AAWDC Project Environmental and Social Impact Assessment Update:

Assessment of New Desalination Plant Site

26th May 2025

Revision History

Date	Rev	Author	Checked	Approved
20/05/2025	1	Mat Neale	Anna Rouse	Bill Boulton
26/05/2025	2	Mat Neale	Anna Rouse	Bill Boulton

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References

Ref. 1 AAWDC Project – Final Environmental and Social Impact Assessment Report dated 5th April 2022, prepared by Tetra Tech International Development

Ref. 2 Technical Proposal submitted as part of the bid (the "Bid") by the Meridiam-Suez Consortium dated December 4th, 2023

Ref. 3 Technical Proposal Update submitted by the by the Meridiam-Suez Consortium dated August 8th 2024

Ref. 4 Aqaba-Amman Water Desalination and Conveyance Project Agreement Appendix 3 Project Site (dated 5th January 2025)

Ref. 5 AAWDC Project Environmental and Social Management Plan dated 5th April 2022, prepared by Tetra Tech International Development (submitted as Annex 19 of AAWDC Project – Final Environmental and Social Impact Assessment Report

Executive Summary

The Aqaba-Amman Water Desalination and Conveyance Project (AAWDCP) will provide a reliable freshwater supply for Amman and other regions in Jordan. The project comprises three main components: marine works & desalination plant, conveyance system, and renewable energy facilities.

An Environmental and Social Impact Assessment (ESIA) was prepared in 2022 in accordance with the European Investment Bank (EIB), United States Agency for International Development (USAID) and national requirements for ESIA. The ESIA was based on the AAWDCP concept design and was subsequently approved by the relevant authorities. In 2024 the Ministry of Water and Irrigation (MWI) proposed an optimised location for the desalination plant.

The new desalination plant is situated on a brownfield site that was previously used for timber processing and storage. It is located within an industrial zone, surrounded by facilities for chemical, power generation, and fertiliser manufacturing. The topography of the new desalination site offers construction benefits, as it requires significantly less earthwork, minimises operational pumping requirements due to the lower site elevation and reduces the length of the intake and outtake pipelines (from approximately 3.5 kilometres (km) to approximately 1.5 km) being significantly closer to the project marine facilities. The new location of the desalination plant will accommodate the following project facilities:

- Desalination plant facilities
- Booster pumping station 1 (BPS1)

Power for the desalination plant is planned to be supplied from a new electrical substation to be constructed and operated by the National Electric Power Company (NEPCO), which will be a project-associated facility. The location of the NEPCO substation has also changed compared to the 2022 ESIA; it will be situated on a brownfield site, within 1 km of the new desalination plant.

This document is an update to the 2022 AAWDCP ESIA, specifically focusing on evaluating the environmental and social impacts associated with the relocation of the desalination plant site and verifying if any updates are required to the Environmental and Social Management Plan (ESMP). It is to be noted that the Project Company will issue a further consolidated ESIA update, complementing the 2022 ESIA to inform Financial Close.

The assessment methodology used in this update document aligns with the original 2022 AAWDCP ESIA. A site visit was conducted on 29th and 30th April 2025 to aid in the identification and evaluation of potential impacts.

The assessment confirms there are no new impacts or adverse changes to the significance of impacts assessed due to the site change. In general, the new desalination plant site is expected to result in a reduced intensity of site activity as compared to the 2022 site (including reduced earthworks, soil movement, waste generation and associated use of plant and equipment) and corresponding reduced scale of potential impacts, which further supports the selection of the new site location. The mitigation measures included in the 2022 ESIA remain appropriate for the new site; however, given the brownfield nature of the site there will be a requirement to carry out site investigations to manage potential risks of land and groundwater contamination, develop site-specific measures where needed with updates to be made to the existing ESMP and subsequently incorporated into the further consolidated ESIA update.

1 Introduction

1.1 Background

The Aqaba-Amman Water Desalination and Conveyance Project (AAWDCP), tendered by the Ministry of Water and Irrigation (MWI) of the Hashemite Kingdom of Jordan, with the assistance of USAID, in February 2020, will provide a safe and reliable freshwater supply for Jordan by developing a water supply infrastructure which includes desalination and water conveyance components. The Project Agreement for the AAWDC Project was signed between the Ministry of Water and Irrigation (MWI) and the National Carrier Project Company (NCPC) on 12th January 2025.

An Environmental and Social Impact Assessment (ESIA) was prepared in 2022 in accordance with European Investment Bank (EIB), United States Agency for International Development (USAID) and national requirements for ESIA based on the AAWDCP concept design at the time (Ref. 1). The ESIA was approved by the relevant authorities (refer to Annex 1 of the ESIA (Ref. 1) for approval letters). Subsequently, further project planning work has been undertaken to refine aspects of the AAWDCP design and project execution; this has included re-evaluation and change to the location of the desalination plant site.

