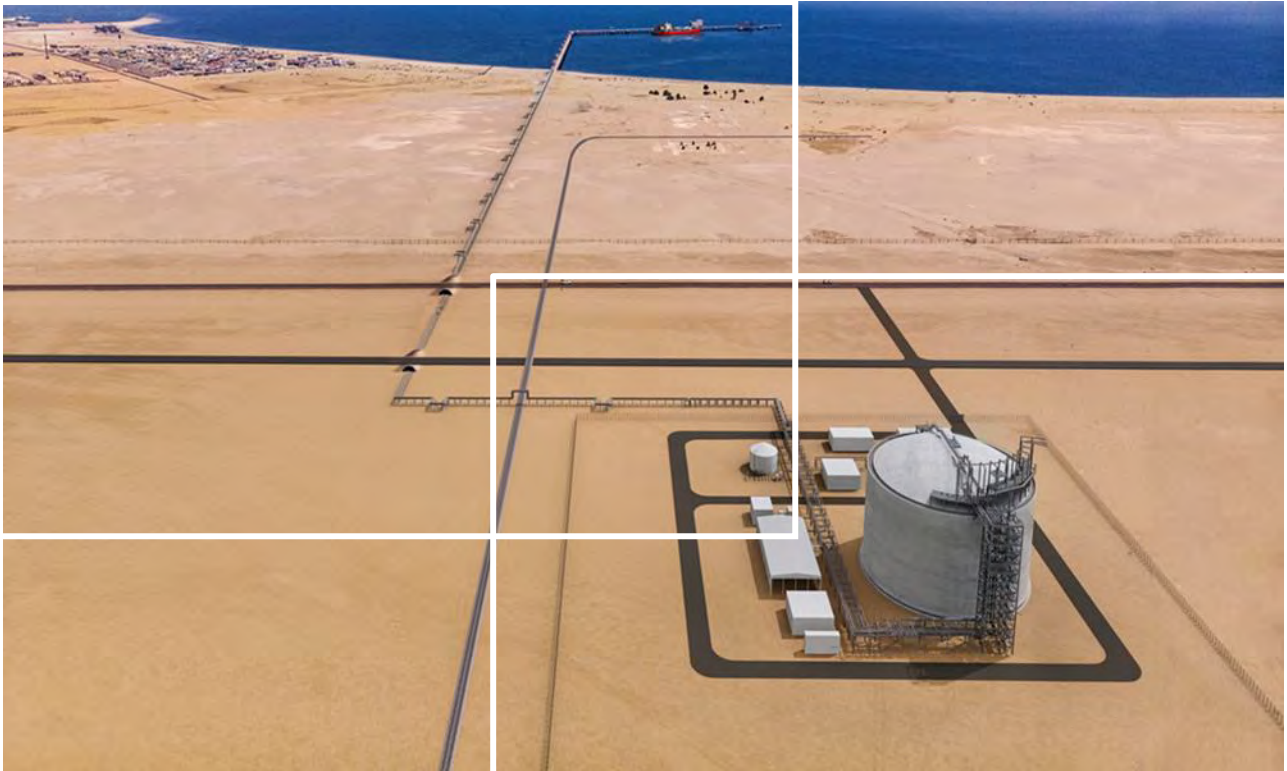




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REPORT:

ESMP FOR THE PROPOSED CONSTRUCTION AND OPERATION OF AN AMMONIA TERMINAL AT THE WALVIS BAY PORT AREA, ERONGO REGION, NAMIBIA

PROJECT NUMBER: ECC-145-453-REP-25-D

REPORT VERSION: REV 02

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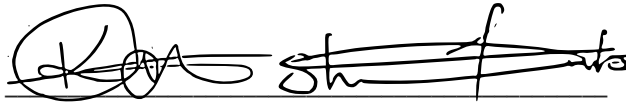
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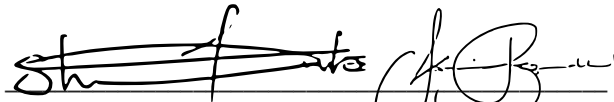
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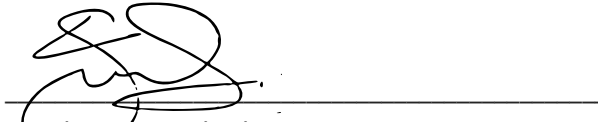
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DISCLAIMER

The report has been prepared by Environmental Compliance Consultancy (Pty) Ltd (ECC) (Reg. No. 2022/0593) on behalf of the Proponent. Authored by ECC employees with no material interest in the report's outcome, ECC maintains independence from the Proponent and has no financial interest in the Project apart from fair remuneration for professional fees. Payment of fees is not contingent on the report's results or any government decision. ECC members or employees are not, and do not intend to be, employed by the Proponent, nor do they hold any shareholding in the Project. Personal views expressed by the writer may not reflect ECC or its client's views. The environmental report's information is based on the best available data and professional judgment at the time of writing. However, please note that environmental conditions can change rapidly, and the accuracy, completeness, or currency of the information cannot be guaranteed.

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ABBREVIATIONS

Abbreviation	Description
%	Percentage
ASTM	American Society for Testing and Materials
CE	control efficiency
CEO	Chief Executive Officer
CFC	chlorofluorocarbon
Cleanergy Solutions	Cleanergy Solutions Namibia (Pty) Ltd
CMB.TECH	Compagnie Maritime Belge Technology
CO ₂	Carbon dioxide
dBA	decibels
E	electrical/electronic
ECC	Environmental Compliance Consultancy (Pty) Ltd
e.g.	example
EIA	environmental impact assessment
EM	Environmental manager
EMP	environmental management plan
EMS	Environmental Management Systems
ESF	environmental and social framework
ESG	environmental, social and governance
ESIA	environmental and social impact assessment
ESMP	environmental and social management plan
etc.	<i>et cetera</i>
GIS	geographic information system
HR	human resources
HSE	health, safety and environment
i.e.	that is
IEC	International Electrotechnical Commission
IFC	International Finance Corporation
km/h	kilometre per hour
L	litre
Ltd.	limited
m	metre
MEFT	Ministry of Environment, Forestry and Tourism
MME	Ministry of Mines and Energy
MSDS	material safety data sheets
MHI	Major hazard installation
NHC	National Heritage Council
NSR	noise-sensitive receptor
O&L	Ohlthaver & List Group

Abbreviation	Description
OEM	Original equipment manual
OHSE	operational health, safety and environment
PE	programmable electronic
PM	particulate matter
PPE	personnel protective equipment
Pty	proprietary
SOP	standard operating procedure
ToR	terms of reference

1 INTRODUCTION

1.1 PROJECT BACKGROUND

Environmental Compliance Consultancy (Pty) Ltd (ECC) has been appointed by CMB.TECH Namibia (Pty) Ltd (hereinafter referred to as the Proponent or CMB.TECH) to conduct an environmental and social impact assessment (ESIA) and compile an environmental and social management plan (ESMP) for the proposed construction of the ammonia terminal at the Walvis Bay Nampont northern area, in the Erongo Region, Namibia.

CMB.TECH, in partnership with Ohlthaver & List (O&L) Group, forms the joint venture Cleanergy Solutions Namibia (Pty) Ltd (hereinafter referred to as Cleanergy Solutions). The Ohlthaver & List (O&L) Group is the largest privately owned consortium in Namibia, with an operational track record spanning over a century and covering a diverse number of industries. CMB.TECH is a Belgium company specialising in the design, construction and operations of large marine and industrial modes of transportation, which utilise hydrogen and ammonia. It forms an integral part of Compagnie Maritime Belge, which is a family-owned shipping group, founded in 1895.

Cleanergy Solutions has established the first green hydrogen production plant in Namibia outside of Walvis Bay in 2024. The plant is completely solar powered and is set to supply fuel for local trucks, port machinery and railway equipment, while acting as a “proof of concept” to authorities and investors. An ammonia production plant is proposed to be developed on Farm 58 and green ammonia will be supplied to various marine and industrial applications and promote sustainable energy practices in Namibia. The Proponent proposes that the liquid ammonia be transported from the ammonia production plant via the ammonia pipeline, to the terminal for storage and exporting purposes. It should be noted that those aspects of the project will be dealt with in standalone EIA processes.

The location of the proposed site is shown in Figure 1.

