



الشركة الوطنية للخدمات البيئية (ش.ك.م.م.)
WATANIYA ENVIRONMENTAL SERVICES CO. (K.S.C.C.)

Az-Zour North IWPP Phase 2 & 3 The State of Kuwait

Environmental and Social Impact Assessment Report

WES Project Ref: WES.20.24.084

WES DOC REF: WES.20.24.084_ESIAS

February 2026

TELEPHONE: (+965) 2249 8390

FACSIMILE: (+965) 2247 4126

EMAIL: info@wes.com.kw

WEBSITE: www.wes.com.kw

POSTAL ADDRESS: P.O. Box 27781 Safat 13135 – State of Kuwait

LOCATION: Mubarak Al-Kabeer Tower, 4th Floor, Mubarak Al-Kabeer Street,
Sharq – State of Kuwait





الشركة الوطنية للخدمات البيئية (ش.م.م.)
WATANIYA ENVIRONMENTAL SERVICES CO. (K.S.C.C.)



DOCUMENT HISTORY & DESCRIPTION

Project	Az Zour North IWPP Phase 2 & 3
Document	Environmental and Social Impact Assessment
Author	5 Capitals Environmental & Management Consultancies
Reviewed By	Wataniya Environmental Services Co.
V0	Draft ESIA – 06 January 2026
V1	ESIA – 22 February 2026
This document has been prepared by Wataniya Environmental Services Company in collaboration with 5 Capitals Environmental & Management Consultancies, ACWA Power's lead and framework environmental and social consultant, with all reasonable efforts according to the terms of the Contract with Kuwait Ministry of Electricity and Water (Client). The report has been prepared for submission to Kuwait Environment Public Authority supporting the client for the environmental permit of the project. The document is copy righted and for any other use, prior written approval from WES or Client is required.	

NON-TECHNICAL SUMMARY

Introduction

The Ministry of Electricity, Water & Renewable Energy (MEWRE) together with the Kuwait Authority for Partnership Projects (KAPP) are planning to develop the proposed Az Zour North Phase 2 and 3 Independent Water and Power Project (IWPP). The proposed Az Zour North 2 & 3 IWPP, herein referred to as the 'Project' is a natural gas-fired Combined Cycle Gas Turbine (CCGT) plant that will utilise gasoil as back-up fuel to produce an anticipated net power capacity of approximately 2,700 Megawatts (MW) which is intended for connection to the national grid via a 400 kV transmission substation. Furthermore, the Project will comprise a desalination component that will utilise Sea Water Reverse Osmosis (SWRO) technology to produce approximately 120 Million Imperial Gallons per Day (MIGD) of water. The Project will be developed on a Build, Own and Transfer (BOT) basis under a 25-year Energy Conversion and Water Purchase Agreement (ECWPA) with MEWRE under which MEWRE will purchase the entire Net Dependable Power Capacity and Net Dependable Water Capacity of the Plant.

The Project supports and is in line with Kuwait's Vision 2035 to facilitate the shift from fossil fuel dependency and increase the production and availability of freshwater in the region. In addition, the demand for electricity in Kuwait is growing and is projected to grow at an average annual rate of 3% through 2040, driven by the expansion of residential areas, infrastructure projects, and industrial developments. Water demand in Kuwait is expected to increase at an annual rate of 2.28% over the same period. Therefore, the Az-Zour North Complex is being developed as a key facility of national importance to address Kuwait's growing demand for both power and water. The Project will be developed by the successful bidder consortium comprising of Saudi based ACWA Power Company ("ACWA Power") and a local firm Gulf Investment Corporation (GIC).

5 Capitals, as part of SLR has been engaged by ACWA Power as an international Environmental and Social (E&S) advisory consultant, whilst Wataniya Environmental Services Co (WES) has been engaged as a local E&S advisory consultant to facilitate the environmental permitting of the Project and ESIA scope of works in line with KEPA requirements.

Institutional and organisational Framework

The Project will be required to comply with all applicable environmental and social laws, regulations, policies, standards, and guidelines that form Kuwait's regulatory framework. In doing so, the process of environmental and social impact identification and evaluation will need to demonstrate that the Project can comply with such criteria for the duration of the Project lifecycle. The Project has developed this ESIA to comply with the following regulations and standards:

- Kuwait's national regulations and standards.
- International and Regional Treaties ratified by Kuwait, and

- International guidelines and standards adopted by anticipated Project lenders, including Equator Principles (EP) IV of 2020, IFC Performance Standards (2012) and World Bank Group (WBG)/IFC EHS Guidelines (2007).

Additionally, this ESIA report has been developed in compliance with the requirements of Resolution no. 2 of 2015 as per the Gazette; Issue no. 1265 dated 25 Safar 1437 H-7 December 2015 following the satisfactory review of the Project scoping report, as requested by KEPA on 28 October 2025.

Project Information

The Project will be developed on a footprint of approximately 467,705 m² within the existing MEWRE Az Zour North Complex with the temporary construction laydown area of 148,715 m², which is located on land within the allocated Project boundary.

The proposed Project will comprise a desalination component that will utilise sea water Reverse Osmosis (RO) technology to produce (not less than) 120 Million Imperial Gallons per Day (MIGD) of water. The Project will be developed on a Build, Own and Transfer (BOT) basis under a 25-year Energy Conversion and Water Purchase Agreement (ECWPA) with MEWRE under which MEWRE will purchase the entire Net Dependable Power Capacity and Net Dependable Water Capacity of the Plant.

Power Generation Technology

The CCGT power plant that will be equipped with Gas Turbine Generators (GTGs), Heat Recovery Steam Generators (HRSGs), Steam Turbine Generators (STGs) as well as other required infrastructure.

The plant will be configured to enable interchangeability between simple cycle (using just the GTGs) and combined cycle modes (using the GTGs, HRSGs and STGs in combination), although combined cycle mode will be the primary operational mode contributing to baseload power output.

The plant will be arranged with two (2) sets of 2+2+1 multi-shaft configuration power blocks, each consisting of the following key components:

- Two (2) GTG,
- Two (2) triple-pressure reheat and natural circulation type HRSG, and
- One (1) triple-pressure reheat and condensing type STG.

The Project includes the development of a 400 kV substation which will serve as an extension of the existing 400 kV substation located at the existing Az-Zour North Complex. The extension of the existing 400kV substation is required for interconnection of the proposed Project to the national grid by evacuating power of the plant through the 400kV intermediate substation.

