

Hamriyah Independent Power Project (IPP)

Environmental and Social Management and Monitoring Plan (ESMMP) Framework

October 2018

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1 Environmental and social management and monitoring plan framework

1.1 Introduction

Ensuring that the site operates a robust environmental and social management and monitoring plan (ESMMP) during the construction and operation phases will form a key part of the mitigation for the proposed plant.

This section comprises framework for the ESMMP based on the outcomes of the environmental and social assessment undertaken as part of ESIA for Hamriyah IPP. It summarises the organizational requirements, mitigation and monitoring measures to avoid potentially adverse effects where possible, or otherwise to minimise the residual impacts of the Project to an acceptable level - and maximise potential benefits - with respect to significant environmental and social aspects, and to operate in conformance with applicable laws and regulations of the UAE and Sharjah Emirate, as well as the policies of international financial organizations.

This ESMMP framework comprises the minimum environmental and social management and monitoring requirements that were identified within the ESIA and shall be implemented at the project. Detailed construction ESMMP (CESMMP) and operational ESMMP (OESMMP) shall be developed prior to commencing each respective phase which shall be in compliance with requirements stipulated within the ESIA, environmental permit conditions, and the national and international standards and regulations applicable to the project.

1.2 ESMMP structure

The content and structure of the detailed ESMMP shall be in compliance with national guidelines and international best practices. Following are the guidelines recommended to be taken into consideration when developing both CESMMP and OESMMP:

- Technical Guidance Document for Operational Environmental Management Plan (OEMP), EAD-EQ-PCE-TG-06, Environment Agency – Abu Dhabi 2014
- Technical Guidance Document for Decommissioning Environmental Management Plan (DEMP), EAD-EQ-PCE-TG-07, Environment Agency – Abu Dhabi 2014
- Technical Guidance Document for Construction Environmental Management Plan (CEMP), EAD-EQ-PCE-TG-05, Environment Agency – Abu Dhabi 2014
- Environmental and Social Management System (ESMS) Implementation Handbook – Construction, IFC WBG 2014
- Environmental and Social Management System (ESMS) Implementation Handbook – General, IFC WBG 2015

The ESMMP shall be considered as a live document. Ongoing evaluation of the effectiveness of measures included in the ESMMP will be undertaken on a regular basis as the project evolves and develops and throughout design, construction, operation and decommissioning of the project. Evaluation will be undertaken through ongoing communication with EPC contractors, stakeholders and lenders supplemented by site audits and monitoring data review to identify weaknesses and / or gaps in the management plan. The ESMMP will be changed and / or updated accordingly to ensure appropriate, robust and effective environmental and social management commensurate to the scale of the Project throughout its lifetime.

In addition to the above-mentioned guidelines, Table 1 provides an example of the minimum contents expected in an ESMMP.

Table 1: Example of minimum content of an ESMMP

No.	Section	Description of content
1	Introduction	An overview of the report context and purpose
2	Project description	This chapter shall provide details on the following: <ul style="list-style-type: none"> ● Location of the project ● Scope ● Overall project and planned construction/operation activities <ul style="list-style-type: none"> – Environmental baseline, current conditions, and sensitive receptors – Construction/operation project description – Environmental permits ● Project schedule and milestones
3	Environmental and social management	<ul style="list-style-type: none"> ● Policy statement ● Environmental and social management systems ● Roles and responsibilities ● Regulations and requirements ● Environmental and social awareness and training ● Document review and updates ● Reporting requirements ● Environmental and social commitments ● Communication procedures and coordination with external entities and addressing complaints
4	Environmental and social impacts	The environmental and social impacts section of the CESMMP or OESMMP should outline the environmental impacts of the specific activities at the project site on the surrounding environment, noting significant impacts. The plan should also explain the methodology used for determining significant impacts within the ESIA report and its associated studies.
5	Environmental and social mitigation measures	<p>As part of the CESMMP/OESMMP procedures for managing and mitigating risk for the project shall be developed. Mitigation measures are to be based the outcomes of the ESIA, environmental permit conditions and on best management practices and best available technologies.</p> <p>It is anticipated that the following management plans might be required as part of the ESMMP (the list below is based on Abu Dhabi requirements, however, for Hamriyah the management plans requirements are identified within the ESIA and sections below):</p> <ul style="list-style-type: none"> ● Air Quality Control Plan ● Erosion and Sediment Control Plan ● Soil and Groundwater Contamination Control Plan ● Terrestrial Ecology Control Plan ● Water Quality and Marine Ecology Control Plan ● Noise and Vibration Control Plan ● Traffic Control Plan ● Waste Control Plan ● Contingency Plan ● Emergency Control Plan ● Security Plan.
6	Monitoring and auditing	<ul style="list-style-type: none"> ● Environmental and social performance monitoring ● Reporting requirements ● Incident reports ● Periodic or annual performance reports ● Monitoring compliance and audit reports ● Environmental checklists ● Procedures to review inspections and steps to address non-compliance Section

Source: Mott MacDonald

1.3 Legislative framework, standards and guidelines

The project shall be in compliance with the national laws, standards and regulations of the UAE as well as applicable international requirements such as IFC Performance Standards and IFC EHS Guidelines. These are detailed within the ESIA report for the Project.

1.4 Construction Environmental and Social Management and Monitoring Plan

The overall responsibility for the implementation of the requirements set out in the ESIA and ESSMP lies with the project owner, whereby a number of the specific actions will be carried out by the third-party contractors in the different stages.

1.4.1 Roles and responsibilities

This section identifies key personnel for monitoring and managing social impacts of the Project.

The Project Owner will ensure that the responsibilities and authorities for relevant roles are assigned and communicated within the Project. The Project Owner will assign the responsibility and authority for:

- Ensuring that the Project conforms to the requirements of the approved ESIA and ESMMS throughout the construction phases; and
- Reporting on the performance to the regulators, competent authorities and other stakeholders, if required.

Those involved in the Project EMS will have a clear understanding of their role, responsibilities and authorities for conforming to the requirements of the Project EMS and achieving the intended outcomes. All staff and contractors working on the Project must know and understand the boundaries of their jobs to execute their work with minimal interference and supervision.

The definition of roles, responsibilities and authorities is an important part of environmental governance and allows for discrete management of tasks and involvement throughout the Project team.

The roles, responsibilities and authorities of all Project-related personnel, including the Main Works Contractor, sub-contractors, and other Project personnel, will be identified and regularly reviewed with respect to environmental management of the Project.

Table 2 details the key personnel and their responsibilities in its implementation.

Table 2: Key personnel and responsibilities

Personnel	Responsibilities
Project Owner	<ul style="list-style-type: none"> ● Ensuring full implementation of the CEMMP ● Ensuring compliance that activities comply with all legislative and company requirements ● To liaise with local government authorities and non-governmental organisations and report on environmental compliance as required ● Incidents, hazards or other environmental related deficiencies are reported, analysed and appropriate preventive/corrective actions are implemented ● Personnel are competent and have the necessary skills to conduct their CEMMP implementation functions
EPC Contractor	<ul style="list-style-type: none"> ● Preparation of a detailed CEMP ● Comply with the CEMP and environmental consents and approvals and ensure that all their appointed Subcontractors also comply with these requirements ● Establishment and implementation of appropriate environmental management processes

Personnel	Responsibilities
EPC Contractor Environmental Manager	<ul style="list-style-type: none"> ● Establishment and implementation of appropriate environmental controls onsite ● Establishment and implementation of appropriate environmental monitoring onsite ● Establishment and maintenance of appropriate environmental records onsite ● Instruct personnel on the measures that each employee will implement to comply with the CEMP ● Delivery of appropriate environmental training to contractor staff and establishing appropriate training requirements for subcontractor staff ● Employ or delegate a competent and dedicated Environmental Manager to oversee implementation of the CEMP <ul style="list-style-type: none"> ● Be based on site and actively participate in the planning, construction and rehabilitation of the works ● Liaise closely with environmental managers of all appointed Subcontractors ● Ensure compliance with the CEMP and any other environmental requirements by the EPC Contractor and Subcontractors ● Ensure protection of the environment ● Perform day-to-day tasks necessary to monitor the performance of the subcontractors ● Act as a guide and adviser to the Subcontractors on environmental issues ● Be familiar with existing information regarding the project area and the CEMP ● Liaise with the Proponent in the case of incidents, non-compliance or any other matter where the course of action is not clear ● Maintain up-to-date records on the following topics, among others: Contracts; Training; Payroll; Insurance; Workers' next of kin details; Staff medical records; Staff grievance logs; Leave records ● Oversee implementation of environmental management policies, procedures and plans on site by all contractors and subcontractors
Subcontractors	<ul style="list-style-type: none"> ● Compliance with the CEMP and environmental consents and approvals ● Establishment and implementation of any additional necessary environmental management processes ● Establishment and implementation of any additional necessary environmental controls onsite ● Appoint an Environmental Manager responsible for ensuring that the requirements of the CEMP are met ● Employ competent and dedicated Environmental personnel/advisers to oversee implementation of the CEMP ● Instruct personnel on the measures that each employee will implement to comply with this CEMP

1.4.2 Construction Environmental Monitoring Plan (CEMP)

All construction contractors will be responsible for ensuring that environmental performance of the Project is in line with this ESMMP, all compliance obligations, and good industry practice with respect to environmental matters.