The new location of the desalination plant will accommodate the following project facilities:

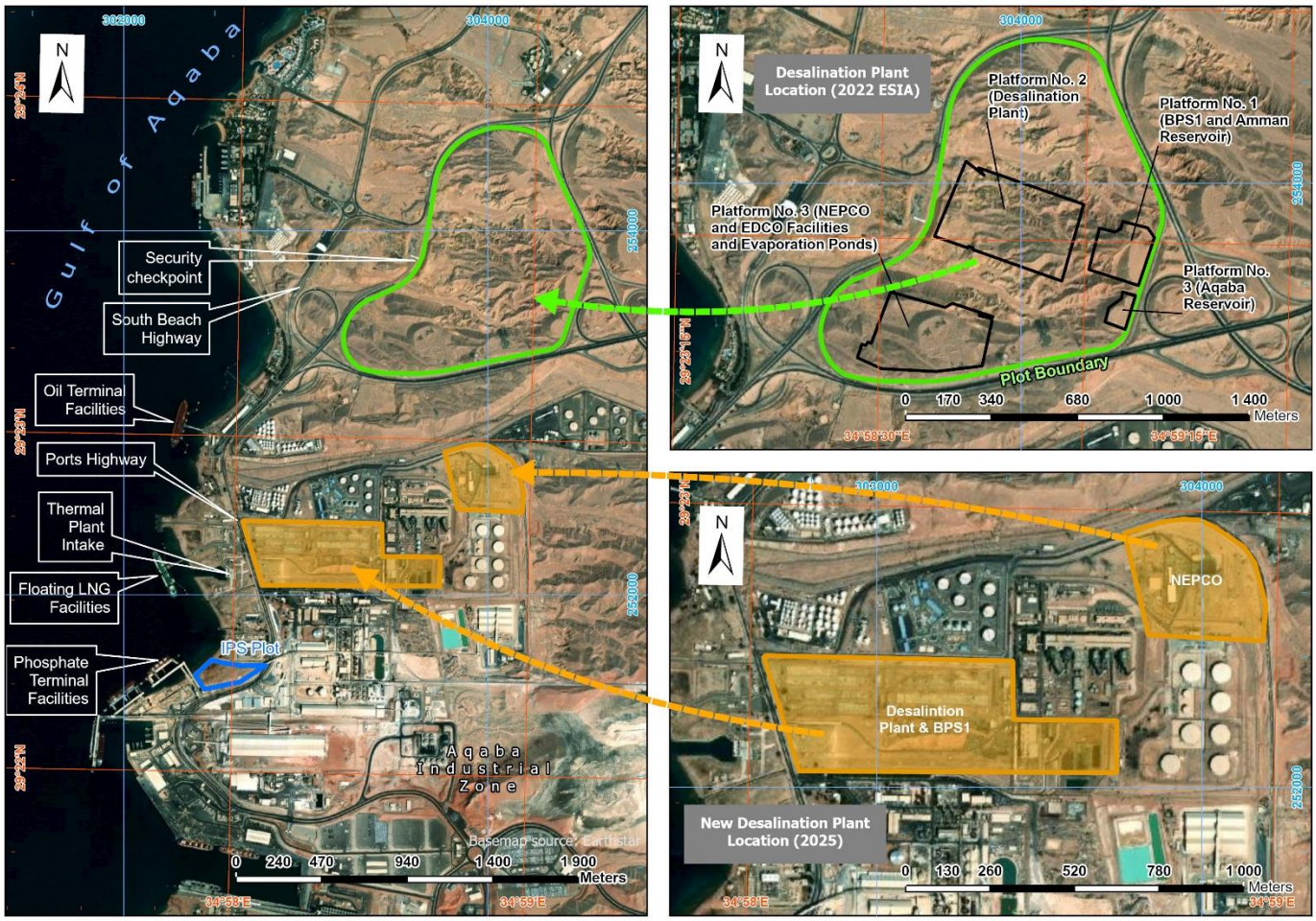
- Desalination plant facilities[1]
- Booster pumping station (BPS) 1[2]

Power for the desalination plant site facilities is planned to be supplied from a new electrical substation to be constructed and operated by the National Electric Power Company (NEPCO), which will be a project-associated facility. The location of the NEPCO substation has also changed compared to the 2022 ESIA; it will be situated on a brownfield site, within 1 kilometre (km) of the new desalination plant.

The locations of the 2022 and new 2025 desalination plant site and NEPCO substation are shown in Figure 1-1.

[1] Part of desalination project component
[2] Part of water conveyance project component

Figure 1-1 Location of Desalination Plant Site and NEPCO substation (2022 and Revised 2025 Locations)



1.2 Data Sources

The main data sources supporting this update to the identification and assessment of impacts associated with the construction of the desalination plant at the new location are listed below:

- The 2022 ESIA (Ref. 1)
- The Technical Proposal submitted as part of the bid (the "Bid") by the Meridiam-Suez Consortium (the "Consortium") on 4th December 2023 and Technical Proposal Update (submitted on 8th August 2024) (Refs. 2 and 3). Neither of these documents considered the new location of the desalination plant, introduced later by the MWI and formalised with the signature of the Project Agreement on 12th January 2025
- Aqaba-Amman Water Desalination and Conveyance Project Agreement Appendix 3 Project Site (dated 5th January 2025) (Ref. 4), which includes new desalination plant location and new NEPCO substation
- A site visit to the new desalination plant location on 29th and 30th April 2025 and engagement with the Central Electricity Generating Company (CEGCO), Aqaba Development Company (ADC) and Aqaba Special Economic Zone Authority (ASEZA)

1.3 Purpose

The purpose of this ESIA update is to:

- Describe the new desalination plant location and proposed project activities
- Assess if the new location of the desalination plant triggers changes to the impacts presented in the 2022 ESIA or creates new impacts (focused on construction aspects)
- Present new/modified impact avoidance, mitigation and management measures associated with the new location of the desalination plant

This update is based on information available at the time of writing. The findings will inform the further consolidated ESIA update to be finalised prior to achieving Financial Close for the project.