The extension of the 400kV substation will be an indoor facility and will consist of the following configurations:

- Two (2) bus sections
- Two (2) bus couplers consisting of one on each side of bus sectionaliser
- Six (6) overhead line feeders
- Two (2) station transformer feeders
- Four (4) coupling transformer feeders for future use
- Two (2) spare feeders
- Generator transformer feeders

The 400 kV connections between the existing Az-Zour North Phase 1 and the proposed extension will be connected by means of oil-filled power cables. The cables will terminate in cable sealing ends at cable pits and will be connected into the substation by means of gas insulated busduct (GIB).

The proposed extension of the existing 400 kV substation will include an indoor double busbar equipped with sulphur hexafluoride gas (SF6) Gas Insulated Switchgear (GIS) which will comprise of the following number of feeders:

- 4 bus bar sectionalisers for two 400kV buses (two per bus)
- 3 bus couplers between the two buses.
- 3 GIL feeders for interconnection with a 400kV intermediate double busbar switchgear assigned for both phase 2 & 3 of the project.
- 2 GIL equipped feeders (spare) to be utilized in future for connection to intermediate 400kV switchgear of phase 4 of complex.
- 1 GIL equipped feeder (spare) to be utilized in future for RO plant.
- 4 overhead transmission line feeders.

The Project will be equipped with gas handling equipment, including a gas handling plant for filling, evacuating, and processing the SF6 gas in the switchgear. The proposed facility will thus be equipped with gas cylinders for the temporary storage of the evacuated SF6 gas including other gases utilized for maintenance.

Seawater Reverse Osmosis Technology

The sea water RO process will use high pressure to force seawater through membranes that remove salt and other impurities. The clean water passes through, while the saltwater (brine) is separated and discharged back to the Gulf.

The RO facility will comprise of the following:

- Sea water intake bays with coarse and fine screening;
- Pretreatment systems including clarification and filtration;
- Chemical dosing and control systems;
- Chemical bulk storage, delivery, transport and preparation systems;



- Pumping systems (seawater low lift, backwash, intermediate, high-pressure RO, booster, and product water pumps)
- Cartridge filtration systems;
- Sea Water Reverse Osmosis (SWRO) desalination trains complete with support rack, pressure vessels, membrane modules, and interconnecting piping;
- RO clean in place (CIP) and flushing system;
- Energy recovery systems (high efficiency isobaric);
- Neutralization plant;
- Waste water treatment plant;
- Storage tanks for pre-treated sea water and product (potable) water tanks;
- Air-conditioned RO buildings including plant control room
- Brine concentrate collection and discharge system;
- Instrumentation and control systems;
- Stairways, platforms and handling systems.

Seawater required for desalination water supply and cooling of the power plant. This will be obtained through a new seawater intake. The sea water demand for the Plant will be provided by an intake structure comprising offshore intake towers with intake risers. The Project will utilize the existing common seawater discharge basin which accommodates the sea water outfall flows of the Az-Zour North Complex, hence it is part of the shared facilities. This seawater discharge basin is sufficiently sized to allow the connection of the Phase 1, the proposed Project and the future phases. However, it is intended that the return flow of the Project will never exceed 334,000 tonnes/hour and will include the brine and waste flows from the plant together with effluent from sanitary treatment and site drainage.

The outfall seawater will be transported into the common seawater outfall basin through buried pipelines. The overflow from the basin will flow to the existing seawater outfall culvert and be discharged to the open sea.

Wastewater Treatment

The wastewater treatment system will have several separate wastewater collection and treatment systems. These will include and facilitate:

- Collection of all sanitary sewage from within the IWPP precincts, provision of necessary sewers, pipes and pumping stations;
- Sanitary wastewater treatment plant with screen(s), primary settling tank, biologic clarification with activated sludge treatment, secondary settling tank, effluent disinfection and discharge to interface point;
- Sludge treatment, storage and disposal facilities;
- Separate collection facilities for oily drains, chemical drains and all process waste waters; and



- Waste water and storm water collection and transfer facilities, all to be in compliance with KEPA regulations.

It is intended that sanitary waste will be treated and disposed according to local regulations and quality requirements.

The discharge point for all effluents and treated wastewater of the Project will be the Connection Point to the common sea water discharge basin of the shared facilities where the collected and treated water will be routed to the sea outfall. The effluents from the basin will comprise of the following:

- Treated contaminated site stormwater drainage,
- Treated domestic sewage,
- Desalination brine reject,
- Condenser water return, and
- Other waters generated during the desalination process.

The discharge pipes will be routed through the corridor located within the Project development footprint. All chemically contaminated wastewater will be collected and treated before disposal to the site effluent system. The sanitary wastewater will be treated prior to effluent discharge. The project is envisioned to be equipped with both wastewater treatment and process wastewater treatment systems.

Stormwater Catchment System

The Project will be equipped with a stormwater catchment system to collect and transfer the clean drains and effluents from stormwater. The system covers collection points from buildings, roads and other areas of the plant. The water collected will be separated in two areas located on the east and west ends of the Project. The collection points will have stormwater pits which will serve to collect water from the respective areas. The collection pits are located on both sides of roads, on some corners of buildings and on other strategic points, so that the whole surface is covered.

Clean stormwater will be managed through one of the following options:

- Collected in the common basin and discharged through the outfall,
- Directed to a pipeline for discharge into the sea shoreline.

This clean stormwater, in compliance with the quality requirements, will be discharged through one of the options above without additional treatment envisaged.

Environmental Monitoring Systems

The Project will be equipped with emission control measures for both wastewater and air emissions. It is intended that the Project will strictly adhere to the environmental emissions limits of the regulations established by KEPA and any other applicable laws and approvals.

Wastewater Emission Monitoring System

The Project will be equipped with a specialized Wastewater Emissions Monitoring System (WEMS) which will be provided for the overall monitoring and control of emissions generated from the water discharge points of the Project. This system will ensure compliance with environmental standards by continuously measuring and analysing key water quality parameters at the final discharge point to the sea. The WEMS will monitor the following critical water quality parameters:

- pH,
- Dissolved Oxygen (O₂),
- Chemical Oxygen Demand (COD),
- Residual Chlorine,
- Temperature, and
- Oil, grease, and hydrocarbons in water

Continuous Emission Monitoring System

The Project will be equipped with a specialized Continuous Emissions Monitoring System (CEMS) for the overall monitoring and control of emissions generated from the stacks of each gas turbine and the HRSG. This system will ensure compliance with international standards such as ISO 11042 and local KEPA emission standards by continuously measuring and analysing key gas parameters. Monitoring will be undertaken for:

- Nitrogen oxides (NO_x),
- Carbon Monoxide (CO),
- Carbon Dioxide (CO₂),
- Sulfur Oxides (SO_x),
- Oxygen (O₂),
- H₂O (Humidity),
- Flue gas pressure, and
- Flue gas temperature.