Contractors will be required to produce site-specific CEMPs for individual projects based on the contents of the approved ESIA and ESMMP. These CEMPs will be subject to periodic updates or following changes to Scope or Systems. Throughout the development, contractor activities will be supervised and audited using the methodologies detailed within this document, which will be subject to internal reviews to ensure that all environmental aspects are identified and mitigated throughout the Project life.

1.5 Operational Environmental and Social Management and Monitoring Plan

1.5.1 Roles and Responsibilities

This section identifies key personnel for monitoring and managing the environmental and social impacts of the Project. The Project Owner will ensure that the responsibilities and authorities for

relevant roles are assigned and communicated within the Project. The Project Owner will assign the responsibility and authority for:

- Ensuring that the Project conforms to the requirements of the approved ESIA and ESMMS throughout the construction phases; and
- Reporting on the performance to the regulators, competent authorities and other stakeholders, if required.

The Project Owner is responsible for implementing the OESMMP and for ensuring that all contractors and subcontractors are actively implementing the specification of the OESMMP.

1.5.2 Operational planning and control

It will be ensured that Project operational planning and controls are in place to avoid or minimise the adverse impacts of the Project activities on the environment and the communities throughout the Project lifecycle. The type and extent of operational controls depend on the nature of the Project activities, the risks and opportunities, significant environmental aspects and compliance obligations.

The type of operational control methods include but are not limited to:

- Designing processes in such a way as to prevent error and ensure consistent results;
- Using technology to control processes and prevent adverse results (i.e. engineering controls);
- Using competent personnel to ensure the desired results;
- Performing processes in a specified way;
- Monitoring or measuring processes to check the results; and
- Determining the use and amount of documented information necessary.

The Project will control planned changes and review the consequences of unintended changes, taking action to mitigate any adverse effects, as necessary.

It will be ensured that outsourced Project processes are controlled or influenced. The type and extent of control or influence to be applied to the processes shall be defined within the Project OESMMP. The extent of control needed within the Project processes to control or influence an outsourced process or a provider of products and services will be determined based upon factors such as:

- Knowledge, competence and resources, including:
- The competence of the external provider to meet the Project's EMS requirements;
- The technical competence to define appropriate controls or assess the adequacy of controls;
- The importance and potential effect the outsourced process will have on achieving the intended outcome of the Project's EMS;
- The extent to which control of the process is shared;
- The capability of achieving the necessary control through the application of its general procurement process; and
- Improvement opportunities available.

Consistent with a life cycle perspective, the Project will:

- Establish controls, as appropriate, to ensure that its environmental requirements are addressed in the design and development process for the product or service, considering each life cycle stage;

- Determine its environmental requirements for the procurement of products and services, as appropriate;
- Communicate its relevant environmental requirements to external providers, including contractors; and
- Consider the need to provide information about potential significant environmental impacts associated with the transportation or delivery, use, end-of-life treatment and final disposal of its products and services.

The documented information shall be maintained to the extent necessary to have confidence that the processes have been carried out as planned.

1.5.3 Environmental and social management and monitoring measures

The minimum environmental social mitigation, enhancement and monitoring measures proposed for the Project’s construction and operations phases are summarised in the following sections presented in Table 3.

Table 3: Topics of the environmental and social management and monitoring measures

Section	Content	Location
1.6.3.1	Air quality management	Table 4
1.6.3.2	Marine ecology and water management	Table 5
1.6.3.3	Solid waste and material management	Table 6
1.6.3.4	Soil, groundwater and land contamination	Table 7
1.6.3.5	Noise and vibration management	Table 8
1.6.3.6	Terrestrial ecology management	Table 9
A.1.1.1	Wastewater management	Table 10
A.1.1.2	Social management and monitoring	Table 11
A.1.1.3	Landscape and visual impacts management	Table 12
A.1.1.4	Cultural heritage and archaeology management	Table 13
A.1.1.5	Traffic management	Table 14

1.5.3.1 Air quality management

Table 4: Air quality management

Objective	Activity	Actions / mitigation measures	Standards	Responsibility	Timescale	Monitoring /KPI
Construction phase						
Minimise dust emissions to prevent nuisance and protect human health	Land clearing and construction.	<ul style="list-style-type: none"> Minimising dust from material handling sources, such as conveyors and bins, by using covers and/or control equipment (water suppression). Minimising dust from open sources, including storage piles, by using control measures such as installing enclosures and covers, and increasing the moisture content. Employ dust suppression techniques such as applying water or non-toxic chemicals to minimise dust from vehicle movements. Development of a Dust Management Plan (DMP). No open burning of solid waste. 	<p>UAE ambient air quality standards</p> <p>IFC EHS General Guidelines on Air Emissions and Ambient Air Quality</p> <p>IFC PS3 - Resource Efficiency and Pollution Prevention</p>	EPC Contractor		<p>EPC Contractor Environmental Manager to undertake visual checks of construction areas ever two weeks.</p> <p>Contractor to undertake daily visual inspections</p> <p>Maintenance of record of violations where observed and disciplinary action imposed on contractor.</p>
Reduction in the generation of vehicle emissions to protect human health	Vehicle emissions on unpaved roads and emissions from vehicle engines	<ul style="list-style-type: none"> Manage emissions from mobile sources as per the EHS Guidelines for Air Emissions and Ambient Air Quality Develop a Traffic Management Plan Emissions from on-road and off-road vehicles should comply with national requirements. In the absence of these, the following should be considered: Regardless of the size or type of vehicle, owners / operators should implement the manufacturer recommended engine maintenance programmes Drivers should be instructed on the benefits of driving practices that reduced both the risk of accidents and fuel consumption, including measured acceleration and driving within safe speed limits Old construction vehicles should be replaced with newer more fuel efficient alternatives Convert high use vehicles to cleaner fuels where possible 	<p>UAE ambient air quality standards</p> <p>IFC EHS General Guidelines on Air Emissions and Ambient Air Quality</p> <p>IFC PS3 - Resource Efficiency and Pollution Prevention</p>	EPC Contractor		EPC Contractor to keep copy of all service records for construction plant and construction vehicles

Objective	Activity	Actions / mitigation measures	Standards	Responsibility	Timescale	Monitoring /KPI
		<ul style="list-style-type: none"> Install and maintain emission control devices such as catalytic convertors Implement regular vehicle maintenance and repair programme 				
Reduction in air pollution	Burning of waste onsite	<ul style="list-style-type: none"> No burning of waste is allowed onsite. All waste is to be disposed of in a permitted waste disposal facility. 	IFC EHS General Guidelines on Air Emissions and Ambient Air Quality	EPC contractor		Records of waste disposal
Operational phase						
Increases in ambient concentrations of NO ₂ and other pollutants in the proposed projects airshed	Power plant operations	<ul style="list-style-type: none"> Monitoring of air emissions is to be undertaken at the stacks and on site as per environmental requirements and Environmental Clearance and conditions. Continuously monitor ambient concentrations of NO_x and NO₂ in accordance with internationally recognised approaches Install air quality monitoring stations at the nearest sensitive receptor communities to the north and south of the site. These stations will monitor NO_x, SO_x, ozone, and PM¹⁰ Include a dispersion model ready meteorological station in accordance with US EPA guidance which can monitor wind speed, direction and temperature Be subject to regular calibration procedures and audits to ensure proper function in accordance with international best practice Be located offsite, at the point of maximum impacts predicted by the dispersion modelling where there is population exposure 	UAE ambient air quality standards	Sponsor and/or Project Company		Monthly air quality monitoring reports
Management of emissions to air	Power plant operation	<ul style="list-style-type: none"> Annual emissions monitoring is to be undertaken on all stacks as per IFC requirements Planting trees around the site boundaries (subject to getting clearance from SEWA) The PC will continuously monitor their mode of operation (open cycle/combined cycle) and will monitor emission compliance levels during these operational modes 	IFC EHS General Guidelines on Air Emissions and Ambient Air Quality	Project Company		Annual reporting

Source: Mott MacDonald, 2018

1.5.3.2 Climate change management plan

GHG emissions associated with the project represent an improvement compared to existing grid carbon intensity and are in line with typical ranges for CCGT technologies. However, they still represent a large volume of GHG emissions and it is recommended that consideration be given to mitigation measures to minimise the GHG impact of the project. These measures may include:

Minimisation of construction emissions;

- low carbon and efficient design, construction and sourcing of materials should be considered. It is noted that any measures to reduce construction emissions should not be at the expense of operational efficiency, given that more significant impacts are associated with the operational phase.

