Submitted To:

Greater Cairo Air Pollution Management and Climate Change Project

First Addendum to the Preliminary Environmental and Social Impact Assessment for the First Landfill Cell for Qalyubia Governorate in 10th of Ramadan Integrated Waste Management Facility

Presented By:

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Table of Abbreviations

Abbreviation	Description
10R	10th of Ramadan
AoI	Area of Influence
BP	Best Practice
C&D	Construction and Demolition
CAA	Competent Administrative Authority
CCL	Compacted Clay Liner
CESHSU	Contractor Environmental, Social and Health & Safety Unit
CoC	Code of Conduct
CRC	Convention on the Rights of the Child
CTA	Cairo Transport Authority
EEAA	Egyptian Environmental Affairs Agency
EHS	Environmental, Health, and Safety
ESIA	Environmental and Social Impact Assessment
ESMMoP	Environmental and Social Management and Monitoring Plan
ESMP	Environmental and Social Management Plan
ESS	Environmental and Social Standards
E.V	Evaporation Pond
FGD	Focus Group Discussion
GCCC	Greater Cairo Air Pollution Management and Climate Change
GCL	Geosynthetic Clay Liner
GRM	Grievance Redress Mechanism
HDPE	High-Density Polyethylene
ILO	International Labor Organization
ILS	International Labor Standards
IWMF	Integrated Waste Management Facility
KII	Key Informant Interview
LFG	Landfill Gas
MBT	Mechanical Biological Treatment
MoE	Ministry of Environment
MoIC	Ministry of International Cooperation
MoLD	Ministry of Local Development
MSWT	Municipal Solid Waste Treatment
NGO	Non-Governmental Organization
NO2	Nitrogen dioxide
NUCA	New Urban Communities Authority
OESHSU	Operator's Environmental, Social and Health & Safety Unit

Abbreviation	Description
OHS	Occupational Health and Safety
OSHA	Occupational health and safety Administration
PAPs	Project Affected Persons
PCU	Project Coordination Unit
PESIA	Preliminary ESIA
PM	Particulate Matter
PMP	Pest Management Plan
POM	Project Operational Manual
PPE	Personal Protective Equipment
PRs	Project Requirements
PS	Performance Standard
PVC	Polyvinyl chloride
RFID	Radio Frequency Identification
RNG	Renewable Natural Gas
RO	Reverse Osmosis
SDO	Social Development Officer
SEA/ SH	Sexual Exploitation and Abuse/Sexual Harassment
SEP	Stakeholder Engagement Plan
SWM	Solid Waste Management
TSP	Total Suspended Particulates
UPOPS	Unintended Persistent Organic Pollutants
VOCs	Volatile Organic Compounds
WBG	World Bank Group
WMRA	Waste Management Regulatory Authority

1 Introduction

1.1 Project Background

The Ministry of Environment is implementing the Greater Cairo Air Pollution Management and Climate Change Project, which is being financed by the World Bank (WB). The project aims to reduce air and climate pollution from critical sectors and increase resilience to air pollution in Greater Cairo. The project is being implemented in collaboration with various ministries and agencies, including the Ministry of Local Development (MoLD), Qalyubia Governorate, Waste Management Regulatory Authority (WMRA), and Cairo Transport Authority (CTA).

Under Component 2, the operationalization of SWM includes the establishment of waste transfer stations, the closure of the Abu Zaabal dumpsite, and the establishment of the Qalyubia sanitary landfill. Additionally, the project will fund the development of key infrastructure for the Integrated Waste Management Facility in 10th of Ramadan (IWMF-10R), which will serve Cairo and Qalyubia Governorates. This includes road construction, utilities, and the development of sanitary landfill cells, ensuring compliance with national and World Bank environmental and social standards.

This assignment specifically targets Subcomponent 2.1, which involves the construction of the first cell of the sanitary landfill for municipal solid waste (MSW) residuals resulting from Qalyubia Municipal Solid Waste Treatment Facility located in plot 2. The landfill will be located within Plot 4 (figure 2-1). Specifically, the sub-project aims to safely and efficiently manage municipal solid waste residuals from Qalyubia Governorate, reduce air and climate-related emissions, mitigate environmental and social risks throughout the landfill lifecycle, and ensure alignment with national regulations and World Bank environmental and social standards.

1.2 Study Objectives

This report is an Addendum to the Preliminary Environmental and Social Impact Assessment (PESIA) for the First Landfill Cell of the 10th of Ramadan Integrated Waste Management Facility (10RIWMF), which was prepared and cleared in 2020. The purpose of this Addendum is to build upon the original PESIA and to specifically assess the environmental and social (E&S) risks and impacts associated with the construction, operation, closure, and post-closure of the first landfill mono-cell for Qalyubia Governorate. While the environmental and social baseline conditions are not expected to materially change and therefore remain as described in the original PESIA and the ESIA for the Shared Internal Basic Infrastructure of the 10RIWMF, this Addendum focuses on the incremental, site-specific considerations relevant to the landfill cell sub-project. The PESIA Addendum aims to ensure that the sub-project remains aligned with applicable regulatory requirements, World Bank Environmental and Social Standards, and good international industry practice, while minimizing adverse impacts and maximizing environmental and social benefits.

More specifically, key objectives of this Addendum-PESIA are as follows:

- Identify potential environmental and social impacts and risks at each stage of the sub-project lifecycle.;
- Propose cost-effective mitigation strategies and management measures;
- Ensure alignment with national legislation, World Bank Environmental and Social Standards (ESSs), Environmental, Health, and Safety (EHS) Guidelines and Best Practices (BPs).
- Engage relevant stakeholders and local communities, ensuring inclusive and transparent consultations;
- Developing environmental & social management and monitoring plans in compliance with the relevant national legislation and international Guidelines;
- Define closure protocols, post-closure monitoring, and aftercare responsibilities to ensure long-term sustainability;
- Evaluate project alternatives, including a "no project" scenario, to guide environmentally and socially optimal decision-making.;
- Ensure the existence of a grievance redress mechanism (GRM) for the lodging and handling of complaints.

2 Sub-Project Description

2.1 Sub-Project Background

2.1.1 Qalyubia MSW Collection and Disposal System

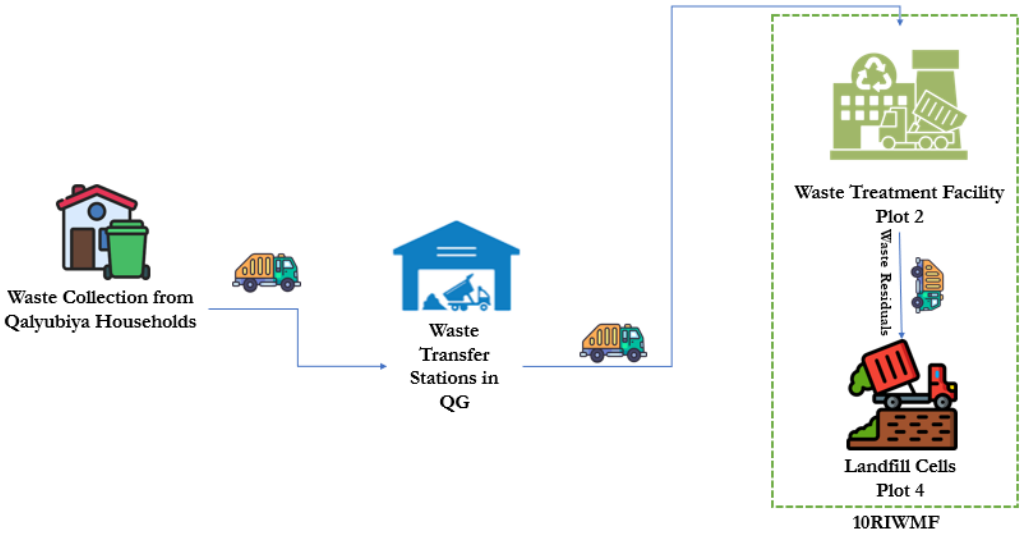

Figure 2-1 Schematic of Qalyubiya Waste Collection and Disposal System

The Qalyubia Municipal Solid Waste (MSW) management system will begin with the collection of household waste. Collected waste will then be transported to designated transfer stations. From these transfer stations, the waste will be hauled to the Waste Treatment Facility in Plot 2 within the 10RIWMF, where it will be processed. Residuals from Plot 2 will be sent to Plot 4 for final disposal. The establishment of this first sanitary landfill cell at Plot 4 is a critical step in the closure of the Abu Zaabal dumpsite, effectively replacing uncontrolled and unsanitary waste disposal practices with a modern, controlled, and environmentally compliant facility. This landfill cell is essential not only for safely managing treatment residuals but also for preventing environmental contamination, protecting public health, and ensuring the long-term sustainability of the Qalyubia MSW management system, thereby completing the process of transitioning the governorate toward integrated and regulated waste management.

2.1.2 10th of Ramadan Integrated Waste Management Facility

The 10RIWMF is divided into 9 designated plots, each serving a specific purpose for managing various waste types. Figure 2-2 below presents the proposed layout of the IWMF. The first landfill cell to be developed in Plot 4 will be dedicated to receiving Qalyubia MSW residuals from Plot 2. In subsequent phases, additional mono-cells will be developed to dispose of MSW and construction and demolition (C&D) waste residues generated by the planned C&D treatment unit at Plot 9

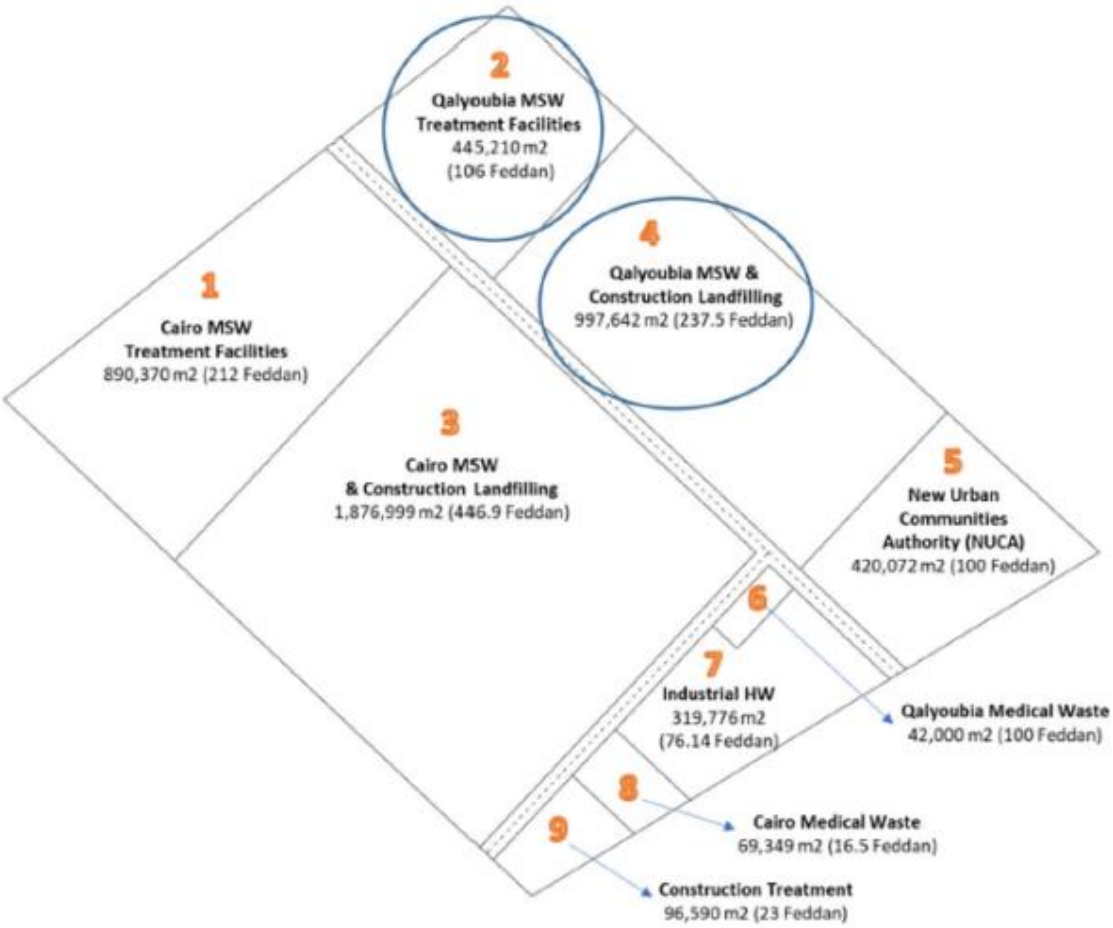

Figure 2-2 Different Components and Plots of the 10R IWMF

The first landfill cell is expected to operate for five years, from mid-2026 to mid-2031. Waste volumes are based on MSW generated in Qalyubia, considering collection efficiency rates and the processed waste quantities at the anticipated MSW treatment (MSWT) facility in Plot 2. The analysis assumes that 25% of the input MSW to the MSWT facility will be waste residual material. The following tables summarize the projected waste quantities that the 1st Landfill Cell will receive during operation. [1]

Table 2-1 Key Operational Parameters of the 1st Landfill Cell[2]

Parameter	Description
Operational Period	Mid-2026 to Mid-2031
Waste Stream	MSW residuals from Qalyubia MSW treatment facility (plot 2)
Leachate Generation Rate	10% of waste input load
Residual fraction of mixed MSW	25% of the input waste to the MSWT facility in Plot 2
Density of Compacted Residuals	800 kg/m^3

[1] Project Specifications have been gathered from the *Planning Considerations for the Execution of the 1st Landfill Cell in 10th of Ramadan IWMF* which can be found in **Annex III**.

[2] The figures originate from the "Project Structuring and Implementation" report, which contains waste generation projections for Qalyubia Governorate from 2023 to 2038

Table 2-2 Projected Waste Quantities During 1st Landfill Cell Operation Period

Parameter	2026	2027	2028	2029	2030	2031	Average
Fresh MSW Generated (t/d)	5,048	5,134	5,221	5,310	5,400	5,492	5,267
Collection Efficiency (%)	65	74	84	95	95	95	-
Fresh Waste Collected (t/d)	3,281	3,802	4,379	5,044	5,130	5,218	4,476
Residual Waste (t/d)	820	950	1,096	1,261	1,283	1,304	1,119

The capacity of the first landfill cell is approximately 2 million cubic meters. This volume is designed to accommodate about 1,000 tons of residual waste per day over an operational lifespan of 5 years, based on the following cell dimensions:

Table 2-3 Approximate Dimensions of the First Landfill Cell[3]

Dimension	Approximate (meters)
Length	456
Width	295
Depth	13
Height Above Ground	15

2.2 Sub-Project Location

The 10RIWMF is located in a remote desert area about 5 km south of the industrial zone of 10th of Ramadan City, outside the official boundaries of Sharqia Governorate.

The landfill lies within a 1228 Feddan site allocated for the IWMF. The first landfill cell is in Plot 4, covering 237.5 feddans (≈997,500 m^2).

Figure 2-3 illustrates the sub-project area, indicating the location of the 1st landfill cell within Plot 4 (Qalyubia Sanitary Landfill), and its location respective to other plots in the 10RIWMF.

[3] Contractors' Scope of Work Document in **Annex III**

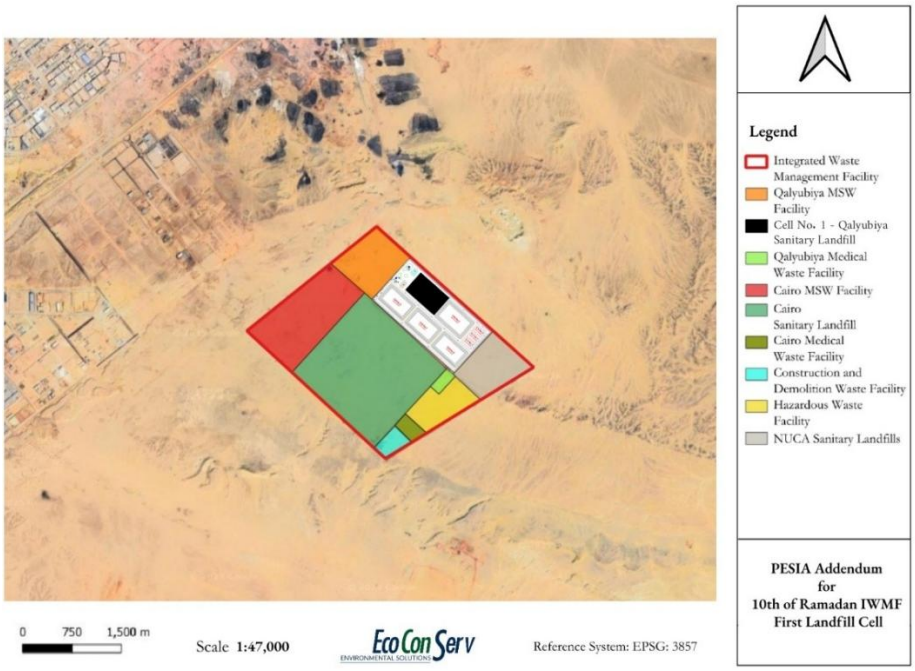

Figure 2-3 10RIWMF

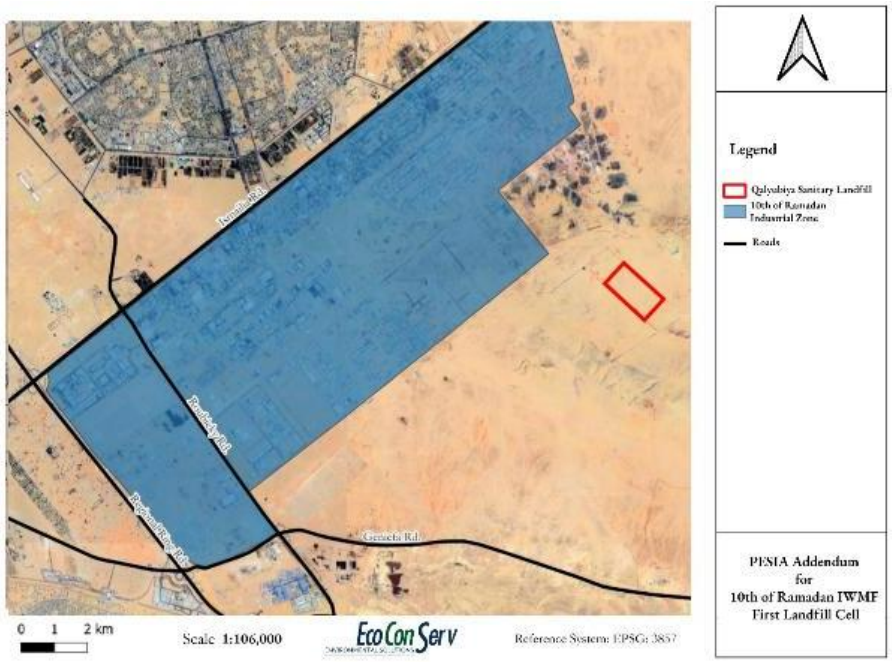

Figure 2-4 Roads surrounding the 10R IWMF and their proximity to Plot 4 (Qalyubia Sanitary Landfill)

2.3 Sub-Project Components

2.3.1 Layout

The layout of the first cell has been carefully planned to ensure safe, efficient, and environmentally compliant operations. The site, located within Plot 4 of the IWMF, incorporates all essential components required for the initial phase of landfill development, including the engineered landfill cell, leachate and gas management systems, operational buildings, vehicle access roads, and environmental control features.

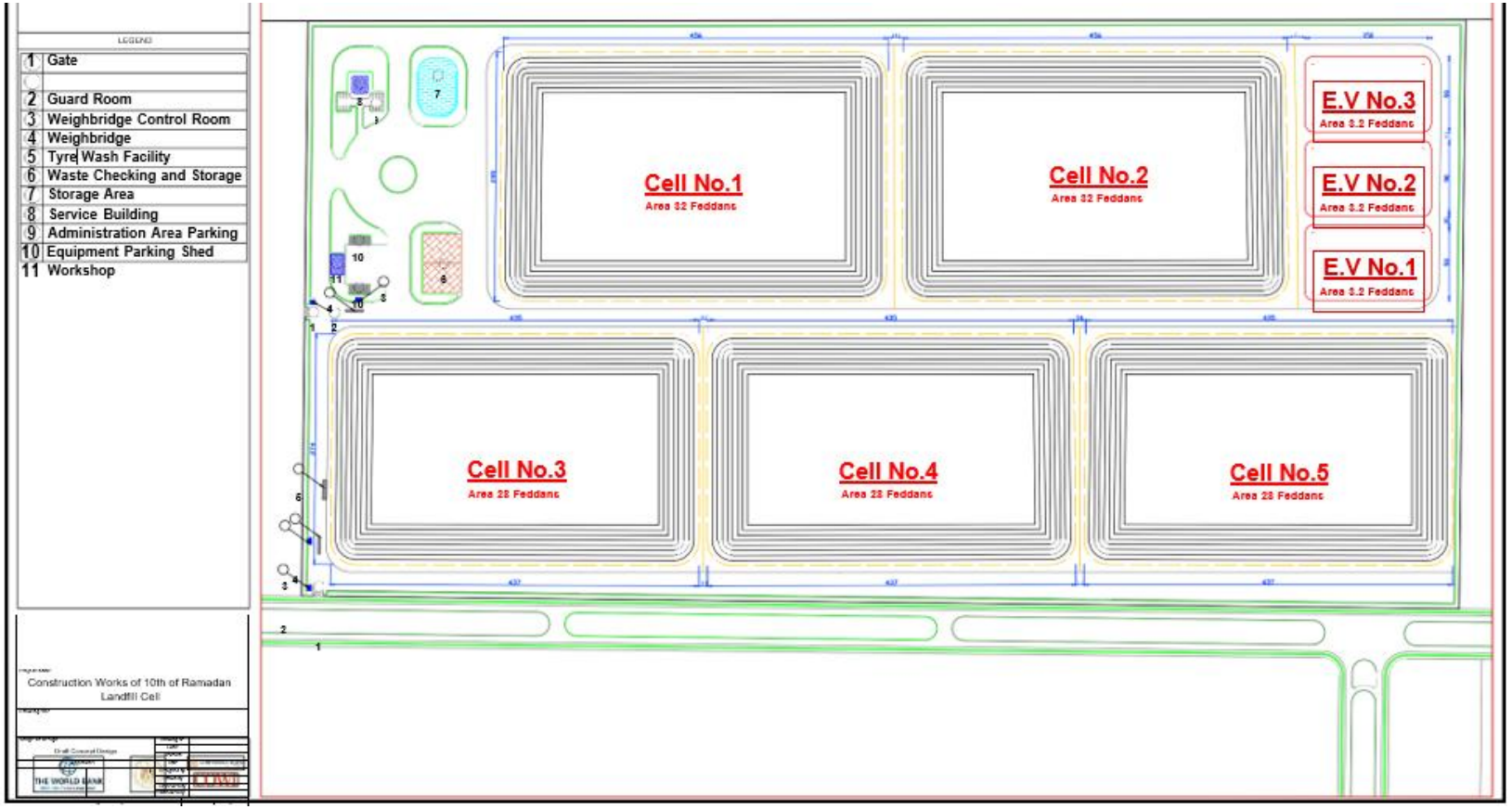

Figure 2-5 General Layout of Plot 4

2.3.1.1 Layout Considerations

Key factors in the landfill layout considered in the planning include prevailing wind direction, ease of access, and the placement of essential facilities close to core operational zones, as shown in the table below. The following considerations should be considered by the Design-Build Consultant

Table 2-4 Plot 4 Landfill Layout Considerations

Aspect	Details
Service Building Location	It will primarily serve the needs of workers, providing essential facilities such as rest areas, and restrooms. Its location will be strategically positioned near the entry point from Plot 2, where residuals will be received, to allow convenient access for staff and facilitate efficient site operations.
Gates and Access Points	The site has a main entrance gate with weighbridge access for incoming/outgoing waste trucks, and a secondary/emergency gate to improve traffic flow and provide backup access. Internal roads connect the gates with landfill cells and support units.
Leachate Treatment Unit	Positioned downstream of the landfill cells, in a controlled low area, allowing collection of leachates via the drainage system.
Landfill Gas Treatment Unit	Located adjacent to the landfill cells for direct connection to the gas collection network. Designed to safely flare or treat methane emissions, with potential for future energy recovery.
Service Water Discharge Pond	The Service Water Discharge Pond is positioned at a lower elevation within the landfill to capture rainwater runoff. It acts as a monitoring reservoir, enabling the early detection of potential pollutants from the landfill, thus allowing for prompt corrective measures to prevent environmental contamination.

2.3.2 Site Infrastructure

Site Infrastructure in Plot 4 include the following:

Table 2-5 Landfill Cell Site Infrastructure

Facility	Associated Infrastructure
Landfill Facilities	• First engineered landfill cell with composite basal lining system • Leachate collection, transfer system, and evaporation ponds • Landfill gas collection and venting system • Waste storage area: a temporary holding space for waste and refused waste loads. • Cover soil stockpile area
Administrative and Support Facilities	• Service building • Garage and workshop with overhead crane and oil/water separator • Fuel tank with dispensing system • Shaded parking areas
Access and Traffic Infrastructure	• Main entrance with motorized gate, barrier, and guard room • Secondary entrance gate for small vehicles/pedestrians • Two weighbridges with weighbridge room and Radio Frequency Identification (RFID) system • Asphalt internal access roads and haul roads • Circular unpaved equipment road around the landfill cell • Internal drainage and traffic control systems

Facility	Associated Infrastructure
Utility and Service Systems	• Electricity substation and connections • Water supply (potable water system and storage) • Sewage collection system • Telephone/data connections • Stormwater collection and drainage channels
Environmental and Safety Infrastructure	• Perimeter and internal security fencing (3 m high with razor wire) • Groundwater monitoring wells • Firefighting system (as per Civil Defense requirements) • Landscape buffer zones (10 m wide green belt) • Signage and pedestrian pathways

2.4 Sub Project Activities

2.4.1 Preconstruction Activities:

Prior to earthwork, the site shall be cleared of any scattered waste or debris (if any). The project involves proper site preparation, safety measures, and the establishment of a work zone. Excavation of all types of soil including rock from ground level to the specified depths to ensure proper drainage and stability, followed by dewatering, and disposal of excavated materials to heaps off site will take place. Fencing of the site with the placement of relevant temporary information boards (billboards) during the construction works.

2.4.2 Construction Activities:

The construction of the landfill cell will be carried out by a Design–Build (DB) Contractor responsible for detailed design and construction works. The anticipated duration of construction activities is 10 months. Major construction activities are summarized in the table below.

Table 2-6 Summary of Landfill Components and Associated Construction Works

Main Component	Subcomponents	Details of Construction Works
Landfill Cell	Basal lining system	Composite liner: GCL/CCL (≥0.75 m), HDPE geomembrane (1.5 mm smooth at base, textured on slopes), geotextile protection layers, drainage layer (≥300 mm gravel or geonet), soil protection layer. Includes anchor trenches, slope stability measures, and settlement analysis.
	Embankments	Earthen embankments with slopes 1V:3H, min. 2 m height, 4 m top width. Designed for stability and future connection to closure systems.
	Access ramps	Two ramps for entrance/exit, designed not to overstress liner. Stabilized with geotextile protection.
	Cover soil stockpile	Stockpile area for ~5,000 m³ daily cover soil.
Leachate Management	Collection system	Perforated HDPE pipes (laterals ≥200 mm, header ≥250 mm), gravel bedding, geotextile filter. Designed for rapid drainage and clogging prevention.
	Transfer system	HDPE pipes (≥300 mm), manholes, submersible pumps, control panels, connections to ponds.
	Evaporation ponds	Two lined leachate evaporation ponds (EV1 and EV2), each with a minimum capacity of ≥5,000 m³, or alternatively one pond (EV1) split into two basins to provide equivalent capacity. Each pond includes

Main Component	Subcomponents	Details of Construction Works
		composite liners, a leak detection system, and reinforced concrete surfaces to allow equipment access.
Landfill Gas System	Venting/collection	HDPE perforated pipes (150 mm) along embankments, 6 m into cell base, gravel-filled trenches wrapped with geotextile. Spacing ~50 m.
Closure System (Future)	Final cover layers	Grading layer, geotextile, gas drainage layer, GCL, 1.5 mm LDPE liner, geonet for stormwater drainage, geotextile, 400 mm sand drainage layer, vegetative/erosion control layer.
Administrative & Support Facilities	Buildings	Service building, garage & workshop (with crane, oil/water separator), shaded parking.
	Gates & fencing	3m chain-link perimeter fence with razor wire; motorized entrance gate and barrier; pedestrian/small vehicle gate; temporary fence at future expansion side.
Access & Traffic Infrastructure	Weighbridges	Two automated weighbridges (with RFID, software, traffic lights, display, speakers, printer) + weighbridge room.
	Tire wash facility	Located at truck exit, adjacent to weighbridges. Includes concrete wash pad, high-pressure sprays, drainage channels, settling tank or link to sewage/stormwater system to prevent mud tracking.
	Internal roads	Asphalt access and haul roads (6 m wide), circular unpaved bitumen-stabilized equipment road, drainage systems.
	Parking	Shaded lots sized for staff and visitors (~30 vehicles).
Utilities & Services	Electricity	Substation (160 kVA transformer, LV panel, RMU), cabling,

2.4.2.1 Construction Materials

Raw Construction Materials

Raw material will be acquired from markets that source their material from commercially operating licensed quarries. The following tables summarizes the construction materials

Table 2-7 Construction Material Required

Material	Purpose/ Use
Clay Soil	Compacted layer in the liner system, Used in berms, final cover, and cell base
Sand	Drainage and leveling; for protection of geosynthetics, drainage, embankments, roads, and final cover systems
Gravel/ Crushed Stone	Leachate drainage layer, Road sub-base, Pipe bedding
HDPE Geomembrane	Primary liner to prevent leachate infiltration
Geotextile Fabric	Protective layer over geomembrane, Used in drainage and separation systems
Geosynthetic Clay Liner (GCL)	Additional impermeable barrier layer combined with clay and HDPE
Reinforced Concrete	Used in building foundations, weighbridge, wash pads, and drainage channels
PVC or HDPE Pipes	Leachate and stormwater drainage systems, Gas collection pipes (provisional)
Steel	Structural elements in buildings, gates, and maintenance workshop
Bitumen/ Asphalt	Surface paving for internal access roads and heavy vehicle paths
Cement Blocks / Bricks	Building walls for admin offices, guardhouse, utility rooms

Water Consumption

Potable water for the Landfill Cell shall be obtained by connecting to the nearest existing water network. Total average water demand during peak construction may range from 5–10 m^3/day based on the expected number of workers (35-50 workers) and the anticipated construction-related water use activities.