Additionally, the CEMS will measure the flow rate of flue gases and incorporate opacity meters to determine the opacity of the exhaust gases, ensuring that particulate emissions are within the allowed limits, exceedance of stipulated limits values will trigger alarms, enabling immediate corrective actions to mitigate potential environmental impacts.

Associated Infrastructure

Transmission lines

It is envisioned that the proposed extension of the 400kV switchgear will be equipped with transmission lines for the evacuation of electricity to the national grid.

Coupling Transformers

The project is envisioned to have four (4) coupling transformers, it is intended that the coupling transformers will be for future use.

Alternatives

In accordance with good practice methodologies for ESIA, the evaluation of various project design and activity alternatives should be considered, in order to ensure that the objectives of the proposed project have accounted for social, environmental, economic and technological options. The following project alternatives were considered:

No Project Alternative

The no project alternative would potentially result in future demand for water and electricity in Kuwait exceeding supply, subsequently resulting in a deficit. The lack of a secure and reliable electricity generation and supply system would have significant social and economic development implications including impeding the realization of Kuwait's Vision 2035. Therefore, the "no project alternative" option is not considered a viable option, and it would not align with Kuwait's development goals.

Project Location

The Project is being developed as an IWPP and has strict requirements regarding the land allotted for its development. However, the Project is located within the existing MEWRE Az Zour North complex thus potentially minimising environmental and social impacts in the area from the utilisation of existing and shared facilities such as the existing outfall and tie-ins to external associated infrastructure (e.g. for the transmission of power and provision of water).

Technology

As the Project is developed as an IWPP which is of strategic importance to the national development strategies and Kuwait's Vision 2035, the Project successful bidder and EPC Contractor are required to adhere to the specifications and requirements set by KAPP in the tender documents, without the ability to vary design or propose significantly different technology for the energy generation technology.

In addition to the above, the SWRO has been selected as the preferred technology as it requires lower energy utilisation by applying pressure to separate salt than the thermal counterparts like MSF and MED that require heat, thus it has lower operational costs.

Land Ownership

The Project development footprint is located within state owned land. The Project site will be leased to the Project Company by MEWRE.

Site Conditions and Land Use

The Project is located within the existing MEWRE Az Zour North industrial complex and is surrounded by several existing power, water facilities and other external industrial facilities. Residential and commercial areas are located at greater distance to the Project area.

Project Tentative Execution Schedule

Based on the requirements of KAPP, the intended project schedule is outlined below, which is subject to adjustment based on final signing dates.

Project Phase	Date
ECWPA Effective Date	3 February 2026
Financial Closing Date	2026
Notice to Proceed (NTP)	Upon Achieving the Financial Closing Date
Scheduled Early Commercial Operation Date (ECOD) 1	2028
Scheduled ECOD 2	2029
Scheduled Project Commercial Operation Date (PCOD)	2029

Stakeholder Engagement

The Project undertook a public participation process through consultations with the identified stakeholders. Stakeholder engagements for the Project was undertaken through the distribution of a questionnaire to the pre-identified stakeholders within the project AOI, as agreed in the early-stage project introductory meeting and subsequent follow-up discussions with KEPA. The questionnaire serve as both an information disclosure tool and a concerns/grievances mechanism.

Engagement with the identified stakeholders commenced on 12 January 2026. The stakeholders were initially contacted through direct phone calls to introduce the project and explain the purpose of the ESIA stakeholder engagement. Following these initial discussions, it was agreed to proceed with the circulation of the ESIA questionnaires via email and QR code links. Follow-up communications, including calls and coordination meetings where applicable, were undertaken to ensure timely receipt of feedback and responses.

Stakeholders included:

Stakeholder Classification	Stakeholder
Directly Affected Stakeholders	Existing Facilities Workforce: - Az-Zour North Phase 1 - LNGI Facility (KIPIC)

Stakeholder Classification	Stakeholder
Indirectly Affected Stakeholders	MEWRE Az-Zour South Power Plant
	Existing Facilities nearby: - KIPIC ZOR Refinery - The KGOB Mina Azour Oil & Gas Exploration Facility - KGOB Al Dorra
	Nearby Community & Human Settlement: Sabah Al Ahmad Sea City

Feedback was received from the majority of the consulted parties, with the exception of KIPIC, where internal procedures for issuing official responses require multiple levels of approval and have resulted in a delay. Sabah Al Ahmad Sea City did not complete the questionnaire but instead requested clarifications, which were provided. Further technical information was subsequently requested, and the possibility of arranging a meeting was indicated. Accordingly, engagement with these entities remains ongoing and has not yet been formally closed out. Follow-up will continue, and any additional concerns raised will be reviewed and addressed as responses are received. Stakeholder engagement will remain an active process beyond the ESIA stage and will continue throughout the construction and operational phases of the Project.

The remaining stakeholders confirmed that the Project is expected to contribute positively to Kuwait's national economic growth. It was noted that the Project supports diversification of the energy mix through efficient combined-cycle technology, reduces reliance on higher-cost fuels such as oil, and enhances overall operational efficiency.

On the other hand, concerns were raised in relation to potential construction (noise, dust, etc.) and operational impacts (marine discharge, air emissions etc.), traffic movements along shared access roads, and emergency situations requiring coordination with neighbouring facilities and relevant authorities. These matters have been acknowledged and are addressed within the relevant sections of the ESIA.

Environmental and Social Baseline Conditions, Key Impacts and Mitigations

Ambient Air Quality

To determine the baseline conditions, Ambient Air Quality Monitoring (AAQM) survey was carried out for a continuous period of 14 days at two locations. The preferred location (AAQM 1) is within the Project footprint. However, an alternative AAQM option (AAQM 2) was also selected and considered as a representative location situated approximately 230 m from the Project footprint within the nearby Az Zour North 1. Parameters monitored included criteria pollutants (SO₂, NO₂, CO, O₃, PM₁₀, PM_{2.5}) and non-criteria pollutants (NH₃, H₂S, C₆H₆, NMHC) according to Table 1A and 1B of Decision no. 8 of 2017 by KEPA.