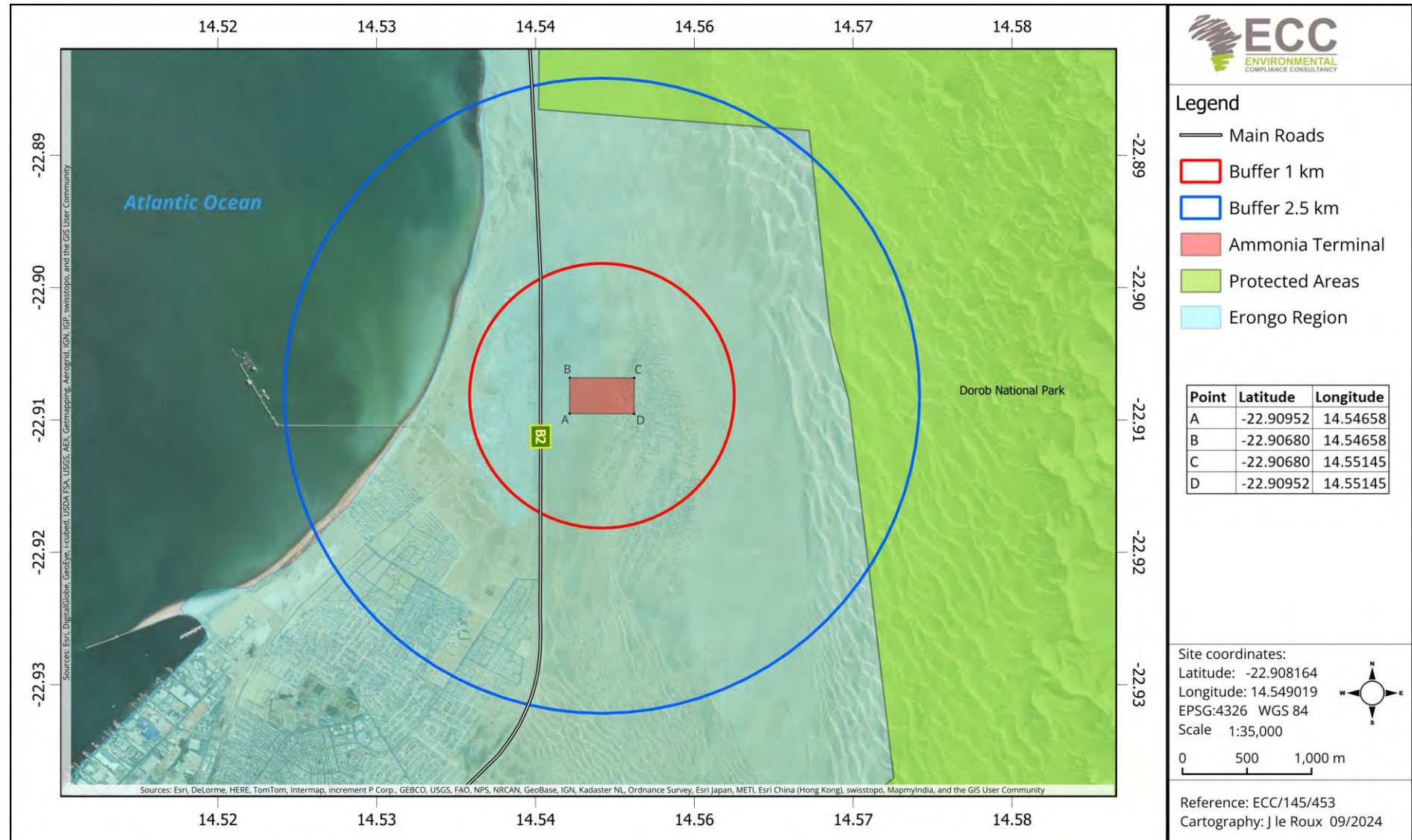


Figure 1 - Locality map of the proposed Project

1.2 ENVIRONMENTAL REGULATORY REQUIREMENTS

The proposed Project triggers listed activities as stipulated in the Environmental Management Act, No. 7 of 2007 and its Regulations, promulgated in 2012. An environmental scoping report, environmental and social impact assessment (ESIA) and environmental and social management plan (ESMP) are required to be submitted as part of the application to support the decision-making process for issuing an environmental clearance certificate.

This report presents the ESMP and has been undertaken in terms of the requirements of the Environmental Management Act, 2007 and its Regulations.

1.3 PURPOSE AND SCOPE OF THIS REPORT

The environmental and social management plan (ESMP) provides a logical framework, mitigation measures and management strategies for the activities and aspects associated with the proposed Project. In this way, ensuring that the potential environmental impacts are curbed and minimised as far as practically possible and that statutory and other legal obligations are adhered to and fulfilled. Outlined in the ESMP are the protocols, procedures, roles and responsibilities to ensure the management arrangements are effectively and appropriately implemented.

The ESMP forms an appendix to the environmental and social impact assessment (ESIA) and is based on the findings of the assessment. The ESIA must be referred to for further information on the proposed Project, assessment methodology and applicable legislation, and assessment findings.

This ESMP is a live document and shall be reviewed at predetermined intervals, updated during the ESIA process when new requirements are specified from specialists' studies, if the scope of work alters or when further data or information is added. All personnel working on the Project will be legally required to comply with the requirements set out in the final ESMP that is approved by the competent authorities and Ministry of Environment, Forestry and Tourism (MEFT).

1.4 MANAGEMENT OF THIS ESMP

The Proponent will hold the environmental clearance certificate for the proposed Project and will be responsible for the implementation of this ESMP and the required resources to ensure efficient implementation. The application and management of the ESMP, and thus the monitoring of compliance, will be undertaken through daily duties and activities, as well as monthly inspections.

1.5 LIMITATIONS, UNCERTAINTIES, AND ASSUMPTIONS RELATED TO THIS ESMP

This ESMP does not include measures for compliance with statutory occupational health and safety requirements. This will be provided in the risk-based safety management plan to be developed by the Proponent. This is especially important in relation to the management and transfer of ammonia liquid, gas and potential releases, due to the hazardous content of potential exposure to humans and the environment.

Where there is any conflict between the provisions of this ESMP and any contractor's obligations under their respective contracts, including statutory requirements (such as licences, Project approval conditions, permits, standards, guidelines and relevant laws), the contract must be amended, and statutory requirements are to take precedence.

The information contained in this ESMP is based on the Project description as provided in the environmental and social impact assessment (ESIA). Where the design or operational method is different, this ESMP may require updating and potential further assessment may be undertaken.

1.6 ENVIRONMENTAL ASSESSMENT PRACTITIONER DECLARATION

Environmental Compliance Consultancy (Pty) Ltd (ECC) (Reg. No. 2022/0593) has prepared this ESMP on behalf of the Proponent.

This report has been authored by employees of ECC, who have no material interest in the outcome of this report, nor do any of the ECC team have any interest that could be reasonably regarded as being capable of affecting their independence in the preparation of this report. ECC is independent from the Proponent and has no vested or financial interest in the project, except for fair remuneration for professional fees rendered based upon agreed commercial rates. Payment of these fees is in no way contingent on the results of this report, the assessment, or a record of decision issued by the Government. No member or employee of ECC is, or is intending to be, a director, officer, or any other direct employee of CMB.TECH Namibia (Pty) Ltd. No member or employee of ECC has, or has had, any shareholding in CMB.TECH Namibia (Pty) Ltd.

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2 ENVIRONMENTAL MANAGEMENT FRAMEWORK

This ESMP provides measures, guidelines and procedures for managing and mitigating potential environmental impacts. The ESMP also indicates monitoring and reporting guidelines and sets responsibilities for those carrying out management and mitigation measures.

2.1 OBJECTIVES AND TARGETS

Environmental objectives and targets have been developed so that construction and operational activities will minimise potential impacts on the environment, as far as reasonably practicable.

Environmental objectives for the Project are as follows:

- Ensuring zero pollution incidents by identifying pollutants sources and detailing prevention and response measures;
- Promote sustainable use of energy resources through proficient, developed standard operating procedures (SOPs);
- Minimize disturbances to the receiving environment (fauna and flora) by ensuring limited vegetation clearing and that earthworks are restricted to the immediate ammonia terminal project site;
- Establishing a safe working environment for employees and communities by implementing protocols that promote a culture of health and safety; and
- Ensuring effective and efficient utilization and management of resources, which includes ensuring that independent third-party environmental audits are conducted regularly.

2.2 ORGANISATIONAL STRUCTURE, ROLES AND RESPONSIBILITIES

The Proponent shall be responsible for:

- Establishing an ESMP related organogram for the site to ensure that responsibilities and accountable persons are clearly documented, defined and assigned.
- Ensuring all members of the Project team, including contractors, comply with the procedures set out in this ESMP;
- Ensuring budgetary provisions are made for the appropriate staff allocations to efficiently comply with the ESMP
- Ensuring that all persons are provided with sufficient training, supervision, and instruction to fulfil this requirement;
- Ensuring that any persons allocated specific environmental responsibilities are notified of their appointment and confirm that their responsibilities are clearly understood; and,

- Contractors shall be responsible for ensuring and demonstrating that all personnel employed by them are compliant with this ESMP, and meet the responsibilities listed above.
- Ensuring that the Principal Contractor take full responsibility for compliance by subcontractors appointed by them

Table 1 lists the roles and responsibilities allocated to different management levels in the company and specific personnel.