Electricity Consumption (Estimated)

The Contractor is responsible for connecting the Landfill facility to the electrical power grid. The construction of the landfill cell will require an estimated power supply of 15 to 25 kW peak load based on similar projects.

Fuel

Diesel fuel used for the construction equipment is estimated to be 0. 5 m^3/day.

2.4.2.2 Construction Equipment

The Table Below shows a list of the main expected construction equipment for the project. Additional soil compaction equipment might be needed during the site preparation.

Table 2-8: List of main construction equipment

Name of equipment	Number of equipment
Excavators	2-3
Bulldozers	2
Wheel Loader	2
Dump truck	3-4
Compactors/ Rollers	1-2
Water Tanker	1
Grader	1
Backhoe Loader	1
Crane or Boom Truck	1
Welding Machines	3-4
Backup diesel generator	1-2
Concrete Mixer	1
Survey Equipment	1

2.4.3 Landfill Cell Operation Activities

The operation of the landfill cell will be undertaken by a Design–Build–Finance–Operate (DBFO) Operator, who will assume responsibility for financing and long-term operation in accordance with the approved design and environmental and social management requirements.

1. **Waste Reception and Entry Control**

The landfill cell operation begins with the controlled entry of waste trucks through the main gate. All vehicles are required to pass over an automated weighbridge system equipped with RFID technology, traffic lights, and display units to record the type, origin, and weight of each incoming load. Adjacent to the weighbridge is a tire wash facility, which ensures that all trucks leaving the landfill have their wheels thoroughly cleaned.

2. **Type and Volume of Waste Accepted**

The first landfill cell is designed to receive only the residual fraction of MSW generated from the Qalyubia MSW treatment facility (Plot 2). These residuals are non-recyclable, non-hazardous residues amounting to approximately 25 % of the total input to the treatment plant.

3. **Landfilling Operations and Daily Practices**

Trucks proceed to the active tipping face of the engineered cell, where waste is unloaded. Heavy equipment spread the waste in thin layers and compact it to achieve the design density of approximately 800 kg/m³. At the end of each working day, a daily cover layer, typically consisting of sand or sandy soil equal to about 15 % of the waste volume is placed over the exposed waste. This daily cover minimizes odors, wind-blown litter, pest attraction, and potential fire hazards. The filling sequence follows a phased plan to ensure slope stability, proper drainage, and safe traffic circulation within the cell. Maximum side slopes are set at 1V:3H (about 33 %) and the total cell height does not exceed 15–20 meters.

4. **Leachate Management System**

As organic waste decomposes, leachate is generated and drains downward through the waste mass. The basal lining system includes perforated HDPE collection pipes embedded in gravel and wrapped in geotextile to filter solids. These pipes convey leachate to a network of manholes and pumping stations. From there, the leachate is transferred via pressure lines to two double-lined evaporation ponds, each with a minimum volume of 5,000 m³. These ponds include leak detection layers and reinforced access points to facilitate maintenance. The system is designed based on rainfall data and USEPA/World Bank guidelines.

5. **Landfill Gas Management**

Decomposing organic matter also produces landfill gas, primarily methane and carbon dioxide. The landfill is equipped with a passive gas venting system during its early operation. Perforated HDPE vent pipes, typically installed along embankments and within the waste body, release the gas in a controlled manner to prevent pressure build-up and migration.

6. **Surface Water and Groundwater Protection**

The landfill includes a network of surface water drainage channels, curbs, and interceptors to divert stormwater away from the waste body. This prevents excessive leachate generation and protects the integrity of the basal liner. In parallel, a groundwater monitoring network consisting of at least five monitoring wells (two up-gradient and three down-gradient) is installed around the perimeter.

7. **Ancillary Infrastructure and Safety Systems**

Supporting the landfill operation are various site facilities including internal asphalt access roads, a circular unpaved service road for heavy equipment, and a designated area for unacceptable or non-compliant waste as a precautionary measure and regulatory requirement. Non-compliant waste refers to any material that does not meet the acceptance criteria for the landfill cell, i.e. loads inconsistent with the declared waste treatment facility residual stream. These will be identified through visual inspection at the weighbridge and tipping point, verification against transfer documentation, and RFID-based source tracking. The site also contains a workshop and garage with an overhead crane for equipment maintenance, a fueling area, and shaded parking for staff. Firefighting systems, designed according to Egyptian Civil Defense requirements, are installed throughout the facility. A 10-meter landscaped greenbelt around the perimeter acts as a buffer zone, while signage and pedestrian paths improve safety and navigation.

2.4.3.1 Landfill Cell Maintenance Activities

A comprehensive maintenance program will be implemented in the operational phase. Proactive measures will help prevent operational disruptions, environmental risks, and structural deterioration. The following table outlines the key maintenance activities:

Table 2-9 Landfill Cell Maintenance Activities

Area of Maintenance	Planned Activities
Infrastructure and Facility Maintenance	- Routine servicing weighbridges, tire wash stations, workshops, and firefighting units. - Regular maintenance of operational equipment. - Ongoing upkeep of access roads to ensure safe and efficient vehicle movement.
Leachate and Gas Systems	- Frequent inspection and cleaning of leachate collection pipes and tanks. - Monitoring leaks or system malfunctions. - Ensuring uninterrupted operation of the leachate treatment unit. - Deferred installation of landfill gas collection systems unless needed based on gas emission levels.

Area of Maintenance	Planned Activities
Drainage and Surface Water Control	- Regular clearance of sediment and debris from drainage channels. - Routine monitoring of the service water discharge pond for overflow or pollution. - Implementation of erosion control measures to protect liners and slopes.
Environmental Monitoring	- Continuous monitoring of groundwater, leachate quality, and landfill gas emissions. - Routine visual inspections for signs of waste settlement, liner damage, or daily cover failures. - Meteorological monitoring to prepare for and adapt to extreme weather conditions.
Record Keeping and Reporting	- Documentation of daily waste quantities, types, and sources. - Maintenance of incident logs for equipment failures, odor complaints, or non-compliance events. - Preparation of regular environmental compliance and performance reports.

2.4.4 Closure Activities

At the end of its operational life (mid-2031), the first landfill cell will undergo a systematic closure process in order to seal the landfill in a manner that prevents environmental contamination, ensures structural stability, and minimizes long-term risks.

The closure process will be executed according to national regulations (Summarized in the following table):

Table 2-10 Landfill Cell Closure Details

No.	Closure Step	Description	Details
1	**Construction of the Final Cover System**	A robust final cover system will be constructed to isolate the waste, prevent rainwater infiltration, and reduce leachate generation.	The cover system will at a minimum consist of: - Grading layers to be placed directly on the waste - Geotextiles with puncture resistance of 3.5 KN to enhance impermeability - Gas drainage layer (gravel or geonets/geodrains) - Geosynthetic clay liner (GCL) - 1.5mm LDPE liner - HDPE Geonet for stormwater drainage - Geotextile with puncture resistance 10.5 KN - 400m sand to provide structural integrity - Vegetative layer
2	**Continued Leachate Management**	The existing leachate collection and treatment systems will remain active post-closure.	These systems will: - Collect leachate via installed drainage pipes - Transport it to the on-site treatment unit - Ensure regular monitoring to detect and address any contamination issues
3	**Landfill Gas (LFG) Control**	Although gas generation is expected to be low LFG management systems will be maintained or adapted as necessary.	These systems will capture any residual gas emissions from the waste body and route them for flaring or energy recovery, if feasible and prevent gas migration, which could pose explosion hazards or odor nuisances Gas monitoring will help assess decomposition rates and ensure environmental safety.
4	**Erosion Control and Slope Stabilization**	The closure plan will include measures to prevent erosion and ensure slope stability.	These will involve: - Revegetation of the final cover using native or adapted plant species - Installation of erosion control mats or terracing - Maintenance of surface gradients to direct stormwater away from the waste mass

No.	Closure Step	Description	Details
5	**Visual and Aesthetic Improvements**	To reduce the visual impact and improve public perception, landscaping will be part of the closure design.	This will include: – Green barriers or planted zones – Grading of the surface for a natural contour – Possibly integrating the closed cell into future green public space planning

These closure activities will be carried out in compliance with the Egyptian Code for MSW Management Systems, the executive regulations of Law 202/2020, and international guidelines such as those of the EU Directive 1999/31/EC.

2.4.5 Post-Closure Activities

After final closure, a long-term post-closure care program will be implemented. This will include:

- Leachate monitoring: Sampling and analysis to ensure treatment effectiveness
- Gas monitoring: Tracking emissions and ensuring safe dispersion or recovery
- Groundwater monitoring: Routine testing of wells for any signs of contamination
- Settlement monitoring: Observation of any differential settlement or subsidence that could affect the final cover or gas/leachate systems

The post-closure period is expected to last between 15 to 20 years, depending on regulatory requirements.

2.5 Labor

Throughout the construction phase, an estimated workforce of around 35-50 skilled and unskilled personnel will be required. A total number of 2-4 security guards will be recruited. They will be unarmed, and they will receive all required training including training on Code of Conduct (CoC). The labor force will operate in shifts, each lasting 8 hours. During the construction phase, work will take place for one daytime shift only.

Upon transitioning to the operational phase, the landfill cell is anticipated to necessitate approximately 15-20 employees hired through direct and indirect jobs. The operational workforce will be organized into two shifts, each spanning 8 hours, for waste handling and gate operations, and 1 shift for administration, leachate management, and environmental monitoring.

If laborers are to be accommodated by the contractor/sub-contractors, it is essential that the contractor and sub-contractors develop an Accommodation Management Plan to ensure that the accommodations meet minimum standards of IFC accommodation requirements[4]. Some key requirements to consider:

- **Safety and Security:**
  a. Ensure the accommodation is secure and safe from potential hazards.
  b. Provide adequate lighting and security measures to protect the workers.
- **Living Conditions:**
  a. Ensure that living spaces are clean, well-ventilated, and spacious enough.
  b. Provide access to clean drinking water, sanitation facilities, including toilets and showers.
- **Health and Hygiene:**
  a. Implement regular cleaning and maintenance schedules.
  b. Provide access to medical facilities or first aid kits for emergencies.
- **Comfort and Amenities:**
  a. Ensure that beds, mattresses, and other furniture are in good condition.
  b. Provide cooking facilities or access to nutritious meals.
- **Compliance with Regulations:**
  a. Regularly inspect and audit the facilities to ensure ongoing compliance.
  b. In collective rooms, which are minimized, in order to provide workers with some privacy, only a reasonable number of workers are allowed to share the same room. Standards range from 2 to 8 workers.

[4] IFC Workers' Accommodation: Processes and Standards 2009

3 Legal and Institutional Framework

3.1 Overview

The sub-project will comply with national laws and World Bank Environmental and Social Standards. This Addendum builds upon the 2020 PESIA legal and institutional framework which remain valid since then. This maintains adherence to all relevant national regulations and international standards related to environmental protection, waste management, labor, occupational health and safety, and stakeholder engagement, among others. It also incorporates new or updated legal requirements which may have been introduced from the time the original PESIA was prepared to ensure alignment with current legislation and project-specific requirements.

3.2 National Laws and Regulations

In Egypt, environmental regulations are governed by the Egyptian Environmental Affairs Agency (EEAA), which operates under the Ministry of Environment. The primary legal framework guiding environmental protection is Law No. 4 of 1994 concerning the Protection of the Environment. This law empowers the EEAA to regulate and control various environmental aspects, including air and water quality, waste management, and biodiversity conservation. In addition to the laws detailed in the original PESIA, the following are also relevant laws for the project:

Law No. 202 of 2020 – Solid Waste Management Law

Law No. 202 of 2020 on Solid Waste Management provides a comprehensive national framework for the management of all waste streams in Egypt, with the objectives of reducing pollution, promoting waste reduction and recycling, and ensuring environmentally sound final disposal. The law establishes the Waste Management Regulatory Authority (WMRA) as the central body responsible for regulating, licensing, and monitoring waste management activities, and requires governorates to prepare and implement Integrated Waste Management Plans. Its Executive Regulations issued under Prime Ministerial Decree No. 722 of 2022 further detail procedures for waste classification, permitting, monitoring, and compliance, and set technical and operational requirements for waste management facilities, including sanitary landfills.

Within this framework, the operation of a sanitary landfill receiving only residuals from a municipal solid waste (MSW) treatment facility is regulated as part of an integrated waste management system. The law mandates that non-hazardous municipal waste residuals be disposed of exclusively in licensed sanitary landfills and strictly prohibits open dumping or uncontrolled disposal. Landfill operators must obtain the required licenses from the WMRA and comply with approved environmental permits and environmental impact assessment requirements. The landfill must be designed and operated to prevent contamination of soil, surface water, and groundwater; control leachate and landfill gas; minimize odors and nuisances; and protect public health and surrounding communities.

The Executive Regulations require operators to apply approved operational procedures, restrict acceptance to authorized waste streams; specifically, residuals generated from the designated MSW treatment facility, and implement environmental monitoring, record-keeping, and periodic reporting to the competent authorities. Failure to comply with licensing, operational, or environmental requirements may result in administrative sanctions, penalties, or suspension of operations in accordance with the enforcement provisions of the law.

Labor Law No. 14 of 2025 – New Egyptian Labor Law

Effective September 1, 2025, this law replaces the outdated Labor Law No. 12 of 2003 to modernize employment relations, enhance job security, and align with international standards.

3.3 World Bank Environmental and Social Standards

The World Bank Environmental and Social Framework[5] sets out the World Bank's commitment to sustainable development, through a Bank Policy and the ten Environmental and Social Standards which are designed to guide borrowers to operate in compliance with good international practices in the key areas of environmental and social issues and impacts. The table below shows all the E&S standards as stipulated by the WB and indicates their applicability to the Sub-Project. Details of each ESS is presented in details in the Original PESIA. The ten Environmental and Social Standards establish the standards that the Borrower and the Sub-Project will meet through the Project life cycle, as follows:

Table 3-1 Applicability of WB Environmental and Social Standard (ESS) to the Sub-Project

ESS	Title of the ESS	Applicability to the Sub-Project (Y/N)	Justification
ESS 1	Assessment and Management of Environmental and Social Risks and Impacts	Yes	ESS1 is relevant to this sub-project due to the E&S risks and impacts associated with the activities.
ESS 2	Labor and Working Conditions	Yes	ESS2 is relevant to this sub-project due to the need for workers and health and safety impacts associated with the nature of project activities.
ESS 3	Resource Efficiency and Pollution Prevention and Management	Yes	ESS3 is relevant to this sub-project due to activities involving consumption of resources and generation of pollution.
ESS 4	Community health, safety and security	Yes	ESS4 is relevant to the sub-project due to possible risks and impacts on the community health and safety from sub-project activities.
ESS 5	Land Acquisition, Restrictions on Land Use and Involuntary Resettlement	No	In accordance with Presidential Decree No. 648 of 2020, the plot of land has been allocated for the Governorate of Qalyubia. ESS5 is not relevant to this sub-project as there is no need for land acquisition.
ESS 6	Biodiversity Conservation and Sustainable Management of Living Natural Resources	No	No natural habitat or natural protectorate property issues have been identified during site visits or desk studies, hence the risk of Sub-Project activities affecting natural habitats or natural protectorate property is considered minimal.
ESS 7	Indigenous Peoples/Sub-Saharan African Historically Underserved Traditional Local Communities	No	No indigenous people are identified in connection the sub project's boundaries.
ESS 8	Cultural Heritage	Yes	No tangible or intangible cultural heritage sites are determined within the boundaries of the project. However, in case of finding any objects of cultural value a chance-finds procedure.
ESS 9	Financial Intermediaries	No	Not Applicable
ESS 10	Stakeholder Engagement and Information Disclosure	Yes	ESS10 is relevant to the sub-project due to the involvement of various stakeholders.

[5] http://pubdocs.worldbank.org/en/837721522762050108/Environmental-and-Social-Framework.pdf

3.3.1 EHS Guidelines (World Bank Group):

The Environmental, Health, and Safety (EHS) Guidelines established by the World Bank Group provide a comprehensive framework for conducting ESIAs for various projects. As explained in the original PESIA, the EHS Guidelines for Waste Management Facilities, the General EHS Guidelines, and the EHS Guidelines for Construction Materials Extraction[6] are applicable to this sub-project. The following Labor Influx Guidance Note (2016)[7] and Good Practice Note – Addressing Sexual Exploitation and Abuse and Sexual Harassment (SEA/SH) in Investment Project Financing (2022)[8] are also applicable.

3.3.2 Permitting

3.3.2.1 Egyptian Permitting Procedure

Developers must submit an environmental impact assessment (EIA) study to the Competent Administrative Authority (CAA), which ensures the study complies with the guidelines from the EEAA. Upon verification, the CAA forwards the application to the EEAA, which evaluates it within 30 days. If necessary, EEAA may request amendments before approving the report. Approved management plans become legally binding for the developer.

The CAA for this subproject is the ***Qalyubia Governorate.*** According to the EEAA, establishment of the first landfill cell falls under **Category C**, that requires a full ESIA and the execution of a Public Consultation event.

3.3.2.2 Other Permits

Per Law 9/2009 and its amendments, establishments must keep environmental registers and notify EEAA of non-compliance. There are specific regulations for hazardous waste management and detailed documentation requirements. Various permits are needed for constructing and operating a Municipal Solid Waste Treatment facility, including approvals for civil defense, building height, construction, environment, operation, land acquisition, product approval, industrial registration, and wastewater discharge.

[6] EHSG for Construction Materials Extraction
[7] Labor Influx Management Guidance Note - 2016
[8] Good Practice Note - Addressing Sexual Exploitation and Abuse and Sexual Harassment (SEA/SH) in Investment Project Financing - 2020

4 Environmental and Social Baseline Assessment

4.1 Sub-Project Site Surroundings

The 10RIWMF is located approximately 5 kilometers southeast of 10th of Ramadan Industrial Zone outside the borders of Sharqiyah Governorate. The site lies about 9 kilometers from both 10th of Ramadan and Badr cities, 9.6 kilometers east of the 10th of Ramadan–Badr Road, and 7 kilometers south of the Cairo–Ismailia Desert Road. No residential, educational, medical, or cultural receptors are present within a 5-kilometer radius. The facility is also well connected to a network of major roads, including the Cairo–Ismailia, 10th of Ramadan–Badr, Geneva (under development), Ismailia Agricultural, Regional Ring Road, Cairo–Belbeis, and Belbeis–10th of Ramadan roads. This PESIA will assess the site-specific environmental and social impacts associated with the **1st** landfill cell, focusing on the area of influence that includes Plot 2 where MSW is processed and then transferred to the 1st cell of the sanitary landfill in plot 4 for final disposal

4.2 Environmental Baseline

The sub-project area is characterized by a hot desert climate (Köppen BWh) with high summer temperatures averaging up to 34.9 °C in July and August, mild winters, and minimal annual rainfall of about 26 mm concentrated between November and March, as reported in the original PESIA (2020). Wind conditions are generally moderate, predominantly from the north and northwest. Topographical conditions, based on the Topographical Survey conducted in July 2025, show a flat to gently sloping desert terrain ranging between 183 m and 205 m above sea level, with sandy soils and minimal natural relief, making the site suitable for landfill construction. Geological and hydrogeological conditions, confirmed through Geotechnical Investigations carried out in July 2025, indicate that the site lies within the eastern Nile Delta basin and is underlain by Quaternary sandy soils interbedded with silty clay and shale, underlain by Eocene limestone. No shallow groundwater was detected in boreholes up to 40 m deep, suggesting a low risk of leachate infiltration. The site lies in a remote desert area, with no protected areas or ecologically sensitive habitats within at least 70 km, as verified through field ecological surveys and desktop reviews. The landscape is barren, with sparse xerophytic vegetation and no recorded fauna or biodiversity of significance. In terms of natural hazards, the site is not prone to flooding due to its flat topography and minimal rainfall, though it may occasionally experience sandstorms during the spring and heatwaves in summer (for more details, please refer to Annex I).

4.2.1 Air Quality

A baseline measurement includes the sampling and analysis of active air, noise levels was conducted in April 2025 to describe the baseline conditions. Ambient air quality measurements were undertaken for the pollutants of primary concern; in order to better characterize the ambient air quality, as part of the required environmental baseline measurements. The detailed methodology and results of the measurements are included in the Air and Noise Baseline Study Report, **Annex I.**

Table 4-1 Coordinates of Measurement Locations

Measurement Locations	N coordinates	E coordinates
Point 1 (P1)	30°14' 42.48"N	31°51' 19.07"E
Point 2 (P2)	30°14' 24.97"N	31°51' 19.05"E

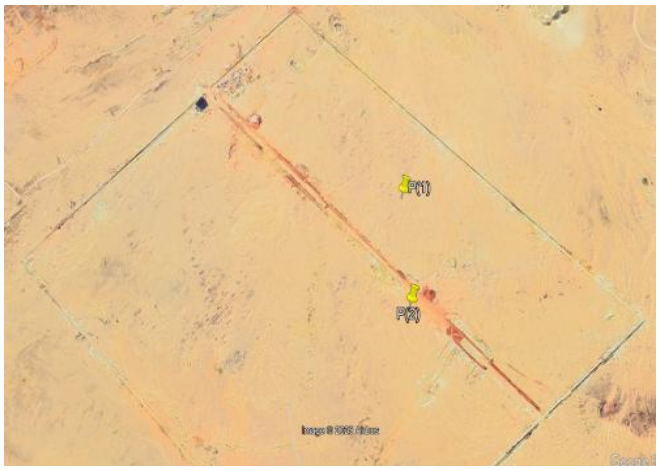

Figure 4-1 Location of Air and Noise Measurements

The ambient air quality in the project region showed compliance with the National guidelines as well as the permissible limits of the WBG General Guidelines for Ambient Air Quality.

Table 4-2 Ambient Air Quality Baseline Measurements Results

	Air Quality Parameter					
	NO_2	SO_2	CO (mg/m³)	$PM_{2.5}$	PM_{10}	T.S.P
Point 1 Average Results (µg/m³)	**23.54**	**35.39**	**2.63**	30.1	49.7	62.1
Point 2 Average Results (µg/m³)	**26.58**	**39.05**	**2.87**	31.4	52.3	65.7
IFC Permissible Limit (µg/m³)	**200-1 hour**	**125**	**------**	**75**	**150**	**-----**
National Permissible Limit (µg/m³)	**150**	**125**	**10 (mg/m3**	**100**	**150**	**230**

4.2.2 Noise & Vibration

The results of ambient noise measurements were compared to the National limits of the Executive Regulation (D710/2012) and the guideline values of the IFC General Guidelines for the 'Day' and 'Night' intervals. The tables below list the noise measurement results and applicable national and WBG EHS Guidelines for ambient noise levels.

Table 4-3: WBG EHS Guidelines Ambient Noise Level

Permissible Limits LAeq (dBA)			
Industrial ambient noise		Residential; institutional; educational	
During Day (7 am to 10 pm)	During Night (10 pm to 7 am)	During Day (7 am to 10 pm)	During Night (10 pm to 7 am)
70	**70**	**55**	**45**

Table 4-3: National Requirements for Ambient Noise Levels

Permissible Limits LAeq (dBA) National Requirements

Residential areas with within light industrial areas		Sensitive receptors (e.g. schools, hospitals, tourist resorts…etc.)	
During Day (7 am to 10 pm)	During Night (10 pm to 7 am)	During Day (7 am to 10 pm)	During Night (10 pm to 7 am)
70	60	50	40

Table 4-4: Ambient Noise Quality Baseline Measurements Results and Applicable Permissible Levels

Measurement Point	Average Sound Level Equivalent & Percentile Recordings in dBA	Applicable Noise Level[9] (National Requirements)
	LAeq	LAeq
Point 1 Day	57.83	70
Point 1 Night	47.08	60
Point 2 Day	57.19	70
Point 2 Night	45.5	60

As shown in the above tables, the ambient background noise levels are well below the national requirements for industrial areas.

4.3 Socioeconomic Baseline

4.3.1 Administrative Divisions

The sub-project lies within the 10th of Ramadan IWMF in Sharqiyah Governorate. The city is a major industrial hub along the Cairo–Ismailia Highway, about 46 km northeast of Cairo. The project's footprint is fully contained within the IWMF site, located in an arid desert zone with industrial establishments which are approximately 10 kilometers away. No residential areas are nearby the IWMF.

The land designated for the landfill cell of the 10R-IWMF is supported by two land allocation documents as follows.

Presidential Decree No. 648 of 2020 allocated approximately 1,227.84 feddans for public waste management purposes. The land was transferred free of charge from military property. A secondary allocation confirmed Qalyubia's share for developing an integrated waste management facility. Both documents formalize land use under national waste management plans. Both documents can be found in **Annex II**.

4.3.2 Land Use

The subproject area is located on vacant desert land within the 10th of Ramadan IWMF. The subproject area is unoccupied, with no activities taking place on it.

[9] National requirements are more stringent than WBG guidelines for ambient noise levels.

Figure 4-2: Project site footprint

Figure 4-3: Surrounding constructions

Figure 4-4: Site visit on the 18th of March

Figure 4-5: Project site footprint

Figure 4-6: Overhead Transmission Lines in the proximity of project site

Figure 4-7: A sign showing 10th of Ramadan Integrated Waste Management Facility

4.3.3 Demographic Characteristics

Due to the isolated nature of the sub project area, no resident communities exist within or near the site. Accordingly, the social baseline focuses on workforce mobilization, transport routes, and potential impacts along access corridors.

4.3.4 Vulnerable Groups within workforce

Vulnerability in this context is primarily labor-related: informal or seasonal laborers and non-local laborers. These groups face limited job security, lack of social protection, and economic instability.

4.3.5 Child Labor

Risks of child labor exist due to poverty, school dropouts, and weak enforcement. Continuous monitoring and awareness measures are necessary to ensure there is no child labor onsite.

4.3.6 Health Services

The closest hospital to the subproject area is the General Authority for Health Insurance (9 km), with additional hospitals in El Shorouk and New Cairo (15–22 km). These provide 24-hour emergency and routine care.

4.3.7 Transportation

10th of Ramadan City is well connected through an organized internal and external transportation network. Externally, it is accessible via the Cairo–Ismailia Road, with regular bus and microbus services linking it to Cairo and surrounding regional centers. Internally, microbuses, service vehicles, and taxis provide mobility for workers and residents, supported by public operators such as Mwasalat Misr. Workers will be transported to and from the site using microbuses or private cars. Residual waste and operational coordination between Plot 2 (MSW Treatment Facility) and Plot 4 (Sanitary Landfill) will be ensured through dedicated internal haul routes within the 10RIWMF, allowing controlled and efficient movement of vehicles between the two plots.

4.3.8 Cultural Heritage

No archaeological or cultural heritage sites were identified at the subproject area.

5 Analysis of Alternatives

5.1 No-Project Scenario

The sub-project addresses the urgent need to close the Abu Zaabal dumpsite. This landfill cell is essential not only for safely managing treatment residuals but also for preventing environmental contamination, protecting public health, and ensuring the long-term sustainability of the Qalyubia MSW management system, thereby completing the process of transitioning the governorate toward integrated and regulated waste management. While the establishment of the first landfill cell is part of the larger IWMF, choosing to not establish the landfill cell for Qalyubia MSW residuals would result in the continuation of environmental and public health risks in Qalyubia Governorate. The transfer stations are not designed to house the waste for more than 24 hours which would therefore result in illegal dumping of waste. Without the cell there will be no engineered alternative to handle residual waste from the treatment facility (Plot 2).

5.2 Site Selection

As elaborated in the original PESIA, Plot 4 was selected for the landfill construction for the following reasons:

- Plot 4 is officially allocated for Qalyubia municipal solid waste (MSW) and construction & demolition (C&D) landfilling, covering 237.5 feddans. Plot 2 is designated for MSW treatment, and Plot 4 is the logical downstream destination for residuals from that treatment.
- The landfill cell in Plot 4 is designed to receive approximately 1,119 tons/day of residuals from the MSW treatment plant in Plot 2. The proximity and planning logic support efficient transfer and operations between the treatment facility and the landfill cell.
- The PESIA outlines a site selection process based on "negative mapping" (exclusion of unsuitable sites) and "positive mapping" (selection of optimal locations). Plot 4 and the broader IWMF site met key criteria, including:
    - Located on vacant, state-owned desert land with no prior development or conflicting land uses.
    - Sufficient distance (≥1.5 km) from residential areas and sensitive receptors.
    - No seismic risks, no flooding, and deep groundwater levels.
    - Favorable wind direction (landfill downwind of populated areas).
    - Proximity to industrial zones and good access via major highways
- Plot 4 has the spatial capacity to accommodate the first mono-cell (20 feddans) and future cells, aligning with projected MSW residual volumes and lifecycle needs. The feasibility and design studies further confirmed that the topography and geology of Plot 4 support safe construction and operation of the landfill

5.3 Site Layout Alternatives

5.3.1 Layout

Two landfill layout options have been proposed, as illustrated in the following figures, each varying in capacity and operational flexibility. The first design features six smaller cells that can later be merged into a larger single cell, offering greater adaptability. However, it requires a longer transport route of approximately 2 km between Plot 4 and Plot 9. The second design comprises five larger, non-combinable cells but benefits from a shorter 1.4 km transport distance, improving truck movement efficiency.