1.4 Document Overview

This update document includes the following sections:

- Project Description
- Legal and Administrative Framework
- Project Alternatives
- Assessment Methodology
- Environmental and Social Baseline
- Stakeholder Engagement
- Impact Assessment and Mitigation
- Environmental and Social Management Plan

2 Project Description

2.1 Overview

As described within Section 1 and shown in Figure 1-1 the desalination plant site is planned to be located within a brownfield area of 27 hectares (ha) and include:

- Reverse Osmosis (RO) treatment plant including pre- and post- water treatment systems and treatment of resulting process waste
- Bulk chemical and waste storage area/systems and brine storage facilities
- Instrumentation, electrical and control systems and piping
- Domestic wastewater treatment facility
- Administration and maintenance buildings
- BPS1 comprising tanks, pumps, instrumentation, electrical and control systems and piping to transfer the treated water to the onward AAWDCP conveyance system

During operations, water will be pumped to the desalination plant from a marine intake system and intake transfer pipeline. Brine from the desalination plant will be discharged to the sea via a return transfer pipeline and outfall system. Treated water from the desalination plant will be sent to BPS1 and a portion provided for local industrial zone supply. Power will be provided through connection to a new nearby substation to be constructed and operated by NEPCO (an associated facility).

2.2 Desalination Plant Site Construction Activities

The key construction and installation activities will comprise:

- Pre-construction mobilisation activities - including geotechnical and soil investigation, topographic survey and existing utilities surveys to refine detailed layout and permitting including traffic management and security
- Mobilisation activities - establishing access, safety and security arrangements e.g. gates, fencing and signage. Set up processes and temporary facilities to support construction expected to include but not limited to:
    - Labour recruitment and accommodation selection
    - Temporary site offices
    - Temporary workshops and storage warehouses
    - Welfare facilities for the construction workforce (to include changing, toilet and catering facilities and first aid station)
    - Space for the storage of construction materials and construction equipment/plant/vehicles
    - Designated areas for fuel, oil and chemicals storage/handling
- Main civil engineering works – comprising:

  i) site preparation and grading (including clearance of existing soil/aggregate stockpiles, removal of existing foundations and removal of topsoil and vegetation)

  ii) subsurface groundworks and trenching (i.e. excavations for foundations, drainage system, underground pipework and cabling)

  iii) backfilling and compacting (including import of structural fill materials where required and on-site soil management)

iv) installation of foundations, piles, bunding/kerbing and surfacing (including internal roads, parking areas and relevant chemical/fuel/waste storage areas)

- Erection of permanent structures – including permanent building structures for operational storage, maintenance, control and instrumentation, electrical plant, administration and welfare
- Mechanical and electrical works – installation and connection of equipment and system packages on site including cleaning, painting and welding, completion of electrical works on site and substation connections prior to testing and commissioning

On-site plant and equipment (e.g. trucks, excavators, cranes, etc.) will be used throughout the construction period. Road traffic associated with the project will move to and from the desalination plant site via the existing public highway and access roads. Access to the site is expected to be from the main Ports Highway to the west of the site, subject to relevant permitting approval and traffic management planning. Vehicles accessing the site from the north will pass through the existing security control shown in Figure 1-1.

2.3 Construction Utilities

It is anticipated the following utilities will be established for use over the construction period:

- **Power** – supply for the temporary offices, workshops and welfare facilities is unconfirmed but expected to be via local connections and/or temporary diesel generators
- **Water** – water for general use e.g. cleaning, wheel washing, dust suppression supplied by tankers and stored in an onsite tank. Bottled drinking water provided for the workforce
- **Sewage** – treatment plant or use of storage tanks with the contents tankered off site for appropriate treatment to a municipal sewage treatment plant (subject to relevant approvals)
- **Waste** - to be appropriately segregated and stored on site prior to transfer to appropriate disposal facilities offsite (in accordance with project specific waste management procedures to be developed by the construction contractor and approved by the Project Company)
- **Fuel/Chemical Storage and Refuelling** - it is anticipated that above ground fuel diesel tanks will be required to supply equipment on site during construction. In addition, other fuels, oils and chemicals will be supplied and stored on site in containers
- **Drainage** – areas in temporary use will be appropriately surfaced and designed to route uncontaminated runoff to existing drainage and potentially contaminated drainage to appropriate containment and/or treatment systems such as bunds, temporary sumps and oil/water separator systems to prevent pollution to soils, groundwater and/or surface water

3 Legal and Administrative Framework

A description of the Jordanian authorities and institutions, the donors and financing institutions and the relevant national and international environmental and social policies, legislation, standards and commitments that the project must comply with are described within Section 3 of the 2022 ESIA (Ref. 1). The requirements described in the 2022 ESIA also apply to this update.

Subsequently, the project is seeking finance from the European Bank for Reconstruction and Development (EBRD), International Finance Corporation (IFC), the US Development Finance Corporation (DFC), the EIB and the Société de Promotion et de participation pour la coopération économique (PROPARCO) as well as other private and development finance institutions and, as a consequence, will need to integrate the environmental and social policy requirements of these institutions into the further consolidated ESIA update to be prepared before Financial Close of the project.

4 Project Alternatives

The proposed change to the location for the desalination plant and NEPCO facilities arose as an outcome of the technical design review and optimisation work completed in 2024 (Ref. 3). This work, which was focused on investigating potential options for reducing cost, optimising schedule, mitigating technical risks and improving deliverability, highlighted the challenging nature of the previous location, which covered a total area of 110 ha. This included the:

- Significant civil engineering works required to prepare the site (including major earthworks to move natural and man-made topographic features (e.g. spoil heaps) and construct platforms to locate equipment)
- Constraints around the seasonal wadis and power lines traversing the site
- The site elevation contributing to pumping requirements and hence higher operating costs
- Distance to the project marine intake pumping station facilities and the associated routing of the intake and outtake pipelines over a distance of approximately 3.5 km

The recommendation to consider other sites that minimised these challenges resulted in the identification of the new brownfield site located in the centre of the Aqaba Industrial Zone. Following consultation with the ASEZA and MWI this site was formally adopted for the project within the Project Agreement (Ref. 4). Further work to define the exact boundaries of the site within the area assigned to the project, taking into the site conditions and constraints, as described in Section 6 below, are ongoing with MWI and other relevant stakeholders at the time of writing and will be finalised before achieving Financial Close of the project.