Analysis of both the AAQM 1 and AAQM 2 locations indicate that the ground level concentrations of the measured parameters are within the respective KEPA standards as per Table 1A and 1B of Decision no. 8 of 2017, no exceedances are observed in both locations for all measured parameters. Exceedances are observed against WHO standards; however, it can be deduced that results represent the ambient conditions of an airshed that is not degraded in comparison to Kuwait standards.

The construction activities associated with the project and its facilities may contribute to changes in air quality due to dust, gaseous emissions, odour, and volatile organic compounds (VOCs).

- Dust Emissions: Generated from site preparation, earthworks, vehicle movements. However, dust from vehicle movements is unlikely to adversely affect receptors.
- Gaseous Emissions: Equipment and plant operations will produce pollutants such as NO_x, CO, SO₂, VOCs, and PM. Given the transient nature of construction, the impact is considered minor.
- Odour Emissions: Potential sources include sewage storage and biodegradable waste. With no residential receptors within 100m, odour nuisance impacts are deemed negligible.
- VOC Emissions: Small quantities of fuels, paints, and solvents will be stored securely. Any potential impacts will be temporary and limited to the Project site, with negligible magnitude.

Overall, while some air quality impacts are expected during construction, they are largely localised and can be mitigated through proper management practices such as regular maintenance of vehicles, implementing speed limits, compaction and dust suppression as well as regular monitoring such as annual quantitative assessment of emissions from engines and exhausts as well as biannual stack emissions at one location.

A detailed air quality dispersion modelling assessment was carried out to evaluate the potential impacts associated with the operation of the proposed Project. The assessment also considered existing baseline air emissions in order to determine the cumulative effects of the Project operating within the industrial area alongside the surrounding facilities. Dispersion modelling has been carried out using the United States (US) Environmental Protection Agency (EPA) Breeze AERMOD 13.1 dispersion model, five years of meteorological data from meteorological station at Kuwait International Airport, which is located approximately 70 km to the north northwest of the project site. Key pollutants anticipated from the combustion of gas are oxides of nitrogen (NO_x, NO₂), CO and SO₂. Additionally, PM₁₀ and PM_{2.5} have only been modelled for scenarios when the plant is envisioned to operate on diesel fuel.

No exceedances of national standards were predicted, but contributions exceeded IFC's 25% background emissions threshold was recorded at some receptors for a few parameters during simple cycle. However, given the limited operation of the plant in simple cycle, the impact is considered insignificant.

To ensure compliance with the standards, the Project will be equipped with a specialized Continuous Emissions Monitoring System (CEMS) for the overall monitoring and control of emissions generated from the stacks of each gas turbine and the HRSG. In addition, annual manual NO_x, SO₂, PM and CO stack emissions will be carried out at the main stacks and bypass stacks and ensure compliance with KEPA regulations.

Noise and Vibration

In order to benchmark the existing ambient noise conditions in the Project area, noise monitoring surveys were undertaken to measure Leq(A), Lmin(A), Lmax(A) and L90(A) at distinct location outlined as below

- 4 locations were monitored for a duration of 30 minutes each during the day between 07:00 am to 14:00 pm to inform short-term noise monitoring, and
- 1 location was monitored for 24-hours for a duration of 7 consecutive days.

It is noted that no exceedances were recorded when benchmarked against KEPA Limit for Industrial Areas as per Decision 8/2017 – Table 5. Furthermore, the results were compared against WHO standards for industrial areas, benchmarked at 70 dB(A) where no exceedances were recorded for both short-term and long-term monitoring.

Noise will be generated by construction and propagated from the project site and the associated facilities to the surrounding areas via a range of processes. Pertinent construction activities at the project site in relation to noise are likely to include:

- Site preparation (e.g. earthworks, compaction);
- Civil works including trenching;
- Construction, mechanical and electrical installation; and
- Road compacting;
- Vehicles movement.

Construction noise is inevitable but will have a localised extent, contained within the project footprint. The duration of the impact will be short considering individual noise emission events relative to the duration of the construction activities. The frequency of occurrence is high as noise emissions will likely occur daily, but noise emissions are reversible once the activity ceases. Noise impacts will be mitigated via a noise management plan that will be implemented by the EPC Contractor. In addition, noise monitoring will be carried out throughout the construction period as per the monitoring plan.



The operation of the plant will typically result in a continuous low-level humming noise due constant and relatively stable operational processes such as rotating equipment, air intake, emissions release and water treatment. As such, impacts are likely to be discernible at the receptor locations in proximity to the site, especially the nearby industrial facilities. The main source of noise is anticipated to be emitted from the gas turbines, HRSG's, steam turbines, stack emissions, fans, water pumps, ventilation units, switchgear equipment, etc. Noise levels may increase during transient (start-up) operation.

Noise modelling was conducted as part of the operational noise impacts assessment to predict the potential noise egress from the proposed Project and the potential effect on the receptors. The assessment also considered existing baseline noise levels in order to determine the cumulative effects of the Project operating within the industrial area alongside the surrounding facilities. Results show that noise levels generated by the project are in compliance with the KEPA Limit for Industrial Areas as per Decision 8/2017 – Table 5 as well as the IFC noise limits at all receptors. It is thus deduced that the project operational noise is unlikely to result in impacts at the surrounding receptors.

Additional mitigation includes good design of the noise control within the plant and the noise generating components and regular scheduled maintenance activities. In addition, quantitative noise monitoring (Leq(A)) will be carried out at the Project boundary and where feasible near baseline receptor locations for seven (7) consecutive days, semi-annually as per KEPA decision no.8/2017 of KEPA regulations, Table 5.

Soil and Geology

As a precautionary approach and to determine the existing baseline conditions, soil samples were collected at 10 variable sample points within the Project footprint from approximately 0-10 cm from the surface. Kuwait has not established soil standards; thus the soil results were benchmarked against the Dutch Standards which have been utilised in this report as a good practice reference for soil contamination. The results do not indicate any exceedances to the Dutch standards.

The construction phase will involve excavation, backfilling, and grading, which may lead to soil erosion, compaction, and loss of fertility. However, most excavated soil will be reused on-site, and proper stockpiling will help maintain soil conditions. Since the site lacks steep slopes, the impact is expected to be minor and localised. There is also a risk of soil and groundwater contamination from fuel, chemicals, and construction waste if not properly stored and handled. Accidental spills and hazardous waste, such as concrete washout and used oils, could lead to environmental damage. Such impacts will be mitigated through the implementation of good industrial practice as well as project specific waste and wastewater management plan, spill prevention plan and emergency preparedness plan.