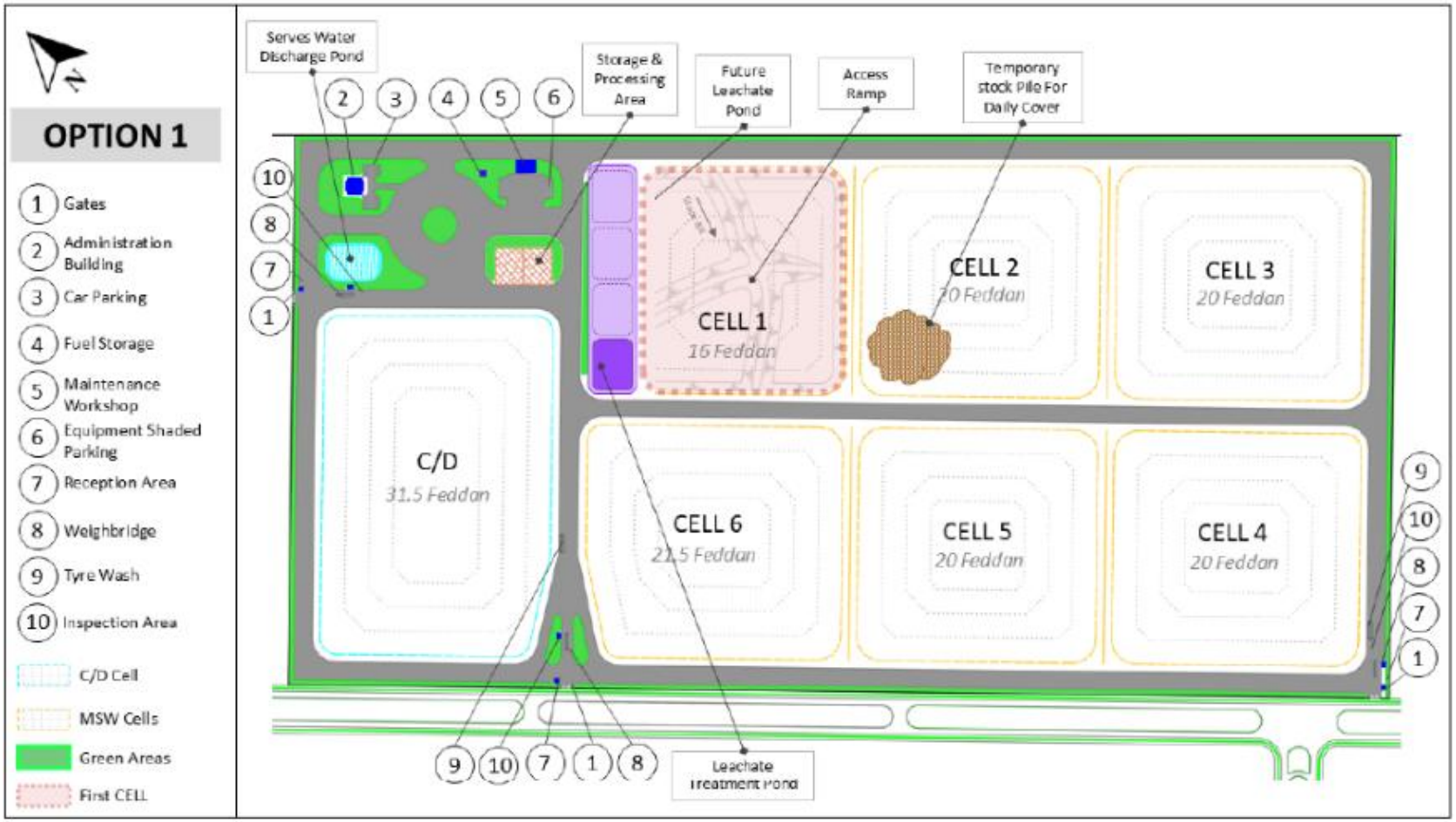

Figure 5-1 General Layout of Option 1

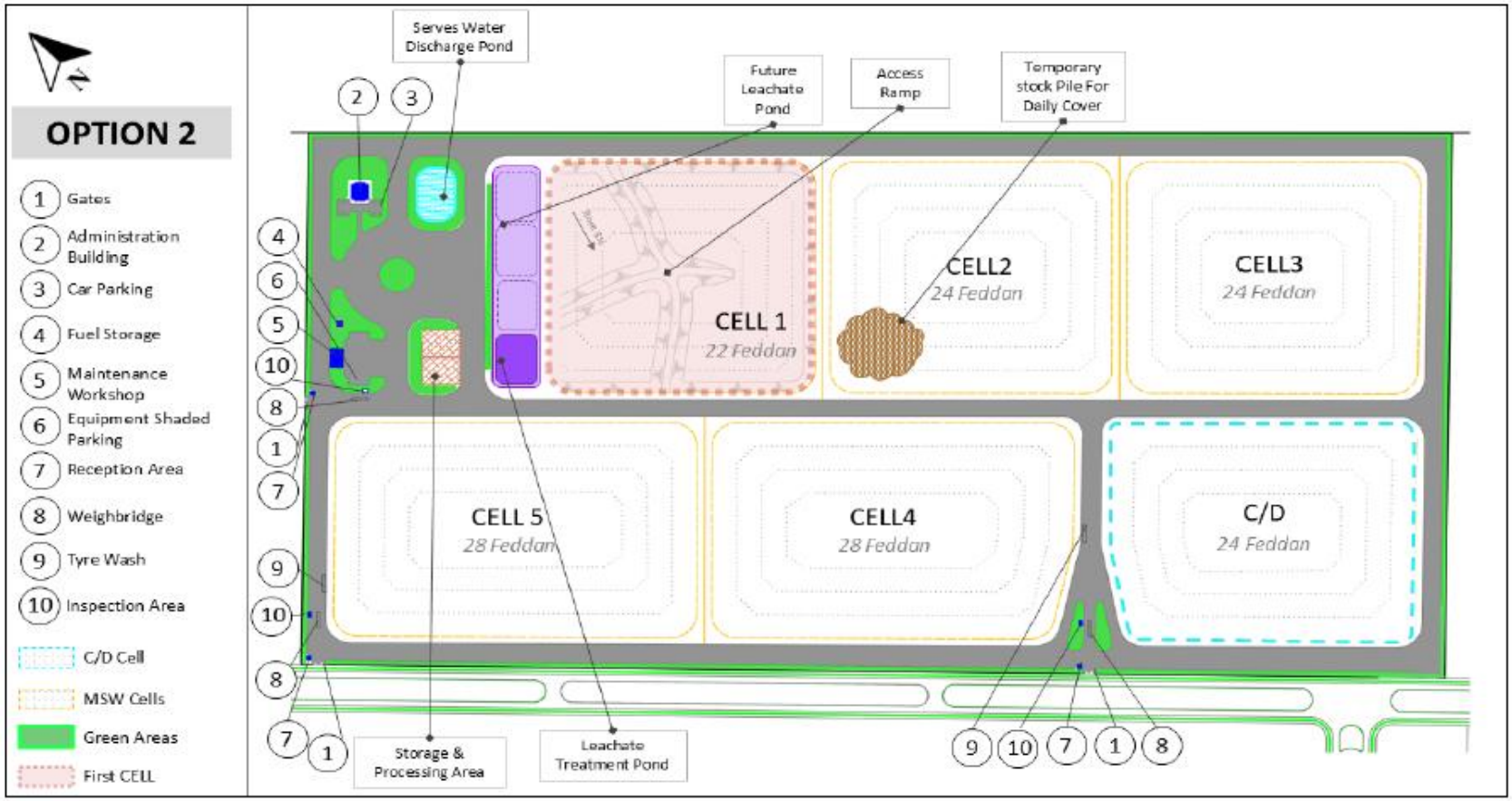

Figure 5-2 General Layout of Option 2

The following table provides a comparison between the two layout options.

Table 5-1 Comparison of Layout Options

Layout Option	Design	Operational Advantage	Distance to Plot 9	Entry/ Exit Points	Recommended Use Case	Limitations
1	Consists of 6 smaller landfill cells within Plot 4	Offers greater flexibility for staged development and phased filling. Allows operational separation if different waste streams are to be managed independently at first.	Approx. 2 km	Shorter truck route: faster tipping, but higher congestion near service building/weighbridge.	Best suited when operational adaptability and long-term planning flexibility are prioritized over transport logistics.	Longer haul distances increase costs and reduce efficiency
2	Comprises five larger landfill cells. Cells not designed to be consolidated in the future.	Offers a shorter transportation distance Plot 4 and Plot 9. More efficient for truck movements, reducing fuel usage and turnaround time.	Approx. 1.4km	Longer truck route: more internal traffic, but better segregation of admin and operational zones.	More suitable when transport logistics and operational efficiency in the short to medium term are the main concerns.	Less adaptable to changes in future operational requirements (e.g., changing waste composition or volume).

In conclusion, Option 1 emphasizes flexibility and adaptability for future expansions or changing waste streams, making it ideal for long-term operational planning. Option 2, on the other hand, is optimized for transport efficiency and operational simplicity in the short term. The choice between the two options depends on strategic priorities such as whether flexibility or cost-effective logistics takes precedence in the project's early implementation.

Layout Option 2 is the more efficient and cost-effective choice for the initial implementation of the landfill in Plot 4, offering larger, consolidated cells that simplify construction, reduce operational complexity, and minimize transportation distances. With a shorter haul route of approximately 1.4 km between Plot 4 and Plot 9, compared to 2 km in Option 1, Option 2 significantly lowers fuel consumption, vehicle wear, and internal traffic congestion., **Option 2** presents the most practical and operationally robust solution.

5.3.2 Location of On-Site Facilities

As shown in Figure 2-5, Plot 4 will also include a service building for on-site workers, evaporation ponds, and a fueling area. Regarding the service building, its location has been carefully assessed since it lies downwind of Plot 2. While this raises minor concerns, such as the exposure of workers to odors, airborne contaminants, bioaerosols, and noise carried by prevailing winds, requiring mitigation through ventilation, filtration, and buffer zones. The location of the service building remains an appropriate choice because the building needs to be close to Plot 2 to ensure convenient access to its facilities and to the entrance area where waste residuals from Plot 2 will be transported for disposal at Plot 4. Given the site's overall orientation, relocating the building elsewhere would still position it downwind of either Plot 2 or the landfill cell itself. Therefore, the proposed location remains valid, provided that suitable mitigation measures are implemented, especially since workers will not spend extended periods in this building.

The inclusion of an on-site fueling area has also been assessed. Equipment such as compactors, loaders, and excavators must be refueled within the facility, as transporting them off-site would be inefficient, costly, and potentially disruptive to daily

operations. Locating the fueling area near the equipment parking area will enhance operational efficiency, reduce equipment downtime, and minimize unnecessary movement across the site, thereby improving safety and fuel management.

The evaporation ponds are strategically placed downwind of Plot 2, the landfill cells, and other areas with high human activity. This siting minimizes potential odor and vector nuisance to workers, reduces the risk of accidental contact or contamination, and supports safe and efficient management of leachate or wastewater generated within the site.

5.4 Technology Alternatives

5.4.1 Landfill Types

Two landfill options were considered: sanitary and controlled. The sanitary landfill employs a composite liner system combining clay and geomembrane, along with leachate and gas collection and treatment systems to prevent soil and groundwater contamination and control methane emissions. The controlled landfill, on the other hand, relies on compacted soil liners and provides only limited containment and environmental protection. Selection of a **sanitary landfill** design was selected for the Qalyubia MSW cell as elaborated in the following table.

Table 5-2 Selection of Landfill Type for the First Landfill Cell

Factor	Justification
Environmental Protection	It is crucial to implement an advanced landfill design to mitigate risks of contamination to surrounding soil, water, and air quality. A sanitary landfill, with its composite lining system, ensures better containment of leachate, which is critical to preventing the seepage of pollutants into local groundwater. An engineered, sanitary landfill for final waste disposal will meet National and WB environmental safeguards.
Climate Conditions	The arid climate presents specific challenges that reinforce the need for sanitary landfill engineering: • Low annual rainfall may limit leachate volumes but also causes intense storm events that require proper surface water drainage to avoid liner erosion. • High temperatures and solar radiation accelerate waste decomposition, increasing the risk of gas generation, odors, and fires if unmanaged. • Frequent strong winds can carry loose waste and odors to nearby zones unless the site is fully enclosed and properly covered. A sanitary landfill is equipped to withstand extreme weather, with: • Covered waste zones, • Erosion-resistant capping layers, • Leachate and runoff controls are designed to handle intense precipitation events.
Waste Composition	The landfill will receive the residual fraction from the MSWT facility in Plot 2, which consists of: • Roughly 25% of total MSW input, primarily non-recyclable and inert materials, still includes organic residues, fine particles, and small plastics. • This residual fraction, although pre-treated, still contains potential pollutants that can generate leachate and landfill gas under anaerobic conditions. Therefore, it must be managed in a sanitary facility with containment and control systems to: • Prevent contaminant migration, • Capture and treat any emissions, • Avoid long-term environmental legacy impacts.
Health and Safety	A sanitary landfill provides a higher level of protection against health risks associated with less-contained landfill practices.

The selection and design of a sanitary landfill for the Qalyubia MSW residuals are fully aligned with the WBG EHS Guidelines for Waste Management Facilities, which require engineered controls to minimize risks to human health and the environment throughout the facility lifecycle. In accordance with the EHS Guidelines, the sanitary landfill incorporates a composite liner system, leachate collection and controlled disposal, and landfill gas management to prevent contamination

of soil and groundwater, control emissions, and reduce nuisance impacts such as odors and windblown waste. These measures directly address the EHS requirements for containment, pollution prevention, and climate impact mitigation.

5.4.2 Leachate Treatment

Several leachate treatment methods exist, each with different advantages and limitations. Several alternatives were assessed. Leachate treatment ponds are a common, low-cost solution suitable for arid climates, relying on evaporation and natural degradation but requiring large areas and careful lining to avoid groundwater contamination. Leachate recirculation with evaporation enhances waste stabilization but poses emission and contamination risks, making it less suitable for this site. Off-site treatment at municipal wastewater plants can be cost-effective but may be rejected due to high pollutant concentrations, requiring costly pre-treatment. Physical-chemical treatment and membrane filtration (micro/ultra-filtration) are effective for certain contaminants but generate sludge and need frequent maintenance. Reverse osmosis (RO) provides the highest removal efficiency and environmental protection, though it is expensive and produces concentrated brine waste.

5.4.2.1 Justification for Leachate Treatment Pond

MSWT residuals are typically low in organic content and already partially dried and stabilized during the treatment. As a result, the leachate generation rate is estimated at just 10-15% of the waste input volume, which is significantly lower than what is produced in landfills receiving raw municipal solid waste. The area's dry climate with low rainfall means that stormwater inflow is limited, reducing the risk of pond overflow. High evaporation rates naturally aid in reducing leachate volume over time. These climatic factors make open evaporation and stabilization ponds highly effective and cost-efficient for leachate management. The treatment pond will be lined with impermeable materials (e.g., geomembranes or clay) to prevent seepage, equipped with monitoring systems to detect any leakages or failures. The proposed leachate management approach, including lined evaporation and stabilization ponds, complies with EHS guidance on wastewater and leachate management by ensuring hydraulic containment, seepage prevention, and environmental monitoring, particularly under arid climatic conditions.

5.4.3 Landfill Gas Collection and Treatment

Three main gas collection methods were considered; passive venting, active extraction, and horizontal collection layers. Passive venting is simple and low-cost but releases untreated gas into the atmosphere. Active systems use mechanical suction to capture gas efficiently for treatment or energy use but require higher investment and maintenance. Horizontal layers provide short-term collection during early landfill phases but have lower recovery efficiency as waste depth increases.

Treatment options include flaring, gas-to-energy, direct-use, and upgrading to renewable natural gas (RNG). Flaring effectively destroys methane emissions when energy recovery is not feasible. Gas-to-energy systems and direct-use applications allow energy recovery but depend on consistent gas supply and infrastructure. Upgrading to RNG provides the highest environmental and economic value but is technologically complex and costly.

5.4.3.1 Recommended Landfill Gas Collection and Treatment

For the first landfill cell of Plot 4, landfill gas production is expected to be limited. Therefore, a minimal system such as passive venting or low-capacity flaring may suffice in early years. However, designing the infrastructure to allow for future upgrading to active gas collection or energy recovery is recommended to support climate mitigation goals and sustainability objectives. The provision for landfill gas control, with passive or low-capacity systems designed for future upgrading, is consistent with WB EHS recommendations for methane management, fire prevention, and greenhouse gas reduction, even where gas generation rates are expected to be limited.

6 Identification and Assessment of Potential Environmental and Social Impacts

This chapter addresses potential impacts of all planned subproject activities during the sub-project phases.

6.1 Impact Assessment Methodology

The following methodology was utilized to systematically evaluate the environmental and social impacts of the subproject. It ensures a comprehensive understanding of potential implications and supports informed decision-making and effective mitigation measures. Detailed descriptions of the methodology are provided in **Annex V**.

The Area of Influence (AoI) considers both the project footprint, where direct impacts occur, and the surrounding zone where indirect impacts may arise. For this subproject, the AoI assessed includes the direct site of the first landfill cell (Plot 4), which will receive residual waste from Plot 2 after treatment, and Plot 2.

This impact assessment operationalizes these three impact dimensions as follows:

Magnitude

Table 6-1 Description and Coding of Impact Magnitudes

Index Value	Category	Description
1	Very Low	A very small proportion of the receptor is affected
2	Low	A small proportion of the receptor is affected
3	Moderate	A moderate proportion of the receptor is affected
4	High	A large proportion of the receptor is affected
5	Very High	A very large proportion or all of the receptor is affected

Spatial Extent

Table 6-2 Description and Coding of Impact Spatial Extent

Index Value	Category	Description
0	Nil	No effect
1	Very Low	Local scale impact in the immediate area of activity
2	Low	Local scale impact in the study area
3	Moderate	Regional scale impact
4	High	National scale impact
5	Very High	Global scale impact

Duration

Table 6-3 Description and Coding of Impact Duration

Index Value	Category	Description
0	Nil	No effect
1	Very Low	Less than one year
2	Low	One to five years
3	Moderate	Five years to ten years
4	High	Greater than ten years
5	Very High	Irreversible

Table 6-4 Basic Impact Index based on Receptor Sensitivity

	Basic Impact Index

Receptor Sensitivity	(0) N	(1) VL	(2) L	(3) M	(4) H	(5) VH
Low	Insignificant (IN)	IN	IN	MI	MO	MA
Medium	IN	IN	MI	MO	MA	MA
High	IN	Minor (MI)	Moderate (MO)	Major (MA)	MA	MA

6.2 Overall Positive Impacts of the Subproject

The Project tends to have a positive environmental & socioeconomic impact as follows:

- Improved waste management
- Conservation of natural resources
- Aesthetic and Urban Development
- Job Creation
- Enhanced Infrastructure
- Long-Term Sustainability

6.3 Cumulative Impacts

6.3.1 Cumulative Impacts During the Construction Phase of the 1st Landfill Cell at Plot 4

6.3.1.1 Concurrent Construction Activities within the 10RIWMF

During the construction phase of the first landfill cell at Plot 4, cumulative environmental and social impacts may arise as a result of simultaneous construction activities occurring across other plots of the 10RIWMF. Although each plot is developed as a discrete component, construction activities are spatially concentrated within a single integrated site and rely on shared infrastructure, access roads, utilities, and staging areas. The cumulative effects are therefore associated with the combined intensity, duration, and spatial overlap of construction works to manage cumulative impacts arising from the simultaneous construction of Plot 4 and other plots within the 10RIWMF. High-level, facility-wide coordination and control measures are identified below, while detailed and site-specific mitigation measures applicable to the construction of the first landfill cell itself are presented in the ESMPs in Chapter 7.

Table 6-5 Cumulative Impacts of Concurrent Construction Activities within the 10RIWMF

Cumulative Impact	Impact Description	Recommended Mitigation Measures
Construction Traffic and Internal Circulation	The concurrent movement of construction vehicles and heavy machinery serving multiple plots may result in cumulative traffic impacts within the IWMF. These include increased traffic density on internal access roads, higher risk of traffic incidents, and potential conflicts between vehicles transporting soil, construction materials, geosynthetics, and equipment to different plots. If not properly coordinated, overlapping delivery schedules and haul routes may lead to congestion, reduced operational efficiency, and elevated safety risks for drivers and site personnel. Increased vehicle movements also contribute cumulatively to fuel consumption and exhaust emissions.	• Onsite contractors to develop and implement site-specific traffic management plan covering all plots under construction within the 10RIWMF. PCU to ensure coordination between different contractors through dedicated site manager. • Define designated internal haul routes for each plot and assign priority access where routes overlap. • Implement staggered delivery and haulage schedules to avoid peak congestion periods. • Require all contractors to coordinate material deliveries through a centralized scheduling system managed by the PCU or Supervision Engineer. • Enforce speed limits and install clear directional signage within the facility. • Deploy trained traffic marshals at critical intersections and high-risk movement areas to reduce accident risks and improve vehicle flow.
Air Quality and Dust Emissions	Earthworks, excavation, backfilling, embankment construction, and material handling at Plot 4, when combined with similar activities at other plots, may lead to cumulative dust generation across the wider IWMF. Elevated levels of total suspended	• Apply uniform dust control measures across all plots under construction to prevent cumulative particulate matter exceedances.

Cumulative Impact	Impact Description	Recommended Mitigation Measures
	particulates (TSP) and PM_{10} may occur, particularly during dry and windy conditions typical of the project area. While impacts are expected to be confined largely to the site and its immediate surroundings, cumulative dust emissions may affect construction workers across multiple plots and reduce overall air quality within the facility if dust suppression measures are inconsistently applied.	• Conduct coordinated water spraying of active earthwork areas, internal roads, and material stockpiles. • Require mandatory covering of trucks transporting fine or loose materials. • Stabilize, compact, or temporarily cover exposed surfaces where construction activities are paused. • Synchronize dust suppression activities among plots, particularly during high-wind conditions, to avoid additive impacts on ambient air quality.
Noise and Vibration	Simultaneous operation of heavy construction equipment such as; excavators, bulldozers, compactors, and trucks across several plots may generate cumulative noise levels higher than those produced by Plot 4 construction alone. Although the site is located in a remote desert area with no sensitive receptors nearby, cumulative noise may still affect worker comfort, communication, and occupational health within the IWMF. Localized vibration effects may also occur where multiple plots are undergoing intensive earthworks, potentially affecting temporary structures or newly constructed infrastructure if not properly sequenced.	• Coordinate construction schedules to avoid simultaneous operation of multiple high-noise equipment clusters in adjacent plots. • Restrict particularly noisy activities (e.g. compaction, rock breaking) to daytime hours, where feasible. • Rotate high-noise activities spatially across the site to reduce localized cumulative noise exposure. • Enforce regular equipment maintenance to minimize excessive noise and vibration. • Apply temporary separation distances or noise buffers between work fronts where multiple crews operate in proximity.
Shared Utilities and Resource Demand	Construction of Plot 4 will rely on shared utilities and services, including electricity supply, water for construction and dust suppression, fuel storage, and temporary waste management facilities. When combined with demand from other plots under construction, cumulative pressure may be placed on these shared systems. Without adequate planning, this could result in temporary shortages, increased reliance on fuel-powered generators, or inefficiencies in water use, thereby amplifying environmental impacts such as emissions and resource consumption.	• Plan water, electricity, and fuel demand at the IWMF level, rather than individually by plot. • Consolidate consumption estimates from all active plots to ensure adequate supply capacity. • Minimize reliance on diesel generators and emergency water sources through coordinated planning. • Promote resource-efficient practices, including reuse of treated water for dust suppression. • Optimize equipment utilization to reduce cumulative fuel consumption and associated emissions.
Waste Generation and Material Stockpiling	Construction across multiple plots will generate cumulative quantities of construction waste, surplus excavated material, and packaging waste. If material stockpiling and waste storage areas are not centrally coordinated, this may lead to overcrowding, poor housekeeping, windblown debris, and increased risk of soil contamination. Overlapping use of laydown areas may also constrain space availability and create logistical challenges.	• Implement a centralized construction waste and surplus material management system across the IWMF. • Designate and share approved areas for soil stockpiling, recyclable materials, and construction waste. • Prevent uncontrolled dumping and windblown debris through proper containment and housekeeping. • Coordinate waste segregation, timely removal, and reuse of suitable excavated materials within the site. • Minimize cumulative land take and visual clutter caused by unmanaged stockpiles.
Occupational Health and Safety Risks	The presence of multiple contractors and work crews operating simultaneously within the IWMF increases cumulative occupational health and safety risks. These include higher potential for accidents due to overlapping work zones, increased interaction between workers and moving machinery, and inconsistent application of safety procedures across plots. Without a unified site-wide safety management system, cumulative risks related to heat stress, dust exposure, noise, and traffic incidents may be exacerbated.	• Apply a unified OHS framework to all contractors operating within the IWMF. • Implement harmonized safety rules and joint induction training for all construction personnel. • Establish common emergency response procedures applicable across all plots. • Coordinate supervision of high-risk activities to avoid overlap and unsafe interactions. • Clearly demarcate work zones and enforce consistent use of PPE.

Cumulative Impact	Impact Description	Recommended Mitigation Measures
		• Apply coordinated heat-stress management measures, considering cumulative exposure to dust, noise, traffic, and climatic conditions.
Visual and Temporary Nuisance Effects	While temporary in nature, the combined visual footprint of construction activities across the IWMF—earthworks, machinery, stockpiles, and temporary structures—may create a cumulative visual impact within the facility. Although this impact does not affect nearby communities due to the remote location, it may influence overall site organization and worker perception of safety and order if not properly managed.	• Coordinate construction activities across plots to minimize unnecessary overlap of visually intrusive works, such as large earthworks and material stockpiling, occurring simultaneously in adjacent areas. • Designate approved, centralized stockpile and laydown areas to avoid scattered materials and visual clutter across the IWMF. • Limit the height and footprint of soil and material stockpiles and maintain orderly shaping and compaction to reduce visual intrusion. • Require contractors to maintain good housekeeping practices, including regular removal of surplus materials, debris, and packaging waste. • Ensure that temporary structures, fencing, signage, and equipment are clearly organized and properly maintained throughout the construction period. • Remove temporary facilities, unused equipment, and stockpiles promptly upon completion of construction activities in each plot. • Restore disturbed areas not required for subsequent construction phases through grading and surface stabilization to reduce prolonged visual disturbance.