Table 1 – Roles and responsibilities

Role	Responsibilities and duties
Proponent	– Responsible for the overall management and implementation of the ESMP; – Ensure environmental policies are drafted/updated and communicated to all personnel throughout the company; – Responsible for providing the resources required to effectively run operations and comply with the ESMP; – Appoint all managers needed to ensure effective running of operations; – Ensure systems for proper induction and training of personnel and contractors are in place; and – Ensure that ESMP / ECC conditions of compliance are included / incorporated during design decision making and included in tender documents.
Project manager	– Responsible for ensuring compliance with this ESMP including overseeing the construction work, day-to-day activities during operations, and routine and non-routine maintenance work during operations, as well as the decommissioning of the Project; – Ensure all personnel are aware of the commitments made in the ESMP and any other relevant regulatory requirements applicable to the Project; – Responsible for the management, maintenance and revision of the ESMP or otherwise identifying a position to adopt the responsibility of managing, maintaining and revising the ESMP; – Ensure adequate resources are made available for implementation of this ESMP; – Maintain the community issues and concern register, and keep records of complaints; – Ensure all employees and contractors participate in a site induction process before commencing work on the Project and maintain an up-to-date register; – Ensure that the best environmental practice is undertaken throughout the project; and, – Report any non-compliance or accidents to the regulatory authority.
Site manager	– Appointed to manage the performance of the construction and operational maintenance activities;

Role	Responsibilities and duties
	– Responsible for implementation and compliance of this ESMP; – Managing the preparation and implementation of method statements for certain activities, and ensuring the environmental manager reviews all method statements and the relevant environmental protocols are incorporated; – Reporting any non-compliance or accidents to the Project manager and environmental manager; – Ensuring that all staff have attended a site induction session before the commencement of any work on-site and that they are adequately informed of the requirements of this management plan; – Ensuring that all contract workers, sub-contractors and visitors to the site are conversant with the requirements of this ESMP, relevant to their roles on site and adhere to this ESMP at all times; and, – Receiving, responding to and recording complaints.
Health, safety and environment coordinator	– Responsible for monitoring site activities and ensure that the Project objectives as per the ESMP are met and provide performance feedback to the Project managers, in monthly and compliance reports.
Employees/contractor employees/subcontractor	– Responsible for being compliant with this ESMP throughout the construction work, in addition to: – Ensuring they have undertaken a site induction and are conversant with the requirements of this ESMP; – Ensuring appropriate briefings for certain activities have been provided and fully understood; – Adherence to this ESMP at all times; and, – Reporting of any operations and conditions that deviate from the ESMP or any non-compliant issues or accidents to the environment manager and site manager/contractor.
Safety, health and environment officer(s)	– A Safety officer for the Project will be available, as required, throughout the construction of the Project; – Implement all relevant measures to target zero injuries incurred onsite; – Assessing risks on the construction site; – Ensuring a safe working environment;

Role	Responsibilities and duties
	– Carrying out inductions to employees and/or contractors for construction and operations activities; and – Advise and instruct project staff, contractors, sub-contractors on various safety, health and environmental related matters related to project implementation.

2.3 CONTRACTORS

Any contractors (including subcontractors) hired during the construction work or maintenance activities in the operational phase shall be compliant with this ESMP and shall be responsible for the following:

- Undertaking activities in accordance with this ESMP as well as relevant policies, procedures, management plans, statutory requirements, and contract requirements;
- Implementing appropriate environmental and safety management measures;
- Reporting of environmental issues, including actual or potential environmental incidents and hazards, to the Site manager and
- Ensuring appropriate corrective or remedial action is taken to address all environmental hazards and incidents reported by employees and subcontractors.

2.4 EMPLOYMENT

The Proponent and all contractors and subcontractors shall comply with the requirements of the Republic of Namibia's regulations for Labour, Health and Safety, and any amendments to these regulations. The following shall be complied with:

- In liaison with local government and community authorities, the Proponent shall ensure that local people have access to information about job opportunities and, where they have the prerequisite skills and experience, are considered first for construction/maintenance contract employment positions;
- The number of job opportunities shall be made known together with the associated skills and qualifications;
- The maximum length of time the job is likely to last for shall be indicated;
- Should foreign workers be hired, the proponent shall ensure that they have a valid work permit at all times; and,
- Every effort shall be made to recruit from the group of unemployed workers living in the surrounding area for positions that entail unskilled work.

3 ENVIRONMENTAL MANAGEMENT PRINCIPLES

3.1 CONTINUAL IMPROVEMENT

The Proponent's management team is responsible for reviewing and updating this ESMP, which will be supported by the regular reports on the various areas of the site. As part of this review process, the regular reports will be reviewed, identifying any trends or significant areas of concern, as well as measures implemented to manage / resolve environmental or social issues. Compliance and legislative changes will be reviewed, and lessons learnt will be captured. The ESMP will be amended as required and follow up training, awareness or updates will be provided.

Ongoing hazard identification through the review of the ESMP and supporting management plans and standard operating procedures (SOPs) will ensure environmental impacts are avoided or minimised to as low as reasonably practicable as part of the continuous improvement of the environmental management system (EMS).

3.2 BEST PRACTICE

The best practice management measures that will be complied with in accordance with the international best practice codes and standards, during Project activities, are listed in summary in Table 2.

Table 2 - A list of environmental best practice measures to be implemented

Environmental aspect	Best practice requirement
Pollution prevention control	– IEC 60079 Hazardous Area Classification Standard to be applied and maintained – IEC 61508 Functional Safety of electrical, electronic and programmable electronic (E/E/PE) safety-related systems to be applied and maintained – Employees to be trained on relevant SOPs; – Plant and equipment to be maintained and serviced regularly; – Refueling at designated locations, where possible; – Ammonia neutralizing spill kits and various spill kits available where the risk of loss of containment is identified; – Bunds to be at least 110% of the largest container therein; and – Good housekeeping.
Solid waste management	– Good housekeeping (no littering);

Environmental aspect	Best practice requirement
	– Designated waste collection areas around site and one central location; – Bins labelled; – Waste to be separated and kept clean and tidy; and – Waste bins emptied on regular basis.
Ground contamination	– Spill kits must be available, i.e., ammonia neutralising spill kits; – Chemical and hydrocarbon management enforced on site; and – Good housekeeping.
Storage of fuels, oils, chemicals and other hazardous liquids	– Storage tanks will be suitable and labelled for the liquid being stored; – Bunds to be at least 110% of the container; and – Inspections will be conducted as per the standard or equipment specifications.
Air quality	– Turn off equipment when not in use; and equipment to be maintained and serviced regularly. – Use environmentally friendly substitutes for CFCs where feasible.
Noise	– Turn off plant and equipment when not in use; and equipment to be maintained and serviced regularly. – Construction power tools are only to be used during normal working hours. – Outside working hours, the noise levels must be limited to the International Financial Corporation residential noise levels (55 dBA- during the day and 45 dBA- at night).

3.3 ENVIRONMENTAL MONITORING

A monitoring and evaluation program will be used in line with internal OHSE standards to evaluate environmental performance and promote continual improvement. Monitoring also supports environmental management on-site to evaluate how effective the environmental management has been, over an extended period. An environmental monitoring schedule will be put in place for the construction and operations based on the recommendations of relevant experts and results of the specialist environmental studies completed as part of this assessment process.

The monitoring program will comprise *inter alia*:

- Noise monitoring (e.g. effect on mammals and residents nearby);

- Biodiversity monitoring (flora and fauna); and
- Air quality monitoring (e.g. dust generation during construction).

4 COMMUNICATION AND TRAINING

To ensure potential risks and impacts are minimised it is vital that personnel are appropriately informed and trained on how to properly implement the ESMP. It is also important that regular communications are maintained with stakeholders (if applicable) and made aware of potential impacts and how to minimise or avoid them. This section sets out the framework for communication and training in relation to the ESMP.

4.1 COMMUNICATIONS

Prior and during the construction activities, the Project manager and site manager shall communicate site-wide environmental issues to the Project team through the following means (as and when required):

- Site induction;
- Audits and site inspections;
- Toolbox talks, including instruction on incident response procedure; and;
- Briefings on key project-specific environmental issues, like feedback on complaints.

This ESMP shall be distributed to the construction team including any contractors and to ensure that the environmental requirements are adequately communicated. Key activities and environmentally sensitive operations will be highlighted to workers and contractors.

During the construction phase, communications between the management team shall include discussing any complaints received and actions to resolve them, any inspections, audits, or non-conformance with this ESMP, and any objectives or target achievements.

4.2 ENVIRONMENTAL EMERGENCY AND RESPONSE

An emergency is any abnormal event, which demands immediate attention. It is any unplanned event, which results in the temporary loss of management control at site, but where functional resources can manage the response. An emergency response plan document will be put in place that manages the response in relation to emergencies including environmental emergencies. Additionally emergency response contact lists and details will be affixed on site. Table 3 contains potential contacts to be found on site in case of an emergency.

Table 3 - Emergency contact details

Town	Ambulance	Police	Fire Department
Walvis Bay	+264 85955 / +264 811 245999	+264 64 21 9048	+264 64 20 6425

4.3 COMPLAINTS HANDLING AND RECORDING

Any complaints received verbally by any personnel on the Project site shall be recorded by a dedicated and responsible staff member including:

- The name of the complainant;
- The contact details of the complainant;
- Date and time of the complaint; and,
- The nature of the complaint.

The information shall be given to the Project manager, who is overall responsible for the management of complaints. The Project manager shall do the following:

- Inform the Site manager of issues, concerns, or complaints;
- Maintain a complaint register that requires details of the complaint; and,
- Provide a written response to the complainant of the results of the investigation and action to be taken to rectify or address the matter(s). Where no action is taken, the reasons why are to be recorded in the register.

The workforce shall be informed about the complaints register, its location and the person responsible, to refer residents or the public who wish to lodge a complaint. The complaints register shall be kept for the duration of the Project and will be available for government or public review upon request.

4.4 TRAINING AND AWARENESS

All personnel working on the Project shall be competent to perform tasks that have the potential to cause an environmental impact. Competence is defined in terms of appropriate education, training, and experience.