5 Assessment Methodology

The methodology used to identify potential impacts, determine changes in impact significance and any mitigation required is aligned with the 2022 ESIA process (Ref. 1), and summarised below:

1. Identification of project-related activities that are likely to result in environmental and social impacts (environmental stressors)
2. Identification of the environmental and social features within the Project Area of Influence (PAI) that could be affected by project activities (environmental and social receptors were considered in this update)
3. Identification of potential impacts on the physical, biological, and socioeconomic environment (environmental and social receptors were considered in this update) that may arise from the project activities during its life cycle
4. Assessment and evaluation of potential assessed and residual impacts to determine their significance and subsequently their priority ranking in terms of mitigation based on pre-set criteria, provided below with Table 5-1

Table 5-1 Description of Impact Significance Results

Significance	N	**Negligible:** • No measurable impact. Issues identified as negligible can be scoped out
	L	**Low:** • No considerable adverse alteration of the existing environment • Low priority mitigation or mitigated through best practices
	M	**Moderate:** • Without mitigation, would result in considerable adverse alteration of the existing environment • Strict requirement for mitigation to minimise or prevent the significance of the impact
	H	**High:** • Results in considerable adverse alteration of the existing environment • Project cannot be safely implemented without mitigation measures; compensation or offsetting may be necessary
	C	**Critical:** • Results in critically adverse alteration of the existing environment • Project cannot be safely implemented. Alternatives including the no project alternative need to be investigated in depth for reducing the level of impact significance

6 Environmental and Social Baseline

6.1 Setting and Geographic Context

The new desalination plant site, covering an area of approximately 27 ha, is located approximately 18 km south of the city of Aqaba and 2 km north of the Jordan-Saudi Arabia border within the Aqaba Industrial Zone. The location is approximately 300 m inland from the coast of the Gulf of Aqaba (see Figure 1-1) and immediately to the east of the Ports Highway (Highway 47). The nearest community receptors are located approximately 2 km to the north-west on the coast in a mixed-use area that also incorporates office, military, hotel, and recreational facilities. As shown in Figure 1-1 the coastline to the west of the site is dominated by facilities associated with the Aqaba Industrial Zone including marine supply and offloading facilities. The new NEPCO site (an associated facility), shown in Figure 1-1 and occupying an area of approximately 7 ha, is located approximately 500 m to the north-east of the desalination plant site, also within the Aqaba Industrial Zone.

6.2 Land Use and Surrounding Facilities

The majority of the new desalination plant site, shown in Figure 6-1, is not in active use. However, the eastern section of the new site, covering an area of approximately 4.7 ha, is currently operated by CEGCO. This area is occupied by warehouses and cooling water management infrastructure including a pumping station and several engineered ponds containing process wastewaters / cooling water associated with Aqaba Thermal Power Station operations.

The northern section of the new desalination plant site was, until 2013, occupied by a timber processing and manufacturing facility. These facilities included warehouses and workshops that have largely been removed however some structures and infrastructure such as chimney stacks and electrical substations remain in situ, along with the concrete building footings (visible from satellite imagery and from the site photos shown in Figure 6-1).

Within the southern section of the new desalination plant site, operational underground utilities including the Arab Gas Pipeline Right of Way; CEGCO power lines and a Jordan Oil Terminals Company (JOTC) fuel pipeline are located in a corridor running east to west and supporting surface infrastructure including ventilation, control and access structures. Markers are visible at the surface to indicate the presence of underground utilities. A surface access road runs from east to west just north of the utility corridor, linking the Aqaba Thermal Power Station facilities in the west to a service culvert under the highway, enabling access to the Aqaba Thermal Power seawater intake pumps and lagoon. Based on a review of satellite imagery, it appears that the use of this southern section of the site has remained unchanged for at least 25 years.

Figure 6-2 shows the current status of the site allocated for the construction of the substation (to be constructed and subsequently operated by NEPCO). Several existing storage facilities and structures are located on the site, which is currently owned by CEGCO. A review of satellite imagery indicates very little change in operations within the proposed site boundary over the last 25 years. The most significant change appears to be the construction of the access road to the east of the site (visible from 2013 onwards).