6.3.2 Cumulative Impacts During the Operation Phase of the 1st Landfill Cell at Plot 4

6.3.2.1 Impacts Associated with Operation of Plot 2 and the 1st Landfill Cell at Plot 4 Simultaneously

The cumulative interaction between Plot 2 and Plot 4 represents one of the most important linkages within the 10RIWMF, as both plots are directly connected through the waste management chain for Qalyubia Governorate. Plot 2 will house the MSW Treatment Facility, while Plot 4, located downwind of Plot 2, will receive the non-recoverable residuals. The close functionality between both plots could result in overlapping and reinforcing impacts during operation if not properly managed. The first landfill cell at Plot 4 will not commence operation until Plot 2 is fully operational, ensuring that only treated residuals are disposed of and avoiding direct landfilling of raw municipal waste. Due to their close functional integration, spatial proximity, and continuous material flow between the two plots, simultaneous operation may result in cumulative and reinforcing impacts if not effectively coordinated and managed. Key potential cumulative impacts are explained in the following table:

Table 6-6 Cumulative Impacts of Operation of Plot 2 and the 1st Landfill Cell at Plot 4 Simultaneously

Cumulative Impact	Impact Description	Recommended Mitigation Measures
Air Quality and Odor	Emissions and odors generated during waste unloading, sorting, mechanical treatment, and composting activities at Plot 2 may combine with emissions from landfill operations at Plot 4, including landfill gas release, waste tipping, and compaction activities. Given that Plot 2 is located upwind of Plot 4, prevailing wind conditions may facilitate the movement of odors and air pollutants toward the landfill area, potentially leading to localized air quality deterioration and increased odor nuisance affecting	• Apply operational sequencing, whereby the first landfill cell at Plot 4 shall not commence waste reception until the MSW Treatment Facility at Plot 2 is fully operational, ensuring that only treated residuals are landfilled. • Enforce waste acceptance controls such that only non-recoverable residual waste generated at Plot 2 is accepted at Plot 4, with strict prohibition of untreated or raw municipal solid waste. • Implement integrated environmental monitoring for air quality and odor in the buffer/interface

Cumulative Impact	Impact Description	Recommended Mitigation Measures
	on-site workers and operational zones between the two plots.	zone between Plot 2 and Plot 4 to detect cumulative effects arising from simultaneous operations. • Coordinate odor-generating activities (e.g. waste unloading, treatment, tipping, and compaction) to avoid peak emissions occurring concurrently at both plots.
Leachate and Wastewater Management	Both Plot 2 and Plot 4 will generate leachate and process wastewater requiring collection, treatment, and safe disposal. Although Plot 2 and Plot 4 operate independent leachate and wastewater management systems, simultaneous peak leachate generation or maintenance activities at both plots could increase overall operational oversight and response demands if not adequately coordinated.	• Monitor leachate volumes and system performance at each plot independently, while maintaining site-level oversight to identify cumulative operational stress or abnormal conditions. • Maintain contingency procedures at each plot to manage system upsets without transferring environmental risk to the other plot.
Noise and Dust Emissions	Simultaneous operation of heavy machinery, including loaders, conveyors, compactors, and haul trucks across both plots, may result in elevated cumulative noise and dust levels within the IWMF. While impacts are expected to remain within an industrial setting, increased noise and dust exposure could affect worker comfort, communication, and occupational health if operations are not spatially and temporally coordinated.	• Coordinate daily operations to minimize the simultaneous use of high-noise and dust-generating equipment in adjacent areas of Plot 2 and Plot 4. • Apply consistent dust suppression and noise control measures at both plots, supported by joint monitoring programs to identify cumulative exposure levels in shared work zones. • Ensure regular maintenance of equipment to prevent excessive emissions during concurrent operations.
Traffic and Safety	The internal transfer of residual waste from Plot 2 to Plot 4 will generate regular truck movements along designated internal haul routes. If waste transfer schedules are not properly managed, cumulative traffic volumes may lead to congestion, and heightened safety risks for drivers, operators, and maintenance personnel working across both plots.	• Implement controlled waste transfer, whereby residual waste is transported exclusively between Plot 2 and Plot 4 via the designated internal haul route, without passing through or mixing with waste from other plots. • Coordinate waste transfer schedules to avoid traffic congestion and unsafe interactions along internal roads. • Enforce site-wide traffic management measures, including speed limits, signage, and driver training applicable to both plots.
Worker Exposure and Health	Workers will be assigned separately to Plot 2 and Plot 4, and therefore will not experience combined occupational exposure arising from simultaneous operations. Potential cumulative considerations are limited to the need for consistent application of occupational health and safety standards, training, and emergency procedures across both plots.	• Maintain coordinated OHS programs across both plots, including mandatory use of appropriate PPE. • Implement worker rotation schedules, rest periods, and exposure management measures to reduce cumulative exposure to dust, odors, noise, emissions, and heat. • Conduct joint OHS inductions and toolbox talks addressing cumulative risks associated with simultaneous operations.
Operational Interdependence	The operational performance of Plot 4 is directly dependent on the functioning of the MSW Treatment Facility at Plot 2. Any disruption at Plot 2 such as; equipment failure, maintenance shutdowns, or reduced processing capacity could result in waste accumulation, delays in residual transfer, or pressure to temporarily increase landfill intake rates. Such situations may create logistical challenges and elevate	• Establish clear operational protocols recognizing that Plot 4 operations are dependent on the performance of Plot 2, while maintaining independent operational systems. • Require regular communication and scheduling between Plot 2 and Plot 4 operators to coordinate waste transfer volumes, equipment fueling, maintenance activities, and contingency responses.

Cumulative Impact	Impact Description	Recommended Mitigation Measures
	environmental and operational risks across both plots if contingency arrangements are not in place.	• Ensure that operational disruptions at Plot 2 (e.g. shutdowns or reduced capacity) are promptly communicated to Plot 4 to prevent waste accumulation or environmental stress.

6.3.2.2 Impact of the Landfill Cell on Other Plots of the 10RIWMF

During the operational phase of the first landfill cell at Plot 4, construction activities may continue for other plots within the 10RIWMF, as well as for external infrastructure works leading to or supporting the facility (e.g. access roads, utilities, or ancillary infrastructure). Although these activities may be spatially separated from Plot 4, their simultaneous occurrence could give rise to cumulative impacts affecting shared environmental and operational receptors if not adequately coordinated.

Table 6-7 Impact of the Landfill Cell on Other Plots of the 10RIWMF

Cumulative Impact	Impact Description	Recommended Mitigation Measures
Air Quality and Dust	Construction activities associated with other plots or external infrastructure works may generate dust and exhaust emissions that add to localized emissions from landfill operations, including waste tipping, vehicle movements, and daily cover activities. The combined effect may result in temporary increases in particulate matter concentrations along internal roads, access routes, and working areas within or adjacent to the 10RIWMF, particularly during dry or windy conditions.	• Apply consistent dust suppression measures across all construction sites and access routes, including water spraying of roads, active work areas, and stockpiles. • Require all construction and operational vehicles to comply with emission control and maintenance standards. • Coordinate construction schedules to minimize simultaneous high-dust activities near operational landfill areas and main access routes.
Noise	Noise generated from construction equipment used in other plots or external infrastructure works may occur concurrently with operational noise from the landfill, contributing to an elevated industrial noise environment within the facility and along access corridors. Cumulative noise may influence worker comfort and communication in operational areas.	• Coordinate work schedules to avoid concurrent high-noise activities occurring in proximity to landfill operational areas. • Restrict particularly noisy construction works to daytime hours where feasible. • Maintain construction and operational equipment in good working order to limit excessive noise emissions.
Traffic and Access	Construction traffic associated with other plots or external infrastructure works may overlap with landfill operational traffic along internal roads and external access routes serving the 10RIWMF. This may lead to localized congestion, increased vehicle interactions, and elevated safety risks for drivers, operational staff, and maintenance personnel, particularly during peak construction or waste delivery periods.	• Implement site-wide traffic management measures covering landfill operations, construction of other plots, and external infrastructure works. • Define and enforce separate or clearly prioritized routes for construction traffic and landfill operational vehicles where practicable. • Coordinate delivery schedules to reduce congestion on internal and external roads. • Deploy signage, speed limits, and traffic marshals at key junctions and work interfaces.
Operational Interface and Site Management	Ongoing construction activities in other plots or along access infrastructure may temporarily affect site access, traffic routing, or availability of shared corridors, potentially interfering with landfill operations if not properly planned. Poor coordination could result in delays, rerouting of waste haulage, or increased operational inefficiencies.	• Maintain regular communication between landfill operators and construction contractors working within the 10RIWMF. • Plan construction phasing and access arrangements to avoid disruption to landfill waste reception, internal haul routes, and emergency access. • Clearly demarcate construction zones to prevent encroachment into operational landfill areas.
Visual and Temporary Nuisance Effects	The combined presence of active landfill operations and construction activities across multiple plots or access corridors may increase temporary visual	• Designate approved areas for material stockpiling and temporary facilities to minimize visual clutter.

Cumulative Impact	Impact Description	Recommended Mitigation Measures
	disturbance within the 10RIWMF. While the facility is located in an industrial/desert setting, cumulative visual clutter from equipment, stockpiles, and temporary structures may affect site organization and safety perception if not well managed.	• Enforce good housekeeping practices, including timely removal of surplus materials and waste. • Remove temporary construction features promptly upon completion of works and restore affected areas where applicable.
Workers' Exposure	The simultaneous operation of the 1st landfill cell at Plot 4 and other facilities within the 10RIWMF (e.g., MSW treatment at Plot 2 and future facilities in other plots) may result in cumulative occupational exposure to dust (PM10, TSP), bioaerosols, landfill gas emissions (e.g., methane, trace VOCs), noise, and vehicle-related emissions. Workers moving between plots, particularly along shared internal access roads or operational interfaces between Plot 2 and Plot 4, may experience increased exposure duration and frequency. In addition, overlapping operational activities (waste handling, compaction, equipment movement, leachate management) may elevate cumulative health and safety risks if not properly coordinated.	• Implement a facility-wide Occupational Health and Safety (OHS) Management Plan applicable to all operational plots within the 10RIWMF. • Enforce the use of appropriate PPE (e.g., respiratory masks, hearing protection, high-visibility clothing) based on task-specific risk assessments. • Conduct periodic air quality and landfill gas monitoring at worker-accessible areas, particularly at the interface between Plot 2 and Plot 4. • Establish designated and clearly marked internal transport routes to minimize unnecessary worker–vehicle interaction. • Rotate workers in high-exposure tasks to limit cumulative exposure duration. • Provide regular occupational health screening and medical check-ups for workers exposed to dust, noise, and landfill emissions. • Conduct regular toolbox talks and safety training covering cumulative exposure risks across the IWMF. • Coordinate operational schedules across plots to reduce simultaneous peak-emission activities where feasible.

6.3.2.3 Impacts Associated with the Construction of Other Landfill Cells at Plot 4 While the 1st Landfill Cell is in Operation

Following commissioning of the first landfill cell at Plot 4, additional landfill cells will be constructed in phases to accommodate future disposal needs. During these periods, construction activities for new cells will occur concurrently with the operation of the first landfill cell within the same plot. Although both activities are spatially contained within Plot 4 and are part of a single facility, their simultaneous occurrence may give rise to localized cumulative impacts if not properly managed.

Table 6-8 Impacts Associated with the Construction of Other Landfill Cells at Plot 4 While the 1st Landfill Cell is in Operation

Cumulative Impact	Impact Description	Recommended Mitigation Measures
Air Quality and Dust	Construction of additional landfill cells will involve excavation, earthworks, liner installation, and material handling, generating dust emissions. These may occur concurrently with operational emissions from the active landfill cell, including dust from waste tipping, vehicle movements, and daily cover placement. The combined effect may result in localized increases in particulate matter concentrations within Plot 4, particularly during dry and windy conditions, potentially affecting on-site workers and operational efficiency.	• Coordinate construction and operational activities to minimize simultaneous dust- and odor-generating activities in adjacent areas. • Implement enhanced dust suppression measures (e.g. water spraying of construction areas, internal roads, and exposed surfaces) during periods of concurrent activity. • Maintain strict daily cover practices at the operating landfill cell to limit odor emissions, particularly when construction is occurring nearby.

Cumulative Impact	Impact Description	Recommended Mitigation Measures
Odor	While odor generation during construction activities is generally limited, construction works in proximity to the active landfill cell may exacerbate odor perception by disturbing operational zones or increasing vehicle movements near active waste areas. Temporary disruption of cover placement or increased exposure of waste surfaces due to concurrent works could contribute to short-term odor nuisance within the landfill operational area.	• Schedule earthworks and liner installation activities away from prevailing wind directions where practicable.
Noise and Vibration	Simultaneous use of heavy construction equipment for new cell development and operational machinery at the active landfill cell may result in elevated cumulative noise levels within Plot 4. Although no sensitive receptors are located nearby, increased noise levels may affect worker comfort and communication if activities are not properly coordinated.	• Coordinate work schedules to avoid simultaneous operation of multiple high-noise equipment clusters in close proximity. • Restrict particularly noisy construction activities to daytime hours and ensure regular maintenance of both construction and operational equipment. • Apply temporary spatial separation between construction zones and active tipping areas where feasible.
Traffic and Operational Safety	Concurrent construction and operational activities will increase internal vehicle movements within Plot 4, including construction machinery, waste haul trucks, and operational support vehicles. Without clear separation and scheduling, cumulative traffic may increase the risk of accidents, equipment interaction, and delays in waste disposal operations.	• Establish clearly segregated internal routes for construction traffic and operational waste haulage within Plot 4. • Implement traffic management measures, including signage, speed limits, and designated crossing points, to reduce interaction risks between construction machinery and operational vehicles. • Appoint on-site supervision to coordinate movements during peak construction and disposal periods.
Operational Interference and Efficiency	Construction activities for new landfill cells may temporarily constrain access routes, working space, or support infrastructure used by the operating cell. If not adequately planned, this could interfere with daily landfill operations, affect waste acceptance efficiency, or create logistical challenges during peak disposal periods.	• Plan construction phasing to avoid disruption to access routes, leachate infrastructure, and operational support systems serving the active landfill cell. • Maintain continuous communication between construction and operations teams to coordinate daily activities, equipment movements, and contingency responses. • Implement clear demarcation of construction zones to prevent encroachment into operational areas.
Workers' Exposure	During the simultaneous operation of the 1st landfill cell and the construction of additional landfill cells within Plot 4, workers may be exposed to cumulative occupational risks arising from overlapping construction and operational activities. These include increased exposure to dust emissions (PM10 and TSP) from earthworks and vehicle movement, elevated noise levels from heavy construction equipment, potential exposure to landfill gas emissions from the active cell, and increased traffic-related safety risks within shared internal haul roads. The coexistence of construction crews and operational staff within the same plot	• Develop and implement a Construction–Operation Interface Management Plan specific to Plot 4. • Physically segregate active construction zones from operational landfill areas using fencing, signage, and controlled access points. • Establish dedicated haul routes and equipment corridors for construction activities to minimize interaction with operational waste transport vehicles. • Enforce mandatory PPE appropriate to both construction and landfill operational risks

Cumulative Impact	Impact Description	Recommended Mitigation Measures
	may heighten the likelihood of accidents, interface risks, and prolonged exposure durations if activities are not properly segregated and coordinated.	(respiratory protection, hearing protection, safety boots, helmets, high-visibility clothing). • Implement dust suppression measures (e.g., water spraying, speed control) during excavation and embankment works. • Schedule high-noise construction activities outside peak operational periods where feasible. • Conduct joint safety briefings and coordination meetings between the Construction Contractor and the Landfill Operator. • Carry out routine occupational exposure monitoring (dust, noise, landfill gas) at worker-accessible boundaries between construction and operational areas. • Maintain clear emergency response procedures covering both construction and operational scenarios.

6.4 Impacts during Construction, Operation, Closure, and Post-Closure Phases

To enhance clarity and facilitate implementation by the Contractor and Operator, the detailed assessment of environmental and social impacts has been presented in **Annex XI**, while a concise summary of these impacts, along with corresponding mitigation and monitoring measures, has been incorporated directly within the Environmental and Social Management Plan (ESMP) section of this report.

7 Environmental and Social Management and Monitoring Plan (ESMMP)

7.1 Introduction

This chapter outlines the environmental and social management procedures and mitigation measures to be implemented by the Contractor, the Operator, and the PCU to address residual impacts in line with national regulations and World Bank requirements.

7.2 Institutional Setup

The effective implementation of the ESMMP relies on a coordinated institutional framework involving the Project Coordination Unit (PCU) under the Ministry of Environment, the Technical Implementation Unit, the Contractor, Supervision Engineer and the Landfill Operator. Each entity shall ensure that qualified Environmental, Health, and Safety (EHS) and social specialists are appointed, adequately trained, and equipped to implement and monitor mitigation and management measures in compliance with Egyptian regulations and World Bank ESSs. The roles and responsibilities are summarized as follows:

7-1 ESMMP Institutional Setup

Entity	Responsibilities
Project Coordination Unit (PCU)	The PCU will oversee and coordinate all project implementation activities, including environmental and social management. The PCU will ensure compliance with World Bank requirements, supervise the performance of contractors and operators, and consolidate monitoring and reporting at the national level. The PCU will be responsible for overseeing the ESHS performance.
Supervision Consultant	The Supervision Consultant will oversee contractors' technical, environmental, social, health, and safety performance, ensure compliance with contractual requirements
TIU for Component 2	The TIU will oversee construction and operation activities. The TIU includes Qalyubia Governorate, MoLD, WMRA, EEAA
Contractor	The Contractor will be responsible for integrating all Environmental, Social, Health, and Safety (ESHS) requirements into the detailed design of the subproject, as identified in **Annex XIV**, and for implementing all construction-phase mitigation measures outlined in the ESMMP. The Contractor will establish and maintain an Environmental and Social Management System (ESMS), prepare and implement a Construction Environmental and Social Management Plan (C-ESMP), appoint qualified E&S and OHS Officers, and ensure that all subcontractors fully comply with applicable ESHS requirements.
Operator	The Operator shall ensure that all operational-phase ESHS mitigation, monitoring, and reporting measures are implemented as per the ESMMP,

To ensure accountability and transparency, each responsible party shall maintain proper documentation, registers, and records of ESHS training, incidents, and grievances.

7.3 Environmental and Social Management plan (ESMP)

7.3.1Construction Phase ESMP

Table 7-2: Environmental and Social Management plan During the Construction Phase

Receptor / EHS Aspect	Impact	Impact Significance	Mitigation Measures	Relevant WB ESS	Means of supervision	Residual Impact	Responsibility		Est. Cost (EGP)
							Implementation	Supervision	
Construction Phase									
Air Quality Impacts and Dust	Construction-generated air quality impacts arise from: • Dust (PM_{10} and $PM_{2.5}$) generated from excavation and grading of soil, haulage of cover material and liner materials, stockpiling of soil and aggregates, vehicle movement on unpaved roads Exhaust emissions from construction equipment.	**Moderate**	The following mitigation measures shall be implemented by the DB Contractor: Dust suppression using water. Slowing driving speed of material transportation vehicles. Providing worker awareness on safe driving and machinery usage. Temporary windbreaks around stockpiles Maintaining machinery and vehicles in good condition to reduce emissions. Adjusting construction timing to favorable climate conditions. Developing a construction environmental social management plan Workers are wearing appropriate PPE	ESS1 ESS2 ESS3	Site inspection Review the equipment, maintenance records. Quarterly Air Quality Measurements Review the grievance log	**Minor**	DB Contractor	PCU TIU	Contractor's Cost
Noise & Vibration	Construction-related noise and vibrations can have the following impacts: Disturbance to nearby workers, leading to stress. Potential damage to nearby structures and utilities due to vibrations. Occupational noise exposure and related health issues for construction workers, including hearing loss and discomfort.	**Moderate**	The DB Contractor shall: Ensure that ambient noise level doesn't exceed 3 dB above the background level near the sensitive receptors. Maintain machinery and vehicles in good condition Keep site roads in good condition Create buffer zones or locate facilities away from sensitive areas. Choose equipment with low noise emission levels. Follow manufacturers' recommended maintenance schedules. Schedule construction activities during appropriate daytime hours. Provide earmuffs/protective hearing equipment for all workers. Turn off equipment when not in use in community areas. Place noise-generating sources as far as possible from sensitive receptors. Use silencers or acoustically attenuating shields for stationary equipment.	ESS1 ESS2 ESS3	Site inspection Review the equipment and maintenance records. Quarterly Noise Measurements Review the complaints log	**Minor**	DB Contractor	PCU TIU	Contractor's Cost
Soils and Landscape	The construction of the Landfill Cell can impact the soil in these ways: Disturbance, compaction, and erosion from excavation and construction activities. Potential soil contamination from improper handling of materials and chemicals. Risk of soil and groundwater contamination.	**Moderate**	The DB Contractor shall maintain soil erosion control measures as; the use of silt fences, sediment basins, and erosion control blankets. Proper management of construction waste, such as segregating hazardous waste, implementing good construction management practices, and properly disposing of waste, can help prevent soil contamination.	ESS1 ESS3	Site inspection Review the equipment, maintenance records. Review the complaints log	**Minor**	DB Contractor	PCU TIU	Contractor's Cost
Groundwater	Groundwater contamination may occur due to: Soil disturbance and excavation altering natural soil composition and permeability. Accidental spills or leaks Stormwater runoff carrying sediment and pollutants into groundwater.	**Minor**	The DB Contractor must: Prevent spillages and conduct periodic equipment inspections. Implement site management procedures, good housekeeping	ESS1 ESS3	Site inspection	**Insignificant**	DB Contractor	PCU TIU	Contractor's Cost

Receptor / EHS Aspect	Impact	Impact Significance	Mitigation Measures	Relevant WB ESS	Means of supervision	Residual Impact	Responsibility		Est. Cost (EGP)
							Implementation	Supervision	
Construction Phase									
	Improper handling and disposal of construction waste, including hazardous materials.		If on-site fuelling of construction equipment and vehicles is necessary, spill prevention measures should be adhered to. Dispose of construction waste by a licensed contractor Properly insulate sewage storage tanks Design a drainage system to collect rainwater and prevent leakage under foundations.						
Waste Management	Various types of waste can be generated, including non-hazardous, hazardous waste, and liquid waste: Improper waste handling poses health risks to workers, and the environment. Impact magnitude is high, spatial extent is low, and duration is short term during construction. Proper waste management is crucial to mitigate these impacts.	**Moderate**	To manage preconstruction and construction waste the DB Contractor shall: Collect and haul construction waste to approved disposal sites. Ensure proper washing and maintenance of concrete mixer trucks. Provide covered bins for solid and hazardous waste collection, dispose of them at approved sites. Conduct awareness campaigns and training Establish communication with local authorities for regular waste disposal and risk reduction. Provide collection tanks for wastewater and regularly remove and dispose of sewage/septage. For non-hazardous solid waste: Segregate waste at the source and promote recycling and reuse. Develop a waste management plan and monitor waste generation Provide adequate storage facilities Dispose of non-hazardous waste in compliance with regulations. For hazardous solid waste: Store hazardous waste securely in designated areas and conduct regular inspections. Dispose of hazardous waste at authorized facilities Train workers on hazardous waste management and safety measures. For wastewater: Minimize water usage and treat wastewater for reuse. Implement erosion and sediment control measures. Use impermeable materials and maintain equipment Train workers on proper waste handling and monitor water quality.	ESS1 ESS3	Site inspection Review the equipment, maintenance records. Review the grievance log	**Minor**	DB Contractor	PCU TIU	Contractor's Cost
Biodiversity	Clearance and grading will remove sparse xerophytic shrubs and grasses. Although surveys found no established fauna, occasional movement of desert-adapted species could be disrupted by heavy machinery, noise, and lighting. Excavation and earthworks will increase dust, which can settle on the few existing shrubs, stressing their photosynthetic capacity Construction fencing, vehicles, and stockpiles may obstruct the sporadic movement of desert reptiles or small mammals across the open landscape.	**Minor**	The DB Contractor shall: Limit land clearing to only essential areas to reduce habitat destruction. Implement buffer zones to protect nearby vegetation and wildlife habitats. Rehabilitate disturbed areas by replanting native vegetation after construction.	ESS1 ESS4 ESS6	Site inspection	**Insignificant**	DB Contractor	PCU TIU	Contractor's Cost
Labor working conditions: All Workers	Risks include underpayment, lack of insurance coverage, informal employment without contracts, excessive working hours, OHS hazards (traffic,	**Major**	Implement Labor Management Procedures: written contracts in Arabic with insurance coverage, legal compliance, and fair wages; salaries ≥ EGP	ESS2 ESS4 ESS10	Field visits and investigations Review workers' contracts	**Minor**	DB Contractor DB Contractor Social Specialist	PCU	Contractor's Cost

Receptor / EHS Aspect	Impact	Impact Significance	Mitigation Measures	Relevant WB ESS	Means of supervision	Residual Impact	Responsibility		Est. Cost (EGP)
							Implementation	Supervision	
Construction Phase									
(i.e. Drivers, Operators, Mechanics, Electricians, EHS Officers, Security, Admin)	biohazards, electrical), discrimination, SEA/SH, poor sanitation, inadequate training, lack of workers' facilities		7,000/month; provide written details of employment including rights, pay, benefits, and hours, overtime premiums per law; ensure timely payment of wages and compliance with rest and leaves as per the law, provide written notice and severance details upon contract termination, PPE provision and safe working conditions; vaccination for biohazards; lock-out/tag-out for maintenance; prohibit forced and child labor, audit labor practices regularly, SEA/SH protocol; clean functional restrooms, potable drinking water, areas, shaded or indoor rest areas, gender-sensitive facilities; confidential worker GRM; traffic and safety plans; hygiene and sanitation facilities; induction and refresher training		Review the grievance log Review the project CoC Review consultation activities report and training reports				
Temporary Labor Influx	Based on the location and scope of the landfill cell inside the 10RIWMF, labor influx impacts are assessed as very low for the following reasons: The subproject site is within the fenced IWMF boundaries. The IWMF in located in an isolated desert area with no residential communities surrounding the IWMF with no interaction with local populations. The workforce required for construction is small (35–50 workers) and temporary. The contractor will prioritize local hiring, reducing the need for non-local labour. Any specialized workers from other governorates will be few and short-term, limiting potential social tensions or pressure on local services. Risks such as illicit behaviour or reputational concerns are minimal and manageable through standard codes of conduct and monitoring.	**Minor**	In order to minimize impacts pertaining to labor influx the following should be thoroughly implemented. Preparation and implementation of CoC and corresponding training concerning commitment of labor towards the community and the different behaviour that should be avoided. All workers should be trained on the code of conduct. Code of conduct to be signed by the sub-contractor Code of conduct induction to be done every 2 weeks for the recurrent workers and the newcomers before starting work. Apply Penalties to workers violating the code of conduct. Providing workers with the necessary training and awareness raising sessions on issues regarding SEA/SH. Verifying that GRM is adequately implemented to record complaints from the surrounding communities Applying the full requirements related to operating the grievance mechanism including anonymous channels Raising awareness of the local populations about the project commitment towards communities'.	ESS1 ESS2 ESS4	Field investigations Review the grievance log Review the project CoC Review consultation activities report and training reports	**Insignificant**	DB Contractor DB Contractor Social Specialist	PCU TIU Labor bureau	Contractor's cost
Workers / Off-site Apartment Accommodation (Urban residential settings)	H&S & welfare risks: overcrowding; inadequate ventilation/maintenance; electrical/gas hazards; fire safety (blocked exits, missing detectors/extinguishers); water quality & sanitation; communicable diseases. Social & GBV risks: harassment or SEA/SH; privacy breaches; discrimination; conflicts with neighbors. Legal/administrative risks: non-compliant tenancy; lack of landlord maintenance; unauthorized subletting. Commuting risks: road safety during daily travel to site; fatigue. Community risks: waste mismanagement, noise, and disturbances in the neighborhood.	**Major**	Contractors develop an Accommodation Management Plan to ensure that the accommodations meet minimum standards of IFC accommodation requirements. Selection & Contracts: Lease only apartments meeting minimum standards (conduct regular inspection using a documented checklist: floor area/person, ventilation/AC, potable water, sanitation, safe electrical layout, gas-certified appliances, egress routes, smoke/CO detectors, extinguishers, pest control). Include landlord obligations for maintenance & rapid repairs in lease; cap occupancy; gender-segregated or privacy-appropriate arrangements. Safety & Welfare: Provide camp-style house rules adapted to apartments (cleaning rota, quiet hours, waste segregation with municipal	ESS1 ESS2 ESS3 ESS4	HSE Manager & Social/Workers' Welfare Officer verify apartment standards, audits, training records, transport compliance; PCU conducts periodic oversight audits	**Minor**	Contractor (lease selection & contracts, transport, trainings, audits, repairs follow-up, GRM, records)	PCU	Contractor's cost

Receptor / EHS Aspect	Impact	Impact Significance	Mitigation Measures	Relevant WB ESS	Means of supervision	Residual Impact	Responsibility		Est. Cost (EGP)
							Implementation	Supervision	
Construction Phase									
			collection, no smoking in units, safe cooking practices). Establish a GRM and require workers to adhere to a CoC. Induct residents on fire safety, hygiene, SEA/SH code of conduct, GRM access; post emergency numbers & evacuation routes; keep a register of occupants. Commuting: Safe transport plan (licensed buses/minivans, seatbelts, journey scheduling to avoid fatigue, trained drivers, incident reporting). Health: First-aid kits in units; access to clinic/insurance; periodic water potability checks if storage tanks are used; pest management. Community Relations: Neighbor etiquette briefings; landlord/tenant liaison; hotline for complaints; swift corrective actions. Monitoring: Monthly apartment audits; quarterly fire drills/logs; record corrective actions; GRM entries tracked to closure within defined timelines.					
Road Traffic and Transportation	During the construction of the first landfill cell, traffic impacts will be primarily limited to the internal roads within the 10RIWMF and the external access route connecting the site to the regional road network. The expected impacts include a temporary increase in the movement of construction vehicles transporting earth materials, liner components, and equipment to and from the site.	**Moderate**	Restrict vehicle access to authorized and suitable vehicles only, all non-essential, private, or inappropriate vehicles shall be prohibited from entering or circulating within the site. Ensure that all drivers are properly licensed and qualified. Regular maintenance of vehicles and use of manufacturer approved parts Training of drivers on road safety Periodic drug testing of drivers Schedule construction during off-peak hours. Provide advance notice of road closures. Use signage and barriers to guide traffic. Maintain communication with transportation authorities. Monitor traffic conditions and adjust activities. Ensure compliance with safety regulations. Apply vehicle's safety procedures Availability of permits and licences for drivers	ESS1 ESS2 ESS4	Verification of licenses Field investigations Accident log Drug test Training materials Review the grievance log	**Minor**	DB Contractor	PCU TIU Labor bureau	Contractor's cost
SEA/SH	On the project site, potential SEA/SH risks may emerge among male and female workers. This risk can lead to serious implications that should be avoided/prevented and managed.	**Moderate**	Ensure that the CoC and corresponding training concerning commitment of labour towards the community and between themselves, and the different behaviour that should be avoided emphasize zero tolerance of SEA/SH The grievance mechanism developed by the PCU will be adopted, particularly, the aspects related to SEA/SH, including having anonymous channels available. Apply penalties to workers violating the Code of Conduct The contractor to prepare an awareness session/training on SEA/SH issues for workers, The contractor to ensure all available capacity building trainings are accessible to both male and female workers, Conduct random drug and alcohol testing for workers as part of routine safety monitoring. .	ESS1 ESS2	Field investigations Review the grievance log Review the project CoC Review awareness sessions/ trainings reports Review consultation activities reports	**Minor**	DB Contractor	PCU TIU	Contractor's cost