Dewatering will be necessary in areas with a shallow water table where deep excavations are required. However, this activity will be infrequent, temporary, ceasing immediately upon



completion of excavation. The dewatered effluent will be managed using a settlement tank to enhance sediment capture before discharge into the marine environment.

The final effluent is released into the sea through a controlled discharge pipeline with flow regulation. Continuous monitoring includes daily visual inspections for turbidity, if excessive turbidity or contamination is observed, corrective actions will be implemented immediately. Daily in-situ monitoring and monthly laboratory analysis of key water quality parameters will be carried out through an accredited laboratory.

The EPC Contractor will develop a Dewatering Management Plan, detailing dewatering locations, methods, and monitoring protocols to track any potential impacts and ensure compliance with environmental standards.

Commissioning will include processes such as hydrotesting of equipment, pipelines, tanks, as well as cleaning processes (steam and acid). It is envisioned that wastewater generated from chemical cleaning and steam blowing during the commissioning phase will be sent to the on-site temporary evaporation pond estimated to have a volume of approximately 60,000 m³. High density polyethylene (HDPE) impermeable membrane will be utilised to line the evaporation pond and ensure the commissioning hydrotesting water is contained and does not percolate into the ground.

During the operational phase, the potential for soil and groundwater contamination is low, as the project will be static and not directly interact with these environmental parameters. However, risks could arise from improper management and storage of hazardous materials, chemicals, fuels, and wastewater. Key contamination sources include bulk diesel storage, waste oils, solvents, and storm-water runoff. Accidental spills, extreme rainfall, or fires could exacerbate these risks.

To mitigate these impacts, the plant will be designed with paved areas to limit seepage, dedicated storage for contaminants, and drainage systems with collection sumps to prevent environmental pollution. With these measures in place, the impact is expected to be negligible.

Waste and Wastewater

Construction activities such as site preparation, civil works, electrical and mechanical works, materials delivery, operation of labour camps will generate construction, domestic and hazardous waste streams in both solid and liquid form.

The surge in waste due to construction Projects can strain existing waste management facilities and systems due to increased load or limited capacity. The EPC Contractor will make arrangements for the establishment of waste storage areas for the Project's construction phase.

The construction site will be equipped with on-site temporary sanitation facilities to cater to the needs of construction workers. These facilities are expected to include toilets, basins, and ablution facilities. These facilities will require regular maintenance, including emptying and removal of wastewater from the Project site. This will be carried out by licensed contractors



الشركة الوطنية للخدمات البيئية (ك.م.م.)
WATANIYA ENVIRONMENTAL SERVICES CO. (K.S.C.C.)



who will ensure the proper transport and disposal of the wastewater at a licensed wastewater treatment plant.

The operation of the Project will generate small amounts of non-hazardous domestic waste from the administration facilities and from activities of the employees. The operation of the Project may also result in the generation of small quantities of hazardous waste streams including used chemical containers and drums, used oil, miscellaneous wastes such as batteries, waste cables, oily rags, etc., and general clean-up materials and solvents from general maintenance of on-site plant and machinery as well as sludge from the desalination plant.

Waste and wastewater during both construction and operation will be managed through a project specific waste and wastewater management plan which will include GIP measures and monitoring requirements to ensure no impacts arise during handling, storage and disposal.

Climate Change

The estimated quantity of fuel required during the construction phase is 350,000 L/month, thus the GHG emissions for the construction phase were quantified using the Greenhouse Gas Protocol calculation tool for GHG Emissions from Stationary Combustion (World Resources Institute, 2015).

The monthly GHG emissions, during the Project construction phase is estimated to be 939.84 tonnes of carbon dioxide equivalent (tCO₂e). The annual estimate of GHG emissions during construction is 11,278.09 tCO₂e. This will be less much less than the IFC threshold value of significance of 25,000 tCO₂e per year.

The physical risks were screened against EU Taxonomy climate hazards and assessed accordingly. The project may face climate-related physical risks, including extreme heat, dust storms, and flash floods.

Rising temperatures in Kuwait may impact worker safety, causing heat exhaustion, dehydration, and reduced productivity. These risks are addressed under occupational health and safety (OHS) measures. Construction workers may be exposed to harsh conditions during dust storms without proper shelter or mitigation. Relevant OHS measures are in place. Although climate risks exist, mitigation measures will be implemented to ensure worker safety and site resilience. Heat impacts on the operation of the project are not anticipated as the project is designed to withstand high temperatures in Kuwait. Similarly, dust is not anticipated to be a concern on the project operation. Weather conditions will be monitored to ensure workers safety during extreme weather events. Based on flood studies carried out for the Az Zour North area in 2004, the project is not at risk of flood risk or sea level rise risks.



The operation of the Project is estimated to produce approximately 7.5 MtCO₂/year. When this is compared to Kuwait's total emissions of 101.731 MtCO₂ in 2023¹, the project represents approximately 7.4 % of the national total as of 2023 data. The country's energy sector emissions account for approximately 50% of the national emissions, to which the Project will contribute, which exceed the IFCs threshold for GHG quantification of 25,000tCO₂/year, for emissions that are within direct control of the facility for the Project lifetime. Therefore, the project will be required to report annually on its GHGs.

Additionally, the Project will utilise approximately 22,500 m³ of Sulphur Hexafluoride (SF₆) gas for the operation of the switchgear for the Project lifecycle over 25 years. The total Project lifetime emissions are anticipated to be approximately 83,375 tCO₂e, which equates to approximately 3,335 tCO₂e/year, which is well below the IFCs threshold for GHG quantification of 25,000tCO₂/year, for emissions that are within direct control of the facility within the study period.

The Project is intended to be self-sufficient therefore, power supply from the national grid is not expected to be required under normal conditions, therefore, Scope 2 emissions as a result of electricity use are not assessed for the operation phase. GHG emissions are not expected from the operation of the associated facilities and have therefore not been considered in this assessment.

Transition Risks

Transition risks for the Project are considered limited, as Kuwait currently remains heavily reliant on natural gas for secure power generation and desalinated water supply, and the IWPP directly supports national development priorities under Vision 2035. The Project is not classified among activities universally misaligned with the Paris Agreement, and natural gas is expected to continue playing a transitional role in Kuwait's energy mix over the operational life. In addition, the long-term ECWPA framework provides contractual protections against future policy or regulatory changes (e.g., carbon pricing or emissions limits) through Change in Law provisions, reducing the likelihood of significant financial or operational disruption.