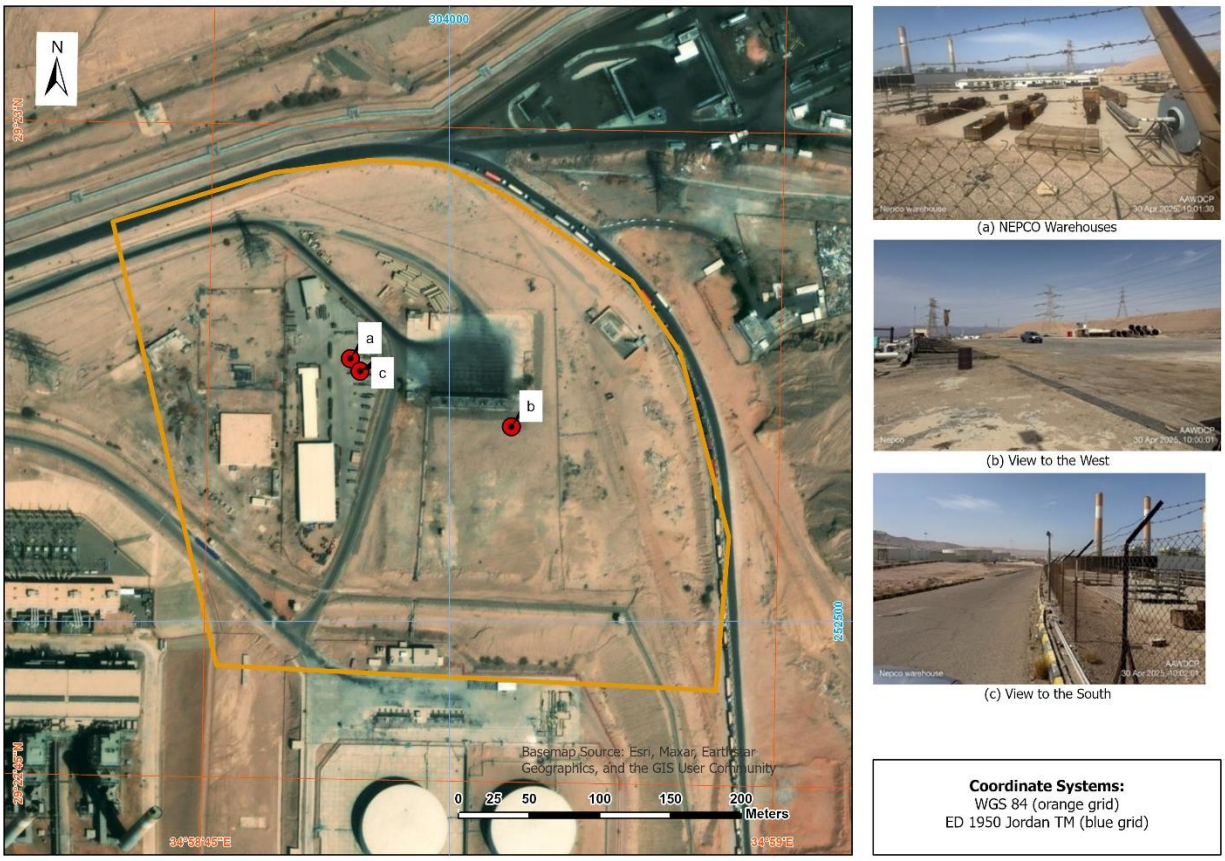
Figure 6-1 New Desalination Plant Site - April 2025 Site Visit Observations and Surrounding Facilities

	Site Features
a	Access route to Port Facilities
b	Typical vegetation cover – sparsely distributed drought tolerant shrubs and grasses
c	Concrete foundations from decommissioned Timber processing facilities, with Solvechem Holland B.V facilities in background
d	Existing infrastructure - pipeline valve station, warehouse building, drainage channel and culvert
e	Natural topographic ridge feature
f	Spoil heaps of soil and debris with modified site topography

	Facility Name
1	Solvechem Holland B.V
2	Jordan Oil Terminals Company (JOTC)
3	Aqaba Thermal Power Station (CEGCO)
4	Jordan Phosphate Mines Company (JPMC)
5	Al Sheikh Sabah LNG Terminal

Coordinate Systems:
WGS 84 (orange grid)
ED 1950 Jordan TM (blue grid)

Figure 6-2 New NEPCO Site - April 2025 Visit Observations



The highly industrial nature of the area, which is zoned for industrial use and is dominated by energy infrastructure (power, Liquified Natural Gas (LNG) and oil storage), chemical distribution, mining exports and the nearby Aqaba port facilities is evident from Figures 1-1, 6-1 and 6-2. The occupants of the sites immediately adjacent to the new desalination plant site are summarised in Table 6-1 below.

Table 6-1 Facilities Adjacent to New Desalination Plant Site

Company	Industrial Sector	Description
Solvechem Holland B.V	Petro-chemical	Chemical and solvent distribution facility
Jordan Oil Terminals Company (JOTC)	Oil and Gas	State-owned petroleum/liquid petroleum gas (LPG) storage and distribution centre
Aqaba Thermal Power Station (CEGCO)	Energy	Power station for electricity generation
Jordan Phosphate Mines Company (JPMC)	Mining and Raw Materials	Industrial processing and export of phosphate
Al Sheikh Sabah LNG Terminal	Oil and Gas	LNG import facility

The Aqaba Industrial Zone is primarily accessed via the main Ports Highway (Highway 47) and via a network of local roads, which include security controls at site boundaries. A security checkpoint is present on the highway to the north of the Aqaba Industrial Zone.

6.3 Physical Environment

The topography of the new desalination plant site is generally flat to gently sloping (grading south/south-east) comprising mostly compacted, sandy soil, some sparse drought-resistant vegetation and areas of concrete hardstanding and building foundations.

Waste soil stockpiles, primarily excavated subsoil and construction debris, are prevalent across the southern and central areas of the site. There is also a natural elevated ridge feature in the southern section of the site (visible within Figure 6-1). Although the terrain appears stable, it is potentially prone to surface water runoff and erosion due to the low water retention capacity of the surface soils.

The site visit identified the presence of engineered drainage systems, consistent with the topographic gradient toward the coast. Surface water within the main site is channelled through an open drainage system, directed into a main culvert that discharges to the sea.

There is no evidence of groundwater abstraction on site, in the form of wells or boreholes.