Receptor / EHS Aspect	Impact	Impact Significance	Mitigation Measures	Relevant WB ESS	Means of supervision	Residual Impact	Responsibility		Est. Cost (EGP)
							Implementation	Supervision	
Construction Phase									
			Conduct ongoing consultations with women and girls. Raise Awareness about project GRM.						
Child Labor	Given the local context and the broader national trends, there is a tangible risk that child labour could be inadvertently utilized during the construction phase of the project. Although the project is located within an industrial zone and involves a relatively small workforce, the risk cannot be overlooked.	**Moderate**	Security personnel will check workers' IDs and inspect vehicles to prevent any child from entering the site. At the entry gate IDs will be checked to prohibit any worker below 18 to log into the site. The contractor will retain copies of all labourers' IDs. The signed contract will also oblige the contractor/subcontractor, suppliers, and service provisions to keep a copy of IDs of labourers in order to facilitate the monitoring of the presence of staff below 18 years. Daily attendance records are to be maintained. Suppliers are required to have a clear policy against child labour. An appendix to be added to all subcontractor contracts, prohibiting child labour and detailing penalties for violations. The appendix should include the following: If a child is found, should not be permitted on-site and should be escorted out of the site. The contractor covers the cost of the child's return home and should compensate the child's daily wage. The social officer of the contractor ensures the child's safe return home. For repeated violations, the contractor will face Penalties be in accordance with contract. A unified recruiting policy prohibiting child labour must be shared with the contractors and sub-contractors Rigid obligations and penalties will be added to the contractor/subcontractors' ToR in order to guarantee that no child labour occurs in the project. Gate control measures will be applied combined with the fining system for the contractors and sub-contractors	ESS1 ESS2	Field investigations Reviewing the daily statements of workers' registration Reviewing employment contracts Reviewing the ID of all workers on site. Penalty system and the course of actions enforced in cases of non-compliance	**Minor**	DB Contractor	PCU TIU Labor bureau	Contractor's cost
Public Infrastructure and Utilities	Construction of the new cell will take place near existing IWMF internal infrastructure, including water supply lines, sewage systems, and telecommunications networks, which may increase the risk of interference with these utilities during construction activities.	**Moderate**	The contractor shall coordinate with the authorities of potable water, wastewater, electricity and telecom authorities. In case an underground utility and infrastructure pipe has been damaged, standard procedures should be followed (the contractor should repair them immediately and inform the affected people).	ESS2 ESS4	Field investigations Review MoMs Review reports of accidents	**Minor**	DB Contractor	PCU TIU	Contractor's cost
Visual and Landscape	The project site is a vacant plot within the 10RIWMF, currently non-operational and free of waste or visual impacts. During the construction phase, temporary visual disturbances may occur due to the presence of equipment, materials, and transport trucks, but these are expected to be minor and short-term, consistent with typical industrial activity.	**Minor**	To mitigate visual impacts, the contractor shall adhere to the following measures: Install visual screens such as green mesh fencing, fabric barriers, or wooden hoardings around the construction site. Maintain a well-organized site layout. Store construction materials and equipment in designated, low-visibility areas. Regularly remove debris and unused materials Implement an efficient construction schedule to limit the duration of visual disruption.	ESS1 ESS4	Field investigations	**Insignificant**	DB Contractor	PCU TIU	Contractor's cost

Receptor / EHS Aspect	Impact	Impact Significance	Mitigation Measures	Relevant WB ESS	Means of supervision	Residual Impact	Responsibility		Est. Cost (EGP)
							Implementation	Supervision	
Construction Phase									
			Phase construction activities to minimize the area exposed at any given time.						
Occupational Health and Safety	The construction of a new cell may have several impacts on the OHS, such as: Exposure to hazardous substances and materials used in construction, such as chemicals, fuels, and construction waste, which can pose risks to the health and safety of workers. This includes the potential for inhalation, skin contact, or ingestion of harmful substances. Construction sites can have various physical hazards, including falls from heights, tripping hazards, and exposure to moving machinery or equipment. These hazards can result in injuries or accidents, if proper safety measures are not in place. Noise and vibration generated by construction activities can impact the hearing health of workers and contribute to stress and fatigue. Dust and airborne particles, especially during excavation and earthmoving, can cause respiratory issues, if not properly controlled. Manual handling of heavy objects and repetitive tasks can lead to musculoskeletal injuries if ergonomic considerations and proper lifting techniques are not followed. Inadequate training and lack of awareness about occupational health and safety measures can increase the risk of accidents and injuries. Changes in work environments, such as working at heights, in confined spaces, or near moving machinery, require specific safety protocols to be followed to prevent accidents and injuries. Adverse weather conditions, such as extreme heat or cold, can affect the well-being and safety of workers if appropriate protective measures are not in place. Increased traffic and movement of vehicles in and around the construction site can pose risks to workers and require proper traffic management and signalling. Additional potential risks e.g. hot works, lifting operations, electrical works, and risk of exposure to toxic gases, lack of oxygen, or limited access for emergency situations in confined spaces.	**Major**	According to U.S. OSHA standards governing workplace safety under labor law, detailed requirements are specified. In Egypt, these are mirrored by Labor Law No. 12 of 2003 and its implementing regulations—especially Decree 211 of 2003—which align with several OSHA provisions. The following must be applied Contractor safety plan should be developed that includes OHS procedures. Medical check-up should be considered according to the Egyptian laws and WBG requirements for all workers prior to join site activities. Workers should be trained on all high risk activities and how to identify its related hazards. Job hazard analysis should be developed by safety supervisors for each activity and delivering it to the involved workers during the TBT and attach it to the Permit to works. Workers must comply with the Egyptian OHS regulations along with the OSHA standards To prevent Heavy Construction Equipment risk, workers should follow all construction safety guidelines necessary to eliminate the exposure to such injuries and accidents. Submitting drug test for any driver involves in the project activities and worker involved in Working at height activities The health and safety risk on the workers should be covered with appropriate insurance schemes for all the types of workers and proper referral to the nearest contracted hospital (e.g. 10th of Ramadan hospital) The contractor will be obliged to maintain daily attendance sheets. Attendance sheet should reflect the workers registered in the permit to works. Other precautionary measures include guarding and insulating of the vehicle from which they might work. This would help prevent electrical hazards while working. Sufficient number of OHS supervisors should be assigned to minimize the breaching of OHS requirements. Daily toolbox should be given to workers Daily site safety inspection should be conducted according to the Egyptian Laws and safety regulations A worker's grievance mechanism must be made available to workers All workers should be provided with full PPE and in specific task they should receive specific PPE related to their tasks. In the event of dust storms, work should take place during appropriate time periods and avoid working during the peak of a storm, workers should wear face-masks.	ESS1 ESS2	Field investigations Review of plans and documents Review of incident and accident documents Review training logs and documentation Review risk assessment Review job hazard analysis Review the daily attendance sheet Review the penalties on the contractor Check the number of supervisors Check drug tests Review grievance log Daily site inspection reports	**Moderate**	DB Contractor	PCU TIU Directorate of Manpower	Contractor's cost

Receptor / EHS Aspect	Impact	Impact Significance	Mitigation Measures	Relevant WB ESS	Means of supervision	Residual Impact	Responsibility		Est. Cost (EGP)
							Implementation	Supervision	
Construction Phase									
			Chemical Risk Mitigation The minimum procedures to mitigate chemical risks are: It is essential to implement a combination of engineering controls, administrative measures, and PPE. Engineering controls such as proper ventilation systems and isolation barriers can significantly reduce the concentration of hazardous chemicals in the air. Administrative controls, including comprehensive training on the safe handling, storage, and disposal of chemicals, along with strict safety protocols for emergencies, are crucial. Additionally, ensuring that workers are equipped with appropriate PPEs, provides a vital layer of protection against chemical exposure. Pathogen Risk Mitigation Promoting stringent hygiene practices, health monitoring, and thoughtful workplace design. Encouraging regular hand washing, providing hand sanitizers, and ensuring the frequent cleaning and disinfection of common areas and equipment are fundamental hygiene practices. Regular health screenings and promoting vaccinations for preventable diseases. All workers must be covered by accident and incident insurance and receive adequate care in case of injuries (first aid, hospital treatment, etc.). Insurance coverage must comply with Egyptian Labor Law No. 12 of 2003 and its implementing Decree No. 211 of 2003, and also align with the newer provisions in Labor Law No. 14 of 2025—ensuring protection extends to casual and daily workers across all subcontractors. [labour.gov.eg], [mideastlaw.de]. Worker's Accommodation It is crucial that the contractor and sub-contractors ensure the accommodations meet minimum standards. Compliance with local regulations and international standards is essential, with regular inspections to maintain these standards. Headcounts to be arranged by name and location. A detailed list linking contractors and subcontractor workers to their respective buildings and apartments for improved tracking and emergency response.					
Community, Health, Safety, and Security	The project's location in 10th of Ramadan City, combined with the absence of nearby residential communities, significantly limits direct impacts on community health and safety. However, certain risks may arise during construction particularly along shared access roads. These include increased traffic congestion and road safety hazards, potential exposure to hazardous substances, elevated noise and dust levels, and temporary disruptions to utility services.	**Minor**	Information related to community health and safety to be shared regularly and systematically as per the (SEP) Awareness raising campaigns should be tailored in cooperation with the community-based organization Using caution tapes that help to keep people away of the site Using hard barricades to prevent people away of the site in addition to the caution tapes Development and implementation of contractors-specific Traffic Management Plans	ESS1 ESS4	Review of stakeholder engagement activities Review the reports related to awareness raising Field visit to oversee the site arrangements Notifications shared with the community Review of the grievance mechanism	**Insignificant**	DB Contractor	PCU TIU	Contractor's cost

Receptor / EHS Aspect	Impact	Impact Significance	Mitigation Measures	Relevant WB ESS	Means of supervision	Residual Impact	Responsibility		Est. Cost (EGP)
							Implementation	Supervision	
Construction Phase									
	Security risks, including theft or antisocial behaviour, may emerge despite the small workforce and limited security personnel.		The construction site to be fenced and guarded by security personnel in order to prevent any unauthorized access to the site In case of transporting heavy equipment, the nearby population should be notified in advance Security team will be trained on human rights and will not be armed. Develop and implement a well communicated and accessible grievance mechanism for community members to address any complaints						

7.3.2 Operation Phase ESMP

Table 7-3 Environmental and Social Management plan During the Operation Phase

Receptor / EHS Aspect	Impact	Impact Significance	Mitigation Measures	Relevant WB ESS	Means of supervision	Residual Impact	Responsibility		Est. Cost (EGP)
							Implementation	Supervision	
Operation Phase									
Air Quality, Gaseous, and GHG Emissions	**Dust** • Waste unloading in active landfill cells, particularly during dry and windy conditions. • Daily surface covering operations, which involve the movement and spreading of soil or alternative cover materials. • Heavy vehicle movement (trucks, compactors, loaders) on unpaved access roads, leading to road dust. • Dispersion of lightweight litter, especially plastic bags and paper, which could be carried by the prevailing winds. **Gaseous Emissions** • Vehicle & Equipment Exhaust Emissions: Trucks, compactors, and loaders used for waste transport and landfill operations will emit CO_2, NO_x (nitrogen oxides), and particulate matter (PM) due to diesel combustion. • Landfill Gas Emissions: The decomposition of organic waste will release methane and carbon dioxide, contributing to both local air pollution and climate change. Improper landfill gas management could lead to methane accumulation, increasing the risk of underground	**Moderate**	The following measures are to be adhered to: **To minimize dust:** • Apply daily cover to all active tipping areas and intermediate cover to inactive areas of the landfill cell • Maintain haul roads and working surfaces through grading, compaction, and water spraying as needed. • Enforce good housekeeping, including prompt removal of wind-blown litter and cleaning of operational areas. • Maintain site fencing and vegetated buffer zones (greenbelts) to limit off-site dispersion of dust and waste. • Implement and enforce safe driving and equipment operation procedures to reduce unnecessary dust generation. • Ensure all trucks, compactors, and mobile equipment are regularly inspected, serviced, and maintained in accordance with manufacturer specifications. • Use equipment that complies with applicable emission and performance standards Operate a preventive maintenance system for all vehicles and mobile equipment. • During high-wind conditions, landfill operations shall be adjusted to minimize dust and litter dispersion through suspension or limitation of dust-generating activities, increased surface wetting, use of wind barriers, covering of waste and stockpiles, and rapid application of daily or intermediate cover. • Ensure all workers are provided with appropriate PPE for respiratory protection **To minimize gaseous emissions** • Ensure proper operation and maintenance of the landfill gas collection and control system in accordance with design • Ensure only non-recoverable MSW residuals are accepted, thereby limiting biodegradable content and gas generation.	ESS1 ESS2 ESS3	• Site inspection • Review the equipment, maintenance records. • Periodic Air Quality Measurements • Review the complaints log	**Minor**	DBFO Operator	PCU TIU	Operator's Budget

Receptor / EHS Aspect	Impact	Impact Significance	Mitigation Measures	Relevant WB ESS	Means of supervision	Residual Impact	Responsibility		Est. Cost (EGP)
							Implementation	Supervision	
	fires or explosions. Auto-combustion of waste may occur if proper waste compaction and daily covering are not maintained. **Greenhouse Gas Emissions** • Direct emissions from waste decomposition, including methane (CH_4) and carbon dioxide (CO_2). • Indirect emissions from fuel combustion by trucks and heavy machinery transporting and processing waste. • Potential emissions from accidental fires if flammable waste is improperly handled.		• Monitor methane concentrations and gas pressure at gas vents, wells, and selected landfill locations. Conduct temperature and gas monitoring to identify abnormal conditions and prevent uncontrolled releases. Maintain all gas collection and control equipment in good working condition to avoid leaks, blockages, and odor escape. **To minimize GHGs** • Ensure compliance with design requirements particularly for the gas management system • Ensure only MSW residuals are disposed of in the landfill to minimize GHG emissions • Avoid idling of equipment • Maintain machinery and vehicles in good working conditions • Provide workers with awareness on procedures to be followed to maintain machinery and vehicles in good working conditions						
Odors	Odor emissions from the sanitary landfill will primarily result from waste decomposition, landfill gas generation, and leachate storage. The release of hydrogen sulfide (H_2S), methane (CH_4), and volatile organic compounds (VOCs) contributes to strong odors, particularly H_2S. Unpleasant odors may also arise from spontaneous combustion or accidental fires if landfill gases accumulate and ignite	**Moderate**	The DFBO must: • Ensure only MSW residuals are disposed of in the landfill to minimize odorous emissions • Proper management and operation including daily cover including in the same time minimization of open tipping face area are the most important measures • Implement a just-in-time operational procedure for the facility • Ensure workers wear PPE • Implement the grievance mechanism; complaints should be logged and receive prompt attention/ action. • Comply with design requirements for leachate collection, treatment, and gas extraction systems • Use odour-neutralizing sprays where necessary particularly for the leachate system components • Consider use of enclosed/covered areas for organic waste storage • Enclose leachate drains to reduce the emission of odors; • Establish and implement an Odor Management Plan • During hot, dry months, odor impacts are considered higher, therefore the frequency of waste compaction and cover application should be more frequent.	ESS1 ESS2 ESS3	• Site inspection • Review the equipment, maintenance records. • Review the complaints log	**Minor**	DBFO Operator	PCU TIU	Operator's Budget
Noise and Vibration	Noise will be generated from daily activities, including waste unloading, vehicle movement, compaction, and daily cover placement. The primary sources of noise will be heavy machinery, such as bulldozers, compactors, loaders, and waste transport trucks	**Moderate**	The DFB Operator shall: • Use administrative control measures. • Installation of noise controls for improved sound-proofing, and other noise reducing features, Acoustic enclosures are installed for noise generating equipment, wherever possible; • Only procure noise generating machines and equipment which are designed to meet statutory regulations concerning noise; • Use buildings to contain inherently noisy fixed plant equipment • Implement regular inspection and maintenance of equipment. • Ensure that the equipment is well-maintained, properly aligned, and regularly inspected. • Workers will need to adhere to OHS requirements, which includes the use of hearing protection should be enforced actively capable of reducing sound levels at the ear to at least 85 dB(A).	ESS1 ESS2 ESS3	• Site inspection • Review the equipment, maintenance records. • Periodic Noise Measurements • Review the complaints log	**Minor**	DBFO Operator	PCU TIU	Operator's Budget

Receptor / EHS Aspect	Impact	Impact Significance	Mitigation Measures	Relevant WB ESS	Means of supervision	Residual Impact	Responsibility		Est. Cost (EGP)
							Implementation	Supervision	
Soil and Groundwater	During the Landfill Cell operation, soil and groundwater contamination may rise from: • Leachate formation from rainwater filtering through waste, carrying heavy metals, organic pollutants, and pathogens. • Fuel and oil spills from landfill vehicles and maintenance activities. • Landfill gas migration (methane) potentially suffocating vegetation. • Improper waste disposal leading to localized contamination.	**Minor**	The DFB Operator shall adhere to soil conservation practices, proper waste storage, vegetation restoration, and community engagement. • Use erosion control measures such as sediment barriers, vegetation buffers, and erosion control blankets. • Use proper waste management practices • Implement landscaping and restoration plans • Adopt soil management practices such as soil aeration, organic matter addition, and soil amendment applications. • Regular monitoring and personnel training are crucial for sustainable waste management and minimizing negative environmental impacts. A proposed groundwater monitoring program is detailed in **Annex VIII.** • Regularly inspect and maintain equipment and storage areas. • Conduct regular staff training on proper operation activities and waste management procedures. • Install appropriate drainage systems and containment measures • Continuously monitor groundwater quality. • Regularly update and review the waste management plan. • Leachate Management: Maintain leachate drainage layers and collection pipes to prevent overflow. Inspect liner integrity regularly to avoid leaks. • Install Landfill Gas Collection System (LGCS) • Specific to the fueling area, the DBFO shall: - Install impervious flooring and secondary containment (bunds) around the fueling area. - Train all operators and drivers on safe fueling procedures and spill-response protocols. - Conduct regular inspection and maintenance of tanks, hoses, pumps, and fittings to detect leaks early. - Implement strict no-overfilling procedures and require supervision during all fueling activities.	ESS1 ESS3	• Site inspection • Review the equipment, maintenance records. • Review the grievance log	**Minor**	DBFO Operator	PCU TIU	Operator's Budget
Waste Management	**Non-Hazardous Solid Waste** The landfill is designed to accept non-hazardous municipal solid waste residuals, originating from the MSW treatment facility. In addition, waste generated on-site, include paper waste, packaging materials from facility operations, and general office waste. If waste is not properly segregated or compacted, it could lead to operational challenges. **Hazardous Solid Waste** While the landfill is not intended to accept hazardous waste, illegal or accidental disposal of hazardous materials remains a risk. **Wastewater** • The landfill will generate wastewater from leachate, domestic sewage, and surface runoff, which must be properly treated to prevent contamination.	**Moderate**	The DBF Operator shall develop and implement a Waste Management Plan including **Non-Hazardous Solid Waste** • Waste generated on site shall not be disposed directly in the landfill cell and shall be sent for proper waste disposal within the facility; e.g. to Plot 2 for MSW treatment • Strict Waste Acceptance Procedures • Compaction & Daily Covering of waste • For On-site waste reduction: provide recycling bins for paper, plastic, and packaging waste, implement waste minimization strategies for office operations. **Wastewater Management** • Ensure proper operation of the leachate treatment collection and treatment system. • Maintain leak-proof leachate evaporation ponds to prevent seepage. • Separate & Treat Different Wastewaters (e.g., leachate, condensate, domestic wastewater). • Install septic tanks or a small-scale wastewater treatment plant for worker facilities. • Prevent direct discharge by using a designated sewer network or storage system. • Construct drainage channels & retention basins.	ESS1 ESS2 ESS3	• Site inspection • Review the equipment, maintenance records. • Review the grievance log	**Minor**	DBFO Operator	PCU TIU	Operator's Budget

Receptor / EHS Aspect	Impact	Impact Significance	Mitigation Measures	Relevant WB ESS	Means of supervision	Residual Impact	Responsibility		Est. Cost (EGP)
							Implementation	Supervision	
	• Leachate mismanagement could lead to groundwater and surface water contamination. • Untreated domestic wastewater from landfill facilities (e.g., worker restrooms, maintenance areas) could create localized sanitation issues if not properly disposed of. • Runoff from waste unloading zones may transport suspended solids, organic matter, and contaminants into the drainage system. • Wastewater from on-site cleaning and maintenance activities could introduce oil, grease, and detergents into the drainage system		• Use sediment traps & oil-water separators in vehicle washing areas. • Regular monitoring of discharge volumes and water quality. • Vehicle and facility cleaning wastewater: Designate a contained washing area with proper drainage and filtration and ensure regular disposal of oil, grease, and sludge at authorized facilities • Regular Equipment Maintenance & Monitoring to prevent leaks and spills					
Attraction of Pests	The operation of the landfill will attract scavengers and pest species Rodents, birds, and insects are likely to increase in number around the landfill due to the availability of food waste and shelter. Larger scavenger species, such as foxes, jackals, and stray dogs, may be drawn to the landfill site in search of food.	**Moderate**	The DFBO shall: • Design and implement a Pest Management Plan (PMP) (Elements of the PMP presented in **Annex XIII**) • Fence the site to limit undesired faunal access • Provide daily covers in active cells and compact the landfilled waste If necessary, use environmentally safe biocides to control mosquitoes and flies • Inspect site for growth of marginal vegetation and regularly remove it. • Prevent and remove any plants or weeds inside the facility • Clean the facility floor daily • Check the facility routinely	ESS6 ESS1 ESS3	• Site inspection • Review the grievance log	**Minor**	DBFO Operator	PCU TIU	Operator's Budget
Road Traffic and Transportation	The movement of residual waste will occur from treatment areas (Plot 2) to the landfill cell (Plot 4). As such, no direct interaction with external or public traffic networks is anticipated. However, minor traffic impacts could arise including increased wear and tear on facility infrastructure due to repeated heavy vehicle movements, and risks of accidents involving site personnel or equipment.	**Minor**	The DBFO shall: • The internal haul road should be wide enough to accommodate vehicles moving inside the site. • Ensure trucks transporting residuals use the designated direct route between Plot 2 and Plot 4 only, avoiding all other internal roads and activity areas within the IWMF. • Enforce low and clearly posted speed limits along the internal haul route • Coordinate transport schedules with the Plot 2 operator to avoid peak handling times and reduce the likelihood of congestion near the landfill entrance. • Maintain physical separation (e.g., barriers, delineators, markings) between truck paths and pedestrian or equipment zones. • Implement routine grading, compaction, and watering of the haul route to reduce dust, maintain road quality, and prevent vehicle wear or accidents. • Require all drivers to undergo training on site-specific traffic rules, safe driving practices, and emergency procedures for internal haul roads. • Install clear signage (speed limits, directional arrows, caution notices) along the haul route. • Ensure all trucks meet minimum mechanical and safety standards, including functional brakes, lights, mirrors, and tarpaulin cover. Monitor truck entry/exit at the landfill cell, including load verification.	ESS1 ESS4	• Routine site inspections by the Operator's E&S and OHS officers. • Daily supervision of truck movements and waste transfer activities. • Verification of compliance with internal traffic rules • Review of driver checklists and vehicle inspection records. • Monitoring of road condition, signage, and safety barriers along the haul route. • Use of logbooks, weighbridge records, or GPS data • Documentation of any non-compliance	**Insignificant**	DBFO Operator	• PCU • TIU	Operator's Budget
Labor working conditions: All Workers	Risks include underpayment, lack of insurance coverage, informal employment without contracts, excessive working hours, OHS hazards (traffic, biohazards, electrical),	**Major**	Implement Labor Management Procedures: written contracts in Arabic with insurance coverage, legal compliance, and fair wages; salaries ≥ EGP 7,000/month; provide written details of employment including rights, pay, benefits, and hours, overtime premiums per law; ensure timely payment of wages and compliance with rest and leaves as per the law, provide written	ESS2 ESS4 ESS10	• PCU E&S Team • Operator HR/EHS	**Minor**	DBFO Operator	• PCU Environmental &	Operators Cost

Receptor / EHS Aspect	Impact	Impact Significance	Mitigation Measures	Relevant WB ESS	Means of supervision	Residual Impact	Responsibility		Est. Cost (EGP)
							Implementation	Supervision	
(Drivers, Operators, Mechanics, Electricians, EHS Officers, Security, Admin)	discrimination, SEA/SH, poor sanitation, inadequate training, lack of workers' facilities		notice and severance details upon contract termination, PPE provision and safe working conditions; vaccination for biohazards; lock-out/tag-out for maintenance; prohibit forced and child labor, audit labor practices regularly, SEA/SH protocol; clean functional restrooms, potable drinking water, areas, shaded or indoor rest areas, gender-sensitive facilities; confidential worker GRM; traffic and safety plans; hygiene and sanitation facilities; induction and refresher training. The number of shifts must not exceed labor law requirements. There must be clear vacations and days off system.					Social Unit	
Workers / Off-site Apartment Accommodation (Urban residential settings)	**H&S & welfare risks:** overcrowding; inadequate ventilation/maintenance; electrical/gas hazards; fire safety (blocked exits, missing detectors/extinguishers); water quality & sanitation; communicable diseases. **Social & GBV risks:** harassment or SEA/SH; privacy breaches; discrimination; conflicts with neighbors. **Legal/administrative risks:** non-compliant tenancy; lack of landlord maintenance; unauthorized subletting. **Commuting risks:** road safety during daily travel to site; fatigue. **Community risks:** waste mismanagement, noise, and disturbances in the neighborhood.	**Major**	**Selection & Contracts:** Lease only apartments meeting minimum standards (conduct regular inspections using a documented checklist: floor area/person, ventilation/AC, potable water, sanitation, safe electrical layout, gas-certified appliances, egress routes, smoke/CO detectors, extinguishers, pest control). Include landlord obligations for maintenance & rapid repairs in lease; cap occupancy; gender-segregated or privacy-appropriate arrangements. **Safety & Welfare:** Provide camp-style house rules adapted to apartments (cleaning rota, quiet hours, waste segregation with municipal collection, no smoking in units, safe cooking practices). Establish a GRM and require workers to adhere to the CoC. Induct residents on fire safety, hygiene, SEA/SH code of conduct, GRM access; post emergency numbers & evacuation routes; keep a register of occupants. **Commuting:** Safe transport plan (licensed buses/minivans, seatbelts, journey scheduling to avoid fatigue, trained drivers, incident reporting). **Health:** First-aid kits in units; access to clinic/insurance; periodic water potability checks if storage tanks are used; pest management. **Community Relations:** Neighbour etiquette briefings; landlord/tenant liaison; hotline for complaints; swift corrective actions. **Monitoring:** Monthly apartment audits; quarterly fire drills/logs; record corrective actions; GRM entries tracked to closure within defined timelines.	ESS1 ESS2 ESS3 ESS4	• HSE Manager & Social/Workers' Welfare Officer verify apartment standards, audits, training records, transport compliance; Engineer/PMU conducts periodic oversight audits	**Minor**	DBFO Operator	• PCU	Operators Cost
SEA/SH	As previous experience indicated, the operation of the first landfill is expected to involve a small, predominantly male workforce operating within a fenced and controlled industrial site. Given the limited probability for engagement offemale workers and the lack of interaction with surrounding communities, the risk of SEA/SH is assessed as very low	**Minor**	The DBFO Operator shall: • Develop and enforce a (CoC) that includes clear behavioural expectations, prohibits misconduct, and explicitly addresses SEA/SH prevention. • Ensure all workers receive training on the CoC and sign their commitment to comply with it. • Implement and publicize the project grievance mechanism, including confidential and anonymous channels, with designated pathways for SEA/SH cases and coordination with relevant authorities (e.g., National Council for Women). • Raise community awareness on the project's commitments • Apply disciplinary measures for any CoC violations. • Conduct random drug and alcohol testing for workers as part of routine safety monitoring.	ESS1 ESS2 ESS4	• Code of conduct established, disclosed and workers are trained on • The workers' compliance to the CoC • Inspection of complaints • Inspection of training records • Number of awareness raising activities • Inspection of drug tests and alcohol tests conducted	**Insignificant**	DBFO Operator	• PCU • TIU	Operator's Budget
Child Labor	The risk of child labor is considered low, as the project will apply formal recruitment procedures, require valid identification, and comply with national labor laws and World Bank ESS2 requirements. Operational activities require skilled personnel and are subject to contractual controls and supervision, which significantly reduce the likelihood of	**Minor**	• Enforce formal recruitment procedures requiring valid government-issued identification for all workers. • Include explicit prohibitions against child labor in all employment contracts and subcontractor agreements. • Conduct periodic labor audits and workforce verification, including subcontractors. • Require contractors and service providers to comply with national labor laws and World Bank ESS2. • Maintain a worker grievance mechanism accessible to all employees for reporting labor-related concerns.	ESS1 ESS2	• Field investigations • Reviewing the daily statements of workers' registration • Reviewing employment contracts • Reviewing the ID of all workers on site. • Penalty system and the course of actions enforced in cases of non-compliance	**Insignificant**	DBFO Operator	• PCU • TIU • Labor Bureu	

