U.S. Embassy Amman

Hashemite Kingdom of Jordan

Ministry Of Water And Irrigation

WATER ENGINEERING SERVICES

TASK 6.2: TECHNICAL SUPPORT FOR REHABILITATION AND EXPANSION OF SOUTH AMMAN WWTP

Non-Technical Summary (NTS)

October 2025

NON-TECHNICAL SUMMARY (NTS)

Background

Task 6.2 of the WES Activity focuses on the "upgrade and expansion of the existing South Amman WWTP," located in Al Jizah, South Amman, approximately seven (7) kilometers from Queen Alia International Airport (QAIA). This facility serves the southern part of the Amman Governorate.

The South Amman WWTP began operations in 2015 to serve the densely populated southern areas of Amman and is the second-largest WWTP in Jordan. As part of the project planning between 2010 and 2012, the location of the WWTP was carefully selected in consultation with the local community to ensure a safe distance from residential areas. However, the South Amman WWTP has operated without an Environmental Impact Assessment (EIA) and an environmental permit. Therefore, the MoEnv, specifically the Directorate of Environmental Inspection and Control, requested ECO Consult to conduct an environmental audit for the WWTP (Task 5.2) in accordance with the Environmental Audit Instructions for the year 2014.

This involves conducting a comprehensive assessment of the facility's environmental performance, identifying potential deficiencies that could result in adverse environmental impacts, and formulating an Environmental Settlement Plan to mitigate or minimize these impacts to acceptable levels.

Figure 1 presents the location of the project area within Jordan.

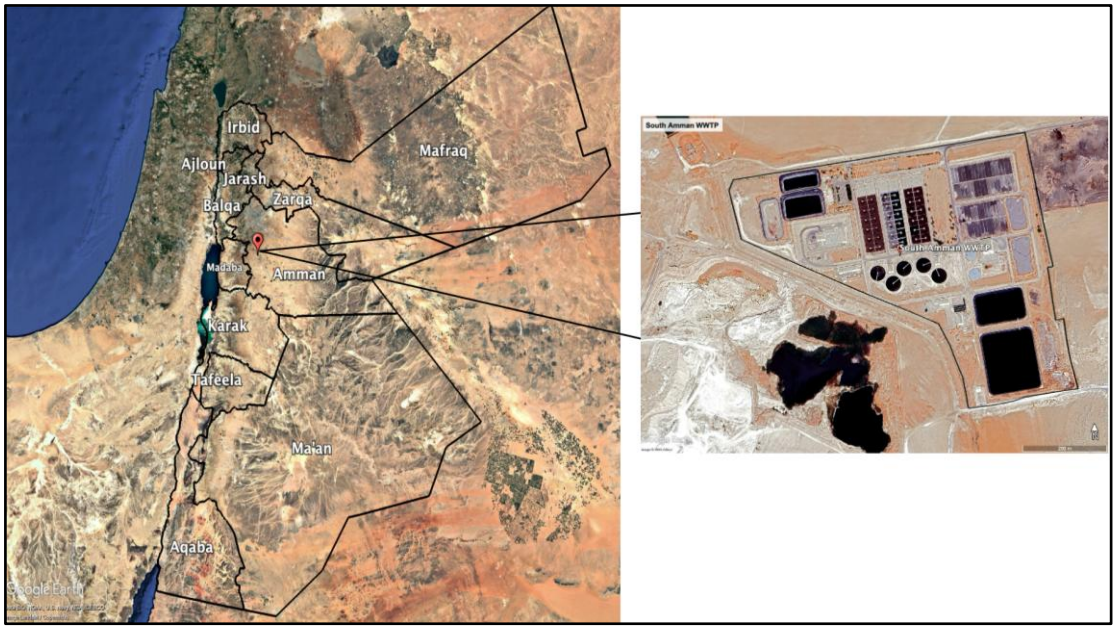

Figure 1: The Project Location within Jordan

South Amman WWTP is one of the major WWTPs in Jordan and in the middle region of the Kingdom. It was operated in 2015 to serve the southern part of Amman. The South Amman WWTP expansion project is a key strategic project, as the South Amman region is considered one of the areas with rapid population growth, leading to an increased demand for essential services, including wastewater treatment. The primary aim of the South Amman WWTP is to treat domestic wastewater, a vital step in ensuring the responsible management of wastewater from residential areas in the region. The treated effluent is strategically repurposed to enhance agricultural productivity in the area through irrigation.