A number of indicators of potential contamination within the new desalination plant site and in the immediate vicinity were noted during the site visit in the form of:

- Soil staining (likely due to historic timber processing activities on-site)
- Unmanaged stockpiles of mixed debris (subsoil and construction debris) potentially containing leachable contaminants
- Satellite imagery indication of oil sheens on surface water near the JOTC Terminal (unverified on site due to restricted access)
- Reports that three separate fires occurred at the timber processing and storage facility before its final closure

In addition, persistent odours of ammonia were reported by CEGCO personnel to be emanating from the JPMC Industrial Complex adjacent to the site. No visible evidence was found of any active leaks or the presence of asbestos containing materials on site. Given the nature of the industrial activities surrounding the site, the stored chemical and hydrocarbon inventory, there is potential for contamination at the new desalination plant site from these sources e.g. through leaching and/or runoff pathways.

6.4 Biological Environment

The site visit recorded sparse vegetation across the new desalination plant site, mostly comprising hardy shrubs and grasses. There are no cultivated or landscaped areas. Due to the sparse vegetation and open nature of the site, wildlife activity appeared to be negligible, with no observed habitats (nesting sites, burrows etc.). The site is located within the wider Aqaba Coast and Mountains International Bird Area (IBA) which covers an area of 283 km². The extent of the IBA and the qualifying factors are presented within Figure 6-102 and Table 6-35 of the 2022 AAWDCP ESIA (Ref. 1), respectively. Key trigger species comprise primarily raptors potentially present across the IBA during spring migration. It should be noted, however, that the IBA designation is acknowledged to be out of date and the Royal Society for the Conservation of Nature (RSCN) who are responsible for updating national IBA designations acknowledge significant land use changes associated with the Aqaba Industrial Zone. These changes have the effect of reducing the value of the land for bird life, including the land associated with new desalination plant site.

6.5 Cultural Heritage

The new desalination plant site is not located in an area identified to be of cultural heritage importance and there are no recorded monuments or sites in the vicinity (Ref.1). There was no evidence of archaeological or cultural heritage features recorded during the site visit. Satellite imagery shows a mosque, likely provided for worker use, 75 m from the southern boundary of the new desalination plant.

7 Stakeholder Engagement

The stakeholder engagement process and feedback received to support the 2022 ESIA are described in Section 7 of the 2022 ESIA (Ref. 1). An ESIA scoping meeting was held in Aqaba in 2021, with additional meetings with local authorities and communities, and a Stakeholder Engagement Plan was prepared. Two ESIA disclosure stage meetings were conducted, one in Aqaba and a virtual meeting. Questionnaires were provided to attendees at the scoping and disclosure meetings to collect feedback, and responses were issued. Further stakeholder engagement activities will be held to prepare the further consolidated ESIA update.

To support the preparation of this update, engagement has been completed with ASEZA and MWI as well as with CEGCO, to collate information on the new desalination site's historical land use and the current surrounding land use.

8 Impact Assessment and Mitigation

This section presents an assessment of impacts associated with the new desalination plant location. Table 8-1 below summarises the findings of the assessment. Where changes to impacts presented in the 2022 ESIA (Ref. 1) are identified, detailed explanations are provided in Sections 8.1 – 8.3.

Table 8-1 Assessment of Changes to Construction Impacts Associated with New Desalination Plant Site (as Compared to 2022 ESIA)

Category[1]	Change in Impacts as Compared to 2022 ESIA?	Justification
Geology and Soils (8.1.1.1)	Yes	Refer to ***Section 8.1*** below for re-assessment of impacts Residual impact remains unchanged and ranked as ***negligible***
Water Resources (Surface Water and Groundwater) (8.1.1.2)	Yes	Refer to ***Section 8.2*** below for re-assessment of impacts Residual impact remains unchanged and ranked as ***negligible***
Energy Resources (8.1.1.3)	No material change	The types of plant and equipment to be used during construction are assumed to be consistent with the 2022 ESIA. The new desalination plant site has a smaller footprint and may reduce construction plant resource/fuel use and combustion emissions[3]. No change to mitigation measures e.g. around energy conservation, equipment maintenance etc. included in 2022 ESIA and ESMP (Refs. 1 & 5). Residual impact unchanged and ranked as ***low***
Air Quality (8.1.1.4)	No material change	See ***Energy Resources*** above re: combustion emissions. The new site location is within the Aqaba Industrial Zone and further from community receptors, hence the potential to affect local air quality at receptors is reduced. Fine particulates from dust are likely to be indiscernible at community receptors, especially considering the new desalination plant site is an additional approximate 2 km from the nearest community receptors. No change to mitigation measures e.g. equipment meets emission standards included in the 2022 ESIA and ESMP (Refs. 1 & 5). Residual impact unchanged and ranked as ***negligible***
Dust (8.1.1.4)	No material change	Activities generating dust are unchanged; however, smaller scope and durations are anticipated, and reduced site preparation/earthwork requirements. The new site location may trigger potential nuisance dust impacts to neighbouring facilities/local roads adjacent to the site; these impacts are considered to be adequately managed through the mitigation measures included in the 2022 ESIA and ESMP (Refs. 1 & 5). Residual impact unchanged and ranked as ***negligible***

[3] It should be noted that the change to the desalination plant site is also expected to result in significant reduction in operational emissions due to the reduced pumping requirements as per Section 4 above. This will be fully assessed within the further consolidated ESIA update.

