act at the RTS premises.
- d. Failure to comply with safety obligations shall be treated as Deficiency of Service.

### **10.2 Personal Protective Equipment (PPE)**

- a. The Contractor shall provide appropriate PPE to all personnel engaged in RTS construction and operations, including safety shoes, gloves, reflective jackets, masks, eye protection, and hearing protection, as applicable.
- b. Use of PPE shall be mandatory, and enforcement shall be the responsibility of the Contractor.
- c. PPE shall be replaced as and when worn out or damaged, at no additional cost to Employer.

### **10.3 Training and Safety Awareness**

- a. All personnel shall be trained in safe operating procedures relevant to their duties, including operation of compactors, vehicles, electrical systems, and emergency response.
- b. Periodic refresher training shall be conducted and documented.
- c. At least one person per shift shall be trained in basic fire-fighting and first aid.

### **10.4 Safety in Operation of Equipment and Vehicles**

- a. Only trained and authorised personnel shall be permitted to operate compactors, hook loader vehicles, and other equipment.
- b. All machines and vehicles shall be fitted with safety guards, alarms, interlocks, and emergency stop mechanisms.
- c. Vehicles shall be operated strictly in accordance with traffic rules and site circulation plans.
- d. No person under the influence of alcohol, drugs, or intoxicants shall be permitted to work at the RTS.

### **10.5 Fire Prevention and Emergency Preparedness**

- a. The Contractor shall operate and maintain fire detection and fire-fighting systems in compliance with NBC and Fire Authority requirements.
- b. Fire extinguishers and emergency equipment shall be readily accessible and regularly inspected.
- c. Emergency response procedures for fire, accidents, spills, and natural events shall be established and displayed prominently.

### **10.6 Occupational Health and Welfare Measures**

- a. The Contractor shall ensure availability of drinking water, sanitation facilities, rest areas, and first-aid kits for all workers.
- b. Periodic health check-ups shall be conducted for personnel engaged in waste handling and heavy equipment operation.
- c. Adequate lighting and ventilation shall be provided in all work areas.

### **10.7 Safety Signage and Access Control**

- a. Safety signage, warning boards, and operational instructions shall be displayed at appropriate locations.
- b. Restricted and hazardous areas shall be clearly marked and access controlled.
- c. Visitor entry shall be regulated, and safety instructions shall be communicated to all visitors.

### **10.8 Accident Reporting and Incident Management**

- a. All accidents, near-misses, and unsafe conditions shall be reported immediately to the Employer.
- b. The Contractor shall investigate incidents and implement corrective and preventive measures.
- c. Statutory reporting requirements shall be complied with without delay.

### **10.9 Insurance and Liability**

- a. The Contractor shall maintain comprehensive insurance coverage for personnel, equipment, vehicles, and third-party liabilities as required under the Contract.
- b. The Contractor shall be solely responsible for compensation arising out of accidents, injuries, or damages involving its personnel or assets.

### **10.10 General Safety Obligation**

- a. Compliance with health, safety, and occupational standards is a fundamental performance requirement of the Contract. Any failure in this regard shall entitle Morbi Municipal Corporation to impose penalties, suspend operations, or take other actions as provided under the Contract.

## **11 Quality Assurance and Quality Control (QA/QC)**

- a. The Contractor shall establish, implement, and maintain an effective Quality Assurance and Quality Control (QA/QC) system to ensure that all works, materials, equipment, and services provided under the Contract comply with the specified requirements, approved drawings, applicable standards, and good engineering practice.
- b. The QA/QC system shall apply to all phases of the Project, including engineering, procurement, construction, installation, testing, commissioning, operation, and maintenance.

### **11.1 Quality Assurance during Engineering and Design**

- a. All designs, drawings, and calculations shall be prepared by qualified personnel and checked independently before submission.
- b. Design documents shall comply with applicable codes, standards, and Contract requirements.
- c. No construction or procurement shall commence without approval of relevant drawings by the Employer or Engineer-in-Charge.

### **11.2 Quality Control of Materials and Equipment**

- a. All construction materials, mechanical equipment, electrical components, and consumables shall be new and of approved quality.
- b. Materials and equipment shall be sourced from approved manufacturers or suppliers.
- c. The Contractor shall submit test certificates, manufacturer's data sheets, and compliance certificates as required.
- d. The Employer or its representative shall have the right to inspect materials and equipment at source or at site.