Receptor / EHS Aspect	Impact	Impact Significance	Mitigation Measures	Relevant WB ESS	Means of supervision	Residual Impact	Responsibility		Est. Cost (EGP)
							Implementation	Supervision	
	child labor. However, a residual risk of non-compliance cannot be entirely ruled out, particularly through subcontracting or indirect labor arrangements.		• Security personnel to check workers' IDs and inspect vehicles to prevent any child from entering the site. • Maintain daily attendance records/registration. • Implement fining system in case of non-compliance. Provide regular supervision and monitoring to ensure continued compliance throughout operations.						
Integrity of Public Infrastructure and Utilities	Given its limited scale, integration with existing infrastructure, and adherence to established operational controls, the landfill cell is not expected to introduce any significant new impacts. Its contribution to cumulative impacts is considered negligible. However, the access roads might be affected due to the truck's movement.	**Minor**	The DBFO Operator shall: • Protect internal haul roads by conducting regular grading, compaction, and dust control • Maintain drainage systems (stormwater channels, culverts, and perimeter drains) • Monitor and maintain leachate collection and storage infrastructure • Ensure uninterrupted power supply to critical systems (weighbridge, pumps, lighting, leachate treatment) through backup generators and routine maintenance of electrical installations. • Protect water supply networks by monitoring usage, preventing leaks, and ensuring that operational water does not interfere with nearby activities or utilities. • Implement preventive maintenance for all mechanical and utility systems • Clearly demarcate underground utility lines • Control vehicle loads • Coordinate with the IWMF administration to ensure shared utilities are not strained beyond their capacity.	ESS4	• Field investigations • Review MoMs • Review reports of accidents	**Insignificant**	DBFO Operator	• PCU • TIU	Operator's Budget
Visual and Landscape Impacts	The accumulation of solid waste poses a significant visual concern, landfill operations often contribute to litter dispersion due to wind, further exacerbating the negative visual impact.	**Minor**	• Ensure timely and organized waste placement within the landfill cell. • Construct and maintain windbreaks, such as fences or vegetative barriers, around the landfill cell and operational areas. • Implement a daily cover system using soil or alternative materials. • Conduct routine litter collection and cleanup in and around the landfill • Clearly define and enforce waste handling zones • Install signage and visual screens • Coordinate with the operators of the composting and recycling plants. • Develop and enforce waste transport and unloading protocols. • Establish a monitoring program to regularly assess the effectiveness of visual impact controls.	ESS1 ESS4	• Field investigations • Review MoMs	**Insignificant**	DBFO Operator	• PCU • TIU	Operator's Budget
Occupational Health and Safety	Key OHS risks include: • Infectious Waste Exposure: Workers may be injured by improperly disposed sharps or contaminated materials, increasing the risk of bloodborne infections. • Hazardous Components: While the likelihood of encountering hazardous waste is expected to be low, the potential for co-mixing with hazardous materials must not be overlooked. Improper disposal of hazardous waste at the landfill cell can pose significant risks to workers and the surrounding environment. Items such as broken glass or sharp metals may be difficult to separate and can	**MAJOR**	• Training of all workers with regards to health and safety aspects will start with the induction training and will be renewed semi-annually. • The operator must develop a detailed OHS plan. • The OHS plan must contain a list of all training activities required based on the type of job. (**Annex IX** of this report sheds light on the required tentative training aspects within the OHS. • Enforcement on the use of PPEs whilst on site • Recording of all accidents and investigating them for establishing root causes • Develop a waste management plan that includes hazardous waste management • Training on fire safety and first aid for staff • Restricting the unauthorized access to the new cell area through applying security procedures, gate check-ups, …etc. • Control of vermin, insects, and birds by application of cover materials according to the waste filling plan. • All workers should receive adequate training on the types of hazardous waste that could be found, and the appropriate methods of handling.	ESS1 ESS4	• Health records about occupational injuries and infectious diseases among workers • Inspection of workers complaints • Inspection of OHS training records • Number and documentation of OHS awareness raising activities	**Moderate**	DBFO Operator	• PCU • TIU	Operator's Budget

Receptor / EHS Aspect	Impact	Impact Significance	Mitigation Measures	Relevant WB ESS	Means of supervision	Residual Impact	Responsibility		Est. Cost (EGP)
							Implementation	Supervision	
	cause injuries during handling and packing. • Chemical Hazards: Corrosive or toxic substances, whether present in the waste stream or used in maintenance activities, can pose serious health risks through skin contact, inhalation, or eye exposure. • Waste Accumulation: Delays in waste processing due to equipment failure or poor maintenance can lead to pest infestations (rodents, insects), increasing the risk of disease transmission. • PPE Non-Compliance: Failure to use Personal Protective Equipment (PPE) significantly heightens vulnerability to injuries and occupational illnesses. • Fire Hazards: Accumulated waste, especially flammable materials, can increase the risk of fire outbreaks if not managed properly. • Respiratory and Skin Issues: Exposure to hazardous substances may result in respiratory problems, skin irritation, or other health complications. • Machinery-Related Injuries: Improper use or maintenance of heavy equipment can lead to serious accidents. • Manual Handling Risks: Lifting and moving heavy or awkward waste items can cause musculoskeletal injuries. • Slip, Trip, and Fall Hazards: Uneven terrain, wet surfaces, and scattered debris increase the likelihood of accidents. • Pest-Related Health Risks: The presence of pests and stray animals can expose workers to bites and zoonotic diseases. • Noise and Dust Pollution: High noise levels and airborne dust can lead to hearing loss and respiratory issues if not adequately controlled. • Mental Health Concerns: The demanding nature of waste handling work can contribute to psychological stress and mental fatigue. • Improper handling of leachate and landfill gases can lead to groundwater contamination, toxic air emissions, fire		• All workers must be covered by health insurance in case of any accidents or incidents and receive adequate care in case of injuries. • Coverage with appropriate insurance schemes for all the types of workers, including casual and daily workers. • Anyone entering the project site will register in an attendance sheet/logbook • Records of copies of national IDs will be kept for all types of Laborers, including casual laborers • All workers should conduct medical check-up prior to join, then every 6 months is a good practice • Development of emergency plans which should include the nearest hospital provides emergency medical services to the site. • Entrance gates for vehicles and workers to the new cell should remain segregated as per the design • All workers should wear appropriate PPE • In the event of dust storms, work should take place during appropriate time periods and avoid working during the peak of a storm, workers should wear face-masks for protection from fine particles. **Chemical Risk Mitigation** The contractor should review the requirements of WBG EHS Guidelines for waste management facilities for more details. However, the minimum procedures to mitigate chemical risks are: • It is essential to implement a combination of engineering controls, administrative measures, (PPE). Engineering controls such as proper ventilation systems and isolation barriers can significantly reduce the concentration of hazardous chemicals in the air. • Administrative controls, including comprehensive training on the safe handling, storage, and disposal of chemicals, along with strict safety protocols for emergencies, are crucial. Additionally, ensuring that workers are equipped with appropriate PPE, provides a vital layer of protection against chemical exposure. **Pathogen Risk Mitigation** • Mitigating risks associated with pathogens involves promoting stringent hygiene practices, health monitoring, and thoughtful workplace design. Encouraging regular hand washing, providing hand sanitizers, and ensuring the frequent cleaning and disinfection of common areas and equipment are fundamental hygiene practices. **Night-Shift Workers** • Adequate site lighting at working face, haul roads, leachate ponds, and equipment areas (fixed floodlights + mobile lights). • High-visibility PPE (reflective vests, helmets, armbands). • Traffic management controls (clear signage, reflective barriers, designated routes for trucks and machinery). • Accompanied workers in high-risk areas (e.g., near ponds, heavy equipment).				

Receptor / EHS Aspect	Impact	Impact Significance	Mitigation Measures	Relevant WB ESS	Means of supervision	Residual Impact	Responsibility		Est. Cost (EGP)
							Implementation	Supervision	
	hazards, and serious public health risks.								
Community Health and Safety	The operation of the landfill cell presents minimal risks to community health and safety due to its location within a fenced, controlled industrial zone and the absence of nearby residential communities. However, internal risks must be considered, particularly during waste transfer and operational activities. These include potential traffic-related hazards within the facility, exposure to dust, noise, and emissions, and risks associated with fire, electrical faults, or equipment malfunction. Although the workforce is small and predominantly male, risks related to occupational health, emergency response, and site security remain relevant. Unauthorized access by workers from neighbouring facilities could also pose safety concerns.	**Minor**	• Follow the mitigation measures mentioned in sections (Air Quality, Noise) same as mentioned above • Provide a grievance mechanism for the community • Regular consultation as well as information sharing with surrounding communities to ensure the sustainable operation of the project. • Provide sufficient firefighting equipment onsite and train workers on using them. • Design the facility for access by firefighting equipment including access to an adequate water supply. • Post emergency telephone numbers in clearly visible points. • Establish fire prevention and control plan • Infestation by flies and vermin: • Incoming fresh waste and separated organic should not be stored on site for more than 24 hours • Install wheel washing facility at entry and exit points to the site • Perform daily cleaning for the facility and storage areas • Controlling rats and other vermin such as feral animals • Control of litter: • Facilities are to be cleaned daily • All vehicles entering the site should have their containers covered • Cover waste promptly after discharge from the vehicle delivering the waste • Provide perimeter planting, landscaping, or fences to reduce wind.	ESS1 ESS4 ESS10	• Community grievance log • Review of community consultation reports • Interview with community members • Recording temperature and moisture content of the compost pile • Monitor temperature at depth around suspected fire zones • Monitor gas composition (methane, oxygen, and carbon monoxide) at depth • Same monitoring for temperature as that mentioned above	**Extremely Minor**	DBFO Operator	• PCU • TIU	Operator's Budget

7.3.3 Closure Phase ESMP

Table 7-4 Environmental and Social Management plan During the Closure Phase

Receptor / EHS Aspect	Impact	Impact Significance	Mitigation Measures	Relevant WB ESS	Means of supervision	Residual Impact	Responsibility		Est. Cost (EGP)
							Implementation	Supervision	
Closure Phase									
Air Quality Impacts and Dust	Air quality may be impacted by dust and gaseous emissions similar to those presented in Table 7-1. In addition, minor residual emissions from landfill gas may be present during the closure phase.	**Moderate**	• See mitigation measures in table 7-1 • Maintain and operate the landfill gas collection and control system (GCCS), including active or passive venting, flaring, or gas recovery units. • Conduct regular monitoring of gas emissions, particularly methane (CH_4), carbon dioxide (CO_2), and hydrogen sulfide (H_2S), to detect leaks or elevated concentrations. • Ensure the integrity of the final cover system, including sealing of cracks or settlement areas that could allow gas escape. • Install and maintain gas vents or passive release structures to safely direct low-pressure emissions away from sensitive receptors. • Apply vegetative cover • Keep access control and safety signage in place around gas monitoring wells and vents. • Implement an emergency response plan in case of unexpected gas buildup, odors, or health complaints. • Submit periodic gas monitoring reports to regulatory authorities. • Train maintenance personnel on gas safety protocols and the proper handling of monitoring and control equipment.	ESS1 ESS2 ESS3	• Site inspection • Review the equipment, maintenance records. • Review the grievance log	**Minor**	Closure Contractor	• QG	Contractor's Cost
Noise & Vibration	Similar to construction phase impacts	**Moderate**	See mitigation measures in table 7-1	ESS1 ESS2 ESS3	• Site inspection • Review the equipment, maintenance records. • Review the complaints log	**Minor**	Closure Contractor	• QG	Contractor's Cost
Soils and Landscape	While closure activities will not require excavation works, soil impacts similar to those elaborated in Table 7-1 are foreseen. In addition, if leachate is not well managed, soil contamination risks are expected.	**Moderate**	See mitigation measures in 7-1 and 7-2	ESS1 ESS3	• Site inspection • Review the equipment, maintenance records.	**Minor**	Closure Contractor	GG	Contractor's Cost
Groundwater	Groundwater impacts similar to those of the construction phase are expected as detailed in Table 7-1.	**Moderate**	See mitigation measures in 7-1 and 7-2	ESS1 ESS3	• Site inspection	**Minor**	Closure Contractor	• QG	Contractor's Cost
Waste Management	Waste management impacts during the closure phase are expected to be similar to those explained in Table 7-1. It is expected that the landfill cell will no longer receive fresh waste during the closure phase, therefore only waste resulting from closure activities are expected.	**Minor**	See mitigation measures in 7-1	ESS1 ESS3	• Site inspection	**Insignificant**	Closure Contractor	QG	Contractor's Cost
Biodiversity & Attraction of Pests	Placement of final cover can further suppress the sparse xerophytic vegetation that might have re-established along cell edges, and disturbance from machinery may temporarily	**Minor**	• Implement buffer zones to protect nearby vegetation and wildlife habitats. • Rehabilitate disturbed areas by replanting native	ESS1 ESS3 ESS6	• Site Inspection	**Insignificant**	Closure Contractor	• QG	Contractor's Cost

Receptor / EHS Aspect	Impact	Impact Significance	Mitigation Measures	Relevant WB ESS	Means of supervision	Residual Impact	Responsibility		Est. Cost (EGP)
							Implementation	Supervision	
	displace any opportunistic desert fauna such as reptiles, rodents, or transient birds.		vegetation after closure.						
Temporary Labor Influx	Given the limited number of workers (25–50), and the contractor's commitment to local recruitment wherever feasible, the overall risk of labor influx impacts, including reputational concerns, is considered low during the closure phase.	**Minor**	See mitigation measures in 7-1	ESS1 ESS2 ESS4	• Community Grievance register	**Insignificant**	Closure Contractor	QG	Contractor's Cost
Labor working conditions: All Workers, (Drivers, Operators, Mechanics, Electricians, EHS Officers, Security, Admin)	Risks include underpayment, lack of insurance coverage, informal employment without contracts, excessive working hours, OHS hazards (traffic, biohazards, electrical), discrimination, SEA/SH, poor sanitation, inadequate training, lack of workers' facilities	**Major**	Implement Labor Management Procedures: written contracts in Arabic with insurance coverage, legal compliance, and fair wages; salaries ≥ EGP 7,000/month; provide written details of employment including rights, pay, benefits, and hours, overtime premiums per law; ensure timely payment of wages and compliance with rest and leaves as per the law, provide written notice and severance details upon contract termination, PPE provision and safe working conditions; vaccination for biohazards; lock-out/tag-out for maintenance; prohibit forced and child labor, audit labor practices regularly, SEA/SH protocol; clean functional restrooms, potable drinking water, areas, shaded or indoor rest areas, gender-sensitive facilities; confidential worker GRM; traffic and safety plans; hygiene and sanitation facilities; induction and refresher training	**ESS2** **ESS4** **ESS10**	• PCU E&S Team + Contractor HR/EHS	**Minor**	Closure Contractor	QG	Contractor's Cost
Workers / Off-site Apartment Accommodation (Urban residential settings)	**H&S & welfare risks:** overcrowding; inadequate ventilation/maintenance; electrical/gas hazards; fire safety (blocked exits, missing detectors/extinguishers); water quality & sanitation; communicable diseases. **Social & GBV risks:** harassment or SEA/SH; privacy breaches; discrimination; conflicts with neighbors. **Legal/administrative risks:** non-compliant tenancy; lack of landlord maintenance; unauthorized subletting. **Commuting risks:** road safety during daily travel to site; fatigue. **Community risks:** waste mismanagement, noise, and disturbances in the neighborhood.	**Major**	**Selection & Contracts:** Lease only apartments meeting minimum standards (conduct regular inspections using a documented checklist: floor area/person, ventilation/AC, potable water, sanitation, safe electrical layout, gas-certified appliances, egress routes, smoke/CO detectors, extinguishers, pest control). Include landlord obligations for maintenance & rapid repairs in lease; cap occupancy; gender-segregated or privacy-appropriate arrangements. **Safety & Welfare:** Provide camp-style house rules adapted to apartments (cleaning rota, quiet hours, waste segregation with municipal collection, no smoking in units, safe cooking practices). Establish a GRM and require workers to adhere to the CoC. Induct residents on fire safety, hygiene, SEA/SH code of conduct, GRM access; post emergency numbers & evacuation routes; keep a register of occupants. **Commuting:** Safe transport plan (licensed buses/minivans, seatbelts, journey scheduling to avoid fatigue, trained drivers, incident reporting). **Health:** First-aid kits in units; access to clinic/insurance; periodic water potability checks if storage tanks are used; pest management. **Community Relations:** Neighbor etiquette briefings; landlord/tenant liaison; hotline for complaints; swift corrective actions. **Monitoring:** Monthly apartment audits; quarterly fire drills/logs; record corrective actions; GRM entries tracked to closure within defined timelines.	**ESS2** **ESS4** **ESS3**	• HSE Manager & Social/Workers' Welfare Officer verify apartment standards, audits, training records, transport compliance; Engineer/PMU conducts periodic oversight audits	**Minor**	Closure Contractor	QG	Contractor's Cost
Road Traffic and Transportation	The road and traffic impacts during the closure phase of the 1st cell at the IWMF project are	**Minor**	See mitigation measures in 7-1	ESS1 ESS4	• MoMs carried out with the local authorities	**Insignificant**	Closure Contractor	QG	Contractor's Cost

Receptor / EHS Aspect	Impact	Impact Significance	Mitigation Measures	Relevant WB ESS	Means of supervision	Residual Impact	Responsibility		Est. Cost (EGP)
							Implementation	Supervision	
	anticipated to be similar to those elaborated in Table 7-1				• Notices shared with the local authorities • Review of duration of trips • Monitoring reports of traffic • Review incidents related to traffic • Review the drug test of all drivers				
SEA/SH and Gender Issues	SEA/SH impacts foreseen are similar to those elaborate in Table 7-2	**Minor**	See mitigation measures in 7-2	ESS1 ESS4	• CoC established, disclosed • The monitoring of workers' compliance to the CoC • Inspection of complaints • Inspection of training records • Number and documentation of awareness raising activities • Inspection of drug test • Numbers of penalties applied	**Insignificant**	Closure Contractor	QG	Contractor's Cost
Child Labor	Child labor impacts during the closure phase are similar to those detailed in Table 7-1	**Minor**	See mitigation measures in 7-1	ESS1 ESS4	• Workers ID on gate • Site visits	**Insignificant**	Closure Contractor	QG	Contractor's Cost
Public Infrastructure and Utilities	During closure activities, there may be a temporary increase in demand for utilities such as water and electricity, particularly for dust suppression, equipment operation, and site rehabilitation. The movement of machinery and materials associated with final capping, landscaping, and installation of post-closure systems may place additional pressure on internal road networks and local sewage systems.	**Minor**	See mitigation measures in 7-1	ESS4	• Water and electricity consumption review • Maintenance schedule	**Insignificant**	Closure Contractor	QG	Contractor's Cost
Visual and Landscape	The closure of the waste cell may lead to moderate visual impacts due to changes in topography and the visibility of closure infrastructure such as gas vents, monitoring wells, and fencing. The reshaped cell may form a raised landform that contrasts with the flat industrial surroundings, especially if not properly integrated or vegetated. In dry conditions, the site may appear barren and prone to dust and erosion, further affecting its appearance. However, these impacts can be	**Minor**	See mitigation measures in 7-1	ESS1 ESS4	• Site inspection	**Insignificant**	Closure Contractor	QG	Contractor's Cost

Receptor / EHS Aspect	Impact	Impact Significance	Mitigation Measures	Relevant WB ESS	Means of supervision	Residual Impact	Responsibility		Est. Cost (EGP)
							Implementation	Supervision	
	mitigated through surface treatments, landscaping, and thoughtful design of permanent features. While the surrounding area's visual sensitivity is low due to its industrial nature, care should still be taken to ensure the site is left stable and visually acceptable.								
Occupational Health and Safety	Workers involved in the closure of the waste cell may be exposed to a variety of occupational health and safety (OHS) risks as explained in Table 7-1	**Moderate**	See mitigation measures in 7-1	ESS1 ESS2 ESS4	• Community grievance log • Review of community consultation reports • Interview with community members • Monitor gas composition (methane, oxygen, and carbon monoxide) at depth • Same monitoring for temperature as that mentioned above	**Minor**	Closure Contractor	QG	Contractor's Cost
Community, Health, Safety, and Security	Impacts during the closure phase are expected to be minimal due to the project's location and the absence of nearby residential areas. However, risks may still arise from increased vehicle movement, including traffic congestion and accident potential. Minor exposure to dust, noise, or residual substances could affect workers or nearby facilities. While disruption to local services is unlikely, any interference with utilities or access roads could impact nearby operations.	**Minor**	See mitigation measures in 7-1	ESS1 ESS4	• Community Grievance register	**Insignificant**	Closure Contractor	QG	Contractor's Cost

7.3.4 Post-Closure Phase ESMP

Table 7-5 Environmental and Social Management plan During the Post-Closure Phase

Receptor / EHS Aspect	Impact	Impact Significance	Mitigation Measures	Relevant WB ESS	Means of supervision	Residual Impact	Responsibility		Est. Cost (EGP)
							Implementation	Supervision	
Post-Closure Phase									
Air Quality Impacts	Air quality impacts during the post-closure period are anticipated are as follows: • Residual landfill gas emissions: Decomposing waste continues to release gases such as methane (CH_4), carbon dioxide (CO_2), hydrogen sulfide (H_2S), and volatile organic compounds (VOCs), which can contribute to greenhouse gas emissions, pose fire/explosion risks, or cause odors if not properly captured. • Dust and particulate matter from maintenance activities: Occasional site access for inspections, monitoring, or repairs may generate localized dust (PM10/PM2.5), especially from vehicle movement on unpaved surfaces. • Odor and surface emissions through vegetative cover: Gases may vent through the final cover system if poorly sealed or if gas collection systems degrade, potentially causing localized odors and harming surface vegetation. Offsite gas migration: In the event of gas control system failure, landfill gases could migrate offsite and impact surrounding areas.	**Minor**	• Maintain and operate the landfill gas collection and control system (GCCS), including flaring or energy recovery units. • Conduct regular gas monitoring to detect and quantify methane (CH_4), CO_2, H_2S, and VOCs. • Inspect and repair any damaged gas wells, pipes, or seals to prevent gas leakage. • Ensure gas flaring or treatment systems comply with national air quality standards and safety requirements. • Apply dust suppression methods such as periodic watering of unpaved access roads and work areas. • Limit vehicle speed and restrict access to designated paths to reduce dust generation. • Schedule maintenance during low-wind conditions when possible. • Use dust covers on vehicles and materials where appropriate. • Inspect the final cover system regularly for cracks, settlement, or signs of gas venting. • Maintain healthy vegetative cover using adapted plant species to support surface stability and reduce emissions. • Monitor localized odor hotspots and respond with corrective actions such as soil cover addition or vent adjustment. • Conduct subsurface gas monitoring at the perimeter of the site. Establish and enforce a buffer zone around the landfill to minimize exposure to sensitive receptors.	ESS1 ESS2 ESS3	• Site inspection • Review the equipment and maintenance records. Review the grievance log	**Insignificant**	**10th of Ramadan City Council**	QG	To Be Determined
Soils and Landscape	Risks persist if landfill systems are not properly maintained. The main concern is leachate leakage from failures in the liner or collection system, which could contaminate soil with pollutants and pathogens. Additional risks include erosion of the final cover, vegetation loss, and surface cracks, which may expose waste and allow gas or water infiltration, further threatening soil integrity.	**Moderate**	To prevent soil contamination, the following measures should be implemented: • Conduct regular inspections of the landfill liner and leachate collection system to detect signs of wear, damage, or blockage. • Maintain and repair the leachate collection and treatment systems. • Monitor leachate levels and quality through sampling to detect potential contamination early. • Implement routine inspections of the final cover to identify erosion, settlement, cracks, or vegetation loss. • Promptly repair any cracks or depressions on the cover. • Maintain and reinforce vegetative cover using drought-resistant and locally adapted species. • Apply erosion control measures such as mulching, geotextiles, or slope grading to protect exposed areas. • Install or maintain stormwater drainage systems. Train maintenance personnel	ESS1 ESS3	• Site inspection • Review the equipment, maintenance records. Review the complaints log	**Minor**	**10th of Ramadan City Council**	QG	To Be Determined

Receptor / EHS Aspect	Impact	Impact Significance	Mitigation Measures	Relevant WB ESS	Means of supervision	Residual Impact	Responsibility		Est. Cost (EGP)
							Implementation	Supervision	
Post-Closure Phase									
Groundwater	Residual risks remain, primarily related to the potential failure or degradation of the landfill's leachate collection and containment systems over time. If leachate is not properly collected and treated, it could gradually infiltrate through the base of the landfill, especially in the presence of cracks, liner degradation, or unaddressed settlement issues. Although the deep-water table provides a natural buffer that reduces the likelihood of direct contamination, persistent leachate leakage over long periods could eventually reach the aquifer and impact groundwater quality.	**Moderate**	To minimize residual risks to groundwater during the post-closure phase, the following measures should be implemented: • Maintain and regularly inspect the leachate collection and containment systems, including liners, pipes, and sump structures, to detect any signs of wear, clogging, or failure. • Ensure timely repair or replacement of damaged components in the leachate system to prevent uncontrolled leakage. • Conduct routine groundwater monitoring through strategically placed monitoring wells around the landfill site, with sampling key indicators such as pH, COD, heavy metals, and pathogens. • Monitor leachate levels and quality to assess system performance and identify early signs of liner or containment failure. • Implement a settlement monitoring program to detect cover subsidence that may compromise liner integrity or create infiltration pathways. • Maintain an impermeable final cover and proper surface grading to minimize rainwater infiltration and reduce leachate generation. • Install or maintain surface water diversion and drainage systems to direct runoff away from the landfill cap. • Establish a contingency plan Document all inspection, monitoring, and maintenance activities as part of a comprehensive post-closure groundwater protection program.	ESS1 ESS3	• Site inspection • Review the equipment and maintenance records. Review the complaints log	**Minor**	**10th of Ramadan City Council**	QG	To Be Determined
Biodiversity and Attraction of Pests	Residual organic matter and landfill gas emissions may attract scavengers, insects, or rodents, particularly if the final cover is compromised, or gas/leachate systems are not well maintained. Improper revegetation or standing water (from poor drainage) could also attract mosquitoes or pest-breeding conditions.	**Minor**	See mitigation measures in Table 7-2	ESS6 ESS1 ESS3	• Site inspection Review the grievance log	**Insignificant**	**10th of Ramadan City Council**	QG	To Be Determined
Project Workers / Labor & Working Conditions	Potential non-compliance with employment terms and OSH (e.g., excessive working hours, delayed wages, inadequate PPE/training, discrimination/harassment, weak worker GRM, gaps among contractors/subcontractors); legal, financial, and reputational risks.	**Minor**	**Labor compliance:** Written contracts for all workers; onboarding that explains wages, hours, leave, benefits, and insurance; insurance coverage for all workers (including casual/daily and subcontracted); timely wage payment; prohibition of child/forced labor; non-discrimination & equal opportunity; anti-harassment and SEA/SH code of conduct. **OSH:** Job hazard analysis; hierarchy of controls; PPE provision & fit; toolbox talks (weekly); OSH induction (100% new hires); medical first aid & emergency response; safe work permits; incident/near-miss reporting and investigation. **Worker voice:** Accessible, confidential Worker GRM (anonymous channels, clear SLAs). **Contractor control:** Mandatory flow-down of requirements; pre-qualification; contract clauses; periodic compliance audits and corrective action tracking.	ESS1 ESS2 ESS4	Monitor contracts, insurance, wages, hours, OSH training, PPE compliance, incidents, GRM performance	**Insignificant**	**10th of Ramadan City Council**	QG	To Be Determined
Temporary Labor Influx	Post-closure activities require a small, specialized workforce for monitoring and maintenance. These tasks are infrequent	**Minor**	• Hire workers from nearby communities to reduce external influx	ESS1 ESS4	Community Grievance register	**Insignificant**	10th of Ramadan city council	• QG	To be determined

Receptor / EHS Aspect	Impact	Impact Significance	Mitigation Measures	Relevant WB ESS	Means of supervision	Residual Impact	Responsibility		Est. Cost (EGP)
							Implementation	Supervision	
Post-Closure Phase									
	and can be handled by local personnel, eliminating the need for temporary labor or accommodations. The risk of social disruption or pressure on local services is negligible.		• Keep workforce small and task-specific to limit social impact • Require valid national ID to verify age and identity • Avoid providing on-site housing to prevent informal settlements • Enforce respectful behavior through clear codes of conduct • Offer training on workplace ethics and community interaction • Maintain accessible grievance channels for workers and locals • Monitor contractor compliance with labor standards regularly Schedule work to avoid long-term presence of non-local labor						
Road Traffic and Transportation	Vehicle movement will be minimal, limited to occasional site visits by light-duty vehicles. The industrial setting and existing road infrastructure are well-suited to handle this low volume, with no expected congestion, emissions, or safety issues.	**Minor**	• Schedule site visits during off-peak hours • Use light-duty vehicles for monitoring tasks • Maintain access roads to prevent damage • Limit vehicle movements to essential trips only Coordinate with local traffic authorities if needed	ESS1 ESS4	• Keep a vehicle logbook • Conduct monthly road condition inspections • Review transport schedules and delivery logs Assign a site supervisor to monitor traffic flow	**Insignificant**	10th of Ramadan city council	QG	To be determined
SEA/SH and Gender Issues	The risk is very low due to the small, professional workforce and lack of interaction with the public. Preventive measures such as codes of conduct and grievance mechanisms should still be maintained.	**Minor**	• Enforce a zero-tolerance policy on SEA/SH • Train all workers on respectful behavior and gender sensitivity • Provide clear codes of conduct for all staff • Set up confidential grievance mechanisms • Limit unnecessary interaction between workers and the public by: - Restricting non-essential visits or errands outside work duties - Assigning designated personnel for any required community engagement Using controlled access points and clear work boundaries to minimize casual contact	ESS1 ESS4	• Maintain training attendance records • Monitor grievance log • Conduct anonymous worker surveys Assign a gender focal point	**Insignificant**	10th of Ramadan city council	QG	To be determined
Child Labor	Activities will be limited to periodic environmental monitoring, maintenance of landfill gas and leachate management systems, and routine inspections, all of which require trained and certified personnel. There is no operational need or incentive to employ underage workers during this phase, and works are typically undertaken by specialized technical staff under formal contractual arrangements. While the likelihood of child labor is therefore very low, a residual risk of non-compliance cannot be entirely excluded in the absence of continued oversight.	**Minor**	• Ensure all post-closure activities are carried out by formally contracted and qualified personnel only. • Require verification of legal working age and valid identification for all staff engaged in monitoring or maintenance activities. • Include explicit child labor prohibitions in service and maintenance contracts. • Maintain oversight through periodic audits or inspections of contractors responsible for post-closure works. • Retain access to a grievance mechanism for reporting labor-related concerns. Ensure continued compliance with national labor laws and World Bank ESS2 requirements.	ESS1 ESS2	• Field investigations • Reviewing the daily statements of workers' registration • Reviewing employment contracts • Reviewing the ID of all workers on site. Penalty system and the course of actions enforced in cases of non-compliance	**Insignificant**	10th of Ramadan city council	QG Labor Bureu	To be determined
Integrity of Public	Routine tasks such as environmental monitoring, inspection of gas and leachate systems, and minor maintenance works require only light-duty vehicles and minimal utility	**Minor**	Ensure that any maintenance or monitoring activities that involve utility connections, such as power supply for gas extraction systems or water for dust	ESS4	• Field investigations • Review MoMs	**Insignificant**	10th of Ramadan city council	QG	