Category[1]	Change in Impacts as Compared to 2022 ESIA?	Justification
Onshore Biological Environment (8.1.2.2)	Yes	Refer to ***Section 8.3*** below for re-assessment of impacts Residual impact remains unchanged and ranked as ***low***
Noise (8.1.3.3)	No material change	Types of plant and equipment to be used and planned construction activities that may generate noise is unchanged. The new site location is within the Aqaba Industrial Zone with numerous existing noise sources and further from community receptors. Impacts however are considered to be adequately managed through the mitigation measures included in the 2022 ESIA and ESMP (Refs. 1 & 5) which include implementing a Noise and Vibration Management Plan, planning of noisy activities, development of a noise monitoring programme and equipment selection. Residual impact unchanged and ranked as ***negligible***
Infrastructure (8.1.3.4)	No material change	Types of waste generated are considered to be unchanged, with some variation in volumes for different waste types due to changes in the site extent and characteristics. Potential for interruptions to local utility networks and services is expected to be limited and unchanged from 2022 ESIA. No change to mitigation measures e.g. development of a Construction Methods Plan, Waste Management Plan and procedures to respond to damage to infrastructure etc. included in 2022 ESIA and ESMP (Refs. 1 & 5). Residual impact unchanged and ranked as ***negligible***
Traffic and Transportation (8.1.3.5)	No material change	Type and number of project-related traffic on the local road network are expected to be unchanged. No change to mitigation measures included in 2022 ESIA and ESMP (Refs. 1 & 5) e.g. liaise with potentially affected receptors and authorities prior to activity commencing, develop and implement Traffic and Transport Management Plan (TTMP) as part of the Construction ESMP etc. Residual impact unchanged and ranked as ***negligible***
Public Health and Safety (8.1.3.6)	No material change	Potential community health and safety risks associated with the project activities, e.g. due to traffic accidents on the road network, are expected to be unchanged due to the new desalination plant location. No change to mitigation measures included in 2022 ESIA and ESMP (Refs. 1 & 5) which include development of Community Health and Safety Plan, Traffic and Transport Management Plan, as well as an Emergency Preparedness Plan (EPRP). Residual impact unchanged and ranked as ***negligible***
Occupational Health and Safety (8.1.3.7	No material change	No change to the approach to occupational health and safety as a result of the new desalination plant location. No change to mitigation measures included in 2022 ESIA and ESMP (Refs. 1 & 5) which includes development of a Health and Safety Plan. Residual impact unchanged and ranked as ***negligible***

Category[1]	Change in Impacts as Compared to 2022 ESIA?	Justification
Labour Influx and General Labour Conditions (8.1.3.8)	No material change	No change to labour management aspects or procurement strategy as a result of the new desalination plant location. No change to mitigation measures included in 2022 ESIA and ESMP (Refs. 1 & 5) which includes implementing a Code of Conduct, Labour Conditions and Grievance Redress Mechanism. Residual impact unchanged and ranked as ***negligible***
Cultural Resources (8.1.3.9)	No material change	The new desalination plant location is situated in a brownfield area within the Aqaba Industrial Zone, which has been subject to previous ground disturbance and development. There are no known cultural heritage features or sites (tangible or intangible) within or in the vicinity of the new desalination plant location. Potential for cultural heritage impacts is considered unlikely. Residual impact unchanged and ranked as ***negligible***
1. Column includes reference to relevant section within 2022 ESIA in brackets for each category		

8.1 Geology and Soils

8.1.1 Impacts

The most significant changes between the site assessed in the 2022 ESIA and new desalination plant site relates to the site topography (which is significantly less challenging for the new site and expected to result in reduced earthworks and soil movements) and the brownfield nature of the new site, where there is an increased risk of potential contamination as compared to the 2022 site.

Similar to the site location assessed in the 2022 ESIA, potential impacts during construction for the new site include soil compaction and natural drainage blockage due to the movement of vehicles and workers on the site, as well as soil erosion resulting from the removal of the topsoil layer, land preparation, and vegetation stripping.

Consistent with the previous 2022 ESIA, excess excavated material or unsuitable excavated material for fill may have impacts on soil quality and morphology if disposed improperly, albeit much lower volumes are expected to be generated as compared to the site assessed in the 2022 ESIA. In addition, soil can become polluted as a result of accidental oil or chemical spills from equipment used during construction activities, or due to improper disposal of solid waste and wastewater. Specific to the new desalination plant site, as mentioned above, there is also a potential risk of encountering and mobilising existing contamination during construction due to the previous site usage; the presence and extent of contamination at the site are currently unknown.

In the 2022 ESIA, the impact of construction activities on soil quality is considered moderate. This impact is restricted to the construction period, as machinery and equipment will be removed after the completion of construction works, and its effect will be no more than local (within a 5 km radius of the project site). Despite the anticipated reduced site activity, the intensity and scale of impact is expected to be remain the same. As such, this impact is considered to have a low significance, consistent with the 2022 ESIA.

8.1.2 Mitigation

2022 Mitigation

The mitigation measures outlined in the 2022 ESIA and ESMP, specifically those related to soil disturbance and contamination risk, remain valid and appropriate for the new desalination plant site.

Additional Mitigation

The following additional measures are also recommended to be incorporated into the ESMP and further consolidated ESIA update:

- Contaminated land survey prior to construction.
- If contamination exceeds screening threshold values, undertake a contaminated land risk assessment to establish:
    - The spatial extent of the contamination
    - The potential mitigations to be put in place to manage the contamination risk
- Site-specific mitigation requirements based on the results of the contaminated land risk assessment will be incorporated into the further consolidated ESIA update and supporting Environmental and Social Management and Monitoring Plan (ESMMP), including hazardous waste disposal.

Assessed and Residual Impact

The assessed and residual impact levels are considered unchanged compared to the 2022 ESIA as shown below.