4.5 SITE INDUCTION

All personnel involved in the Project shall be inducted to the site with specific environmental and social awareness training, and health and safety issues. The environmental and social awareness training shall ensure that personnel are familiar with the principles of this ESMP, and the environmental impacts associated with their activities, the procedures in place to control these impacts and the consequences of departure from these procedures. The project manager shall ensure a register of completed training is maintained.

The site induction should include, but is not limited to the following:

A general site-specific induction that outlines:

- What is meant by "environment" and "social" in the ESMP?
- Why the environment needs to be protected and conserved?
- How can construction activities impact the environment?
- What can be done to mitigate against impacts?

The inductee's role and responsibilities concerning implementing the ESMP:

- The site's environmental rules;
- Details of how to deal with, and who to contact should any environmental problems occur;
- The potential consequences of non-compliance with this ESMP and relevant statutory requirements; and,
- The role of responsible people working on the project.

5 INCIDENT REPORTING

The Proponent and appointed contractors must have an accident and incident reporting system. The section below sets out the minimum requirements for incident reporting and must be used as a basis for incident reporting.

5.1 MINOR INCIDENT OR "NEAR MISS"

Any incident or "near miss" involving the Proponent, a nominated representative, any contractor, or its subcontractors or any third party's personnel, property, plant or equipment must be:

- 1) Orally reported to the supervisor or the supervisor's nominated representative:
 - a. Immediately and without delay.
 - b. Regardless of whether or not injury to personnel has occurred.
 - c. Property or equipment has been damaged.
- 2) Written up and handed to the supervisor or the supervisors nominated representative by the end of the shift. The written report should:
 - a. State all known facts and conditions at the time of the incident and
 - b. includes a preliminary assessment of the most likely potential consequences of the incident under the current circumstances.

5.2 SERIOUS INCIDENTS

For any serious incident involving a fatality, or permanent disability, the incident scene must be left untouched until witnessed by a representative of the Namibian police. This requirement does not preclude immediate first aid being administered and the location being made safe.

5.3 INCIDENT REPORT AND CLOSE OUT

The assigned supervisor or manager must investigate the cause of all work accidents and significant incidents and must provide the results of the investigation and recommendations on how to prevent a recurrence of such incidents. A formal root-cause investigation process must be followed.

6 REPORTING, COMPLIANCE AND ENFORCEMENT

6.1 ENVIRONMENTAL PERFORMANCE MANAGEMENT

The current summary of environmental aspects and impacts identifies mitigation and monitoring measures, as well as the roles responsible for execution. The Project manager and Site manager will use this register to undertake monthly inspections to ensure the Project is compliant with this ESMP.

6.2 CONSTRUCTION: ENVIRONMENTAL INSPECTION AND COMPLIANCE MONITORING

6.2.1 DAILY COMPLIANCE MONITORING

A copy of this ESMP will be on-site throughout the construction work and will be available upon request. It is the responsibility of the Project manager and Site manager to ensure this ESMP is complied with through their daily roles. Daily inspections will be undertaken by the Site manager (or nominated site supervisor). Any environmental problems or potential impacts identified will be reported to the Project manager and actioned as soon as is reasonably practicable.

6.2.2 MONTHLY COMPLIANCE MONITORING

Monthly inspections will be undertaken by the Site manager to check that the standards and procedures set out in this ESMP are being complied with and environmental control measures are in place and working correctly. Any non-conformance will be recorded, including the following details: a brief description of non-conformance; the reason for the non-conformance; the responsible party; the result (consequence); and the corrective action taken and any necessary follow up measures required.

6.3 OPERATIONS: ENVIRONMENTAL INSPECTIONS AND COMPLIANCE MONITORING

Annual inspections of the associated infrastructure will be managed and undertaken by the Project manager. All infrastructure will be inspected to ensure that the equipment is operating as per specification, no damage has been caused, and no leaks or spills or rust have occurred. Any non-conformance will be recorded, including the following details: a brief description of non-conformance; the reason for the non-conformance; the responsible party; the result (consequence); and the corrective action taken and any necessary follow up measures required.

6.4 REPORTING

There will be a requirement to ensure that any incident or non-compliance, including any environmental issue, failure of equipment or accident, is reported to the Project manager.

As part of the conditions of approval of the Project environmental clearance certificate, the Proponent is required, from the date of commencing implementation of project activities, to compile and submit environmental monitoring reports (on project progress and environmental management profile) on a bi-annual basis to Office of Environmental Commissioner (MEFT).

6.5 NON-COMPLIANCE

Where it has been identified that works are not compliant with this ESMP, the Project manager will implement corrective action to the extent that the works return to being compliant as soon as possible. In instances where the requirements of the ESMP are not upheld, a non-conformance and corrective action notice will be produced. The notice will be generated during the inspections and the Project manager will be responsible for ensuring a corrective action plan is established and implemented to address the identified shortcoming.

7 MONITORING AND MANAGEMENT PROGRAMMES

7.1 PLANNING AND PRECONSTRUCTION PHASE

7.1.1 INTRODUCTION

During the planning and preconstruction phase, a strategic plan is developed whereby the ESMP will inform the design, and the associated permits, and labour and resources are assessed.

7.1.2 OBJECTIVES

This section provides the key environmental aspects and mitigation measures to be incorporated during the planning and pre-construction phase to ensure potential environmental and social impacts of the Project are prevented and minimised to the greatest extent possible. Table 4 below shows the key environmental activities and mitigation measures associated with the planning and preconstruction phase of the Project.

Table 4 - Activities and mitigation measures associated with the planning and pre-construction phase

Pre-construction and planning objectives					
– The identification of the management and control of pre-construction activities – Prevent and minimise impacts as far as reasonably practicable					
ID	Aspect	Activity	Impact	Management commitments	Responsibility
1	Terrestrial environment and ecology	Vegetation clearing	Flora and fauna disturbance/loss	– Ensure internal land clearing permits are applied for prior to land clearing and through this process the environmental team have the opportunity to recover or rescue plants of significance or plants that will be used for progressive rehabilitation.	– Project manager/HSE coordinator
2				– Permits to be obtained from Directorate of Forestry.	
3				– Incorporate the Biodiversity Assessment report and ESIA into design of the ammonia terminal and associated infrastructure.	
4				– Limit the development to actual sites for construction and avoid affecting adjacent areas.	
5				– Avoid development and associated infrastructure in sensitive areas in the immediate area. This would minimise the negative effect on the local environment, especially unique features serving as habitat to various vertebrate fauna species.	
6					

				Minimise areas cleared by ensuring that an early works construction plan or a construction management plan is in place and conveyed to contractors.	
7				Identify rare, endemic, endangered, threatened and protected species and demarcate them or remove them where necessary.	
8				Remove unique, sensitive and protected plant species before commencing with the development activities and where possible relocating to less sensitive/disturbed sites in the immediate area if disturbance cannot be avoided.	
9				All workers on-site are to be notified to avoid any excluded areas or species prior to construction.	
10				It is advised that an Environmental Officer be employed during the construction phase(s) to ensure compliance and minimise the overall impact on the flora and the environment.	
11				Educate/inform contractors and staff on protected species to avoid and the consequences of illegal collection of such species.	
12				Implement erosion control.	

13		Access roads	Damage to flora and potential death to fauna	Site access plan must be developed by the Proponent with approved roads and turning points to avoid unnecessary disturbance to the environment	
14				Route new tracks around established and protected trees, and clumps of vegetation, where possible.	
Monitoring requirements					
- Weekly checks on potential rehabilitation plants - Monthly monitoring					
ID	Aspect	Activity	Impact	Management commitments	Responsibility
1	Safety and emergency	Accidental and uncontrolled fire	Safety hazard to employees, the surrounding environment and the community	Identify and designate smoking areas.	Site manager
2				No open fire outside designated areas.	
3				No cigarette buds are discarded but contained and disposed of at an appropriate facility.	
4				Proper fire hazard identification signage to be placed in areas that will store flammable material (i.e. hydrocarbons and gas bottles).	
5				Avoid potential sources of ignition by prohibiting smoking in and around facilities.	
6			Health hazard to employees, the	Relevant permits to be in place for storage of ammonia.	