The WWTP is located in Al-Jizah and uses extended aeration to treat wastewater received from various communities in its catchment area, including Sahab, Khribet Al Souq, Al-Qweismeh, Al-Nuzha, Rajm Al Shami, Dheiban, Jwaideh, Abu Alanda, Al Yadoudeh, Thuheibeh, Feisaleyeh, and Jawa, as shown in **Figure 2.**

Figure 2: The Catchment Area of South Amman WWTP

The South Amman WWTP was originally designed to treat municipal/domestic wastewater to a secondary level through extended aeration, with a design capacity of 52,000 m^3/day. Currently, the plant operates at a capacity of around 35,000 m^3/day, which is 65% of its designed load. In terms of capacity, the South Amman WWTP ranks as the second largest WWTP in Jordan.

Project Location and Land Allocated for the Project

South Amman WWTP is located in South Amman, in Al-Jizah, around five (5) kilometers from QAIA and it serves the southern part of Amman Governorate. The closest settlements to the site are Al-Jizah village (located around 2.5 km to the north), and Areinba Al-Gharbiyah (located around 3.5 km to the south). Figure 3 illustrates the location of the project area in relation to the closest settlements.

The land allocated for the South Amman WWTP Project is part of the existing WWTP, however, there are some components which are outside the WWTP perimeter such as the raw wastewater ponds which have already been approved by MoEnv and is currently under construction.

Figure 3: Location of South Amman WWTP

Main Project Components

The Project will include the upgrading of some existing facilities, demolishing of some existing facilities, and construction of new facilities. The project components inside the existing WWTP boundaries include an Inlet Screw Pumps Pumping Station, Fine and Coarse Screens, Grit and Grease Removal Tanks, Primary Sedimentation Tanks, and Industrial Wastewater Storage Ponds.

Project Alternatives

The Task 6.2 Team, in collaboration with MWI/WAJ, proposed, studied, and evaluated three alternatives for the South Amman WWTP. During the environmental and social screening, WES Team identified several performance-related deficiencies and recommended improvements. Based on these findings, they concluded that any of the three alternatives should include the following enhancements to optimize the plant's performance:

- Improved raw wastewater lifting station, considering future trunk lines.
- Installation of influent flow measurement system.
- Influent and effluent composite samplers.
- New screening units.
- New grit and grease removal systems.
- New primary sedimentation tanks, if the conventional activated sludge process is adopted.
- Replacement of mechanical aeration with a diffused aeration system.
- Anaerobic sludge digestion system.
- Utilization of biogas for power and heat generation.
- New sludge dewatering units.

Alternative-1:

Redesign of the plant as Conventional Activated Sludge Process with provision of a new screw pumps raw wastewater lifting station and new screens, grit removal tanks, primary sedimentation tanks, heated anaerobic sludge digestion and biogas utilization for power generation and boiler heating.

Alternative-2:

Same as Alternative-1, but with utilization of the existing raw wastewater pumping station. This alternative requires new screens, grit and grease removal tanks and primary settling tanks to be built 5 m below the natural ground level. Raw wastewater will be transmitted to the balancing tanks where the effective volume becomes very small due to the additional head loss because of the new added upstream treatment units. This alternative is discounted because little space is available for the new treatment units at the existing site and the complications associated with the excess flow diversion.

Alternative-3:

Redesign the improvements and expansion under the current treatment process of Extended Aeration and provision of new inlet works. Due to lack of space and to the inability of the Extended Aeration process to utilize primary and secondary sludge for biogas and power generation, it is therefore discounted for further analysis.

Based on the analysis of all three alternatives, Alternative-1 is considered the most viable option for the expansion and rehabilitation of the South Amman WWTP.