Terrestrial Ecology

A site visit and walkthrough were undertaken by WES in July and on 28 and 29 October 2025. The Project footprint was observed to be up to 80% vegetated, comprising a variety of plant species; however, site conditions remain broadly consistent with those recorded in 2021. The area is characterised by sandy terrain with sporadic, dry seasonal vegetation consisting

¹ <https://www.iea.org/countries/kuwait/emissions>



الشركة الوطنية للخدمات البيئية (ش.م.م.)
WATANIYA ENVIRONMENTAL SERVICES CO. (K.S.C.C.)



mainly of small trees and low shrubs. In line with IFC Performance Standard 6, the Project footprint is therefore classified as “modified habitat”. The Project is situated within an arid environment in an industrial zone, and the site's disturbed terrestrial conditions, characterised by low-diversity, and IUCN least concern or non-evaluated flora (e.g., *Anabasis setifera*, *Neltuma juliflora*, *Conocarpus erectus*, *Heliotropium bacciferum*, *Zygophyllum album*, *Tamarix macrocarpa* etc). In addition, no signs of fauna were observed on site nor nests or signs of avifauna were recorded. Overall, the terrestrial environment is considered to be of low ecological sensitivity due to its degraded conditions.

The presence of construction equipment, Project workers, temporary facilities and environmental externalities resulting from construction processes (i.e., noise, vibration, waste and wastewater) have the potential to impact upon terrestrial ecology during the construction phase. Such impacts may include the partial or direct loss of habitat and flora species.

Terrestrial ecology impacts associated with the Project are expected to be limited in scale and significance due to the disturbed and modified nature of the site. The Project footprint lies within an arid industrial zone and is characterised by sandy terrain supporting mainly low-diversity, seasonal vegetation dominated by common shrub and small tree species of IUCN Least Concern or non-evaluated status. As a result, direct impacts will primarily relate to the localised clearance of modified habitat within the construction footprint, leading to temporary loss of sparse vegetation cover and minor disturbance of soils. Given the absence of recorded fauna activity, nesting sites, or notable avifauna use during site surveys, impacts on terrestrial wildlife are anticipated to be negligible. With the application of standard mitigation measures, such as minimising the construction footprint, avoiding unnecessary vegetation removal, and implementing good practice site management, residual terrestrial ecological impacts are expected to remain low.

Hydrology – Surface and Groundwater

Groundwater samples were collected from two boreholes following standard protocols to ensure representativeness of aquifer conditions using dedicated bailer tubes to minimize contamination and preserve in-situ water quality parameters.

Analysis of the results show that the two borehole samples are generally in line with the standards, however, exceedances for microbiological parameters are recorded relative to irrigation standards and international drinking-water guidelines. It is imperative to note that groundwater will not be utilised by the Project for either potable supply or irrigation purposes. Groundwater sampling at boreholes was undertaken as a precautionary activity

to characterise baseline groundwater quality and to provide a reference for comparison with any future monitoring campaigns, if required.

Construction-phase impacts on water resources are expected to be low and manageable. Water demand will be temporary and met through municipal supply or licensed tanker providers, with permitting requirements in place to avoid placing pressure on local water availability. Site grading and construction activities may alter surface drainage patterns and increase the risk of runoff carrying sediments or contaminants to surrounding areas, particularly during rainfall events. In addition, there is potential for groundwater contamination from accidental spills, fuel and chemical storage, sanitary waste, and poorly managed liquid hazardous wastes. However, with the implementation of good international practice, including controlled storage, spill prevention measures, licensed waste disposal, and drainage management, significant impacts on surface water or groundwater quality are not anticipated.

During operation, the Project will be static and will not directly interact with groundwater. The main potential risks relate to accidental leaks or loss of containment from stored fuels, lubricants, chemicals, oily wastewater, or brine transfer systems. However, such events are not anticipated, as they would also adversely affect plant operations and efficiency. These risks will be effectively controlled through appropriate engineering design, secondary containment, leak detection, and routine inspection and maintenance programmes.

Marine Ecology

A marine ecology baseline survey was conducted on December 22nd and 23rd, 2025 to determine the existing conditions of habitats, flora and fauna within the project footprint and the surrounding area. The survey comprised of five distinct transect locations (T01–T05) where each location was surveyed using a 100 m transect line, subdivided into four (4) segments of 20 m length, separated by 5 m gaps to ensure statistical independence between replicates.

The marine baseline survey confirmed that the Project nearshore environment is predominantly characterised by extensive homogeneous muddy sand habitats within an industrial coastal setting, with generally low fish abundance and limited structural complexity. Sparse and localised patches of seagrass (*Halodule uninervis* and *Halophila ovalis*; both Least Concern under IUCN) and isolated colonised hard-substrate features were recorded in parts of the corridor, supporting small aggregations of common invertebrates. Overall, the habitats and species observed represent typical regional assemblages, with no Critical Habitat triggered under IFC Performance Standard 6 thresholds.



Construction of the intake pipeline will result in localized seabed disturbance associated with trench excavation and side-casting, leading to temporary increases in suspended sediment and the direct loss of benthic habitat within the immediate project footprint. With the implementation of standard sediment control measures, good practice dredging techniques, and ecological monitoring, recovery through natural recolonisation is anticipated following completion of works.

Elevated turbidity and sedimentation can affect seagrass habitats by limiting light availability for photosynthesis, smothering leaves, and altering local substrate conditions. While temporary increases in turbidity and sediment deposition may affect patchy seagrass habitats immediately adjacent to the trenching works, the impact is expected to be spatially restricted, short-term, and reversible, with recovery anticipated following completion of construction and implementation of standard sediment control measures and monitoring.

During the marine survey, an incidental dolphin sighting was recorded within the broader survey area; however, photographic confirmation was not obtained and the individual could not be identified beyond likely coastal species known from Kuwait waters, such as *Sousa plumbea* (Endangered) or *Tursiops aduncus* (Near Threatened). Given the transient nature of such observations and the implementation of standard marine vessel management measures (including low speeds and lookout procedures), the risk of vessel collision with marine megafauna is expected to be low.

Offshore vessel movements, excavation, and intake pipeline installation will generate temporary increases in underwater noise during the construction period. Given the short-term nature of these activities, the predominantly modified industrial setting, and the low abundance of marine fauna recorded during the survey, any disturbance to mobile species such as fish or occasional marine mammals is expected to be limited and localized and therefore, underwater noise impacts are anticipated to be of minor significance and temporary in duration.