7	Risk of spillage of polluting materials and dangerous goods	surrounding environment and the community	– Relevant permits to be in place for storage of fuel (diesel and petrol).
8			– Ensure that proper storage facilities are incorporated in the planning and design of ammonia terminal and associated infrastructure i.e., the ammonia terminal will have a double wall full containment ammonia storage tank.
9			– Double walled: outer steel tank containing the ammonia liquid in case of a failure of the inner steel tank.
10			– Other hazardous chemicals/hydrocarbons are to be stored in bunded areas, that are impermeable and can contain 110% of the largest volume contained therein.
11			– Training employees and toolbox talks.
12			– Good housekeeping across the site; and
13			– Spill kits (including ammonia neutraliser kits) to be at designated areas across the site or available for use during refuelling, fuel/chemical delivery, or use. Absorption material should be available and at hand. Where sawdust is used it must be cleaned up

				immediately and not left for long periods as this poses a fire hazard. – Should an ammonia leak occur the area must be evacuated and avoided until all ammonia gas has evaporated.	
14		Health and safety incidences	Potential injury, disease or fatalities of employees, community and environment	– A health, safety and environment assessment and a security assessment must be developed and incorporated in the planning and design of the terminal.	
15				– Adequate resources to be made available for the implementation and maintenance of the health, safety and environment as well as security management plan developed in response to the abovementioned assessment report.	
16				– Ensure designated areas for fire extinguishers and fire designs are incorporated in the plan prior to construction	
Monitoring requirements					
– Weekly checks on fire hazard equipment – Weekly hazardous storage monitoring – Annual monitoring of contaminated soil					
ID	Aspect	Activity	Impact	Management commitments	Responsibility
1				– Training through toolbox talks and induction.	– HSE coordinator

2	Groundwater and surface water	Incidental hazardous/hydrocarbon spills or leaks	Groundwater and surface water contamination	- Emergency response plans and spill contingency plans must be in place and include all fuels, chemicals or hazardous substances being handled prior to construction.	
3				- Hazardous waste disposal facilities need to be approved by the MEFT prior to construction and / or meet industry standards to prevent pollution events from occurring.	
4				- Temporary waste disposal facilities will be provided for the collection of waste, which will be removed regularly to the permitted waste disposal site.	
5				- Portable chemical toilets will be provided during the Project phases. They will be routinely cleaned, and sewage disposed of at a licensed sewage treatment plant with the safe disposal certificate to be provided.	
6		Inefficient use of water resources	Water shortage	- To ensure compliance with all legal obligations.	
7				- Terminal infrastructure to be designed and constructed according to national standards and applicable legislative requirements, to prevent surface water and groundwater contamination.	
8				- Ensure erosion control and prevention measures are in place.	

9				- Ensure laydown areas or maintenance workshops are located outside of stormwater catchment areas.	
10				- A 'good housekeeping' policy shall be adopted across the site area.	

Monitoring requirements

- Daily observations
- Monthly water trends monitoring

ID	Aspect	Activity	Impact	Management commitments	Responsibility
1	Waste and wastewater management	Waste pollution	Impact on water sources and degradation of the environment	- The Proponent must compile an integrated waste management plan that should address as a minimum the mitigation measures included below.	- Project manager
2				- Adequate provisions to be made for the general solid wastes. All wastes to be removed from the site on a weekly basis and enclosed waste storage facilities will be erected. Additional provisions to be made for separate Hazardous and non-hazardous waste storage.	
3				- Recycling and proper record keeping will be optimised.	
4				- Training and toolbox talks.	
5				- Good housekeeping.	

Monitoring requirements

- Daily observations
- Weekly waste removal

ID	Aspect	Activity	Impact	Management commitments	Responsibility
1	Air quality	Dust emissions	Decrease the air quality on-site	– Dust suppression measures must be implemented to reduce dust.	– Site manager
2				– Vehicles must adhere to speed limits to avoid producing excessive dust.	
Monitoring requirements					
– Daily observations					
– Monthly air quality observations					
ID	Aspect	Activity	Impact	Management commitments	Responsibility
1	Climate change	Vehicle emissions	Increase in greenhouse gas (CO ₂) emissions	– Transition vehicle fleets from any potential diesel-powered to hybrid or electric powered vehicles, which have lower carbon emissions.	– The Proponent
2				– Create data classification points: this will involve classifying operational assets into groupings that allow for identification of emission “hotspots” and emission reduction opportunities.	
3		Aerial inspection for operations		– Immediate adoption of drones that are battery powered or fueled by hydrogen fuel cells for aerial inspection is advised, with permission from the competent authority	
4		Energy-Efficient Air Conditioning		– Implementing advanced and environmentally friendly air conditioning technologies can significantly enhance energy efficiency within the project	
Monitoring requirements					

- Annual tracking emissions to identify opportunities for emission reductions, optimise energy use, and contribute to global efforts to mitigate climate change.

ID	Aspect	Activity	Impact	Management commitments	Responsibility
1	Heritage	Preconstruction planning	Loss or damage to heritage sites	– Apply for - and obtain heritage consent from the National Heritage Council (NHC)	– The Proponent
2				– Be aware of the no go zones as stipulated in the Heritage specialist study: ○ QRS 206/194 (S22.90312, E14.54781) ○ QRS 206/195 (S22.90096, E14.54655) ○ QRS 206/196 (S22.89784, E14.54572)	

Monitoring requirements

- Obtain heritage consent from NHC

ID	Aspect	Activity	Impact	Management commitments	Responsibility
1	Noise	Equipment noise pollution	Cause nuisance to neighbours and affect the hearing of employees	– As the site or activity is near noise-sensitive receptors (NSR), equipment and methods to be employed must be reviewed to ensure the quietest available technology is used. Equipment with lower sound power levels must be selected in such instances and vendors/contractors must be required to guarantee optimised equipment design noise levels.	– Site manager

2			– All diesel-powered equipment and plant vehicles must be kept at a high level of maintenance. This shall particularly include the regular inspection and, if necessary, replacement of intake and exhaust silencers. Any change in the noise emission characteristics of equipment must serve as trigger for withdrawing it for maintenance.
3			– Avoid unnecessary equipment idling at all times.
4			– Equipment and flare design must be reviewed to ensure the quietest available technology is used.
4		Vehicle based noise pollution	– Minimising individual vehicle engine, transmission, and body noise/vibration. This is achieved through the implementation of an equipment maintenance program.
5			– Minimising the need for trucks/equipment to reverse. This will reduce the frequency at which disturbing but necessary reverse warnings will occur. Alternatives to the traditional reverse 'beeper' alarm such as a 'self-adjusting' or 'smart' alarm must be used. These alarms include a mechanism to detect the local noise level and automatically adjust the output of the alarm is so that it is 5 to 10

				dB above the noise level near the moving equipment.
6		General noise pollution		– Unless it is an emergency situation, non-routine noisy activities such as construction, decommissioning, start-up and maintenance, must be limited to day-time hours.
7				– A noise complaints register must be kept.
8				– Enclosure of the flare can significantly reduce the noise from this source.

Monitoring requirements

- Bi-annual environmental noise monitoring
- Annual noise sampling
- Any surveys must be designed and conducted by a trained specialist
- Sampling must be carried out using a Type 1 Sound Level Meter (SLM) that meets all appropriate International Electro Technical Commission (IEC) standards and is subject to annual calibration by an accredited laboratory
- The acoustic sensitivity of the SLM must be tested with a portable acoustic calibrator before and after each sampling session
- The following acoustic indices must be recorded and reported: L_{Aeq} (T), statistical noise level L_{A90} , L_{AFmin} and L_{AFmax} , octave band or 3rd octave band frequency spectra
- The SLM must be located approximately 1.5 m above ground and no closer than 3.5 m to any reflecting surface
- Efforts must be made to ensure that measurements are not affected by the residual noise and extraneous influences, e.g., wind, electrical interference and any other non-acoustic interference, and that the instrument is operated under the conditions specified by the manufacturer. It is good practice to avoid conducting measurements when the wind speed is more than 5 m/s, while it is raining or when the ground is wet
- A detailed log and record must be kept. Records include site details, weather conditions during sampling and observations made regarding the acoustic environment of each site

ID	Aspect	Activity	Impact	Management commitments	Responsibility
1	Road safety	Development of access roads	Road incidences/accidents	- Access road, speed limits and road safety signage to be erected.	- Project manager and HSE coordinator
2				- Internal roads to be demarcated clearly.	
3				- Off-road driving not allowed.	
4				- Drivers that transport materials must have a valid driver's license and must adhere to all traffic rules.	
5				- The maximum speed on internal roads must be 20 km/h.	
6				- Road safety measures must be abided to prevent road collisions.	
7				- Loads upon vehicles must be properly secured to avoid items falling off the vehicle.	
8		Increased traffic	Road incidences/accidents	- Designs of the intersection layouts of the project access road must address design standards and elements such as alignment, sign distances, cross-sections and provisions for other road users including pedestrians, and must be legally compliant.	
9				- The needs of pedestrians must be taken into consideration in the planning and design of the access to the proposed site, as well as the design of the road infrastructure.	
10				- All employees and contractors must adhere to the speed limits and other road safety procedures, both on site, and on public roads.	