Summary of Impact Assessment (Unchanged from 2022 Assessment)

Parameter	Assessed Impact	Residual Impact
Nature	Adverse	Adverse
Type	Direct	Direct
Magnitude	Medium	Low
Likelihood	Medium	Low
Intensity	**Medium**	**Low**
Duration	Short-term	Short-term
Extent	Local	Local
Scale	**Low**	**Low**
Significance	**Low**	**Negligible**

8.2 Surface Water and Groundwater

8.2.1 Impacts

Contamination of surface and groundwater may occur as a result of seepage of domestic or construction wastewater, accidental oil and chemical spillages, and diversion of contaminated rainwater runoff from the construction site. While the wadis that were a feature of the 2022 site are not present at new

desalination plant site, the new site is close to the Gulf of Aqaba (within 300 m) and there is potential for impact through surface water drainage.

Improper management of the site-generated waste, wastewater and hazardous materials could potentially contribute to surface or ground water pollution. However, the implementation of construction hazardous materials management and site pollution prevention measures will be sufficient to minimise this impact.

There is also potential for impacts due to the temporary alteration of existing drainage patterns, resulting in flooding or erosion during periods of intense rainfall.

Impact on water resources quality and drainage system during construction is expected to occur under exceptional conditions only or as a result of accidental events or uncontrolled surface water management and earthworks. As such, consistent with the 2022 ESIA, this impact is considered of low significance.

8.2.2 Mitigation

2022 Mitigation

The mitigation measures within the 2022 ESIA and ESMP relating to surface water and groundwater are considered to remain valid and appropriate for the new desalination plant site.

Additional Mitigation

The following additional measures are also recommended:

- Establish the characteristics of existing surface water drainage conditions prior to starting the construction activities.
- Site-specific construction, hazardous materials management and site pollution prevention measures are incorporated into the further consolidated ESIA update and supporting Construction ESMMP.

Assessed and Residual Impact

The assessed and residual impact levels are considered unchanged compared to the 2022 ESIA as shown below.

Summary of Impact Assessment (Unchanged from 2022 Assessment)

Parameter	Assessed Impact	Residual Impact
Nature	Adverse	Adverse
Type	Direct	Direct
Magnitude	Medium	Low
Likelihood	Medium	Low
Intensity	**Medium**	**Low**
Duration	Short-term	Short-term
Extent	Local	Local
Scale	**Low**	**Low**
Significance	**Low**	**Negligible**

8.3 Onshore Biological Environment

8.3.1 Impacts

Construction work at the new desalination plant site is expected to be limited to the designated construction areas within the site boundary. This includes land clearance, cut-and-fill operations, pilling of cut materials and construction materials, temporary storage of construction waste on site, construction and installation of the plant facilities and tie-in to utilities e.g. the NEPCO substation for power.

Consistent with the 2022 ESIA, the above activities are associated with:

1. Total habitat loss and clearance of the vegetation cover within the construction site and materials temporary storage locations.
2. Habitat loss within the routes for vehicles and machineries movement and parking.
3. Generation of elevated noise levels which could reach up to 110 decibels (dB) at source (i.e., within 1 metre (m) from the machinery).
4. 4) Emissions to air from the vehicles and machinery.
5. Oil spills from machinery on site lubrication and petrol supply, contamination due to leaks/spills of construction chemicals (e.g. paints, lubricant oils, etc.).
6. Possible attraction of species (especially birds) due to increased food supply.

The proposed new desalination plant site is a brownfield site located within an urban environment (specifically within the Aqaba Industrial Zone) and is already degraded and of very low value as a terrestrial habitat. However, behavioural disturbance to avifauna during migratory and breeding seasons is possible although the site is located in an industrial area and has not been reported as an important feeding, roosting or breeding site for birds.

As stated in the 2022 ESIA, the magnitude of biological impacts would be theoretically high if the affected terrestrial biological environment is of particular value. However, the ecological character of the new desalination plant site is degraded and currently of low terrestrial biodiversity value and hence magnitude is deemed to be low. Accordingly, the overall intensity of the construction impacts is assessed to be low.

Regarding the duration of impacts, once constructed, the proposed desalination plant facilities will be permanent, and therefore, the impact will be permanent to those areas cleared for permanent use within the construction footprint. For those areas in temporary use during construction, the duration will be short-term, and these temporarily disturbed areas will be rehabilitated after completion of the construction activities. Accordingly, the overall impact significance before the application of any mitigation measures is assessed to be medium and will be confined to the site.

8.3.2 Mitigation

2022 Mitigation

The mitigation measures within the 2022 ESIA and ESMP relating to the onshore biological environment are considered to remain valid and appropriate for the new desalination plant site. These include avoidance, reduction and rehabilitation measures.

Assessed and Residual Impact

The assessed and residual impact levels have been adjusted compared to the 2022 ESIA to account for the lower biodiversity value of the new desalination site as shown below.

Summary of Impact Assessment (Updated from 2022 Assessment)

Parameter	Assessed Impact	Residual Impact
Nature	Adverse	Adverse
Type	Direct	Direct
Magnitude	Low	Medium
Likelihood	Low	Low
Intensity	**Low**	**Low**
Duration	Long-term	Long-term
Extent	Local	Site
Scale	**High**	**Moderate**
Significance	**Medium**	**Low**

9 Updates to the Environmental and Social Management Plan

The AAWDC Project ESMP was developed as a stand-alone document and included within Annex 19 of the 2022 ESIA (Ref. 1).

Additional mitigation measures identified as part of the assessment presented within this update are provided in Section 8 and focus on developing site-specific construction stage avoidance, mitigation and monitoring measures that include:

- Site-specific mitigation requirements based on the results of the contaminated land risk assessment, including hazardous waste disposal.
- Site-specific construction, hazardous materials management and site pollution prevention measures.
- Site-specific construction biodiversity management measures.

The above measures and requirements, as relevant, will be incorporated in the updated ESMMP being prepared before Financial Close which that will incorporate and complement the 2022 ESMP.