Receptor / EHS Aspect	Impact	Impact Significance	Mitigation Measures	Relevant WB ESS	Means of supervision	Residual Impact	Responsibility		Est. Cost (EGP)
							Implementation	Supervision	
Post-Closure Phase									
Infrastructure and Utilities	consumption. As a result, there is no anticipated strain on water or electricity supply, nor any disruption to sewage or communication networks.		suppression, are coordinated with local service providers.		Review reports of accidents				
Visual and Landscape	The site may appear barren without landscaping, but its industrial setting reduces visual sensitivity. Residual infrastructure should be designed to minimize visual clutter.	**Minor**	• Use landscaping or ground cover to reduce barren appearance • Design infrastructure (vents, fencing) to blend with surroundings • Avoid bright lighting or signage that causes visual clutter • Maintain the site to prevent dust and erosion Use neutral colors and low-profile structures	ESS1	• Conduct visual inspections quarterly • Take site photos before and after landscaping • Review design plans for visual integration Include visual checks in environmental audits	**Insignificant**	10th of Ramadan city council	QG	To be determined
Occupational Health and Safety	Confined space works and exposure to toxic gases considered high risk activities which require a specific safety measures to mitigate its related hazards. However, the number of workers and passers might be limited	**Moderate**	The same as construction phase. For instance: • Provide PPE and enforce its use at all times • Train workers on safety procedures and emergency response • Conduct regular safety inspections and risk assessments • Monitor for gas leaks and confined space hazards Ensure medical check-ups and health monitoring every six months	ESS1 ESS2	• Keep PPE distribution and usage logs • Maintain safety training records • Perform weekly safety inspections Review medical check-up reports and incident logs	**Minor**	10th of Ramadan city council	QG	To be determined

7.4 Environmental and Social Monitoring plan (ESMoP)

7.4.1 Construction Phase ESMoP

Table 7-6: Environmental and Social Monitoring Plan (ESMoP) During the Construction Phase

Receptor / EHS Aspect	Impact	Monitoring Indicators	Responsibility of Monitoring	Frequency	Location	Method & Target	Est. Cost (EGP)
Construction Phase							
Air Quality and Dust	Increased air emissions	• Number of complaints related to air quality. • Equipment performance and maintenance frequency • Emissions visibility (black smoke, dust for example) • Ambient Air quality measurement results of the main pollutants (CO, SO2, NO2 TSP and PM10) - Ambient air quality (PM_{10}) - Concentrations of gaseous pollutants including SO_2, CO and NO_x - Evidence of covering trucks and loose/friable materials. - Frequency of water spraying on roads • Number of complaints related to air quality	• During construction, the Contractor's Environmental, Social and Health & Safety Unit (CESHSU) • Environmental Monitoring activities are supervised by the PCU. • Waste management activities are supervised by the Environmental Officer within the PCU. • Contractors and subcontractors supervised by the PCU	- Standard air measurements monthly or as soon as receiving a complaint - Daily visual inspection will be carried out continuously	On site	• Site observation • Following up with complaints • Maintenance logs • Grievance log • Ensure air, measurement are in compliance to the following: - PM10 < 0.1 in µg/Nm3 - SO2 < 0.5mg/Nm3 for 10 mins - CO < 150 g/Nm3 for less than 15 mins. - NOx < 150 g/Nm3 for 24 hours • Pb < 1.5 g/Nm3 for 24 hours	230 USD /point measurement Contractor Management Cost
Noise and Vibration	Increases noise levels and vibration	• Number of complaints related to noise level. • Ambient noise will be monitored during the project construction phase • Equipment performance and maintenance		- Daily measurements by well-trained staff - Follow up on complaints will be continuous	On site	• Site observation • Following up with complaints • Measuring ambient noise • Maintenance logs • Grievance log	
Soils & Landscape	Degradation of soil quality	• Increased littering of domestic wastes • Evidence of fuel spills and lubricants • Leachate		- Daily visual inspection will be carried out continuously	On site	• Compliance of test samples with regulatory standards (upon complaint) • Site observation with photos documentation	Contractor Management Cost
Groundwater	Ground water contamination	• Signs of spills (visual inspection) • Tests in cases of accidental spills • Leachate		- Daily visual inspection will be carried out continuously	On site	• Compliance of test samples with regulatory standards (upon complaint) • Site observation with photos documentation	Contractor Management Cost

Receptor / EHS Aspect	Impact	Monitoring Indicators	Responsibility of Monitoring	Frequency	Location	Method & Target	Est. Cost (EGP)
Construction Phase							
Waste Management	Waste accumulation	• Amount of accumulated waste at the construction site		- Daily	On site	• Site observation with photos documentation	Contractor Management Cost
Workers	Legal non-compliance risk with Labor Laws; employee grievances; financial penalties	• Contracts signed. • Payslips issued per payroll cycle • Salaries paid within legal/payroll timetable • Social insurance registration & monthly contributions • Health insurance enrollment active • Annual leave balances tracked & approved • Sick leave & maternity leave recorded • Overtime & working hours records compliant	• HR Manager (primary), Payroll Officer, Legal/Compliance Officer (oversight)	- Monthly (payroll & insurance); Quarterly (audits); Ad hoc (upon employee requests)	HR Office; Payroll System; Social Insurance Portal	• Payroll system reports; • HR leave logs; • Insurance enrollment lists; • Audit checklists; • Sample employee file reviews.	5,000–12,000/month (admin time, HRIS/reporting tools, periodic legal audit)
Local Community	Socio Economic Opportunities	• Number of people employed from the local community. • Employment selection criteria. • Number of community grievances related to employment.	• Contractors and sub-contractors supervised by the PCU and TIU • Social Development officer (SDO)	- 3 times; prior, during, and after construction Monthly	On site Construction site	• Field investigations • Review employment contracts • Reviewing the lists that include who have been employed from the local community	No additional costs
Local Community	Temporary Labor Influx	• Availability of the Code of Conduct • Total number of trained workers on the Code of Conduct • Signed Code of Conduct • Penalties and disciplinary action taken against workers who violate the Code of Conduct • Complaints raised due to Labor influx	• Contractors and sub-contractors supervised by the PCU and TIU • Social Development officer (SDO)	- Monthly during pre-construction and construction	On site Construction site	• Lists of workers trained • Disciplinary actions taken • Review Grievance log • Site observation • Review Worker Code of Conduct • Engagement with women minutes of meetings	No additional costs
Accommodation (**urban residential**)	Overcrowding; inadequate ventilation & sanitation; electrical/gas/fire hazards; communicable diseases; harassment/ SEA/SH; neighbor/community disturbance;	• Occupancy vs. lease/design capacity • Fire safety: smoke/CO detectors, extinguishers, clear egress & drills • Electrical & gas safety: visible defects, RCDs, LPG certificates • Hygiene & sanitation: cleanliness, waste segregation/collection schedule, potable water checks (if roof tanks) • Transport safety: licensed vehicles, driver hours, seatbelt compliance, incident log • GRM: complaints logged and closed on time		- Monthly apartment audits; Weekly spot checks on transport; Quarterly fire drills; Ad hoc upon complaint/incident	Apartments; Transport depots/routes; HR/HSE office for records	• **Method:** Checklist-based audits; photo logs; detector/extinguisher test records; driver logs & vehicle inspection sheets; GRM register; training attendance. • **Targets:** Occupancy: Verify number of residents vs. lease capacity. • Fire Safety: Check detectors, extinguishers, exits, drill records. • Electrical/Gas Safety: Inspect wiring, RCDs, LPG certificates monthly. • Hygiene & Sanitation: Assess cleanliness, waste bins, water quality. • Transport Safety: Confirm licensed vehicles, driver hours, seatbelt use. • GRM: Track complaints logged, acknowledged, and closed on time.	Included in Construction costs

Receptor / EHS Aspect	Impact	Monitoring Indicators	Responsibility of Monitoring	Frequency	Location	Method & Target	Est. Cost (EGP)
Construction Phase							
	commuting road safety risks	• Training/induction completion (house rules, SEA/SH code, fire safety) • CoC				• % training of new workers, consultation activities, SEA/SH training... • Training: Ensure induction and refresher attendance for all workers. • **CoC**	
Local Community	Road and traffic flow	• Vehicle's safety inspections are available. • Installed boards and warning signs for speed limits and construction vehicles. • Implementation of the Traffic Management Plan. • Raised complaints about traffic system by the communities surrounding the project's site. • Notifications to communities of changing traffic patterns. • Contractor to record any road accidents due to construction vehicles • All trucks to be in compliance with standard safety conditions • Drivers to be licensed and randomly checked for drugs	• Contractors and sub-contractors supervised by the PCU and TIU • Social Development officer (SDO)	- Continuously during construction	Sub-project site	• Site inspection with photo documentation • Monthly reports and grievance log • Review Grievance log • Review Accidents log (if applicable)	Included in Construction costs
Local Community	Sexual Exploitation and Abuse & Sexual Harassment (SEA/SH) and Gender Issues	• The monitoring of workers' compliance to the CoC to avoid behaviours, such as SEA/SH. • Complaints raised due to SEA/SH. • Documentation of corrective measures adopted • % of workers trained on Code of Conduct • % of workers trained on SEA/SH.		- Continuously during construction	Sub-project site	• Periodic reports • Review Grievance log • Site observation • Review Worker's Code of Conduct • Engagement with women minutes of meetings • Training attendance sheet	No additional costs
Local Community	Child Labor	• Record of workers • Copies of ID Cards • Labor registry • Grievance log		- Continuously during construction	Sub-project site	• Verifying contracts • Inspection of complaints • Inspection of Human Resources Policy • Inspection of employment contracts • Grievance log Review Labor registry and IDs	Included in Construction costs
Utilities	Public Infrastructure and Utilities	• Waste transport monitoring reports outside the project site • Documentation of affected infrastructure and corrective procedures taken		- Continuously during construction	Sub-project site	• Site inspection with photo documentation • Monthly reports and grievance log • Review Grievance log • Review Accidents log (if applicable) • Periodic reports • Review documentation of affected infrastructure and corrective procedures taken	Included in Construction costs

7.4.2 Operation Phase ESMoP

Table 7-7 Environmental and Social Monitoring Plan (ESMoP) During the Operation Phase

Receptor / EHS Aspect	Impact	Monitoring Indicators	Responsibility of Monitoring	Frequency	Location	Method & Target	Est. Cost (EGP)
Operation Phase							
Air Quality, Gaseous, and GHG Emissions	Increased air emissions	Number of complaints related to air quality. Equipment performance and maintenance frequency Emissions visibility (black smoke, dust for example) Ambient Air quality measurement results of the main pollutants (CO, SO2, NO2 TSP and PM10) Ambient air quality (PM10) Concentrations of gaseous pollutants including SO2, CO and NOx Evidence of covering trucks and loose/friable materials. Frequency of water spraying on roads Number of complaints related to air quality	The Operator's Environmental, Social and Health & Safety Unit (OESHSU) Environmental Monitoring activities are supervised by the Qalyubiya Governorate Waste management activities are supervised by the Environmental Officer within the SWMU	Standard ambient air measurements quarterly or as soon as receiving a complaint	On site Area of Influence	The operator is required to keep an Environmental Register that includes measurements results that shows compliance with the regulatory standards of the EEAA and WB standards: PM10 < 0.1 in µg/Nm3 SO2 < 0.5mg/Nm3 for 10 mins CO < 150 g/Nm3 for less than 15 mins. NOx < 150 g/Nm3 for 24 hours Pb < 1.5 g/Nm3 for 24 hours Grievance log	Included in Operator Management Cost
Odors	Unpleasant odor	Number of complaints related to odor Odor intensity levels measured using field olfactometry Levels of hydrogen sulfide (H_2S), methane (CH_4), and volatile organic compounds (VOCs)		Standard ambient air and odor measurements quarterly or as soon as receiving a complaint	On site	The operator is required to keep an Environmental Register that includes measurements results that shows compliance with the regulatory standards of the EEAA and WB standards: Site observation Following up with complaints Measuring odor levels Maintenance and grievance logs	Included in Operator Management Cost
Noise & Vibration	Increases noise levels and vibration	Noise level Complaints related to high noise level		Standard noise measurements quarterly or as soon as receiving a complaint	On site Area of Influence	The operator is required to keep an Environmental Register (ER) that includes measurements results that shows compliance with the regulatory standards of the EEAA and WB standards: Site observation Measuring ambient noise and Evaluate the impact of landfill activities on noise and vibration levels,	Included in Operator Management Cost

						considering factors like vehicle movements, equipment operations, and waste handling. Maintenance logs Grievance log	
Soils and Groundwater	Degradation of soil quality Groundwater contamination	Observation of accumulation of hazardous materials Evidence of fuel spills and lubricants Leachate		Quarterly measurements Daily visual inspection will be carried out continuously Quarterly site inspections to visually assess the soil conditions and identify any visible signs of potential contamination or impacts. This includes observing the areas where waste is handled, stored, or treated, as well as monitoring for any soil erosion or runoff issues.	On site and at groundwater boreholes selected per the monitoring program	The operator is required to keep an ER that includes measurements results that shows compliance with the regulatory standards of the EEAA and WB standards: Soil Quality pH Level: It can affect the toxicity of certain contaminants. Soil Moisture Content: influences the transport of contaminants. Heavy Metals (e.g., Lead, Cadmium, Mercury): pose risks to human health and the environment. Organic Compounds (e.g., Benzene, Toluene, Ethylbenzene, Xylenes BTEX): may originate from waste materials. Nutrients and Fertilizers: Nitrogen (N), Phosphorus (P), Potassium (K): Assess the levels of nutrients and fertilizers, which can impact soil fertility. Ammonium and Nitrate Concentrations Groundwater Quality Heavy Metals: lead, mercury, cadmium, and chromium. pH Levels BOD: High BOD levels indicate the presence of biodegradable contaminants. COD: It provides an overall indication of water quality. Nutrients: Monitor levels of nutrients. Leachate Quality: Analyse leachate from	Included in Operator Management Cost 300 USD /point measurement

						the waste management facility Groundwater Level: to understand variations and potential impacts on contamination. Turbidity: High turbidity levels may indicate the presence of contaminants. Conductivity: Changes in conductivity can indicate contamination. Site observation with photos documentation	
Waste Management	Waste accumulation and accumulative impacts	Status of waste management processes Contracts with waste management contractors Disposal receipts Cleanliness of the areas where work will take place.		Quarterly inspection Daily visual inspection will be carried out continuously	On site and area of influence	Site observation with photos documentation	Included in Operator Management Cost
Attraction of Pests	Ecological disruption, nuisance, health hazards	Frequency of sightings of pests (e.g., rats, flies, scavenger birds, stray animals) in different landfill zones. Reports of pest-related damage (e.g., burrowed holes in landfill cover, torn waste bags, nests in facility structures). Incidence of pest-borne diseases (e.g., monitoring for signs of disease transmission among workers or nearby communities).		Daily visual inspection will be carried out continuously	On site and area of influence	Site observation with photos documentation	Included in Operator Management Cost
Local Community	Socio Economic Opportunities	Number of people employed from the local community. Employment selection criteria. Number of community grievances related to employment.	The Operator's Environmental, Social and Health & Safety Unit (OESHSU) Environmental Monitoring activities are supervised by the E&S Manager in the Qalyubiya Governorate Waste management activities are supervised by the Environmental Officer within the SWMU	3 times; prior, during, and after construction	Sub-project site	Field investigations Review employment contracts Reviewing the lists that include who have been employed from the local community	No additional costs
Local Community	Job creation	Number of employed local workers Number of employed waste pickers (informal sector workers) who were using the project site Consultation activities conducted with informal sector workers Census of informal sector workers Training and Capacity raising programs conducted for workers in the informal sector		3 times; prior, during, and after construction	Sub-project site	Field investigations Review the consultation activities carried out with waste pickers Review the list of employed waste pickers Review the training activities carried out for waste pickers to raise their capacity and qualify them for work Review grievance log	No additional costs
Local Community	Temporary Labor Influx	Availability of the Code of Conduct Total number of trained workers on COC Signed Code of Conduct Penalties and disciplinary action taken against workers who violate the Code of Conduct Complaints raised due to Labor influx Documentation of corrective measures adopted		Monthly during operation	Sub-project site	Lists of workers trained Disciplinary actions taken Review Grievance log Site observation Review Worker Code of Conduct Engagement with women minutes of meetings	No additional costs

Local Community	Road and traffic flow	Vehicle's safety inspections are available. Installed boards and warning signs for speed limits and construction vehicles. Implementation of the Traffic Management Plan. Raised complaints about traffic system by the communities surrounding the project's site. Notifications to communities of changing traffic patterns. All trucks to be in compliance with standard safety conditions Drivers to be licensed and randomly checked for drugs at least once during construction		Monthly during operation	Sub-project site	Site inspection with photo documentation Monthly reports and grievance log Review Grievance log Review Accidents log (if applicable)	Included in Operators costs
Local Community	Sexual Exploitation and Abuse & Sexual Harassment (SEA/SH) and Gender Issues	The monitoring of workers' compliance to the CoC when interacting with the surrounding communities to avoid behaviours, such as SEA/SH. Complaints raised due to SEA/SH. Documentation of corrective measures adopted % of workers trained on Code of Conduct % of workers trained on SEA/SH.		Monthly during operation	Sub-project site	Periodic reports Review Grievance log Site observation Review Worker's Code of Conduct Engagement with women minutes of meetings	No additional costs
Local Community	Child Labor	Record of workers Labor registry Grievance log		Monthly during operation	Sub-project site	Verifying contracts Inspection of complaints Inspection of Human Resources Policy and employment contracts Grievance log Review Labor registry and IDs	Included in Operators costs
Utilities	Public Infrastructure and Utilities	Waste transport monitoring reports outside the project site Number of local community complaints related to the performance of the contractor for construction activities Documentation of affected infrastructure and corrective procedures taken		Monthly during operation	Sub-project site	Site inspection with photo documentation Monthly reports and grievance log Review Grievance log Review Accidents log (if applicable) Periodic reports Review documentation of affected infrastructure Apply all monitoring methods related to waste management	Included in Operators costs
Work force	Occupational Health and Safety	That a health and safety plan is developed and available Safety samplings (e.g. concentration of dust, level of noise) Routine and daily safety inspection report. Periodic medical examinations and record of health complaints. Records of regular maintenance of electric equipment Records of inspecting available fire extinguisher and functional fire system. Records of fire drills and audits. Trainings performed and recorded Number of accidents/ injuries PPE used by workers Available and regularly sufficient first aid kits for mentioned hazards. Number of JHA and PTW Number of checklists for Hands and power tools. Number of checklists for heavy equipment and vehicles. Number of TBT against JHA and PTW. Number of Hazard observations by workers. Number of safety violations. Number of non-conformities.	The Operator's Environmental, Social and Health & Safety Unit (OESHSU) Environmental Monitoring activities are supervised by the E&S Manager in the 10th of Ramadan City Council Waste management activities are supervised by the Environmental Officer within the SWMU	Monthly during operation Ad-hock based on the level of compliance	Sub-project site	Exposure monitoring of contaminant dusts, vapors, and gases. Regular safety inspection program. Health surveillance program to examine workers before entering workplace for any signs of infection, along with proper health monitoring during operation. Monitoring of noise Regular reporting of any accidents. Regular check on the workers attendance sheet Fire drills should be done regularly and external audit.	Included in Operators costs

						Regular inspection and maintenance of electric equipment, plugs and wires. Daily check of toilet cleanliness and follow up on continuous disinfection of the rest areas as well as presence of clean potable water. Check that the health insurance covers all workers on site, including work injuries.	
Employees / HR & Legal Compliance	Legal non-compliance risk; employee grievances; financial penalties	Contracts signed Pay slips issued per payroll cycle Salaries paid within legal/payroll timetable Social insurance registration & monthly contributions Health insurance enrollment active Annual leave balances tracked & approved Sick leave & maternity leave recorded Overtime & working hours records compliant	HR Manager (primary), Payroll Officer, Legal/Compliance Officer (oversight)	Monthly (payroll & insurance); Quarterly (audits); Ad hoc (upon employee requests)	HR Office; Payroll System; Social Insurance Portal	Payroll system reports; HRIS leave logs; insurance enrollment lists; Audit checklists; Sample employee file reviews.	Included in Operator Cost

7.4.3 Closure Phase ESMoP

Table 7-8 Environmental and Social Monitoring Plan (ESMoP) During the Closure Phase

Receptor / EHS Aspect	Impact	Monitoring Indicators	Responsibility of Monitoring	Frequency	Location	Method & Target	Est. Cost (EGP)
Closure Phase							
Air Quality Impacts and Dust	Increased air emissions	• Number of complaints related to air quality. • Equipment performance and maintenance frequency • Emissions visibility (black smoke, dust for example) • Ambient Air quality measurement results of the main pollutants (CO, SO2, NO2 TSP and PM10) - Ambient air quality (PM_{10}) - Concentrations of gaseous pollutants including SO_2, CO and NO_x - Evidence of covering trucks and loose/friable materials. - Frequency of water spraying on roads • Number of complaints related to air quality	• During construction, the Contractor's Environmental, Social and Health & Safety Unit (CESHSU) • Environmental Monitoring activities are supervised by the E&S Manager in the District Local Unit under the supervision of the Environmental Unit within the governorate. • Waste management activities are supervised by the Environmental Officer within the SWMU. • Contractors and subcontractors supervised by QG Solid Waste Management Unit (SWMU)	- Standard air measurements monthly or as soon as receiving a complaint	On site	• Site observation • Following up with complaints • Maintenance logs • Grievance log • Air, measurement should be in compliance to the following: - PM10 < 0.1 in µg/Nm3 - SO2 < 0.5mg/Nm3 for 10 mins - CO < 150 g/Nm3 for less than 15 mins. - NOx < 150 g/Nm3 for 24 hours Pb < 1.5 g/Nm3 for 24 hours	To be Determined
Noise & Vibration	Increases noise levels and vibration	• Number of complaints related to noise level. • Ambient noise will be monitored during the project construction phase • Equipment performance and maintenance		- Daily measurements by well-trained staff - Follow up on complaints will be continuous	On site	• Site observation • Following up with complaints • Measuring ambient noise • Maintenance logs • Grievance log	To be Determined
Soils and Landscape	Degradation of soil quality	• Increased littering of domestic wastes • Evidence of fuel spills and lubricants • Leachate		- Daily visual inspection will be carried out continuously	On site	• Compliance of test samples with regulatory standards (upon complaint) Site observation with photos documentation	To be Determined
Groundwater	Ground water contamination	• Signs of spills (visual inspection) • Tests in cases of accidental spills • Leachate		- Daily visual inspection will be carried out continuously	On site	• Compliance of test samples with regulatory standards (upon complaint) • Site observation with photos documentation	To be Determined
Waste Management	Waste accumulation and Accumulative impacts	• Status of waste management processes • Contracts with waste management contractors • Disposal receipts • Cleanliness of the areas		- Daily	On site	• Site observation with photos documentation	To be Determined
Local Community	Socio Economic Opportunities	• Number of people employed from the local community • Employment selection criteria • Number of community grievances related to employment	QG	- Prior and during the operation	At subproject site	• Inspection of recruitment strategy • Inspection of employment contracts • Maintaining records of the offered jobs for the neighboring communities. • Community grievance log • Review employment contracts • Review the lists that include who have been employed from the local community	No additional costs
Local Community	Temporary Labor Influx	• Check worker IDs to confirm age and local origin • Review contractor hiring records regularly • Place a complaint box or hotline for feedback	QG	Prior and during the operation	At subproject site	• Workers ID review • Contractor hiring document • Visit the site monthly to observe labor conditions • Keep a log of all complaints and how they were handled • Talk to a few workers to hear their views	No additional costs

Receptor / EHS Aspect	Impact	Monitoring Indicators	Responsibility of Monitoring	Frequency	Location	Method & Target	Est. Cost (EGP)
Local Community	Road and Traffic flow	• Vehicle's safety inspections are available • Installed boards and warning signs for speed limits • Implementation of the Traffic Management Plan • Notifications to communities of changing traffic patterns, if any.	QG	- Quarterly or as soon as receiving a complaint - Follow up on complaints will be continuous	At subproject site	• Site inspection with photo documentation • Monthly reports and grievance log • Review Grievance log • Review Accidents log (if applicable)	No additional costs
Local Community	Sexual Exploitation and Abuse & Sexual Harassment (SEA/SH) and Gender Issues	• The monitoring of workers' compliance to the Code of Conduct when interacting with the surrounding communities to avoid behaviors such as SEA/SH. • Complaints raised due to SEA/SH. • Documentation of corrective measures adopted • % of workers trained on Code of Conduct	QG	- Quarterly or as soon as receiving a complaint - Follow up on complaints will be continuous	At subproject site	• Review periodic reports • Review Grievance log • Site observation • Review Worker Code of Conduct • Engagement with women minutes of meetings	No additional costs
Local Community	Child labor	• Monitoring of any child labor located at the site • Monitoring of employee's IDs	QG	- Quarterly or as soon as receiving a complaint	At subproject site	• Review periodic reports • Site observation	No additional costs
Utilities	Public Infrastructure and Utilities	• Waste transport monitoring reports outside the project site • Documentation of affected infrastructure and corrective procedures taken	QG	- Quarterly or as soon as receiving a complaint - Follow up on complaints will be continuous	At subproject site	• Site inspection with photo documentation • Review Accidents log (if applicable) • Periodic reports • Review the documentation of affected infrastructure and corrective procedures taken • Review Grievance log	No additional costs
Work force	Occupational Health and Safety	• A health and safety plan is developed and available • Safety samplings (e.g. concentration of dust, level of noise) • Routine safety inspection report. • Periodic medical examinations and record of health complaints. • Records of inspecting available fire extinguisher and functional fire system. • Records of fire drills and audits. • Trainings performed and recorded • Number of accidents/ injuries • PPE used by workers • Available and regularly sufficient first aid kits • Random site inspection	QG	- Quarterly or as soon as receiving a complaint - Follow up on complaints will be continuous	At subproject site	• Exposure monitoring of contaminant dusts, vapors, and gases. • Regular safety inspection program. • Health surveillance program to examine workers before entering the workplace for any signs of infection, along with proper health monitoring during operation. • Monitoring of noise • Regular reporting of any accidents. • Regular check on the workers attendance sheet • Fire drills should be done regularly and external audit. • Regular inspection and maintenance of electric equipment and plugs • Regular check of toilet cleanliness, and follow up on continuous disinfection of the rest areas, as well as presence of clean potable water. • Check that the health insurance covers all workers on site, including work injuries.	No additional costs
Local Community	Community Health and Safety	• Number of community complaints related to odors, insects, rodents, and noise • Feedback of consultation activities related to community health and safety risks • Availability of adequate firefighting equipment on site and records of training in its use • Availability of a water source and appropriate passages for firefighting equipment • Availability of emergency phone numbers at clear points • Availability of a fire prevention plan • Procedures established for cleaning the facility and storage areas and monitoring reports • Procedures established to control rats and insects	QG	- Quarterly or as soon as receiving a complaint - Follow up on complaints will be continuous	At subproject site	• Review community complaints related to odors, insects, rodents, and noise • Review the actions taken to resolve community complaints and pending complaints • Review the consultation results with the local community • Regular site visits to inspect the site and check firefighting procedures and equipment, waste storage methods, facility cleaning and rat control procedures • Review all monitoring reports related to operation and waste transportation • Regular reporting of any accidents. • Review and update the emergency response plan, if necessary.	No additional costs

Receptor / EHS Aspect	Impact	Monitoring Indicators	Responsibility of Monitoring	Frequency	Location	Method & Target	Est. Cost (EGP)
Employees / HR & Legal Compliance (Egypt Labor Law)	Legal non-compliance risk; employee grievances; financial penalties	• Contracts signed • Payslips issued per payroll cycle • Salaries paid within legal/payroll timetable • Social insurance registration & monthly contributions • Health insurance enrollment active • Annual leave balances tracked & approved • Sick leave & maternity leave recorded • Overtime & working hours records compliant	HR Manager (primary), Payroll Officer, Legal/Compliance Officer (oversight)	- Monthly (payroll & insurance); Quarterly (audits); Ad hoc (upon employee requests)	HR Office; Payroll System; Social Insurance Portal	Payroll System Reports; HRIS Leave Logs; Insurance Enrollment Lists; Audit Checklists; Sample Employee File Reviews	No additional costs

7.4.4 Post-Closure Phase ESMoP

Table 7-9 Environmental and Social Monitoring Plan (ESMoP) During the Post-Closure Phase