### **11.3 Inspection and Testing During Construction**

- a. The Contractor shall prepare and implement Inspection and Test Plans for all major activities and components.
- b. Testing shall be carried out at various stages to verify compliance with specifications and standards, as per requirement.
- c. All test results shall be recorded and submitted to the Employer for review.
- d. Works found to be defective or non-compliant shall be rectified or replaced at the Contractor's cost.

### **11.4 Quality Control during Installation and Commissioning**

- a. Installation of mechanical, electrical, and utility systems shall be carried out under controlled conditions and supervised by competent personnel.
- b. Pre-commissioning checks, functional tests, and trial runs shall be conducted as per approved procedures.
- c. Commissioning shall be deemed complete only upon successful demonstration of performance and compliance with Contract requirements.

### **11.5 Quality Assurance during Operation and Maintenance**

- a. The Contractor shall maintain quality standards during the O&M period through systematic inspections, maintenance schedules, and performance monitoring.
- b. Equipment logbooks, maintenance records, and performance reports shall be maintained and made available for inspection.
- c. Any deterioration in quality or performance shall be promptly addressed to maintain service standards.

### **11.6 Documentation and Records**

- a. The Contractor shall maintain and submit the following quality records, as applicable:
  - Approved drawings and revisions
  - Material test reports and certificates
  - Inspection and test records
  - Non-conformance reports and corrective actions, as applicable.
  - As-built drawings and O&M manuals
- b. All records shall be maintained in an orderly manner and retained for the duration specified in the Contract.

### **11.7 Audits and Review**

- a. The Employer or its authorised representative shall have the right to conduct quality audits and inspections at any time.
- b. The Contractor shall provide access to all records, facilities, and personnel required for such audits.
- c. Observations and non-conformities identified during audits shall be rectified within the stipulated timeframe.

### **11.8 General Quality Obligation**

- a. Compliance with QA/QC requirements is a fundamental obligation of the Contractor. Failure to comply may be treated as Deficiency of Service and may attract penalties, suspension of works, or other contractual remedies.



## **12 Performance Requirements and Acceptance Criteria**

- a. Compliance with this Section shall be a condition precedent for certification of commissioning, release of milestone payments, and continuation of O&M payments.

### **12.1 General Performance Requirements**

- a. The RTS shall be designed, constructed, equipped, and operated to ensure:
  - Continuous, safe, and hygienic handling of municipal solid waste
  - Compliance with applicable laws, standards, and environmental norms
  - Achievement of specified throughput, availability, and service levels
  - Integration and compatibility of civil, mechanical, electrical, and utility systems
- b. The Contractor shall be responsible for achieving and maintaining the specified performance standards throughout the Contract Period.

### **12.2 Performance Requirements during design and construction Phase**

- a. The following minimum performance requirements shall apply upon completion of construction and installation:
- b. Structural and Civil Works
  - All civil and structural works shall be completed in accordance with approved drawings and specifications.
  - Structures shall be free from visible defects, cracks, settlement, or deformation.
- c. Mechanical and Electrical Systems
  - Stationary compactors, containers, hook loader vehicles, and ancillary systems shall be installed and fully functional.
  - All electrical, utility, and safety systems shall be operational.
- d. Integration and Functionality
  - Seamless integration between tipping platforms, compactors, containers, vehicles, and utilities.
  - Safe and efficient movement of vehicles within the RTS premises.

### **12.3 Testing, Trial Run and Commissioning Criteria**

- a. Prior to commissioning, the Contractor shall conduct testing and trial runs to demonstrate compliance with performance requirements.
- b. Commissioning shall be deemed successful only upon satisfaction of the following criteria:
  - Successful trial operation of the RTS for the prescribed period under normal load conditions
  - Demonstration of waste reception, compaction, container handling, and evacuation operations without spillage or backlog
  - Satisfactory operation of all safety, environmental, and monitoring systems
  - Submission and approval of commissioning reports and test records

## **12.4 Acceptance of EPC Works**

- a. Provisional acceptance of EPC works shall be granted only upon:
  - Completion of all works as per Contract
  - Rectification of defects identified during inspection and trial runs
  - Submission of as-built drawings, O&M manuals, and statutory certificates
- b. Final acceptance shall be subject to satisfactory performance during the Defect Liability Period, if applicable.