Minimising operational emissions:

- Operating the plant efficiently will be essential. Good maintenance practices, upgrades and fuel sourcing strategies can all help reduce emissions.
- The most significant options may be identifying how the plant fits with the UAE's wider decarbonisation strategy, and whether there are opportunities to operate the facility to support the objectives set out in the UAE's energy strategies and climate change plans as part of a more flexible and efficient power network.
- Maintaining the efficiency of the plant by conducting periodic maintenance of equipment
- Quantification and reporting on GHG emissions during the operational phase of the plant

1.5.3.3 Marine ecology and water management

Table 5: Marine ecology and water management

Objective	Activity	Actions / mitigation measures	Standards	Responsibility	Timescale	Monitoring /KPI
Construction phase						
Reduction of seawater quality	Dewatering	<p>In the event the EPC encounter the required to dewater, prior to commencing any dewatering activities, the EPC contractor shall:</p> <ul style="list-style-type: none"> • Develop a comprehensive dewatering plan as part of the CESMMP that details the location of dewatering activities, equipment, discharge point(s), emergency response measures and the proposed monitoring & reporting requirements. • The plan shall be reviewed and approved by the regulator • The monitoring shall include a requirement for a suite of chemical testing of the water and will include metals, benzene, toluene, xylene and ethylbenzene and hydrocarbons. • The results of monitoring should be compared to Canadian water quality guidelines to assess disposal options. There is the potential that that some localised water will be unsuitable for disposal to surface or groundwater due to elevated concentrations of Toluene, therefore this may require disposal off-site to a licenced facility • The plan to comply with the requirements and guidelines stipulated within EAD Best Management Practices (BMP) Technical Guidance Document for Discharges from Construction Activities (EAD-EQ-PCE-TG-15) • Obtain permit from Sharjah Municipality for the discharge of dewatering water to the existing stormwater network, for discharge to the marine environment or collection by authorised third parties • Dewatering systems to include flow control (sedimentation tanks), checked daily for signs of oils and grease and water quality testing by an approved service provider and laboratory on a monthly basis for compliance with relevant 	<ul style="list-style-type: none"> • UAE law, standards and regulations • Environmental permit conditions • Applicable international standards 	EPC contractor		Dewatering systems to include flow control (sedimentation tanks), checked daily for signs of oils and grease and water quality testing by an approved service provider and laboratory on a monthly basis for compliance with relevant applicable standard for discharge to the marine environment

Objective	Activity	Actions / mitigation measures	Standards	Responsibility	Timescale	Monitoring /KPI
Reduction of seawater quality Marine ecology deterioration Impact on human health	<ul style="list-style-type: none"> Hazardous material and waste generation, handling, storage, disposal Leakage or spill of hazardous materials or waste Leakage or spill of sewage 	<ul style="list-style-type: none"> Develop and implement CEMP requirements with respect to handling hazardous materials and wastes Develop and implement environmental incident/spill response procedure as part of the CEMP Provide sufficient welfare facilities/toilets for construction workforce Above ground chemical portable toilet blocks and septic tank facilities to be appropriately designed, monitored and regularly emptied by permitted carrier and disposal site 	<ul style="list-style-type: none"> UAE law, standards and regulations Environmental permit conditions Applicable international standards 	EPC contractor		Visual monitoring of any signs of contamination and leakages/spills
Operational phase						
Deterioration of marine species and biodiversity	Water abstraction from the intake for cooling and process water	<ul style="list-style-type: none"> Install screens, barriers/ fenders or other such structures to prevent marine fauna from being trapped A manual circulation system should be considered which would return any live entrained fauna to the sea (e.g. turtles) Dead organisms will be required to be disposed of in approved landfills by authorised supplier The quantity of biological organisms trapped by the plant's intake structures should be monitored regularly and extra screens/mitigation measures implemented if necessary 	<ul style="list-style-type: none"> UAE law, standards and regulations Environmental permit conditions Applicable international standards 	Project Company		The quantity of biological organisms trapped by the plant's intake structures should be monitored regularly and recorded
Deterioration of marine species and biodiversity	<p>Increased seawater temperature as a result of cooling water discharge</p> <p>Generation, treatment and disposal of wastewaters through the existing outfall</p>	<ul style="list-style-type: none"> Compliance with international standards and guidelines and national Continuous monitoring of discharge water and sea water within the thermal plume Regular monitoring of marine environment including water quality, sediment quality and biodiversity Wastewaters to be treated by appropriate treatment plant processesAll discharges to the existing outfall to comply with the relevant requirements and standards 	<ul style="list-style-type: none"> UAE law, standards and regulations Environmental permit conditions Applicable international standards 	Project Company		<ul style="list-style-type: none"> It is recommended that annual marine ecological surveys (for the first two years of operation) are undertaken at the coral and pearls oyster areas to assess the conditions of marine ecology. Continuous water quality monitoring at the point of discharge into the outfall channel shall be undertaken and

Objective	Activity	Actions / mitigation measures	Standards	Responsibility	Timescale	Monitoring /KPI
Deterioration of marine species and biodiversity Human health impacts	Hazardous material and waste generation, handling and storage and disposal Leakage or spill of hazardous materials or waste	Prepare and implement the hazardous material and waste management plans Prepare emergency response procedure	<ul style="list-style-type: none"> UAE law, standards and regulations Environmental permit conditions Applicable international standards 	Project Company		<p>as a minimum measure water temperature. Chlorine shall be monitored periodically.</p> <ul style="list-style-type: none"> it is recommended that a monthly water quality monitoring at the point of discharge into the sea or the boundary of the boundary of the mixing zone (or as the regulator recommend) shall be undertaken. Parameters to be monitored should include temperature and chlorine. <p>Visual monitoring of receiving environment If required following any incidents, spills, and leakages, sampling and testing of receiving environment to ensure that remediation was undertaken as appropriate</p>

Source: Mott MacDonald, 2018

1.5.3.4 Solid waste and material management

Table 6: Solid waste and material management

Objective	Activity	Actions / mitigation measures	Standards	Responsibility	Timescale	Monitoring /KPI
General measures						
Waste hierarchy and minimisation of waste disposal to landfill	Waste generation, handling and storage	<ul style="list-style-type: none"> Develop a detailed construction materials storage, handling and use plan and a waste management plan for the construction site Best practice waste management begins with waste prevention and minimisation which is achieved through the efficient storage, handling and use of raw materials. Set up a central waste collection area in which multiple waste streams can be segregated and stored before being sent offsite for recycling, treatment/ or disposal. These may include; wood, metal, concrete, plastic, and municipal waste with any food waste stored separately, covered and collected regularly. Re-using materials on site wherever possible. The most significant opportunity in the construction phase is with respect to excavated spoil Instituting good housekeeping and operating practices, including inventory control to reduce the amount of waste resulting from materials that are out-of-date, off-specification, contaminated, damaged, or excess to plant needs Instituting procurement measures that recognise opportunities such as ordering the correct amount of materials to be delivered when needed, reducing the amount of packaging used by suppliers and establishing a take-back system with suppliers Provide an adequate number of covered containers for various waste materials strategically placed throughout the construction site for collection and disposal (at the central waste management area) on a daily basis Ensure suitable covers are made available and used for all receptacles in event of high winds Maintain a working file keeping a record of all waste being disposed. This shall include date, time, type of waste, approx. volume of waste, and disposal method and facility/landfill Undertake regular visual inspections of waste handling and storage areas 	UAE and local waste management standards and technical guidelines IFC EHS General Guidelines on waste and hazardous materials	EPC contractor Project Owner and Contractors	Construction phase and Operation phase	Records of waste management site inspections and audits Records of waste storage, transfer and disposal Register of waste carrier authorisations and permits

Objective	Activity	Actions / mitigation measures	Standards	Responsibility	Timescale	Monitoring /KPI
		<ul style="list-style-type: none"> Waste transportation vehicles will be fitted with adequate covering to prevent scattering of waste from the vehicle All waste will be transported and disposed of to a municipality approved/suitable permitted disposal facility/landfill by appropriately licensed contractor Waste transportation vehicles will be fitted with adequate covering to prevent scattering of waste from the vehicle All waste will be transported and disposed of to a municipality approved/suitable permitted disposal facility/landfill by appropriately licensed contractors Aboveground chemical portable toilet blocks and septic tank facilities to be appropriately designed, monitored and regularly emptied by - permitted carrier and disposal site 				
Prevention of contamination of receiving environments (particularly seawater, groundwater and the ground)	Hazardous material and waste generation, handling and storage Leakage or spill of hazardous materials or waste	<ul style="list-style-type: none"> Anticipated additional waste (including empty oil drums, paints, used absorbent pads from spill kits), will be handled, stored and disposed of as hazardous waste in accordance with the requirements Substituting raw materials or inputs with less hazardous or toxic materials wherever economically and technically feasible All waste generated as a result of the use of chemicals and plant must be dealt with under the applicable duty of care procedures Waste disposal of any sort to the marine environment is strictly prohibited Waste chemicals will be clearly marked and kept separate from non-hazardous construction materials Material Safety Data Sheets (MSDS) will be provided for all hazardous chemicals and substances during the construction and commissioning phases of the Project A separate and sufficiently isolated hazardous waste area upon an impermeable surface will be constructed with adequate secondary containment (110% of the total volume of the largest tank or 25% of the total storage capacity, whichever is greatest) Hazardous waste will be stored in tightly closed, leak proof containers made of or lined with, 	UAE and local waste management standards and technical guidelines IFC EHS General Guidelines on waste and hazardous materials	EPC contractor Project Owner and Contractors	Construction phase and Operation phase	Emergency Preparedness and Response Plan Register of hazardous waste Register of hazardous materials Records of site inspections and audits Records of waste storage, transfer and disposal Register of waste carrier authorisations and permits