				Include speed limits in the induction and enforce the speed limits.	
11				– Road safety issues must be included as part of the overall on-site safety training and at induction.	
Monitoring requirements					
– Environmental audit and inspections prior to construction					
ID	Aspect	Activity	Impact	Management commitments	Responsibility
1	Health and safety	Construction of the development	Occupational health and safety of construction workers	Occupational health, safety and wellness policy/plan must be provided including: ○ Risk assessment ○ Competence and training ○ Use of appropriate PPE; ○ Complying with SOP; ○ Complying with all applicable national regulations and laws to minimise risks at the workplace; ○ Comply with all applicable supervision of activities; ○ Proper use and storage of material and equipment; ○ Any accidents or incidents must immediately be reported to the project manager; and ○ All incidents must be recorded in an incidental register ○ Occupational Health and Safety Training must be enforced and provided to employees.	– Project manager

2			Community health and safety	- Adequate signage is to be in place to show restricted and potentially hazardous areas.	
3				- Site access control.	
4			General health and safety impacts	- Compliance with all statutory requirements, i.e., pressure vessel designs.	- The Proponent
5				- Compliance with applicable SANS codes, i.e., SANS 10087, SANS 10089, SANS 10108, etc.	
6				- Incorporation of applicable guidelines or equivalent international recognised codes of good design and practice into the designs.	
7				- Completion of a recognised process hazard analysis (such as a HAZOP study, FMEA, etc.) on the proposed facility prior to construction to ensure that the design and operational hazards have been identified and adequate mitigation are put in place.	
8				- Full compliance with IEC 61508 and IEC 61511 (Safety Instrument Systems) standards or equivalent to ensure that adequate protective instrumentation is included in the design and would remain valid for the full life cycle of the plant:	

			○ Including demonstration from the designer that sufficient and reliable instrumentation would be specified and installed at the facility.	
9			– Preparation and issuing of a safety document detailing safety and design features reducing the impacts from fires, explosions and flammable atmospheres to the MHI assessment body at the time of the MHI assessment: ○ Including compliance to statutory laws, applicable codes and standards and world's best practice; ○ Including the listing of statutory and non-statutory inspections, giving the frequency of inspections; and ○ Including the auditing of the built facility against the safety document.	
10			– Noting that codes such as IEC 61511 shall be used to achieve these requirements.	
11			– Demonstration by Cleanergy Solutions or their contractor that the final designs would reduce the risks posed by the installation to internationally acceptable guidelines.	
			– Signature of all terminal designs by a professional engineer registered in Namibia in accordance with the Professional Engineers	

				Act, who takes responsibility for suitable designs.	
12				Completion of an emergency preparedness and response document for on-site and off-site scenarios prior to initiating the MHI risk assessment (with input from local authorities).	

Monitoring requirements

- Daily compliance with management commitments
- Conducting an emergency preparedness and response report

ID	Aspect	Activity	Impact	Management commitments	Responsibility
1	Community	The development of the ammonia terminal	Increase the probability of complaints/social discomfort or anxiety	Engage with the surrounding communities and/or all stakeholders about the construction activities.	Proponent
2				Consult and provide a platform for engagement with I&APs.	
3				Appropriately incorporate I&APs consultations, questions and concerns in reporting; and	
4				A complaint register must be kept on site.	

Monitoring requirements

- Weekly checks of register
- Bi-annual updates to the community

ID	Aspect	Activity	Impact	Management commitments	Responsibility
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1	Socio-economic	Creation of employment	Positive impact on local community	– Ensure that local residents get the first opportunity to apply for positions where applicable.	– HR manager
2				– Procurement from local businesses	– Site manager
Monitoring requirements					
– HR recruitment policies.					
ID	Aspect	Activity	Impact	Management commitments	Responsibility
1	Rehabilitation	Decommissioning of Project	Visual nuisance and sense of place	– Develop a rehabilitation plan to ensure the disturbed environment is re-instated to its natural ecological state.	– Site manager
Monitoring requirements					
– Development of rehabilitation plan and update as necessary					

7.2 CONSTRUCTION PHASE

7.2.1 INTRODUCTION

During the construction phase, physical work will be conducted on the proposed site as set out in the ESIA report and project plan. This section of the ESMP will inform the construction activities in terms of how to facilitate key activities in an environmentally sustainable manner as show in Table 5.

7.2.2 OBJECTIVES

The construction phase section provides a management framework for the planning and implementation of construction activities and provides construction standards and operating arrangements so that potential environmental and social impacts of the proposed project are mitigated, prevented and minimised as far as reasonably practicable, and that statutory requirements and other legal obligations are fulfilled.

Table 5 - Activities and mitigation measures associated with the construction phase

Construction objectives					
– The identification of the management commitments and control of construction activities – Prevent and minimise impacts as far as reasonably practicable					
ID	Aspect	Activity	Impact	Management commitments	Responsibility
1	Terrestrial environment and ecology	Vegetation clearing	Flora and fauna disturbance/loss and habitat fragmentation	– All workers on-site are to be notified to avoid any excluded areas or species.	– Project manager/HSE coordinator
2				– Remove unique, sensitive flora and protected plant species before commencing with the development activities and where possible relocating to less sensitive/disturbed sites in the immediate area if disturbance cannot be avoided.	
3				– Initiate a suitable waste removal system as waste often attracts wildlife, which may result in human-wildlife conflict issues.	
4				– Route new tracks around established and protected trees, and clumps of vegetation, where possible.	

5				- In undisturbed areas, especially offsite, avoid driving randomly through the area (i.e., "track discipline"), but rather stick to permanently placed roads/tracks – especially during the construction phase. This will minimise the effect on localised potentially sensitive flora and habitats in the area.
6				- Implement erosion control.
7			Increase in invasive alien species	- Prevent the planting of potentially invasive alien plant species for ornamental purposes or as part of the landscaping.
8				- Incorporate indigenous vegetation, especially protected species, into the overall landscaping. Indigenous species require less water and overall maintenance.
9				- Although unlikely, Project equipment arriving on site from an area outside of the Project or coming from an area of known weed infestations (not present on the project site) must have an internal weed and seed inspection completed prior to equipment being used.
10		Poaching	Loss of flora and fauna	- No plants, animals or birds may be collected, caught, consumed or removed from the site by any contractor or personnel on site.

11				Educate/inform contractors and staff on protected species to avoid and the consequences of illegal collection of such species.	
12		Access roads and entry of vehicles	Possible injury or death of animals	Stick to speed limits that are established to result in fewer faunal road mortalities.	
Monitoring requirements					
- Daily visual inspections for fauna that may become entrapped during construction - Weekly checks on potential rehabilitation plants - Biodiversity monitoring should be undertaken in line with monitoring programme requirements. This program will include, but is not limited to, monitoring of the condition of habitats, ecosystems, topsoil stockpiles, species inventory and alien vegetation control					
ID	Aspect	Activity	Impact	Management commitments	Responsibility
1	Safety and emergency	Accidental and uncontrolled fire	Safety hazard to employees, the surrounding environment and the community	Equipment to be well maintained and serviced regularly and documented proof kept.	Site manager
2				Restrict movements of people to areas of activities only.	
3				No open fire outside designated areas.	
4				No cigarette buds are discarded but contained and disposed of at an appropriate facility.	
5				Designated smoking areas.	
6				Proper fire hazard identification signage to be placed in areas that store flammable material (i.e. hydrocarbons and gas bottles).	

7				- Control and reduce the potential risk of fire by segregating and safe storage of materials.	
8				- Avoid potential sources of ignition by prohibiting smoking in and around facilities.	
9				- Firefighting equipment must always be at designated areas and must be maintained regularly.	
10		Risk of spillage of hydrocarbons, chemicals or other dangerous goods/material	Health hazard to employees, the surrounding environment and the community	- Relevant permits to be in place for storage of ammonia.	
11				- Relevant permits to be in place for storage of fuel (diesel and petrol).	
12				- Training employees and toolbox talks.	
13				- Good housekeeping across the site.	
14				- Spill kits (including ammonia neutraliser kits) to be at designated areas across the site or available for use during refuelling, fuel/chemical delivery, or use. Absorption material should be available and at hand. Where sawdust is used it must be cleaned up immediately and not left for long periods as this poses a fire hazard.	

Monitoring requirements

- Weekly checks on fire hazard equipment
- Weekly hazardous storage monitoring
- Annual monitoring of contaminated soil for rehabilitation purposes
- Any major ammonia liquid spills (> 200 L) should be reported to the competent authority- Ministry of Mines and Energy (MME)
- All major petroleum product spills (> 200 L) should be reported to MME on Form PP/11 titled “Reporting of major petroleum product spill”, issued by the ministry.

ID	Aspect	Activity	Impact	Management commitments	Responsibility
1	Groundwater and surface water	Incidental hazardous/hydrocarbon spills or leaks	Groundwater and surface water contamination/pollution from wastewater of oil spills	– Where the water table is potentially penetrated, a furrow needs to be dug that diverts the water to vegetation. This can only be done for clean (non-contact) water.	– HSE coordinator
2				– Develop a training program that include fuels, chemicals handling, storage and spills emergency response plans	
3				– Ensure temporary waste disposal facilities are in place and procedures are developed to be implemented for the off-site safe disposal of hazardous substances	
5				– Provide portable chemical toilets to the workforce prior to the commencement of Project activities. The toilets are to be routinely cleaned, and sewage disposed of at a licensed sewage treatment plant with the safe disposal certificate to be provided.	
6		Inefficient use of water resources	Water shortage	– Ensure compliance with all legal obligations and sustainability considerations.	
7				– Ensure erosion control and prevention measures are in place.	

8				– Ensure laydown areas or maintenance workshops are located outside of stormwater catchment areas.	
9				– Refueling shall be undertaken in a designated area, where possible.	
10				– All vehicles and machinery must have drip trays to collect leakages of lubricants and oil during any field repairs or emergency maintenance.	
11				– In the event of pollution, polluted material must be collected and disposed of at an approved site.	
12				– A 'good housekeeping' policy shall be adopted across the site area.	
Monitoring requirements					
– Daily observations by the HSE coordinator – Monthly water trends monitoring – Monitor the use of water and keep records of requirements.					
ID	Aspect	Activity	Impact	Management commitments	Responsibility
1	Soil	Wastewater/chemical pollution	Soil quality contamination	– Accidental spills and leaks (including absorption material) to be collected and cleaned as soon as possible.	– HSE coordinator
2				– In the event of spills and leaks, polluted soil must be collected and disposed of at an approved site.	
3				– Limit the possibility to mix mineral waste with topsoil.	