Workforce and Training

The project will require a specific workforce throughout its various phases, including decommissioning, which involves tasks such as demolishing or removing obsolete assets, as well as during the construction and operation phases. However, the duration of the decommissioning and construction phases, along with the associated number of job opportunities, as well as the number of employees required during the operation phase, will be determined, and updated once financing source and arrangements, such as assigning the DBO Contractor for the Project, are secured. Further details are provided below:

- A certain number of job opportunities will peak during the decommissioning and construction phases. These opportunities will mainly involve skilled positions such as engineers, technicians, consultants, and surveyors, as well as unskilled roles including labourers and security personnel. Number of workers depends on the Contractor's program, however; it is expected that at least 125 workers will be on site and at least 8 vehicles will be required in addition to the other construction equipment like loaders, hammers, trucks, etc.
- A certain number of job opportunities, significantly fewer than those available during the decommissioning and construction phases, will arise during the operation phase. These opportunities will encompass skilled positions such as engineers, technicians, and administrative employees, as well as unskilled roles such as security personnel and drivers. Number of Workers estimated about 10 workers per shift, and number of Vehicles is about 2.

Taking the above into account, the DBO Contractor should aim to hire local community members to the greatest extent possible throughout the Project's various phases, for both skilled and unskilled positions. The DBO Contractor is committed to adhering to transparent recruitment procedures, which include involving local community members.

General Overview of the Project Phases

The project phases encompass three (3) main phases; design, construction, and operation, all of which are discussed below:

Design phase: The project will be implemented in a single phase, with an estimated average design capacity of 62,000 m^3/day, sufficient to meet demand through the year 2035. At this stage, Task 6.2 Team has prepared the tender documents for the DBO contract for the project. The detailed design will be prepared by the contractor selected through the DBO tendering process (DBO Contractor).

Construction Phase:

The existing WWTP shall remain fully operational during the entire expansion period to ensure continuous treatment and prevent any release of untreated wastewater into the environment.

The scope of work will consist of the following key construction activities:

- Site mobilization for materials and equipment
- Site preparation
- Excavation
- Earthwork activities for installation of the stationery project components
- An area would be assigned for storage of construction materials and a covered/fenced storage area provided for installation equipment.

Sequence of Construction and Operational Continuity:

To maintain uninterrupted plant operation during the construction phase, WES Team has developed a carefully phased construction sequence. This approach ensures the continuous functionality of the existing treatment processes while facilitating the integration of new infrastructure in a controlled and coordinated manner. The sequence includes:

- Removal and backfilling of the northern raw wastewater storage pond
- Dry construction of inlet works up to splitter box 1N
- Extension of the 1,500 mm influent pipeline and manhole construction
- Construction of major structural components (e.g., digesters, control buildings) in dry conditions
- Isolation and cleaning of individual treatment units and lines
- Diversion and dismantling of existing Disk Filters with bypass provision
- Upgrade and replacement of sludge treatment and dewatering equipment
- WAS sludge holding tank refurbishment and mixer installation
- Modifications to RAS/WAS pumping stations and the balancing tank

This sequencing plan is designed to prevent service disruption, maintain compliance, and ensure safety throughout the construction period.

The construction materials and equipment are characterized as follows:

- **Civil**: Cement, several grades of sand, gravel, concrete blocks stones, asphalt, iron and other metals, electrical and mechanical equipment, bricks, backfilling materials, construction steel, asphalt, etc. Such materials will be purchased from the local market and delivered in bulk to the site.
- **Water**: During the construction, the contractor will need large amounts of water for the construction process as well as large amounts of electricity and diesel for the construction equipment and for the lighting of the construction site.

- **Electro-mechanical materials**: Pipes, fittings, valves, pumps, agitators, mixers, blowers, ducts, vents, high and low-voltage cables, earthling equipment, transformers, switchgear, PLC panels, generators, boilers, heat exchangers, etc.
- **Waste**: Municipal waste from workers, dust, and air pollutants, excavated materials, debris, and waste from equipment delivered to site, fuel, lubricants.

Operation Phase: The Operation of the Project will be enlisted as:

- Wastewater Line includes primary treatment, biological treatment, and chlorination.
- Waste from the treatment processes (grit, screened waste).
- Sludge Line.
- Odor Control System.
- Maintenance of equipment.