Objective	Activity	Actions / mitigation measures	Standards	Responsibility	Timescale	Monitoring /KPI
		<p>materials that are compatible and impermeable to the hazardous waste to be stored</p> <ul style="list-style-type: none"> Storage sites should be at least 50m from coastal waters, or with additional protection measures should closer locations be absolutely necessary Containers of hazardous waste will be clearly marked with appropriate warning labels to accurately describe their contents and detailed safety precautions. Labels will be waterproof, securely attached, and written in Arabic, English and key native languages of the workforce. Wherever possible chemicals will be kept in their original container Material handling and storage areas will be established during the construction phase and then a number of these will be retained for the operational phase. These will be specifically designed giving due consideration to the following requirements: <ul style="list-style-type: none"> Located away from sensitive receptors Not at risk from theft or vandalism Prevention of being spoiled by the elements Easily accessible in a safe manner Well ventilated Unlikely to be damaged Located next to any required Personal Protective Equipment (PPE) (as necessary for irritants and hazardous materials) Bunded and located next to spill kits (as necessary for hazardous liquids) The contractor will be required to develop a spill control, prevention and counter measure Plan and an Emergency Preparedness and Response Plan Hazardous waste will be transported and disposed of to a approved/suitable permitted recycling/disposal facility/landfill Ensure appropriate staff are trained and rehearsed in implementation of the environmental incident/spill response procedure 				
Construction phase						
Waste hierarchy and minimisation of waste disposal to landfill	Construction waste generation,	<ul style="list-style-type: none"> Develop and implement a suitable construction waste management plan (CWMP) which incorporates the principles of reduce, reuse, 	UAE and local waste management standards and	EPC contractor	Construction phase	Construction Waste Management Plan (CWMP)

Objective	Activity	Actions / mitigation measures	Standards	Responsibility	Timescale	Monitoring /KPI
	handling and storage	<p>recycle and is followed by all contractors/subcontractors employed on the site</p> <ul style="list-style-type: none"> ● Provide an adequate number of covered containers for various waste materials strategically placed throughout the construction site for collection and disposal (at the central waste management area) on a daily basis ● Ensure suitable covers are made available and used for all receptacles in event of high winds ● Undertake regular visual inspections of waste and hazardous materials handling and storage areas ● Detailed construction phase hazardous materials storage, handling and use plan and waste management plan ● Aboveground chemical portable toilet blocks and septic tank facilities to be appropriately designed, monitored and regularly emptied by - permitted carrier and disposal site 	<p>technical guidelines IFC EHS General Guidelines on waste and hazardous materials</p>			<p>Records of waste management site inspections and audits Records of waste storage, transfer and disposal Register of waste carrier authorisations and permits</p>
Operational phase						
Waste hierarchy and minimisation of waste disposal to landfill	Waste management	<p>A Site Waste Management Plan (SWMP) which will be developed and will contain:</p> <ul style="list-style-type: none"> ● A map showing each temporary waste storage location for the Project ● A description of each waste stream generated by the operation of the facility, the appropriate handling methodology, the correct approach for temporary storage and the correct route for removal/disposal off site ● Staff training requirements with respect to waste handling procedures ● Waste generation data collection for each waste stream by volume. This should include the proportion of each waste stream going for reuse, recycling or disposal. A procedure for the identification of any unusual waste volumes ● Any waste monitoring as deemed necessary ● An audit schedule which details the frequency of waste management audits and those responsible for undertaking them ● A section related to continuous improvement and corrective actions whereby audit findings can be recorded and incorporated into updated waste management procedure. This will also highlight any new and feasible reuse and recycling opportunities which may arise over time 	<p>waste management standards and technical guidelines IFC EHS General Guidelines on waste and hazardous materials</p>	Project Owner and Contractors	Construction phase and Operation phase	<p>Site Waste Management Plan (SWMP) Records of waste management site inspections and audits Records of waste storage, transfer and disposal Register of waste carrier authorisations and permits</p>

Objective	Activity	Actions / mitigation measures	Standards	Responsibility	Timescale	Monitoring /KPI
		<ul style="list-style-type: none"> • A mechanism by which to routinely track waste consignments from the originating location to the final waste treatment and disposal location • Procedures for the identification and reporting of any environmental incidents related to waste • The specific regulatory reporting requirements as they relate to waste 				
Prevention of contamination of receiving environments (particularly seawater, groundwater and the ground)	Refuelling	<ul style="list-style-type: none"> • Fuel valves to be periodically checked to ascertain that they are closed and in suitable working order • All fuel dispensing hoses (static or mobile) should be fitted with an automatic cut-off valve (with hoses kept within bunding when not in use) • Where refuelling on site is necessary, utilise appropriate protocols including use of drip trays and availability of spill kits • Strong emphasis must be placed on the necessity to maintain to a high level all mobile re-fuelling equipment. Re-fuelling hoses, bunding and drip trays must be inspected on a regular basis to ensure their integrity. • All fuel and oil containers need to be secured within adequate secondary containment and with adequate emergency response equipment within close proximity (spill kit and firefighting) • All static diesel and petrol operated equipment/plant should be provided with adequate secondary containment, typically in the form of an impervious steel drip tray. More permanent facilities should be adequately installed on hardstanding and bunded 	waste management standards and technical guidelines IFC EHS General Guidelines on hazardous materials	Project Owner and Contractors	Construction phase and Operation phase	Emergency Preparedness and Response Plan Register of hazardous materials Records of site inspections and audits

Source: Mott MacDonald, 2018

1.5.3.5 Soil, groundwater and land contamination

Table 7: Soil, groundwater and land contamination

Objective	Activity	Actions / mitigation measures	Standards	Responsibility	Timescale	Monitoring /KPI
Construction phase						
Implementation of best practice on site during construction and the implementation of a Construction Environmental Management Plan (CEMP) to minimise impacts from excavation or dewatering and prevent contamination from spills or leaks on site.	Site preparation, construction, dewatering, excavation.	<ul style="list-style-type: none"> Develop and implement a CEMP Develop a comprehensive dewatering plan as part of the CE(SM)MP that details the location of dewatering activities, equipment, discharge point(s), emergency response measures and the proposed monitoring & reporting requirements. The monitor shall include a requirement for a suite of chemical testing of the water and will include metals, benzene, toluene, xylene and ethylbenzene and hydrocarbons. The results of monitoring should be compared to Canadian water quality guidelines to assess disposal options. There is the potential that that some localised water will be unsuitable for disposal to surface or groundwater due to elevated concentrations of Toluene, therefore this may require disposal off-site to a licenced facility Ensure an unexpected contamination strategy is in place. Ensure construction workers wear appropriate Personal Protective Equipment (PPE). Ensure safe and appropriate storage of material such as fuels and chemicals. Ensure bunding is used and spill kits are available. Ensure materials are stored where they will not be spoiled by the elements, where there is ventilation and where they can be accessed safely. Comply with the requirements and guidelines stipulated within EAD Best Management Practices (BMP) Technical Guidance Document for Discharges from 	Best practice. If further sampling is completed then results should be compared to Dutch Standards. Any groundwater testing should comply with World Health Organisation standards for drinking water if the groundwater if within an aquifer.	Contractor	Construction phase	Monitor for unexpected contamination on site through visual and olfactory checks. Dewatering monitoring if required based on results of risk assessment.