4				- Bioremediation of contaminated soil <i>in situ</i> following possible accidental spills must be conducted.	
5		Employees and staff on the project site	Soil trampling and possible erosion	- Limit the possibility of compaction and creating of a hard subsurface.	
6				- Limit the possibility of trampling.	
Monitoring requirements					
- Daily observations - Weekly checks for potential soil contamination - Annual soil monitoring/rehabilitation					
ID	Aspect	Activity	Impact	Management commitments	Responsibility
1	Waste and wastewater management	Hazardous waste pollution	Impact on water sources and degradation of the environment	- The waste management plan must be kept on site during the construction phase.	- Project manager
2				- Certificates providing details of the safe disposal of waste from a permitted hazardous waste disposal site must be provided upon request.	
3				- Maintain waste record book for all discharges of wastes.	
4				- All non-compliances must be recorded and discussed at weekly site meetings and timeous remedial actions taken.	
5				- All guilty parties that are in contravention of the provisions set out for managing waste must be warned and penalised, and in the event of repeat offenses dismissed, according to the severity of the impact appropriate steps taken.	

6				- Hazardous waste will be removed and managed by an approved service provided.
7				- All construction vehicles (4x4 vehicles and trucks) and equipment on site must be provided with a drip tray/or oil spill kit: - o Drip trays and sealable containers are to be transported with vehicles wherever they go - o Drip trays must be cleaned after use, and spillage handled, stored, and disposed of as hazardous waste - o Contractor vehicles and support equipment must be authorised for use onsite prior to accessing the site. The vehicle either must have a drip tray or must be inspected as part of the authorization and prior to its entry on site each time.
8				- All vehicles must be maintained regularly to prevent oil leakages.
9				- Maintenance of vehicles must be completed at workshops in instances when emergency field maintenance is required, measures need to be put in place to avoid hydrocarbon spillages.
10				- Spilled oil or fuel must be treated as hazardous waste, disposed of as it occurs in the appropriate hazardous waste

			containers (sealable drums) on site, and removed off site regularly, or as required depending on volumes, to the closest licensed hazardous waste disposal site in the vicinity.	
11			– All such waste must be provided to specialists in the handing and treatment of such materials.	
12			– All hazardous substances (e.g., fuel, grease, oil etc.) or chemicals should be stored in a specific location on an impermeable surface which is bunded and facilities should be leads that can seal and a register will be kept of all hazardous materials.	
13			– Appropriate spill kits – refer to MSDS documents.	
14			– Hydrocarbon and chemical liquid waste must be stored correctly and disposed of by registered companies.	
15			– Hazardous and non-hazardous waste shall be always stored separately	
16			– Safe disposal certificates must be kept and provided to the HSE/ESG manager on request.	
17		General waste	– The site areas must be kept tidy at all times	
18			– All domestic and general waste produced daily must be contained.	
19			– No waste may be buried or burned on site.	

20			nuisance and sense of place	- No waste dumping is allowed on or around the construction site.
21				- Waste containers (bins) must be emptied regularly and removed from site to the nearest official licensed waste disposal site, or to onsite approved landfill, if sought by the Proponent and approved by MEFT.
22				- All recyclable waste needs to be taken to the nearest recycling depot if available.
23				- Zero waste to landfill principles must be followed where relevant.
24				- Enough separate waste containers (bins) for hazardous and domestic/general waste must be provided on site. These must be clearly marked.
25				- Personnel must be sensitized to dispose of waste in a responsible manner and not to litter.
26	Littering		Impact on water sources, degradation of the environment, visual nuisance and sense of place	- No littering by workers shall be allowed.
27				- All litter on and around the site must be picked up and placed in the bins provided.
28				- The site must always be kept tidy and free of litter. All domestic and general waste produced daily must be cleaned and contained daily.
29				- Waste shall be collected and shall be removed regularly to avoid bad odours.

Monitoring requirements

- Daily observations
- Weekly waste removal from site

ID	Aspect	Activity	Impact	Management commitments	Responsibility
1	Air quality	Dust emissions	Decrease the air quality on-site	– Dust suppression measures must be implemented such as wind barriers and dust screens.	– Site manager
2				– Vehicles and machinery are to be regularly serviced according to the manufacturers' specifications and kept in good working order to minimise exhaust emissions.	
3				– Minimise air quality impacts during construction by limiting the speed of haul trucks; limiting unnecessary travelling of vehicles on untreated roads; and applying dust suppressants on regularly travelled, unpaved sections.	
4				– When haul trucks need to use public roads, the vehicles need to be cleaned of all mud and the material transported must be covered to minimise windblown dust.	
5				– The access roads to the Project site also needs to be kept clean to minimise carry-through of mud on to public roads.	

Monitoring requirements

- Daily observations
- Monthly air quality observations
- Air quality monitoring:

- A depositional dust fallout monitoring network will be increased based on the results of the existing baseline network of eight (8) dust fall units. The eventual construction and operations network will be maintained, and the monthly dust fall results used as indicators to track the effectiveness of the applied mitigation measures during construction. Dust fallout collection should follow the ASTM method
- PM2.5 and PM10 as well as passive gas monitoring will also be conducted.

ID	Aspect	Activity	Impact	Management commitments	Responsibility
1	Climate change	Vehicle emissions	Increase in greenhouse gas (CO ₂) emissions	– Transition vehicle fleets from any potential diesel-powered to hybrid or electric powered vehicles, which have lower carbon emissions.	– The Proponent
2				– Ensure sufficient refueling or recharging facilities are available.	
3				– Create data classification points: this will involve classifying operational assets into groupings that allow for identification of emission “hotspots” and emission reduction opportunities.	
4		Energy-Efficient Air Conditioning		– Implementing advanced and environmentally friendly air conditioning technologies can significantly enhance energy efficiency within the project	

Monitoring requirements

- Annual tracking emissions to identify opportunities for emission reductions, optimise energy use, and contribute to global efforts to mitigate climate change.

ID	Aspect	Activity	Impact	Management commitments	Responsibility
1	Visual	Construction of development/ visual disturbance	Visual nuisance and sense of place	– Engage with the surrounding residents about the construction activities.	– Site manager
2				– Good housekeeping.	

Monitoring requirements					
– Daily observations to maintain a neat and tidy environment					
ID	Aspect	Activity	Impact	Management commitments	Responsibility
1	Noise	Noise pollution during construction	Cause nuisance to neighbours and affect the hearing of employees	– Whenever possible, work hours for non-production heavy equipment must be restricted between dawn and dusk where the use of heavy equipment, power tools, and the movement of heavy vehicles is within 500 m from sensitive receptors. Reversing, and the associated reverse alert, must be minimised at all times, but especially at night and by non-production equipment within 500 m of sensitive receptors. Affected stakeholders must be updated on the mitigation efforts during regular engagement meetings and updates.	– Site manager
2				– All diesel-powered equipment and vehicles must be kept at a high level of maintenance. This must particularly include regular inspection and, if necessary, replacement of intake and exhaust silencers. Any change in the noise emission characteristics of equipment should serve as trigger for withdrawing it for maintenance.	

3				- In managing noise specifically related to vehicle traffic, efforts should be directed at: - o Minimising individual vehicle engine, transmission, and body noise/vibration. This is achieved through the implementation of an equipment maintenance program to maintain road surfaces and regularly to repair potholes, etc. - o Keep all roads well maintained - o Avoid unnecessary equipment idling - o All equipment and vehicles to be maintained as per the original equipment manual (OEM) - o Minimising noise levels to International Finance Corporation noise levels for residential areas (i.e. 55 dBA during the day and 45 dBA at night).	
4				- A noise complaints register must be kept.	
5				- As the site or activity is near noise-sensitive receptors (NSR), equipment and methods to be employed must be reviewed to ensure the quietest available technology is used. Equipment with lower sound power levels must be selected in such instances and vendors/contractors must be required to guarantee optimised equipment design noise levels.	