A brine and thermal dispersion modelling study was undertaken by HR Wallingford in January 2025 to determine the potential impacts of the Project operational activities on the water quality. The marine hydrodynamic and dispersion modelling assessed the operational effects of the proposed brine and thermal discharge taking into consideration the existing Az Zour South (AZS) and Az Zour North Phase 1 IWPP (AZN1) plants. The results indicate that baseline salinity and temperature conditions in the Az-Zour coastal zone are already elevated due to existing desalination and power plant operations. The proposed project development will increase the total thermal and brine load discharged to the receiving environment; however, predicted changes are generally localised and attenuate with distance through dilution and dispersion.



Predicted changes include winter near-bed increases of up to +4 ppt and +6°C near the outfall, decreasing to less than +2 ppt and less than +2°C across the wider area around LNG reclamation; surface changes remain smaller (less than +1 ppt and less than +1°C). Summer impacts are lower, with excesses up to +2 ppt and +2°C over baseline within the project area. Sensitive receptors within the wider study area are therefore not expected to experience significant or widespread impacts, provided the discharge system performs as designed and remains compliant with KEPA requirements, Decision 12/2017, Table 3 Guidelines for water discharged into Kuwait seawater.

The marine ecology baseline survey confirms that the habitats most closely associated with the discharge corridor, particularly Transects 2 and 5, are characterised by uniform soft sediment with no recorded seagrass, coral communities, or notable fish assemblages. These transects therefore represent low-sensitivity benthic habitat within a modified industrial coastal environment. Although an incidental dolphin sighting was recorded at Transect 5, this opportunistic observation does not indicate the presence of critical habitat features or elevated prey availability within the footprint, and marine mammals are expected to remain transient in the wider coastal system. As such, the ecological sensitivity of the immediate discharge-receiving area remains low.

In addition, the modelling outcomes suggest that operational interactions between the proposed discharge and the existing AZN1 intake will be minor, with plume-related changes in temperature and salinity at the intake remaining close to current baseline conditions.

Marine biofouling may develop on intake infrastructure over time as larvae settle and organisms grow within the seawater flow. Routine inspection and maintenance cleaning will therefore be required. Occasional non-routine discharges associated with macro-fouling removal may result in temporary, localized increases in organic material and turbidity near the intake. However, given the limited frequency, rapid dilution, and implementation of standard operational controls, such impacts are expected to be minor, short-term, and spatially restricted.

There is the potential for impingement and entrainment of marine organisms and fauna at the inlet intake riser in the intake system. Based on the baseline marine ecology survey, the risk of impingement and entrainment at the proposed intake is expected to be low. Fish abundance and activity within the survey area were very limited, and the nearshore environment is predominantly modified soft sediment with sparse, patchy seagrass and overall low faunal diversity. In line with the IFC EHS Guidelines for Thermal Power Plants, the intake system has been designed with an operational approach velocity of 0.15 m/s to minimise impingement and entrainment risks. In addition, the intake structure is expected to be fitted with appropriate bar and mesh screens.



During construction, marine habitats will be monitored seasonally while planktons will be monitored quarterly in comparison to the baseline conditions. During operation, entrained flora and fauna will be monitored through daily observations on screens and monthly at intake head. In addition, Phytoplankton, Zooplankton and Benthic Infauna will be sampled and analysed once every six months.

Marine Water and Sediment Quality

The surveys for seawater quality and marine sediment quality are intended to collect additional information at the intake and outfall pipelines. The survey included sampling water and sediments at ten (10) stations (S1–S10) distributed across the survey area.

From the analysis of the seawater and sediments sample results, it can be deduced that the marine water and sediments within the survey area represent a good baseline as parameters are compliant with the national standards.

Construction activities may result in short-term and localised effects on marine water and sediment quality, mainly associated with trench excavation, pipeline installation, and vessel movements. The primary impact is the temporary increase in suspended sediments and turbidity, as fine material is resuspended during dredging and backfilling. Modelling of cutter suction trenching and intake head pocket construction (including sediment stockpiling and subsequent backfilling) indicates that these sediment plumes remain largely confined to the nearshore corridor and reduce rapidly with distance from the works, meaning impacts on the wider marine environment are expected to be limited and reversible. The main area of sensitivity is the existing AZN1 intake, where the modelling predicts higher temporary peak suspended sediment concentrations due to proximity. To minimise impacts, use of silt curtains (double curtains if required) or low impact environmental dredging around the inshore part of the intake pipeline corridor, near to the existing AZN1 intake towers, shall be implemented by the EPC Contractor to ensure sufficient control of fine sediment dispersion near AZN1.

In addition, daily turbidity monitoring near AZN1 intakes and coordination with AZN1 management will be required to ensure the intake construction does not result in any major impact on the operation of the nearby plant.

Excavated material will be stockpiled offshore of the intake trench and intake heads. The site will be carefully selected to be away from seagrass areas in location where seabed is characterised by sediments. In addition, silt curtains (double curtains if required) will be installed around this area to ensure settlement and avoid dispersion.

In addition to turbidity, sediment deposition may temporarily alter seabed surface conditions immediately adjacent to the trench footprint. However, deposition thicknesses



are expected to remain localised and given the predominance of muddy sand habitats and the absence of dense benthic flora in key areas, the overall ecological significance is considered low.

Construction also introduces risks of accidental spills, leaks, or contaminated runoff from fuels, oils, and chemicals, which could degrade water quality if uncontrolled. These risks are expected to remain low with implementation of EPC construction management measures, including secondary containment, spill response procedures, and controlled storage.

Temporary dewatering discharges represent another short-term construction-related influence. Treatment through settlement tanks and daily water quality monitoring prior to discharge will ensure compliance with KEPA requirements, Decision 12/2017, Table 3 Guidelines for water discharged into Kuwait seawater. Discharge points will be selected to avoid interaction with seagrass areas. Overall, construction-phase impacts on marine water and sediment quality are expected to be temporary, localised, and manageable with standard mitigation.

During operation, the main long-term water quality consideration is the discharge of brine and heated cooling water. Modelling indicates that incremental increases in salinity and temperature are largely restricted to the near-field mixing zone close to the outfall, with rapid dilution under prevailing coastal circulation. Therefore, significant impacts on water quality are not anticipated.

A further operational risk relates to chlorination systems used for biofouling control. Although risks of uncontrolled chlorine release are low, double-wall pipework, dosing controls, pressure monitoring, routine inspection, and water quality sampling are required to prevent localised exceedances.