Objective	Activity	Actions / mitigation measures	Standards	Responsibility	Timescale	Monitoring /KPI
Construction Activities (EAD-EQ-PCE-TG-15)						
Operational phase						
Implementation of best practice during plant operation to ensure spills from chemicals or fuels are prevented.	Operation of plant.	<ul style="list-style-type: none"> ● Ensure proper storage and safe use of any chemicals and fuels used and stored on site, this must include bunding and the availability of spill kits. ● Use less hazardous or less toxic materials where possible. ● Fuels and chemicals should be stored away from sensitive receptors and stored such that it will not be spoiled by the elements. ● Fuels and oils should be easily accessible in a safe manner. ● Storage areas should be well ventilated. 	Best practice	Project company	Operation phase	

Source: Mott MacDonald, 2018

1.5.3.6 Noise and vibration management

Table 8: Noise and vibration management

Objective	Activity	Actions / mitigation measures	Standards	Responsibility	Timescale	Monitoring /KPI
Construction phase						
Minimise noise emissions to prevent nuisance and protect human health	Construction works	<ul style="list-style-type: none"> Adherence to measures included within CEMP to minimise noise impact Works only to be undertaken between 07:00 to 19:00 Saturday to Thursday; Regular communication with local residents All plant onsite should be the quietest model available and where needed silenced according to the manufacturers' recommendations Where practicable, construction plant should not be left operating at idle Fixed plant items (e.g. site generators) should be located at the greatest practical distance away from the nearest receptors, particularly the rest area located south of the site perimeter boundary Undertaking noisier activities during daytime hours and minimising and avoiding where possible any noisier work during more sensitive times of the day Arrange for deliveries of equipment and transport of staff during daytime, avoid where possible the sensitive night time hours Establish haul routes away from the existing receptors 	Dubai EPSS TG9 UAE Federal Law No. 12 BS 5228-1 (2009+A1:2014)	EPC Contractor	Construction Phase	Contractor to undertake regular inspections of plant and equipment such that noise emissions are minimised where practical Contractor to undertake regular inspections of mitigation (e.g. barriers/enclosures/silencers) to ensure acoustic effectiveness Noise level to not exceed threshold values
Minimise noise emissions to prevent nuisance and protect human health	Construction site traffic	<ul style="list-style-type: none"> No unnecessary revving of engines Provide and maintain the surfaces of site roads with minimal discontinuities to avoid vehicle body rattle 		EPC Contractor	Construction Phase	Construction traffic to use to identified routes
Operational phase						
Minimise noise emissions to prevent nuisance and protect human health	Plant operation (daytime and night-time)	<ul style="list-style-type: none"> Specification of low noise equipment Lagging ducts Gas turbine vent fan casing and outlet silencers Appropriate specification of the building elements, apertures, doors and louvers for the turbine and generator building to minimise breakout noise Air inlet and ducting silencers The application of acoustic barriers around items such as transformers 	Dubai Local Order No. 61	Sponsor and/or Project Company	Operation Phase	Noise levels to not exceed threshold values

Source: Mott MacDonald, 2018

1.5.3.7 Terrestrial ecology management

Table 9: Terrestrial ecology management

Objective	Activity	Actions / mitigation measures	Standards	Responsibility	Timescale	Monitoring /KPI
Construction phase						
Implementation of best practice site management practices to support good environmental management and minimise any impacts on Al Zora Protected Area (2.5-3km from the Site)	Site preparation, groundwork and clearing, construction	<ul style="list-style-type: none"> Adopt pollution control measures. Adopt screening & dust suppression to minimise dust levels. Weekly check to release any entrapped animals. Use of native plants for reinstatement & landscaping. Make staff aware of the location of Al Zora Protected Area Ramsar Site, its importance and rules & regulations. Ensure proper waste management & no feeding of feral & domestic cats. 	UAE ambient air quality standards. IFC EHS General Guidelines on Air Emissions and Ambient Air Quality. IFC PS 6: Biodiversity Conservation& Sustainable Management of Living Natural Resources	EPC Contractor	Construction Phase	Records of waste disposal. EPC Contractor Environmental Manager to undertake visual checks of construction areas every two weeks. Maintenance of record of violations where observed and disciplinary action imposed on contractor.
Operational phase						
Implementation of best practice plant operation practices to support good environmental management and minimise any impacts on Al Zora Protected Area (2.5-3km from the Site)	Plant operation	<ul style="list-style-type: none"> Landscape planting using native species for screening, aesthetic & biodiversity value. Implement noise reduction measures. Make operation staff aware of the location of Al Zora Protected Area Ramsar Site, its importance and rules and regulations. Adopt pollution control measures. Adopt dust suppression to minimise dust levels. Minimise artificial light spill by design. 	IFC PS 6: Biodiversity Conservation& Sustainable Management of Living Natural Resources. UAE ambient air quality standards. IFC EHS General Guidelines on Air Emissions and Ambient Air Quality.	Project Company	Operation Phase	Monthly checks on actions and mitigation measures

Source: Mott MacDonald, 2018

A.1.1.1 Wastewater management

Table 10: Wastewater management

Objective	Activity	Actions / mitigation measures	Standards	Responsibility	Timescale	Monitoring /KPI
Construction phase						
Prevention of pollution to soil and groundwater	Leakage or spill of sewage	<ul style="list-style-type: none"> Provide sufficient welfare facilities/toilets for construction workforce Aboveground chemical portable toilet blocks and septic tank facilities to be appropriately designed, monitored and regularly emptied by DM permitted carrier and disposal site Management of sewage sludge in accordance with the waste management plan Comply with the requirements and guidelines stipulated within EAD Best Management Practices (BMP) Technical Guidance Document for Discharges from Construction Activities (EAD-EQ-PCE-TG-15) 	UAE and local wastewater management standards and technical guidelines IFC EHS General Guidelines on water	EPC Contractor	Construction Phase	Records of site inspections and audits
Prevention of contamination and degradation of receiving environments	Dewatering	<ul style="list-style-type: none"> Develop a comprehensive dewatering plan as part of the CESMMP that details the location of dewatering activities, equipment, discharge point(s), emergency response measures and the proposed monitoring & reporting requirements. The monitoring shall include a requirement for a suite of chemical testing of the water and will include metals, benzene, toluene, xylene and ethylbenzene and hydrocarbons. The results of monitoring should be compared to Canadian water quality guidelines to assess disposal options. There is the potential that that some localised water will be unsuitable for disposal to surface or groundwater due to elevated concentrations of Toluene, therefore this may require disposal off-site to a licenced facility Comply with the requirements and guidelines stipulated within EAD Best Management Practices (BMP) Technical Guidance Document for Discharges from Construction Activities (EAD-EQ-PCE-TG-15) 	UAE and local wastewater management standards and technical guidelines IFC EHS General Guidelines on water	EPC Contractor	Construction Phase	<p>Site dewatering plan</p> <p>Results of dewatering water sampling prior to disposal</p> <p>Records of site inspections and audits</p> <p>Water quality parameters level to not exceed threshold values for discharge to sea</p>
Water conservation	Water use and wastewater	<ul style="list-style-type: none"> Re-using water on site wherever possible. 	UAE and local wastewater	EPC Contractor	Construction Phase	Records of site inspections and audits

Objective	Activity	Actions / mitigation measures	Standards	Responsibility	Timescale	Monitoring /KPI
	treatment and discharge	<ul style="list-style-type: none"> Detailed water management measures to be included in the CEMP developed by the Construction Contractor 	management standards and technical guidelines IFC EHS General Guidelines on water			
Operational phase						
Prevention of contamination and degradation of receiving environments	Wastewater management	<ul style="list-style-type: none"> Monitoring of water discharges is to be undertaken at the outfall as per environmental requirements and Environmental Clearance and conditions. 	UAE and local wastewater management standards and technical guidelines IFC EHS General Guidelines on water	Project Owner / Contractors	Operation Phase	Site environmental monitoring plan Records of monitoring Monthly monitoring reports Water quality parameters level to not exceed threshold values for discharge to sea

Source: Mott MacDonald, 2018

A.1.1.2 Social management and monitoring

Table 11: Social management and monitoring

Social aspect	Impact/significance	Mitigation/enhancement measures	Proposed monitoring measures
Construction phase			
Employment generation	<p>Temporary employment will be generated, providing an income source for workers and their families with economic benefits for communities surrounding the workers and their families. Most workers will be migrants, and thus remittances will be sent back to families in their home countries.</p> <p>Workers are likely to develop new and/or enhance existing skills through their work, thereby increasing their employability.</p>	<ul style="list-style-type: none"> Allocate resources to recruiting and retaining local Emiratis, subject to availability of appropriately qualified staff. Develop a training and skills development programme for local workers to increase their skills and knowledge Provide additional specialised training to unskilled or low skilled workforce in skills required by the Project. Assist workers with obtaining professional certification or accreditation during their contract period. 	<ul style="list-style-type: none"> Maintain a training register for employees, including for specialised training for local staff provided by EPC contractor and other contractors Maintain workforce profile data Maintain training and skills development schedule Review certificates issued by EPC contractors/ Contractor issued to employees detailing training received / new skills acquired while employed.
Workers' rights and working conditions	<p>High number of migrant workers during the project activities poses social risks with respect to human rights and health disparities. These risks are most relevant for migrant subcontracted construction workers, as oversight of labour issues can be more difficult for the project company to manage among subcontractors.</p> <p>Typical risks in the region can include poor accommodation provision, retention of workers' passports, payment of exorbitant fees by workers to recruitment agents, workplace accidents and injuries and health-related issues related to working in extreme temperatures.</p>	<ul style="list-style-type: none"> Adopt and implement a Human Resource Policy based on non-discrimination, equal opportunity and fair treatment to ensure workers' rights adequately protected in accordance with national law, ILO core labour principles and best practice for fair worker management in the Middle East Develop and disclose staff grievance policies and mechanisms for complaints about unfair or unsafe treatment or working conditions. Provide employees with a certificate of employment and register of training upon completion of contract Develop clauses to be included in the EPC Contract and all subcontracts regarding expectations of the treatment of employees.¹ Schedule on the spot auditing of contractors through: interviewing workers; undertaking HR checks to identify key documents to be kept on site; and payroll checks to ensure timely, fair pay. Develop of workers accommodation management plan to ensure audits of camps against the IFC Guidance on Workers' Accommodation.² Develop a retrenchment plan in accordance with UAE laws and IFC PS2 to be used in the post 	<ul style="list-style-type: none"> Maintain grievance register and records of grievances resolved Review EPC contract and subcontracts for inclusion of clauses Records of hours worked during a month, including overtime payment. Review HR personnel files to include documents such as leave records, next of kin details, contracts, signed passport retention letters if applicable, certificate of employment. Conduct monthly inspections of labour camps and develop worker camp audit reports with corrective measures and evidence demonstrating implementation of corrective measures