Receptor / EHS Aspect	Impact	Monitoring Indicators	Responsibility of Monitoring	Frequency	Location	Method & Target	Est. Cost (EGP)
Post-Closure Phase							
Air Quality	Residual landfill gas emissions, offsite gas migration, and odor emissions	• Number of complaints related to air quality. • Emissions visibility (black smoke, dust for example) • Ambient Air quality measurement results of the main pollutants (CO, SO2, NO2 TSP and PM10) - Ambient air quality (PM_{10}) - Concentrations of gaseous pollutants including SO_2, CO and NO_x • Number of complaints related to air quality • Number of complaints related to odor • Odor intensity levels measured using field olfactometry • Levels of (H_2S), (CH_4), and (VOCs)	Environmental Monitoring activities are supervised by the E&S Unit of QG.	Standard ambient air measurements quarterly or as soon as receiving a complaint	On site Area of Influence	• See Table 7-8	No additional costs
Soils and Landscape	Degradation of soil quality	• Leachate		Quarterly measurements Daily visual inspection will be carried out continuously Quarterly site inspections to visually assess the soil conditions and identify any visible signs of potential contamination or impacts. This includes observing the areas where waste is handled, stored, or treated, as well as monitoring for any soil erosion or runoff issues.	On site	• See Table 7-8	No additional costs
Groundwater	Groundwater contamination	• Leachate		Quarterly measurements Daily visual inspection Quarterly site inspections to visually assess the soil conditions and identify any visible signs of potential contamination or impacts. This includes observing the areas where waste is handled, stored, or treated, as well as monitoring for any soil erosion or runoff issues.	Groundwater boreholes selected per the monitoring program	• See Table 7-8	No additional costs
Groundwater	Groundwater contamination	• Leachate		Quarterly measurements Daily visual inspection Quarterly site inspections to visually assess the soil conditions and identify any visible signs of potential contamination or impacts. This includes observing the areas where waste is handled, stored, or treated, as well as monitoring for any soil erosion or runoff issues.	Groundwater boreholes selected per the monitoring program	• See Table 7-8	No additional costs

Receptor / EHS Aspect	Impact	Monitoring Indicators	Responsibility of Monitoring	Frequency	Location	Method & Target	Est. Cost (EGP)
Post-Closure Phase							
Attraction of Pests	Ecological disruption, nuisance, health hazards	• Frequency of sightings of pests in different landfill zones. • Reports of pest-related damage • Incidence of pest-borne diseases (e.g., monitoring for signs of disease transmission among workers or nearby communities).		Daily visual inspection will be carried out continuously	On site and area of influence	• Site observation with photos documentation	No additional costs
Local Community	Socio Economic Opportunities	• Number of people employed from the local community • Employment selection criteria • Number of community grievances related to employment	QG	After completion of closure phase	On project site	• See Table 7-8	No additional costs
Local Community	Job creation	• Existence of a Human Resources HR policy • Establish clear procedures for recruitment, evaluation and promotion • The number of employment contracts corresponds to the number of workers on the site • Compatibility of employment contracts for employees with HR policy • The number of workers listed in the payment roll corresponds to the number of workers on the site • Results of consultations with workers • Number of workers' complaints related to working conditions	QG	Quarterly or as soon as receiving a complaint Follow up on complaints will be continuous	At subproject site	• See Table 7-8	No additional costs
Local Community	Labor Influx	• Check worker IDs to confirm age and local origin • Review contractor hiring records regularly • Place a complaint box or hotline for feedback	QG	After completion of closure phase	At subproject site	• See Table 7-8	No additional costs
Local Community	Road and Traffic flow	• Vehicle's safety inspections are available • Installed boards and warning signs for speed limits • Implementation of the Traffic Management Plan • Notifications to communities of changing traffic patterns, if any.	QG	Quarterly or as soon as receiving a complaint Follow up on complaints will be continuous	At subproject site	• See Table 7-8	No additional costs
Local Community	Sexual Exploitation and Abuse & Sexual Harassment (SEA/SH) and Gender Issues	• The monitoring of workers' compliance to the CoC when interacting with the surrounding communities to avoid behaviors such as SEA/SH. • Complaints raised due to SEA/SH.	QG	Quarterly or as soon as receiving a complaint Follow up on complaints will be continuous	At subproject site	• See Table 7-8	No additional costs

Receptor / EHS Aspect	Impact	Monitoring Indicators	Responsibility of Monitoring	Frequency	Location	Method & Target	Est. Cost (EGP)
Post-Closure Phase							
		• Documentation of corrective measures adopted • % of workers trained on Code of Conduct					
Utilities	Public Infrastructure and Utilities	• Waste transport monitoring reports outside the project site • Number of local community complaints related to the performance of the contractor for construction activities • Documentation of affected infrastructure and corrective procedures taken	QG	Quarterly or as soon as receiving a complaint Follow up on complaints will be continuous	At subproject site	• See Table 7-8	No additional costs
Local Community	Visual intrusion	• Walk around the site once a month and take photos to check if plants or ground cover are still in place • Look at new structures like vents • Visit the site at night to make sure lights and signs are not too bright • Check the ground after dry or windy days to see if dust or erosion is happening • Compare the color and height of new items with what was planned	QG	Monthly or as soon as receiving a complaint	At subproject site	See Table 7-8	No additional costs
Work force	Occupational Health and Safety	• The health and safety plan is developed and available • Routine safety inspection report. • Periodic medical examinations and record of health complaints. • Records of regular maintenance of electric equipment • Records of inspecting available fire extinguisher and functional fire system. • Records of fire drills and audits. • Trainings performed and recorded • Number of accidents/ injuries • Available and regularly sufficient first aid kits for mentioned hazards.	QG	Quarterly or as soon as receiving a complaint Follow up on complaints will be continuous	At subproject site	• Exposure monitoring of contaminant dusts, vapors, and gases. • Regular safety inspection program. • Health surveillance program to examine workers before entering the workplace for any signs of infection, along with proper health monitoring during operation. • Regular reporting of any accidents. • Regular check on the workers attendance sheet	No additional costs

Receptor / EHS Aspect	Impact	Monitoring Indicators	Responsibility of Monitoring	Frequency	Location	Method & Target	Est. Cost (EGP)
Post-Closure Phase							
						• Fire drills should be done regularly and external audit. • Check that the health insurance covers all workers on site, including work injuries.	
Local Community	Labor Influx	• Check worker IDs to confirm age and local origin • Review contractor hiring records regularly • Place a complaint box or hotline for feedback	QG	After completion of closure phase	At subproject site	• See Table 7-8	No additional costs
Local Community	Road and Traffic flow	• Vehicle's safety inspections are available • Installed boards and warning signs for speed limits • Implementation of the Traffic Management Plan • Notifications to communities of changing traffic patterns, if any.	QG	Quarterly or as soon as receiving a complaint Follow up on complaints will be continuous	At subproject site	• Site inspection with photo documentation • Monthly reports and grievance log • Review Grievance log • Review Accidents log (if applicable)	No additional costs
Local Community	Sexual Exploitation and Abuse & Sexual Harassment (SEA/SH) and Gender Issues	• The monitoring of workers' compliance to the CoC when interacting with the surrounding communities to avoid behaviors such as SEA/SH. • Complaints raised due to SEA/SH. • Documentation of corrective measures adopted • % of workers trained on Code of Conduct	QG	Quarterly or as soon as receiving a complaint Follow up on complaints will be continuous	At subproject site	• Review periodic reports • Review Grievance log • Site observation • Review Worker Code of Conduct • Engagement with women minutes of meetings	No additional costs
Utilities	Public Infrastructure and Utilities	• Waste transport monitoring reports outside the project site • Number of local community complaints related to the performance of the contractor for construction activities • Documentation of affected infrastructure and corrective procedures taken	QG	Quarterly or as soon as receiving a complaint Follow up on complaints will be continuous	At subproject site	• Site inspection with photo documentation • Review Accidents log (if applicable) • Periodic reports • Review the documentation of affected infrastructure and corrective procedures taken	No additional costs

Receptor / EHS Aspect	Impact	Monitoring Indicators	Responsibility of Monitoring	Frequency	Location	Method & Target	Est. Cost (EGP)
Post-Closure Phase							
						• Review Grievance log • Apply all monitoring methods	
Local Community	Visual intrusion	• Walk around the site once a month and take photos to check if plants or ground cover are still in place • Look at new structures like vents • Visit the site at night to make sure lights and signs are not too bright • Check the ground after dry or windy days to see if dust or erosion is happening • Compare the color and height of new items with what was planned	QG	Monthly or as soon as receiving a complaint	At subproject site	• Review periodic reports • Site observation	No additional costs
Project Workers / Labor & Working Conditions	Legal, financial, and reputational risks due to gaps in employment terms, insurance coverage, wages/payslips, OSH/PPE & training, worker GRM, and contractor/subcontractor compliance	• Contracts & IDs: % workers with valid written contracts & IDs. • Insurance: % workers (incl. casual/daily & subcontracted) covered. • Payroll: on-time payment rate; % pays lips issued; ≤1% payroll corrections. • Hours & Leave: weekly avg hours; overtime within limits; rest day compliance. • OSH: induction completion; toolbox talk attendance; PPE compliance %; incident/near-miss reporting & closure time. 6) • GRM: acknowledgement & closure within SLA; complaints open >14 days. 7) Contractor audits: monthly score; # critical NCRs open >14 days.	QG	Monthly compliance audit; weekly HSE walkdowns & transport spot checks; quarterly management review; ad hoc upon complaint/incident	Site offices; work fronts; HR/HSE records; contractor yards	• Checklist-based audits, document review (contracts, payroll, insurance lists, training logs), site inspections, interviews, GRM log analysis, photo evidence.	No additional costs

8 Stakeholders Consultation and Public Disclosure

This Chapter provides a summary of the stakeholder consultation and engagement undertaken as part of the ESIA process for the subproject and provides an overview of the findings..

8.1 Stakeholder Identification and Analysis

Stakeholders identified for the First Landfill Cell for Qalyubia Governorate at the 10RIWMF subproject are listed as follows:

- **National and Regional Authorities:**
  - Ministry of Local Development
  - Waste Management Regulatory Authority
  - Egyptian Environmental Affairs Agency
- **Governorate-Level Stakeholders (Qalyubia):**
  - Deputy Governor of Qalyubia
  - Community Communication Officer, Qalyubia Governorate
  - Solid Waste Management Unit, Qalyubia
  - Environmental Affairs Department, Qalyubia
  - Occupational Health and Safety Department, Qalyubia
  - Manpower Office, Qalyubia
- **Local Subproject Stakeholders:**
  - Contracting Company: Al Shams, responsible for the construction on the internal infrastructure and utilities at the IWMF
  - Contracting Company: SETS, responsible for supervising the construction work at the IWMF.
  - ECWM: responsible for constructing and operating Cairo Treatment Factory and the landfill plot
- **10th of Ramadan City Stakeholders:**
  - Environmental and Waste Management Department, 10th of Ramadan City Authority
  - Public Relations Department, 10th of Ramadan City Authority
  - New Urban Communities Authority (NUCA)

8.2 Consultation Methodology and Activities Undertaken

The consultant conducted a set of Focus Group Discussions (FGDs) involving 15 men and 4 women, in addition to 10 Key Informant Interviews (KIIs) with various concerned stakeholders (7 men and 3 women). The total number of participants in the consultations was 29 individuals.

Table 8-1 Summary of Consultation Activities Conducted with the Stakeholder Groups

Stakeholder Group	Male	Female	Type of Interview	Date
Officials from the Ministry of Local Development (MOLD)	–	1	KII	14 April
Officials from the Waste Management Regulatory Authority (WMRA)	3	1	Interview	14 April

Stakeholder Group	Male	Female	Type of Interview	Date
Officials from the Egyptian Environmental Affairs Agency (EEAA)	–	2	Interview	14 April
Officials from Al-Shams Contracting Company at the project site	3	–	Interview	16 April
Officials from STES Company at the project site	2	–	Interview	16 April
Social development officers from Al-Shams and STES	1	1	KII	16 April
Officials from the Environment, Waste, and Cleanliness Department of the 10th of Ramadan City Authority	3	–	KII	17 April
Officials from the Public Relations Department of the 10th of Ramadan City Authority	1	1	Interview	17 April
Officials from the Labor Office in Qalyubia Governorate	3	–	Interview	6 May
Officials from the Environmental Department in Qalyubia Governorate	1	–	KII	6 May
Deputy Governor of Qalyubia	1	–	KII	6 May
Community Liaison Officer in Qalyubia Governorate	–	1	KII	6 May
Officials from the Solid Waste Management Department in Qalyubia Governorate	3	–	Interview	6 May
Officials from the Occupational Health and Safety Department at the Labor Office	1	–	KII	6 May
Total	**22**	**7**		

Below is a summary of outcomes of consultation activities to be considered during all phases of the subproject as applicable.

8.2.1 Outcomes of the Scoping Consultation Activities

All consultation activities conducted were documented with lists of participants and photo documentation in order to guarantee an appropriate level of transparency. The following table presents the main outcomes of the stakeholder engagement activities conducted by the Consultant.

Table 8-2: Outcomes of the scoping consultation activities

Stakeholder Group	Title / Position of Representatives Consulted	Key Questions / Discussion Topics	Summary of Points of Discussion	Agreed Outcomes / Recommendations	ESIA Reference
MoLD	Project Coordinator for Component 2 of GCCC Project	What is the Ministry's coordination role? How will infrastructure be developed? How will waste transport from Qalyubia be handled? What are the expected environmental and social impacts?	• The Ministry of Local Development coordinates between WMRA, Cairo and Qalyubia Governorates, and NUCA. • It oversees infrastructure development, including roads and landfill design for Qalyubia. • Waste transport from Qalyubia will require upgraded roads and improved logistics to connect transfer stations. • Environmental and social impacts include traffic congestion, inter-provincial coordination challenges, and the need for consistent infrastructure standards.	Continue leading coordination, complete infrastructure works, engage investors, upgrade Geneva Road, and implement Abu Zaabal Dumpsite Closure.	Institutional Setup (7.2), Project Description (2), E&S impacts and Cumulative Impacts (6)
WMRA	Environmental Engineer; Solid Waste Consultant; Environmental Engineer	What is WMRA's role in planning and oversight? How will environmental and OHS standards be enforced? What facilities are needed for workers?	• Described WMRA's role as planner, regulator, and monitor for the IWMF. • Secured land for the project through a presidential decree. • Developed the site master plan for the IWMF.	Ensure EHS compliance, operate grievance systems, provide full worker facilities, coordinate across agencies, and oversee construction and operation.	Institutional Setup (7.2), ESMoP (7.4), Project Description (2)

Stakeholder Group	Title / Position of Representatives Consulted	Key Questions / Discussion Topics	Summary of Points of Discussion	Agreed Outcomes / Recommendations	ESIA Reference
			• Coordinated inter-agency approvals to streamline implementation. • Emphasized the importance of personal protective equipment (PPE), grievance systems, rest areas, first aid, and training. • Highlighted the need for operational facilities such as laboratories, workshops, and spare parts storage.		
EEAA	Director, Infrastructure Projects; Senior Environmental Researcher	What environmental studies and permits are required? How will impacts during construction and operation be mitigated?	• The participants asked for detailed descriptions of all phases of the project. • Requested assessment of traffic impacts during construction and operation. • Emphasized the need for a waste management plan during the construction phase. • Recommended exploring leachate treatment and gas-to-energy utilization. • Suggested reuse of treated wastewater within the facility. • Highlighted the importance of clear landfill specifications.	Integrate comprehensive environmental design, utilize landfill gas for energy, build industrial wastewater treatment, and align permits with operational details.	Project Description (2)
Qalyubia Governorate	Representative of Deputy Governor; Director of Community Liaison; Director of Environment Dept.	What is the Governorate's role in the project? How will waste contractors be regulated? What risks are foreseen?	• The Governorate is involved in project planning and permitting. • It manages the licensing of waste contractors.	Proceed with landfill and station construction, plan for risk mitigation, integrate informal collectors into formal system, provide training and permits.	Institutional Setup (7.2), Waste Contractors still TBD

Stakeholder Group	Title / Position of Representatives Consulted	Key Questions / Discussion Topics	Summary of Points of Discussion	Agreed Outcomes / Recommendations	ESIA Reference
			• It enforces safety standards and insurance requirements for contractors. • Identified risks include delays in establishing transfer stations. • Other risks include fuel price fluctuations and shortages of spare parts. • The Governorate proposed a new fee system linked to electricity bills to support waste management financing.		
New Urban Communities Authority – 10th of Ramadan City Development Agency	Director of Environment Environmental Engineer; Deputy Head of Agency; Public Relations Officer	What infrastructure links are planned? How will odor and transport costs be managed? How will jobs be created for locals?	• It was recommended to coordinate with utility and road connections to 10RIWMF. • Allocated 100 feddans for disposal/recycling facilities for eastern cities. • The participants emphasized on EHS facilities, job creation, GPS tracking for waste vehicles, and compost quality improvement. Raised concerns on odor and leachate control.	Complete external infrastructure, implement GPS tracking, coordinate with agricultural research bodies, and ensure odor/leachate control.	Project Description – infrastructure (2), ESMP costs (7.2), Recruitment (6.3.2.1)
Al Shams Contracting & Engineering Works	Director of HSE & Environment; HSE Manager; Social Specialist of Al Shams contracting firm	What are the contractor's responsibilities? How is worker safety ensured? How are grievances handled?	• The contractor is responsible for executing internal infrastructure works on the project site. • Implemented safety protocols, grievance mechanisms, and anti-child-labor measures.	Enforce EHS policies, improve housing and transport, maintain training programs, prohibit child labor, and expand local hiring.	ESMP (7.2) & ESMoP(7.3) specifically OHS and labor and working conditions

Stakeholder Group	Title / Position of Representatives Consulted	Key Questions / Discussion Topics	Summary of Points of Discussion	Agreed Outcomes / Recommendations	ESIA Reference
			• Ensured worker safety through detailed safety training and enforcement of housing policies. • Installed grievance boxes and maintained open channels for worker complaints and feedback. • Engaged with the surrounding community to support transparency and address concerns.		
SETS Consulting Engineers	Social Consultant; Technical Engineers	How is construction quality monitored? How are safety issues escalated? What infrastructure concerns exist?	• Construction quality is monitored through supervision of works, material verification, and safety compliance checks. • Safety issues are escalated through coordination with Al Shams and the City Agency. • Infrastructure concerns include road safety and inadequate lighting.	Coordinate with authorities for security and lighting, improve access routes, monitor welfare and grievance mechanisms.	ESMP (7.2) & ESMoP(7.3) specifically OHS and labor and working conditions
Ministry of Manpower	Deputy Head of Labor Directorate; Director of HSE Dept.; Legal Advisor;	How will labor laws be enforced? How are informal workers protected? How will safety compliance be monitored?	• Labor laws are enforced through regular inspections and monitoring of work standards. • Informal workers are protected through oversight measures and inclusion in safety protocols. • Digital checklists and worker ID systems are used to track compliance from the start of construction.	Enforce new labour law provisions, integrate informal workers, ensure medical screening, and strengthen inspection and compliance systems.	ESMP (7.2) & ESMoP(7.3) specifically OHS and labor and working conditions

Stakeholder Group	Title / Position of Representatives Consulted	Key Questions / Discussion Topics	Summary of Points of Discussion	Agreed Outcomes / Recommendations	ESIA Reference
			• Safety compliance is enforced continuously throughout the project. • The new Labor Law No. 14/2025 strengthens worker protections, supports inclusion of persons with disabilities, and requires medical screening.		

8.2.2 Summary of Public Hearing Discussions

A final public hearing event was carried out on the 3rd of September 2025 at the 10th of Ramadan Investor's Association Meeting Hall. Below is a summary of activities. During the public hearing event, the Design Consultant "Chemonics Egypt" presented the conceptual design. Additionally, the ESIA Consultant presented the ESHS impacts and mitigation measures. An advertisement for the event was published in the local newspaper on August 19th (see Annex X)

8.2.2.1 Distribution of Participants

The list of participants (Annex X) shows the distribution of attendees across various sectors and institutions, as listed in the following table.

Table 8-3 Distribution of Participants

Sector / Entity	Female	Male	Total
Environmental Sector & Qalyubia Governorate	6	8	14
Industrial Sector	2	5	7
Health Sector	2	3	5
GCCC (General Cleaning & Cleansing Co.)	1	3	4
10th of Ramadan Authority & NUCA	1	3	4
NGOs	1	1	2
Firms	1	1	2
Consultants	0	2	2
Labor	0	1	1
Academia	0	1	1
MSMEDA	0	1	1
World Bank (Virtual)	2	2	4
Total	16	31	47

The key outcomes of the public hearing event are as follows

Table 8-4: Comments and concerns raised during the public consultation session

Issue Raised	Raised By	Detailed Question	Detailed Response	Reflected in ESIA
Benefiting from lessons learned	Social Expert at SETS Company	It is strongly recommended to benefit from lessons learned during construction and operation phase of similar projects carried out by the GCCC and other projects	The consultant has thoroughly reviewed comparable projects and developed the Environmental and Social Management Plan (ESMP) in full alignment with best practices and compliance standards observed in those projects.	The ESMP section 7
Closure Plan for the 1st Landfill Cell after it reaches full capacity	Egyptian Environmental Affairs Agency	Why was the closure of 1st Landfill Cell after it reaches full capacity not discussed in detail? What are the environmental precautions being considered during the closure phase, and how will these be communicated to the public and contractors?	• The ESMP provides high-level mitigation measures for the closure phase, however, a detailed ESIA/ESMP should be developed once the operation phase of the 1st cell is completed. • A separate tender will be issued for operation, and contractors must comply with environmental standards. Closure will be phased and coordinated with the opening of alternative sites.	ESMPs 7.3.3, 7.4.3
Waste Management Contracting	Environmental Supervisor, Tenth of Ramadan City	Why was only the first cell constructed and not the full 10RIWMF project? What is the plan for managing waste once Abu Zaabal closes?	• The key for constructing the first landfill first is so that once Abu Zaabal Dumpsite is closed, the first landfill cell for Qalyubiya MSW is in operation and ready to receive waste. • A comprehensive contract for waste management is planned.	Project Description Chapter 2
Management of the Landfill		Who will be responsible for managing the landfill once it becomes operational? Has a contract been awarded for this purpose, and what are the current arrangements for waste management in Qalyubia?	• A comprehensive contract for landfill management is planned but has not yet been awarded. Waste needs to be transferred to the treatment facility to ensure proper processing while considering management and transportation logistics. Coordination is ongoing between local authorities and stakeholders to finalize the operational framework and ensure continuity of service.	6.2 Cumulative Impact Assessment

Issue Raised	Raised By	Detailed Question	Detailed Response	Reflected in ESIA
Safety and Health Protocols	Safety Manager, Al-Shams Company	He shared information about safety measures adopted by Shams company as a role model	• A safety plan is being developed. NEBOSH-certified staff are involved. • A monitoring plan is included in their HSE management procedures • The PCU monitor their activities •	ESMP aspects related to OHS (7)
Handling of Excavated Soil and Absence of Integrated Waste Facility	Former Deputy Head of the 10th of Ramadan Authority	What will be done with the soil excavated during the construction of the landfill? Will it be reused on-site or transported elsewhere? Additionally, why is there no integrated facility that combines both waste treatment and landfill operations?	• Dr. Abdullah explained that part of the excavated soil will be reused on-site, specifically in the construction of stone layers and embankments. Some of the soil may be transported off-site depending on its suitability.	Project Description (2) ESMP measures for soil reuse recommendations. (7)
Occupational Health & Safety	Ministry of Labor	How will occupational health and safety be ensured, especially regarding the use of proper protective equipment?	• An occupational health and safety consultant will be appointed to oversee safety measures. • Detailed risk assessment will be carried out. • Detailed procedures will be developed • A long list of permits and forms will be applied for implementation and monitoring in full compliance with labor law • All workers will be provided with appropriate PPE (Personal Protective Equipment) and trained on safety protocols.	ESMP OHS measures (7)
Waste Utilization	Ministry of Labor	How can we maximize the benefit from waste materials, and ensure proper licensing and control over the waste management system?	• The project will include a waste management strategy that ensures optimal utilization of waste. Licensing procedures will be established similar to airport-level controls to prevent unauthorized operations.	ESMP measures for waste management (7)

Issue Raised	Raised By	Detailed Question	Detailed Response	Reflected in ESIA
Occupational Health & Safety	QA/QM Sega-M Electrical Products Company	Is there a designated person responsible for occupational health and safety?	• Yes, a dedicated occupational health and safety officer will be appointed as per Egyptian law and international standards.	ESMoPs regarding OHS (7)
Safety Requirements	QA/QM Sega-M Electrical Products Company	Why are there no visible safety and health requirements in the documentation?	• Safety requirements are detailed in the ESIA under the Health and Safety section, including PPE, training, and emergency protocols.	ESMP measures for OHS (7)
Cell Closure	QA/QM Sega-M Electrical Products Company	Will the waste cell be closed or remain open?	• The cell will be closed with a daily cover according to technical specifications and environmental regulations. Closure procedures are included in the design.	Project Description (2)
Surface Materials & Resting	QA/QM Sega-M Electrical Products Company	What materials will be used for surface insulation, and will the surface be rested before use?	• Composite insulation layers will be used. Geotechnical studies have been conducted to ensure proper surface resting and stability.	Project Description (2)
Site Selection Distance	QA/QM Sega-M Electrical Products Company	Why was the site chosen to be 5 km away?	• The site was selected based on environmental buffer zones, safety considerations, and regulatory compliance.	Site Selection (5)
Explosion Possibility	QA/QM Sega-M Electrical Products Company	Is there a possibility of explosion at the site?	• No, if all safety and environmental protocols are followed. Gas monitoring wells and insulation systems are in place to prevent such risks.	Project Description (2) ESMP mitigation measures (7)
Vehicle Washing & Treatment	GM of Environment & Quality – Cleopatra	Will there be a treatment unit for washing tires and vehicles?	Tires will be washed and the wastewater will be directed to an evaporation pond. A treatment station is also planned.	Project Description (2) ESMP mitigation measures to prevent contamination from drainage water (7)
Gas Utilization	GM of Environment & Quality – Cleopatra	Is there a method to utilize the gas generated?	Yes, gas layers will be captured and may be used for incineration or energy recovery.	Project Description (2)

Issue Raised	Raised By	Detailed Question	Detailed Response	Reflected in ESIA
Groundwater Protection	GM of Environment & Quality – Cleopatra	Was groundwater taken into account in the design?	Yes, groundwater is located at 45 meters depth. Monitoring wells and insulation layers are included to prevent contamination. Groundwater monitoring program will also be in place	Baseline assessment describes depth of groundwater (4) Monitoring program suggested in ESMPs (7)
Post-Closure Phase	EEAA, Sharqia	What happens after the landfill is closed?	The post-closure phase will include measures for environmental monitoring and land rehabilitation.	Project Description 2.4.4. and 2.4.5
Household Waste Sorting	Social Expert at Shams Contractor	Is there an initiative for household-level waste separation?	Yes, awareness campaigns will be conducted to promote household sorting and coordination with contractors. Economic diversity affects participation levels.	Community engagement and awareness highlighted in section 6.1
Distance from Residential/Industrial Areas	EEAA	The cell is located 5 km away from residential and industrial zones. Why this distance?	There is no urban sprawl according to the New Urban Communities Authority. Coordination was done with local development authorities to ensure safe distancing.	Site Selection (5)
Waste Management Contract	EEAA	Who is responsible for operating the cell and monitoring its performance under the comprehensive waste contract?	The comprehensive contract will define responsibilities. Monitoring will be conducted by designated authorities.	Institutional Setup (7.2)
Scope of Current Session	Environmental Specialist at the PCU - GCCC	She shared information about the studies that will be carried out for the other plots in the IWMF	This session focuses on the first cell. Separate studies will be conducted for each unit.	Cumulative Impact Assessment (6.2)
Transport and Treatment Planning	Environmental Specialist at the PCU - GCCC	This was not a question. It was additional information shared by GCCC representative about scenarios of waste transportation	Eng. Doaa indicated that, at this stage, the final scenario for waste transportation has not been determined yet.	Cumulative Impact Assessment (6.2)

8.3 Proposed Grievance Mechanism

An effective grievance redressal mechanism and its implementation are crucial for achieving subproject objectives, enhancing the quality of subproject activities and results, and guiding the management of force and defense procedures. Additionally, individuals who wish to file complaints or raise concerns will only do so if they are confident that their grievances will be addressed in an effective, respectful, impartial, and courteous manner, without fear of retaliation.

The PCU has developed a detailed Grievance Mechanism Manual which has the details of the different channels to be used for submitting complaints. The details on the channels are disclosed on project sites and are also available on the following link: https://www.eeaa.gov.eg/Project/127/Details

8.3.1 GRM Channels (Intake)

General enquiries about the First Cell Landfill are managed by Citizens Service Department of QG through the following channels:

- WhatsApp:01273133917 - 01129947162
- Email: Khdmetmwatnen@gmail.com
- In case of appeal, grievances should be submitted to the PCU on the following channels:
    - **Mobile number:** 01126669002
    - **WhatsApp:** 01126669002
    - **Email :** Complaints@gccceg.com

More details about the GM are available on the above link.

9 Appendices

9.1 Annex I: Field Studies

9.2 Annex II: Plot 4 Land Documents

9.3 Annex III: Design Documents

9.4 Annex IV: Details of the Legal and Institutional Framework

9.5 Annex V: Impact Assessment Methodology

9.6 Annex VI: GCCC Project Grievance Redress Mechanism and CoC

9.7 Annex VII: Chance Finds Procedure

9.8 Annex VIII: Proposed Groundwater Monitoring Program

9.9 Annex IX: Preliminary Training Aspects Within OHS Plan

9.10 Annex X: Public Consultation Material

9.11 Annex XI: Detailed Impact Assessment

9.12 Annex XII: C-ESMP TOR

9.13 Annex XIII: Elements of the Pest Management Plan

9.14 Annex XIV: ESHS Design Requirements

All the above annexes are available on the below link:

https://drive.google.com/drive/folders/12Qc5xHeIm7HwhIkEoIiB501VvbMMfWQ_?usp=sharing