With appropriate engineering design, dispersion performance, and compliance monitoring in place, operational water quality impacts from brine and thermal discharge are expected to remain localised, low in magnitude, and compatible with the existing modified industrial marine setting.

During construction, the dewatered effluent, sea water quality during dredging, backfilling and construction will be monitored to ensure compliance with decision 12/2017 and the sediment quality will be sampled and analysed. During commissioning, the water will be tested before discharge. During operation, temperature, Salinity, DO, flow rate and residual chlorine will be monitored.

Public Health & Safety

All construction Projects have potential risks relating to public safety that could arise, particularly regarding the use, for example, of equipment, construction plant and vehicles and deep excavations, which could result in potential hazards on or near the site and on the surrounding roads. It is important therefore to protect the local community from risks which could occur due to traffic accidents or emergency situations of fire, flood or pollution incidents. However, the site is fenced and secure, therefore there is negligible potential that the Project could be accessed by the public in the vicinity of the Project area. Specific management plans during the construction phase, in addition to the CESMP, will include a Pollution Prevention and Control Plan, Traffic Management Plan and an Emergency Preparedness and Response Plan. A Stakeholder Engagement Plan will also provide the basis for consultation with communities including a grievance mechanism.

Operational public safety risks are primarily associated with the storage and handling of hazardous materials (e.g., natural gas, backup fuel, treatment chemicals, and lubricants), which could lead to incidents such as fires, explosions, toxic releases, or spills if not properly controlled. Although the Project is located within a secure industrial zone, emergency coordination with neighbouring facilities and external agencies remains essential. These risks will be minimised through advanced design and control measures, including gas leak detection, automatic isolation systems, emissions monitoring, and bunded, access-controlled storage areas with secondary containment. Public safety will be further managed through comprehensive firefighting systems and the implementation of an Operational Emergency Preparedness and Response Plan aligned with the wider Az Zour North Complex protocols, supported by regular training, drills, and ongoing review.

Historic and Archaeological Heritage

Based on the desk review, there are no international or national sites of cultural heritage significance listed in connection with the Project site. The project site itself is located within an industrial area surrounded by existing power plants, with no known archaeologically sensitive sites in the vicinity. Therefore, potential impacts on this heritage site are unlikely.

There is no evidence to suggest that the project site contains significant archaeological or cultural features, and observations from the site visit revealed no findings of concern. The site has also been modified, having previously served as temporary construction facility during the construction of the adjacent power plants. As such, impacts on any buried artifacts are considered unlikely. Therefore, archaeology and cultural heritage have not been discussed further in this report.



Nonetheless, an archaeological 'Chance Find Procedure' will be developed prior to the start of site earthworks. This will include protocols and procedures to stop work and methods to preserve potential finds, as well as reporting requirements and coordination with the relevant authorities.

Visual Topography

Construction will cause minor, adverse changes to the landscape, primarily through site levelling and building construction. The site, being a previously utilized for the utilities such as transformer rooms and communication towers and having demolition waste within an undeveloped industrial area, has low sensitivity to these changes.

Construction activities may cause temporary visual disturbances due to heavy machinery, dust, and lighting at night. These impacts will be most noticeable to nearby workers, and road users, but are considered minor due to the site's location within an industrial complex.

The visual and landscape impacts are expected to be temporary, with minimal long-term effects on surrounding receptors. The project's proximity to existing industrial facilities reduces the sensitivity of the area to these changes.

Receptors affected by the visual impacts will be those that have direct (and partial) views across the existing site. It is inevitable that the plant, once completed will contribute to the existing landscape and visual setting which is mostly an industrial landscape, it is thus deduced that the development of the proposed Project will result in minor and insignificant impacts to the visual landscape of the AoI and development region.

Lighting will be required for security around the site perimeter, lighting within the plant itself and that site entrances or along access roads. Impacts due to lighting may result in considerable changes to the night-time views of the site. This will be minimised through implementing the applicable measures to avoid unnecessary sky glow glare or light spill into dark areas. Considering the existing landscape value of the project area, the impacts are likely to have negligible magnitude and significance on the surrounding receptors.

Labour and Working Conditions

IFC PS2 and ILO conventions provide clear requirements related to the working conditions. However, contractors may violate the laws and regulations and workers could potentially accept the unjust conditions they experience due to lack of knowledge of their legal rights or from fear of the adverse outcomes from expressing their concerns. Discrimination based on gender, nationality, religion or as a result of different social status or work position is widespread within the construction industry. Labour exploitation on construction sites, unfortunately, has become a reality in some parts of the world with history of contractors



الشركة الوطنية للخدمات البيئية (ش.م.م.)
WATANIYA ENVIRONMENTAL SERVICES CO. (K.S.C.C.)



and recruitment agency exploitation of workers despite existing Labour Law articles that forbid such practices.

Workers are also at risk, especially migrant workers, as they face the risk of debt bondage through unscrupulous recruitment agencies in their home countries. Even though the EPC Contractors will be responsible for covering the required expenses as per the Labour Law, there still remains a risk of engaging uncertified recruitment agencies who have human rights violations. During the construction phase, workers will be vulnerable to various forms of harassment, exploitation and abuse, aggravated by traditionally male working environment. GBVH is likely to be committed by co-workers or construction supervisors and can be attributed to gender stereotypes.

Common activities undertaken during construction such as the movement of heavy machinery, excavation, handling of chemicals, etc. can all introduce significant risk to the health and safety for the associated work force.

In addition, the close interaction and mixing of workers on construction sites and in labour accommodations can facilitate the spread of diseases, which may also impact the surrounding communities.

Labour risks will be managed through compliance with Kuwait Labour Law and IFC PS2, including fair wages, written contracts, regulated working hours, overtime compensation, and provision of adequate worker accommodation, transport, and welfare services. Recruitment risks will be controlled through the use of certified agencies, prohibition of worker-paid recruitment fees, clear communication of employment terms in workers' native languages, and monitoring of timely wage payments through audits and salary transfer verification.

Worker wellbeing and safety will be ensured through a robust Occupational health and safety management system, mandatory inductions and toolbox talks, adequate PPE, medical services, heat-stress and extreme weather protections, and emergency preparedness measures.

Social and ethical risks (forced labour, child labour, discrimination, GBVH) will be mitigated through strict HR policies, codes of conduct, confidential grievance mechanisms, workforce training, and regular labour audits across contractors and subcontractors.