¹ This should address topics including working conditions and terms of employment; expectations regarding timeliness of payment to employees; no employment of workers less than 18 years of age or forced labour. Include clause in EPC Contractor so they do not hire anyone under the age of 18 nor allow terms for forced labour to occur

² Key standards include but are not limited to: Minimum sleeping space requirements; Provision of recreational facilities such as gyms, cinemas, etc; Provision of access retail outlets; Affordable communications facilities, i.e. phone, internet, money transfer; Provision of condoms and HIV/Aids awareness; Laundry and canteen services, with food appropriate to the migrant workers home country diet; etc. All sub-contractors must be required to meet these minimum standards

Social aspect	Impact/significance	Mitigation/enhancement measures	Proposed monitoring measures
Occupational, health and safety (OHS) hazards	<p>OHS incidents (including accidents and injuries resulting from exposure to physical hazards from use of heavy equipment and cranes, trip and fall hazards, exposure to dust, noise and heat, dehydration and traffic hazards) can result in permanent disabilities and even death.</p> <p>If incidents occur, the significance can be critical, however the risk can be dramatically reduced through appropriate OHS management.</p>	<p>operation/decommissioning phase, if the need to dismiss permanent members of staff is anticipated</p> <ul style="list-style-type: none"> Produce a health and safety plan aimed at preventing accidents, injuries and work-related diseases for both construction and operation in accordance with Emirati law and industry best practice including the WB EHS Guidelines Develop a site safety training programme Implement toolbox talks on OHS risk issues and specialised training for certain activities, and conduct due diligence of supply chain of materials and equipment used by workers. Prepare Emergency Preparedness and Response Plan with training and drills. Provision of shaded resting areas and sufficient drinking water, as well as stopping work at the hottest time of the day in the hottest months of the year, in accordance with current Emirati regulations. Development of code of conduct for workers to cover expected behaviour in relation to working behaviour (e.g. use of PPE) and behaviour in relation to local communities. 	<ul style="list-style-type: none"> Review health and safety plan Conduct daily visual inspection of use of PPE equipment and first aid facility Maintain training and toolbox talk registers Conduct daily visual inspection of eating, resting, drinking and washing facilities Develop OHS audit reports, corrective measures and action plan, photographs demonstrating corrective measures implemented Compile accident statistics reported as part of OHS performance records
Community health, safety and security	<p>Use of public roads for construction traffic and transport of materials can lead to road traffic accidents and create construction related impacts including noise and dust, with adverse impact on local communities.</p>	<ul style="list-style-type: none"> Minimise traffic hazards within the community by implementing road safety plans / maximum speed limits for site and access routes, and a Traffic Management Plan. 	<ul style="list-style-type: none"> Maintain a register of traffic-related incidents and grievances, showing corrective measures taken
Stakeholder relations	<p>The Project will need to develop a comprehensive and culturally appropriate approach to consultation and disclosure for the lifecycle of the Project, to manage its stakeholder relations and engagement activities.</p>	<ul style="list-style-type: none"> Develop and implement a Stakeholder Engagement Plan (SEP) 	<ul style="list-style-type: none"> Maintain a register of stakeholder engagement activities conducted, and a register of community grievances received
Operational phase			
Employment generation	<p>Temporary employment will be generated, providing an income source for workers and their families with economic benefits for communities surrounding the workers and their families. Most workers will be migrants, and thus remittances will be sent back to families in their home countries.</p> <p>Workers are likely to develop new and/or enhance existing skills through their work, thereby increasing their employability.</p>	<p>Allocate resources to recruiting and retaining local Emiratis, subject to availability of appropriately qualified staff.</p> <p>Develop a training and skills development programme for local workers to increase their skills and knowledge</p> <p>Provide additional specialised training to unskilled or low skilled workforce in skills required by the Project.</p> <p>Assist workers with obtaining professional certification or accreditation during their contract period.</p>	<p>Maintain a training register for employees, including for specialised training for local staff provided by contractors</p> <p>Maintain workforce profile data</p> <p>Maintain training and skills development schedule</p> <p>Review certificates issued by contractors to employees detailing training received / new skills acquired while employed.</p>
Workers' rights and working conditions	<p>While operational jobs will be primarily permanent, technical jobs with lower risks relating to working conditions, the operational workers' labour rights will need to continue to be maintained.</p>	<ul style="list-style-type: none"> Implement the Human Resource Policy based on non-discrimination, equal opportunity and fair treatment to ensure workers' rights adequately protected in accordance with national law, ILO core 	<ul style="list-style-type: none"> Maintain grievance register and records of grievances resolved Review contract for inclusion of clauses

Social aspect	Impact/significance	Mitigation/enhancement measures	Proposed monitoring measures
		<p>labour principles and best practice for fair worker management in the Middle East</p> <ul style="list-style-type: none"> Develop and disclose staff grievance policies and mechanisms for complaints about unfair or unsafe treatment or working conditions. Provide employees with a certificate of employment and register of training upon completion of contract Develop clauses to be included in subcontracts regarding expectations of the treatment of employees.³ Schedule on the spot auditing of contractors through: interviewing workers; undertaking HR checks to identify key documents to be kept on site; and payroll checks to ensure timely, fair pay. Develop of workers accommodation management plan to ensure audits of camps against the IFC Guidance on Workers' Accommodation.⁴ Develop a retrenchment plan in accordance with UAE laws and IFC PS2 to be used in the post operation/decommissioning phase, if the need to dismiss permanent members of staff is anticipated 	<ul style="list-style-type: none"> Records of hours worked during a month, including overtime payment. Review HR personnel files to include documents such as leave records, next of kin details, contracts, signed passport retention letters if applicable, certificate of employment. Conduct monthly inspections of labour camps and develop worker camp audit reports with corrective measures and evidence demonstrating implementation of corrective measures (if accommodation will be used in operations phase)
Occupational, health and safety (OHS) hazards	<p>OHS incidents (including accidents and injuries resulting from exposure to physical hazards from use of heavy equipment and cranes, trip and fall hazards, exposure to dust, noise and heat, dehydration and traffic hazards) can result in permanent disabilities and even death.</p> <p>If incidents occur, the significance can be critical, however the risk can be dramatically reduced through appropriate OHS management.</p>	<ul style="list-style-type: none"> Produce a health and safety plan aimed at preventing accidents, injuries and work-related diseases for both construction and operation in accordance with Emirati law and industry best practice including the WB EHS Guidelines Develop a site safety training programme Implement toolbox talks on OHS risk issues and specialised training for certain activities, and conduct due diligence of supply chain of materials and equipment used by workers. Implement Emergency Preparedness and Response Plan with training and drills. Provide shaded resting areas and sufficient drinking water, as well as stopping work at the hottest time of the day in the hottest months of the year, in accordance with current Emirati regulations. Implement code of conduct for workers to cover expected behaviour in relation to working behaviour 	<ul style="list-style-type: none"> Review health and safety plan Conduct regular visual inspection of use of PPE equipment and first aid facility Maintain training and toolbox talk registers Conduct regular visual inspection of eating, resting, drinking and washing facilities Develop OHS audit reports, corrective measures and action plan, photographs demonstrating corrective measures implemented Compile accident statistics reported as part of OHS performance records

³ This should address topics including working conditions and terms of employment; expectations regarding timeliness of payment to employees; no employment of workers less than 18 years of age or forced labour. Include clause in EPC Contractor so they do not hire anyone under the age of 18 nor allow terms for forced labour to occur

⁴ Key standards include but are not limited to: Minimum sleeping space requirements; Provision of recreational facilities such as gyms, cinemas, etc; Provision of access retail outlets; Affordable communications facilities, i.e. phone, internet, money transfer; Provision of condoms and HIV/Aids awareness; Laundry and canteen services, with food appropriate to the migrant workers home country diet; etc. All sub-contractors must be required to meet these minimum standards