Project Benefits

As previously noted, the existing South Amman WWTP is currently facing several operational, environmental, and social challenges. The implementation of the proposed upgrade project is expected to address and mitigate many of these issues through improved infrastructure, better compliance with regulations, and enhanced environmental performance. The project offers a wide range of benefits, which include:

Improved Operational Performance and Compliance

The upgrade of the South Amman WWTP will significantly enhance the overall efficiency and reliability of wastewater treatment operations. Modernized infrastructure and process improvements will eliminate the use of carbonate storage ponds, reducing odor and environmental risks. These improvements will ensure the plant consistently meets national environmental standards and regulatory discharge requirements, supporting legal compliance and long-term operational stability.

Enhanced Sludge and Energy Management

The project will improve sludge stabilization, handling, and disposal processes, leading to safer and more sustainable outcomes. Anaerobic digestion will reduce the volume of volatile solids and produce biogas, which will be used in combined heat and power (CHP) units to generate electricity and thermal energy. This internal energy recovery reduces reliance on external power sources and contributes to the plant's operational sustainability and lower greenhouse gas emissions.

Protection of Water Resources and Environmental Health

By ensuring consistent production of high-quality effluent, the project will contribute to maintaining safe and sanitary conditions within the reuse system and surrounding environment. High treatment standards will help prevent odors and reduce vector attraction. This, in turn, supports public health, promotes safe reuse practices, and contributes to maintaining ecological quality in the project area.

Agricultural Reuse and Community Support

The availability of higher-quality treated wastewater will support its use in agriculture, improving irrigation reliability and helping reduce crop losses. This will benefit farmers and rural communities by supporting livelihoods, decreasing reliance on freshwater sources, and promoting sustainable agricultural practices. In parallel, the project will result in better environmental, health, and safety conditions in the areas surrounding the WWTP.

Strategic Alignment and Long-Term Impact

The project aligns with Jordan's national water, energy, and environmental strategies. It addresses key sectoral challenges such as water scarcity, pollution, and energy efficiency while creating long-term economic, social, and environmental benefits at both the local and national levels. It also enhances institutional capacity by introducing modern technologies, operational practices, and sustainable service models.

Stakeholders Engagement

Stakeholder engagement is an integral part of ESIA good practice and is a statutory requirement of the national EIA legal framework in Jordan, and the International Financial Institutions' (IFIs) policies and standards on the E&S aspect.

International requirements and GIIP set out certain recommendations for stakeholder engagement, to ensure that stakeholders are appropriately engaged on environmental and social issues that could potentially affect them through a process of information disclosure and meaningful consultation.

Following the MoEnv's requirements, a scoping session must be held for those projects which require a comprehensive ESIA study. Public participation is one of the most important aspects of the Scoping/ESIA process as it directly involves the stakeholders who are expected to be affected by the Project development. In general, the objectives of the scoping session include the following:

- Introduce the Project and its various components to the stakeholders and provide them with all available information about the Project.
- Allow stakeholders to participate in the process of scoping environmental and social impacts of the Project.
- Early consideration of stakeholders' concerns and doubts regarding the nature, scale, and impacts of the Project; and
- Allow stakeholders to comment on the scope of work and methodology that will be adopted for the ESIA study.

The Scoping Session was held in coordination with the MoEnv on 17th December 2024 in Amman with different stakeholders including central governmental entities, Community Based Organizations (CBOs), Non-governmental Organizations (NGOs), and local community members.

Compilation of Environmental and Social Management Plan

An ESMP for the decommissioning and construction, and operation phases was prepared which included the following:

- The environmental and social components (e.g., air quality) that are likely to be impacted.
- A summary of the potential impact and/or likely issue.
- The identified management actions to be undertaken aim to eliminate and/or reduce the potential impact to acceptable levels. Management actions include mitigations, additional studies, or additional requirements and approvals.
- Monitoring actions to ensure that the identified management measures are implemented. Monitoring actions include inspections, review of reports/plans, reporting, etc.
- The frequency for implementing the monitoring actions, which could be once, continuously throughout the construction/operation period (depending on the mitigation

measure identified this could include daily, weekly, or monthly), or upon occurrence of a certain issue.

- The responsible entity for implementing the mitigation measures and monitoring actions identified.
- The relevant legislations that must be adhered to and which govern the environmental component or likely issue identified.