## **12.5 Performance Requirements during O&M Period**

- a. During the O&M period, the RTS shall meet the following minimum performance requirements:
  - Operational Availability: RTS and critical equipment shall remain available for operation as per prescribed service levels.
  - Waste Handling: No accumulation, overflow, or prolonged storage of waste at the RTS.
  - Equipment Performance: Compactors, vehicles, and containers shall function reliably with minimal downtime.
  - Housekeeping and Hygiene: Clean and sanitary conditions maintained at all times.
  - Environmental Compliance: No violations of environmental norms, odour nuisance, or pollution incidents.
- b. Failure to meet these requirements shall constitute Deficiency of Service.

## **12.6 Key Performance Indicators (KPIs)**

- a. The Contractor's performance during O&M shall be evaluated against defined KPIs,
- b. Contractor's performance shall be measured and certified by the Employer or its authorised representative.
- c. Failure to meet any KPI shall be treated as Deficiency of Service, as defined in the Contract.
- d. KPI-linked penalties and deductions shall be applied as per the Penalty & Payment Mechanism Schedule.
- e. Repeated or continuous failure against KPIs may lead to escalated penalties, suspension of O&M payments, termination of Contract, as applicable
- f. MMC reserves the right to refine KPI targets or add additional indicators during contract execution, without altering the core scope.
- g. The KPI details are specified in the following table;

Table 2: key Performance Indicators

Sn.	Key Performance Indicator	Measurement Method	Performance Standard / Target	Frequency	Consequence of Non-Compliance
1.	RTS operational availability	Daily logbook & inspection	≥ 100% availability of the RTS to accept waste (24 x 7)	Monthly	Liquidated damages (LD) of <b>Rs.15,000/-</b> per shift of unavailability
2.	Accumulation of waste at RTS	Physical inspection	No backlog of waste for more than 24 hours	Daily	Liquidated damages (LD) of <b>Rs.10,000/-</b> per day
3.	Availability of stationary compactors	Maintenance logs	≥ 93% availability per month	Monthly	LD for each day for each compactor as per the LD clause of Vol-4.
4.	Availability of hook loader vehicles	Fleet records	≥ 93% availability per month	Monthly	LD for each day for each vehicle as per the LD clause of Vol-4.
5.	Time to restore equipment	Maintenance records	≤ 24 hrs (minor) / ≤ 7 days (major)	Per incident	LD for each instance as per the LD clause of Vol-4.
6.	Cleanliness of platforms, internal road & building	Inspection	No visible waste / leachate	Daily	LD per instance (as per the LD clause of Vol-4)
7.	Odour nuisance beyond premises	Complaints & inspection	No substantiated complaints	Monthly	LD per instance (as per the LD clause of Vol-4)
8.	Leachate spillage	Inspection	Zero spillage	Per incident	LD per instance (as per the LD clause of Vol-4)
9.	Use of PPE by workers	Surprise inspections	100% compliance	Monthly	LD per instance per day (as per the LD clause of Vol-4)
10.	Recordable accidents	Incident reports	Zero fatal accidents	Per incident	LD as decided by MRMC and/or

Sn.	Key Performance Indicator	Measurement Method	Performance Standard / Target	Frequency	Consequence of Non-Compliance
					competent Authority
11.	Availability of safety systems	Inspection	Fully functional	Quarterly	LD per instance per day of unavailability (as per the LD clause of Vol-4)
12.	Availability of approved manpower	Attendance records	100% of minimum requirement	Daily	LD of <b>Rs. 1000/-</b> per day per person
13.	Timely submission of reports	Report submission record	Reports submitted on time	Monthly	LD of <b>Rs. 1000/-</b> per day of delay
14.	Environmental & labour compliance	Audit / inspection	No violations	Continuous	LD as decided by MRMC based on severity of the incident
15.	Compliance with MRMC official directions / instructions	Records	100% compliance	Per instance	LD per instance (as per the LD clause of Vol-4)

**Note:** In case of serious or repeated violations / defaults by the Contractor, the Employer shall be authorized to levy higher amount of LDs, suspend Contractor payment, deduct from / forfeit the performance security, terminate the contract, and/or blacklisting of the contractor, as applicable, based on the severity of the violations / defaults.