Social aspect	Impact/significance	Mitigation/enhancement measures	Proposed monitoring measures
Community health, safety and security	Use of public roads for Project traffic can lead to road traffic accidents, with adverse impact on local communities. However, the risk of accidents will be lower in the operations phase given the reduced amount of traffic to be created.	(e.g. use of PPE) and behaviour in relation to local communities. <ul style="list-style-type: none"> Minimise traffic hazards within the community by implementing road safety plans / maximum speed limits for site and access routes, and a Traffic Management Plan. 	<ul style="list-style-type: none"> Maintain a register of traffic-related incidents and grievances, showing corrective measures taken
Stakeholder relations	The Project will need to develop a comprehensive and culturally appropriate approach to consultation and disclosure for the lifecycle of the Project, to manage its stakeholder relations and engagement activities.	<ul style="list-style-type: none"> Update and implement the Stakeholder Engagement Plan (SEP) 	<ul style="list-style-type: none"> Maintain a register of stakeholder engagement activities conducted, and a register of community grievances received

Source: Mott MacDonald, 2018

A.1.1.3 Landscape and visual impacts management

Table 12: Landscape and visual impacts management

Objective	Activity	Actions / mitigation measures	Standards	Responsibility	Timescale	Monitoring /KPI
Construction phase						
	Site vehicle movements, earthworks, waste generation, handling and storage	<ul style="list-style-type: none"> Install site hoardings with consideration for safety and security 	Best practice for construction works	EPC Contractor	Construction phases	Conduct daily site inspections
Minimisation of light pollution to residential areas and marine environment	Site vehicle movements, lighting of construction areas and roads	<ul style="list-style-type: none"> Implement aviation standards requirements minimise lighting and use appropriate directional lighting fixtures 	Best practice for construction works	EPC Contractor	Construction phases	Conduct daily site inspections

Source: Mott MacDonald, 2018

A.1.1.4 Cultural heritage and archaeology management

Table 13: cultural heritage and archaeology management

Objective	Activity	Actions / mitigation measures	Standards	Responsibility	Timescale	Monitoring /KPI
Construction phase						
Prevent loss of archaeological find	Earthworks	<ul style="list-style-type: none"> Maintain a 'chance finds procedure' for artefacts during excavation works - stop if any findings until appropriate Governmental department contacted 	Best practice for construction works	EPC Contractor	Construction phases	Conduct daily site inspections

Source: Mott MacDonald, 2018

A.1.1.5 Traffic management

Table 14: Traffic management

Objective	Activity	Actions / mitigation measures	Standards	Responsibility	Timescale	Monitoring /KPI
Construction phase						
Minimise pollutants and dust emissions to prevent nuisance and protect human health	Site vehicle movements, earthworks, waste generation, handling and storage	<ul style="list-style-type: none"> Develop and incorporate a traffic management plan (TMP) into the site management plan Manage vehicle flows and provide adequate signage to prevent collisions, avoid interaction between vehicles and the workforce, JAPS operational staff or pedestrians as well as to warn of heavy vehicles using roads Confirm any abnormal load movements with the competent administrative authority and adhere to prescribed routes Schedule traffic, deliveries and waste collection to avoid the peak hours on the local road network wherever practicable; Consider staggering construction shifts to split arrival and departure times Select and use appropriate drop-off and waiting locations for workforce buses to avoid community disturbance Provide safety training to vehicle drivers and ensure that all drivers have the required driving licenses and training as necessary Manage driver shifts to prevent overtiredness Provide medical checks for drivers Develop and implement a dust management plan Provide wheel washers at site exits to minimise the movement of debris onto public roads Ensure all vehicles leaving the site have properly fitted tail-gates and tarpaulins (if carrying friable material) Select transport routes to avoid potentially sensitive receptors, such as schools and hospitals Keep excavations, temporary stockpiles of spoil and haulage roads moist in order to limit sediment entrainment potential. Where possible, use water generated as a result of 	Best practice for construction works	EPC Contractor	Construction phases	Traffic Management Plan (TMP) Conduct daily site inspections

Objective	Activity	Actions / mitigation measures	Standards	Responsibility	Timescale	Monitoring /KPI
		<p>dewatering activities (upon completion of olfactory/visual assessment) to reduce the demand on potable water supplies</p> <ul style="list-style-type: none"> ● Avoid 'double handling' of spoil/materials to keep disturbance and therefore potential for dust generation to a minimum 				
Minimise pollutants and dust emissions to prevent nuisance and protect human health	Site vehicle movements, plant and equipment use	<ul style="list-style-type: none"> ● Vehicle and machinery emission levels to comply with emissions specifications approved in the UAE ● Instruct drivers on benefits of driving practices that reduce risk of accidents and fuel consumption ● Limit vehicular movements to only essential journeys ● Adopt a 'no idling' policy onsite (where practical) (ie, switch off engines when plant and machinery is not in use) ● Adequate signage and isolation of the construction area (s) will be provided ● Site plant and its operators will adopt a 'banksman' policy to ensure the safe management of plant and vehicle movements onsite ● Mobile refuelling equipment must be properly maintained with the provision of adequate 'spill response' (and fire safety) equipment provided ● For mobile plant, refuelling stations shall be well defined and communicated to all site personnel by signs and notice boards ● Re-fuelling stations are to be situated on an impervious area of hardstanding with adequate spill response (and fire safety) equipment and situated at least 100m from marine waters 	Best practice for construction works	EPC Contractor	Construction phases	Conduct daily site inspections
Prevention of contamination of receiving environments	Vehicle maintenance	<ul style="list-style-type: none"> ● Plant, equipment and vehicles will be regularly maintained to ensure efficiency and reduce, noise, emissions and potential for leaks of engine fluids, oils and lubricants ● Implement manufacturer recommended maintenance programmes ● Maintenance of vehicles, plant and equipment that may be easily removed from site will not take place onsite but off-site in a proper vehicle maintenance workshop 				

Objective	Activity	Actions / mitigation measures	Standards	Responsibility	Timescale	Monitoring /KPI
		<ul style="list-style-type: none"> Undertake daily inspections and regular repairs when appropriate, to ensure no excessive exhaust emissions On identification of faulty plant, the service team will be notified immediately and the problem either fixed onsite within adequate secondary containment or the item removed and replaced Construction equipment and vehicles will be regularly maintained to reduce the potential for leaks or engine fluids, oils and lubricants The dedicated vehicle wash area is to be cleared of hardened cement on a regular basis and the design must ensure that no runoff spills out into the soil and water environment A minimal amount of water will be used for washing of trucks onsite Strong emphasis must be placed on the necessity to maintain good conditioned / clean marine works equipment (including excavators) The dedicated vehicle wash area is to be cleared of hardened cement on a regular basis and the design must ensure that no runoff spills out into the soil and water environment A minimal amount of water will be used for washing of trucks onsite Maintenance of vehicles, plant and equipment that may be easily removed from site will not take place onsite but off-site in a proper vehicle maintenance workshop Strong emphasis must be placed on the necessity to maintain good conditioned / clean marine works equipment (including excavators) 				
Operational phase						
Minimise pollutants and dust emissions to prevent nuisance and protect human health	Site vehicle movements, plant and equipment use	<ul style="list-style-type: none"> Vehicle and machinery emission levels to comply with emissions specifications approved in the UAE Implement manufacturer recommended maintenance programmes Instruct drivers on benefits of driving practices that reduce risk of accidents and fuel consumption 	Best practice for construction works	EPC Contractor	Operation phase	Conduct regular site inspections

Objective	Activity	Actions / mitigation measures	Standards	Responsibility	Timescale	Monitoring /KPI
		<ul style="list-style-type: none"> ● Enforce vehicle speed restriction onsite to 20 km/h ● Limit vehicular movements to only essential journeys ● Use coverings, where possible, for the transport/temporary storage of excavated/stockpiled material ● Adopt a 'no idling' policy onsite (where practical) (ie, switch off engines when plant and machinery is not in use ● Undertake daily inspections and regular repairs when appropriate, to ensure no excessive exhaust emissions ● Maintenance of vehicles, plant and equipment that may be easily removed from site will not take place onsite but off-site in a proper vehicle maintenance workshop 				

Source: Mott MacDonald, 2018

1.6 Incident/emergency preparedness and response

It is the responsibility of the Project Owner to ensure that appropriate resources, procedures, equipment and arrangements are provided to be prepared and to respond to emergency situations in a manner appropriate to its needs. Project processes will be established, implemented, and maintained to prepare for and respond to potential emergency situations to:

- Prepare to respond by planning actions to prevent or mitigate adverse environmental impacts from emergency situations;
- Respond to actual emergency situations;
- Take action to prevent or mitigate the consequences of emergency situations, appropriate to the magnitude of the emergency and the potential environmental impact;
- Periodically test the planned response actions, where practicable;
- Periodically review and revise the processes and planned response actions, in particular after the occurrence of emergency situations or tests;
- Provide relevant information and training related to emergency preparedness and response, as appropriate, to relevant interested parties, including persons working under its control.

1.6.1 Emergency Preparedness and Response Plan (EPRP)

An Emergency Preparedness and Response Plan (EPRP) will be developed to govern the response to such incidences that also allow for the mitigation of any impacts or dangers that may be associated with them. The following will be taken into account when establishing the EPRP:

- The nature of on-site hazards, e.g., flammable liquids, storage tanks and compressed gases, and measures to be taken in the event of spillages or accidental releases.
- The most likely type and scale of an emergency situation or an incident.
- The potential for an emergency situation or incident at a nearby facility. (i.e., road, another building or infrastructure, etc.)
- Emergency organisation and responsibilities.
- A list of key personnel and aid agencies, including contact details (e.g., fire department, spillage clean-up services, etc.)
- Internal and external communication plans.
- The most appropriate methods for responding to an incident or emergency situation.
- The most appropriate actions to be taken in response to emergency situations, such as fires, explosions, or the unplanned releases of hazardous materials where such hazards exist.
- Evacuation plans for the construction site, including procedures, evacuation routes and assembly points.
- The arrangements agreed to by local police or fire departments, hospitals, contractors, and emergency response teams to coordinate emergency response services.
- The actions required to minimise environmental damage.
- Training of emergency response personnel.
- The possibility of mutual assistance from neighbouring organisation.
- Mitigation and response actions to be taken for different types of accident or emergency situations.

- The need for processes for post-accident evaluation to establish and implement corrective and preventive actions.
- Periodic testing of emergency response procedures.
- Information on hazardous materials, including each material's potential impact on the environment, and measures to be taken in the event of accidental release.
- Training plans and testing plans for effectiveness.

The EPRP will include procedures (i.e., roles, responsibilities, reporting relationships, resources, activities, records) for responding to the various types of emergencies identified.

The EPRP will be periodically reviewed, and where necessary, revised to reflect changes in the Project activities and, in particular, after the occurrence of incidents or emergency situations. The EPRP will also be periodically tested where applicable. The frequency of testing will be determined by the Project team.

Documented information will be retained to the extent necessary to have confidence that the processes are carried out as planned.

1.6.2 Incident Response Plan

Due to the potentially significant impact of hazardous materials on the environment and human health, a typical incident response procedure is illustrated in Figure 1 to mitigate potential adverse impacts. The aim of the response procedure is to identify the procedures for dealing with any environmental accidents/incidents. Any environmental incident must be dealt with rapidly and effectively. Spill kits will be readily available onsite at strategic locations where spills may occur e.g. where fuels, oils and chemicals are stored and used, with additional quantities kept in the stores with consideration of both on-land and off-shore spills. Sufficient quantities will be kept onsite to deal with a 'worst-case' spill event. Personnel will be trained to identify, report and deal with incidents, including the clean-up of spills with periodic drills run onsite. An incident reporting form should be completed for every incident that requires action.

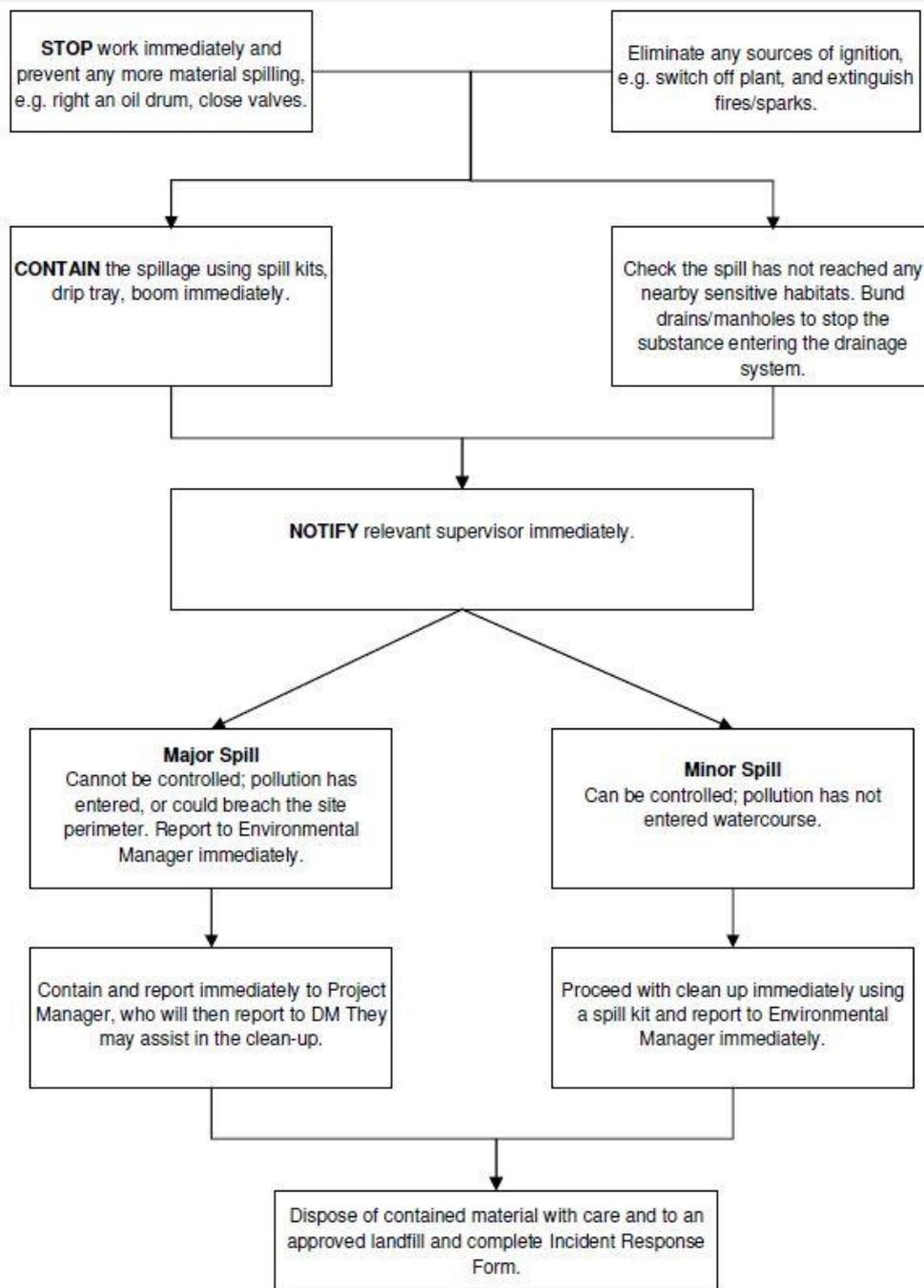
1.6.3 Spill Response Equipment

Spill response/pollution control materials will be stored in a safe location onsite in close proximity to potentially hazardous activities or where risks of spillages are high, such as fuelling. This material is to be used to contain and clean up pollution/spills, and care will be taken to dispose of any absorbent materials under applicable hazardous material duty-of-care procedures. Contractors will keep stocks well-maintained and replenished. For incidents on land, spill response materials will include the following:

- Clean sand and oil absorbing material
- Sand bags
- Buckets and shovels
- Storage containers

Sand stocks will be dry and buckets and shovels readily available. Mechanical loading shovels, excavators and dump trucks will be readily available for sand distribution and clean up. Storage containers for contaminated materials and earth will be bunded, located in the waste storage area, and labelled and treated as hazardous waste.

Figure 1: Incident response procedure for hazardous spills



1.7 Data management and reporting

Reporting will include onsite records and documents to meet regular reporting requirements. The particular requirements for the document records will be determined through development of the ESMMP. An indicative list of onsite records is provided in the table below.

Table 15: Indicative list of onsite records

Category	Records to be kept
General	Daily/weekly/monthly environmental monitoring (inspection forms and laboratory analysis) and audits. Construction programme. Equipment/vehicle maintenance/repair records. Equipment calibration records. Correspondences in relation to environmental matters / permits including internal and external (such as those with DM). Copies of all relevant permits. Minutes of relevant meetings. Contact details of responsible parties for all contractors/subcontractors and liaison with DM Environmental training records (e.g. attendance records for environmental awareness training). Complaints register and related response documentation
Waste Management	Chemical waste producer registration record. Public dumping license. Waste storage, transfer and disposal records Waste transfer notes for all wastes, specifying type, quantity etc. for collection and disposal. Records of quantities of waste recycled on site. Records of quantity of waste sent off site for recycling or landfilling/treatment. Copies of relevant valid licenses as provided by the employed waste haulers and waste collectors.
Chemical Storage	Material Safety Data Sheets (MSDS) for all chemicals used and stored. Log of chemical inventories and consumption
Environmental Emergency	Emergency drill schedule and reports. Weekly and monthly reports from (sub) contractor. Completed incident response forms

The specific procedures for regular reporting requirements, including the frequency and content of required reports, will include:

- Incident forms/reports
- Periodic or annual performance/monitoring reports
- Auditing reports
- Non-compliance reports
- Corrective action reports
- Complaints management reports
- Any special reports required by government agencies.