### 12.7 Acceptance Criteria for O&M Services

- a. Acceptance of O&M services for payment certification shall be based on:
  - Achievement of prescribed KPIs
  - Absence of unresolved Deficiency of Service
  - Submission of required reports and records
  - Compliance with safety and statutory obligations
- b. Persistent failure to meet acceptance criteria may lead to penalties, suspension of payments, or termination as per Contract provisions.

### 12.8 Employer's Right of Inspection and Verification

- a. The Employer or its authorised representative shall have the right to
  - Inspect and verify RTS operations and performance at any time
  - Review records, reports, and logs related to performance and compliance

- Issue directions for corrective actions, which shall be complied with by the Contractor within the stipulated timeframe

### **12.9 General Acceptance Provision**

- a. Certification of acceptance shall not relieve the Contractor of its responsibility for achieving and maintaining performance standards throughout the Contract Period.

## Appendix 1: Project Milestones

### A. Design, Procurement, Construction & Installation Phase Milestones

Milestone No.	Milestone Description	Key Activities Covered	Timeline (from Date of Work order)
M-1	Detailed Engineering & Drawings Approval	Civil, structural, mechanical, electrical drawings; equipment layouts	1.5 months
M-2	Procurement of Major Equipment	Ordering of compactors, containers, hook loaders	4 months
M-3	50% Completion of Civil & Structural Works	Main Building Foundations, Main buildings super structure, tipping platforms, internal roads, ramp, foundations and RCC structures for stationary compactors, Administrative office, Weighbridge foundations and approaches, Wash area, maintenance area, drainage structures, generator room, electrical room, toilet block.	4 months
M-4	100% Completion of Civil & Structural Works		6 months
M-5	Delivery of Mechanical Equipment & Vehicles	Delivery of compactors, containers, hook loader vehicles at site	7 months
M-6	Installation of Mechanical & Electrical Systems	Installation of compactors, utilities, electrical systems	9 months
M-7	Testing, Trial Run & Commissioning	Integrated trial run under load conditions	10 months
	EPC Completion & Provisional Acceptance	Submission of as-built drawings, manuals	

- Delay in achievement of any milestone shall attract Liquidated Damages as mentioned in the respective clause related to Liquidated Damages on Volume IV of the Tender document, unless extension is granted by the Employer or its authorised representative including Engineer-in-charge.
- Milestone payments shall be released only upon certification by Morbi Municipal Corporation or its authorised representative as mentioned in the Volume IV of the Tender document.
- O&M payment shall be linked with KPI performance and payment certification as mentioned in the Volume IV of the Tender document.

## Appendix 2: Submission Schedule

### A. EPC Phase Submissions

Sl. No.	Submission Description	Timeline (from LoA)
1.	Performance Security	Within 15 days
2.	Contract Agreement	Within 15 days
3.	Project Execution Plan including Detailed Activity wise construction Schedule (Bar Chart / CPM)	Within 20 days
4.	Topographical & Site Survey Report, Geotechnical Investigation Report (if applicable)	Within 20 days
5.	General Layout Drawings (RTS Layout)	Within 30 days
6.	Civil & Structural Design Drawings Mechanical Equipment Layouts Electrical & Utility Drawings Fire Safety Layout	Within 45 days
7.	Equipment Data Sheets & Technical Catalogues	Within 60 days
8.	Manufacturer's Test Certificates	Prior to delivery
9.	Factory Inspection Reports (if required)	Prior to dispatch
10.	Vehicle RTO / CMVR Compliance Documents	Prior to commissioning
11.	Method Statements (Civil, Mechanical, Electrical)	Prior to execution
12.	Monthly Progress Reports (Physical & financial Progress)	Monthly
13.	Material Test Reports	As applicable
14.	Trial Run & Performance Test Report	During commissioning
15.	Commissioning Completion Report	At commissioning

### B. O&M Phase Submissions

Sl. No.	Submission Description	Frequency
1.	O&M Manual (Final)	At commissioning
2.	As-Built Drawings (All Disciplines)	Within 30 days
3.	Manpower Deployment Plan	At O&M start
4.	Preventive Maintenance Schedule	At O&M start
5.	Daily Operation Logs	Maintained daily. Submitted monthly or as required.
6.	Monthly KPI & Performance Report	Monthly