6			– As far as it is practically possible, sources of significant noise must be enclosed. Enclosure of the flare can significantly reduce the noise from this source
7			– It should be noted that the effectiveness of partial enclosures and screens must be reduced if used incorrectly, e.g., noise must be directed into a partial enclosure and not out of it, there must not be any reflecting surfaces such as parked vehicles opposite the open end of noise reduction walls/padding/berms.
8			– Equipment must be sited as far away from NSRs as possible. Also: ○ Machines used intermittently must be shut down between work periods or throttled down to a minimum and not left running unnecessarily. This will reduce noise and conserve energy ○ Equipment from which noise generated is known to be particularly directional, must be orientated so that the noise is directed away from NSRs ○ Acoustic covers of engines must be kept closed when in use or idling ○ Doors to pump houses must always be kept closed

				○ Construction materials such as beams should be lowered and not dropped.	
9				- Regular and effective maintenance of equipment are essential to noise control. Increases in equipment noise are often indicative of imminent mechanical failure. Also, sound reducing equipment/materials can lose effectiveness before failure and must be identified by visual inspection.	
10				- Noise generated by vibrating machinery and equipment with vibrating parts must be reduced using vibration isolation mountings or proper balancing. Noise generated by friction in conveyor rollers, etc. must be reduced by sufficient lubrication.	
11				- To the extent possible, high noise-level activities shall be minimised or avoided to reduce the noise levels reaching NSRs. Alternatively, and to the extent possible, the distance between source and receiver will be increased, or noise reduction screens, barriers or earthen berms shall be installed (as close to the noise source as possible).	
12				- When mobile equipment and activities are used, increasing the distance between source and receiver is often the most effective method of controlling noise since, for a typical point source at ground level, a	

				6-dB decrease will be achieved with every doubling in distance. It is however conceded that it might not always be possible, although must be employed at the design and planning stage of operations.	
13				- If noise control at the source and the use of distance between source and receiver is not possible, screening methods must be used. The effectiveness of a noise barrier is dependent on its length, effective height, and position relative to the source and receiver as well as material of construction. To optimise the effect of screening, screens must be located close to the source of the noise.	
14				- The careful placement of barriers such as screens or berms will significantly reduce noise impacts but may result in additional visual impacts. Although vegetation such as shrubs or trees may improve the visual impact of construction sites, it will not significantly reduce noise impacts and must not be considered as a control measure.	
Monitoring requirements					
- Bi-annual environmental noise monitoring - Annual noise sampling - Any surveys must be designed and conducted by a trained specialist - Sampling must be carried out using a Type 1 Sound Level Meter (SLM) that meets all appropriate International Electro Technical Commission (IEC) standards and is subject to annual calibration by an accredited laboratory					

- The acoustic sensitivity of the SLM must be tested with a portable acoustic calibrator before and after each sampling session
- The following acoustic indices must be recorded and reported: LAeq (T), statistical noise level LA90, LAFmin and LAFmax, octave band or 3rd octave band frequency spectra
- The SLM must be located approximately 1.5 m above ground and no closer than 3.5 m to any reflecting surface
- Efforts must be made to ensure that measurements are not affected by the residual noise and extraneous influences, e.g., wind, electrical interference and any other non-acoustic interference, and that the instrument is operated under the conditions specified by the manufacturer. It is good practice to avoid conducting measurements when the wind speed is more than 5 m/s, while it is raining or when the ground is wet
- A detailed log and record must be kept. Records must include site details, weather conditions during sampling and observations made regarding the acoustic environment of each site

ID	Aspect	Activity	Impact	Management commitments	Responsibility
1	Heritage	Construction of development	Loss or damage to heritage sites	– Be aware of the no go zones as stipulated in the Heritage specialist study: ○ QRS 206/194 (S22.90312, E14.54781) ○ QRS 206/195 (S22.90096, E14.54655) – QRS 206/196 (S22.89784, E14.54572)	– Site manager
2				– In the unlikely event of a heritage site or archaeological site to be uncovered or discovered during either construction or operational phases of the Project, a “chance find” procedure (Appendix A) must be applied in the order they appear below: ○ If operating machinery or equipment, stop work; ○ Demarcate the site with danger tape;	

				○ Determine GPS position if possible; ○ Report findings to foreman; ○ Report findings, site location and actions taken to superintendent; ○ Cease any work in immediate vicinity; ○ Visit the site and consult with any potentially affected community to determine whether work can proceed without damage to findings; ○ Determine and demarcate the exclusion boundary ○ Site location and details to be added to the Project's geographic information system (GIS) for field confirmation by an archaeologist; ○ Inspect site and confirm addition to Project GIS; ○ Advise the National Heritage Council (NHC) and request written permission to remove findings from work area; and ○ Contact a certified professional to recover, package and label findings for transfer to the National Museum.	
Monitoring requirements					
- Environmental audits and inspections - Archaeological monitoring programme					

ID	Aspect	Activity	Impact	Management commitments	Responsibility
1	Traffic and road safety	Work vehicles on the public roads and increased traffic volumes on existing roads	Road incidences/accidents	- Designs of the intersection layouts of the project access road must address design standards and elements such as alignment, sign distances, cross-sections and provisions for other road users including pedestrians, and must be legally compliant.	Project manager and HSE coordinator
2				- All employees and contractors must adhere to the speed limits and other road safety procedures, both on site, and on public roads. Include speed limits in the induction and enforce the speed limits.	
3				- Provide large visible road signage, indicating the presence of heavy vehicle traffic at least 500 m before, on either side of the site access road intersection along the road.	
4				- Provide any other signage required by the relevant authorities during the construction period.	
5				- Inspect light duty site vehicles that travel offsite regularly, contractors' vehicles weekly for clean and operational taillights, indicators, reflective signage and reverse horns/beepers to ensure visibility of vehicles, especially at night.	
6				- All employees and contractors must adhere to the speed limits and other road safety procedures, both on site, and on public	

				roads. Include speed limits in the induction and enforce the speed limits.	
7				– Provide large visible road signage, indicating the presence of heavy vehicle traffic at least 500 m before, on either side of the site access road intersection along the road.	
8				– Road safety issues must be included as part of the overall on-site safety training and at induction.	
9				– Only licences employees to operate vehicles.	
10				– Provide necessary safety mechanisms required by regulators.	
11				– Vehicles must be road worthy.	
12				– Vehicles must have relevant licences.	
Monitoring requirements					
– Environmental audits and inspections					
ID	Aspect	Activity	Impact	Management commitments	Responsibility
1	Health and safety	Construction of the development	Occupational health and safety of construction workers	- Occupational health, safety and wellness policy/plan must be provided including: - Emergency response plan/Risk assessment - Competence and training - Use of appropriate PPE; - Complying with SOP;	– Proponent

				○ Complying with all applicable national regulations and laws to minimise risks at the workplace; ○ Comply with all applicable supervision of activities; ○ Proper use and storage of material and equipment; ○ Any accidents or incidents must immediately be reported to the project manager; and ○ All incidents must be recorded in an incidental register ○ Occupational Health and Safety Training must be enforced and provided to employees.	
2			Community health and safety	- Adequate signage is to be in place to show restricted and potentially hazardous areas.	
3				- Site access control.	
4			General health and safety	- Compliance with all statutory requirements, i.e., pressure vessel designs.	- The Proponent
5				- Compliance with applicable SANS codes, i.e., SANS 10087, SANS 10089, SANS 10108, etc.	
6				- Incorporation of applicable guidelines or equivalent international recognised codes	

				of good design and practice into the designs.	
7				- Full compliance with IEC 61508 and IEC 61511 (Safety Instrument Systems) standards or equivalent to ensure that adequate protective instrumentation is included in the design and would remain valid for the full life cycle of the plant: - o Including demonstration from the designer that sufficient and reliable instrumentation would be specified and installed at the facility.	
8				- Preparation and issuing of a safety document detailing safety and design features reducing the impacts from fires, explosions and flammable atmospheres to the MHI assessment body at the time of the MHI assessment: - o Including compliance to statutory laws, applicable codes and standards and world's best practice; - o Including the listing of statutory and non-statutory inspections, giving the frequency of inspections; and - o Including the auditing of the built facility against the safety document.	

9				- Noting that codes such as IEC 61511 will be used to achieve these requirements.	
Monitoring requirements					
- Daily compliance - Weekly toolbox talks - Preparing an emergency preparedness and response report					
ID	Aspect	Activity	Impact	Management commitments	Responsibility
1	Community	The development of the ammonia terminal	Increase the probability of complaints/social discomfort or anxiety	- Engage with the surrounding communities and/or all stakeholders about the construction activities.	- Proponent
2				- Consult and provide a platform for engagement with I&APs.	
3				- Appropriately incorporate I&APs consultations, questions and concerns in reporting.	
4				- A complaint register must be kept on site.	
Monitoring requirements					
- Weekly checks of register - Bi-annual updates to the community					
ID	Aspect	Activity	Impact	Management commitments	Responsibility
1	Training and awareness	Lack of environmental knowledge on ESMP requirements during construction	Potential environmental incidents	- Environmental department to provide weekly information regarding environmental issues of concern.	- Site manager and HSE coordinator
2				- Line management to discuss topics with teams.	

3				- HSE staff will be employed by contractor staff to brief staff on their company HSE topics and those of the proponent.	
4				- Awareness will be distributed by various channels as deemed appropriate.	
5				- Daily site inspections to ensure HSE requirements are adhered to; - o HSE files to be maintained per shift; and - o Incident reports covering HSE to be included, including lessons learned and corrective actions.	
6				- All construction personnel must undergo environmental induction (training), which must include as a minimum the following: - o Explanation of the importance of complying with the ESMP. - o Discussion of the potential environmental impacts of the construction activities. - o Employees' roles and responsibilities, including emergency preparedness. - o Explanation of the mitigation measures that must be implemented when particular work groups carry out their respective activities. - o Explanation of the specific mitigation measures within this ESMP especially unfamiliar provisions.	

7				– Improve awareness of ambient air quality and consideration regarding wind speed and direction when undertaking dust generating activities.	
Monitoring requirements					
– Site manager to request attendance registers be completed by all personnel and contractors’ construction crew attending induction training sessions – Environmental audits and inspections					
ID	Aspect	Activity	Impact	Management commitments	Responsibility
1	Socio-economic	Creation of employment	Positive impact on local community	– Ensure that local residents get the first opportunity to apply for positions where applicable.	– HR manager
2				– Procurement from local communities	– Site manager
Monitoring requirements					
– HR recruitment policies.					

7.3 OPERATIONAL PHASE

7.3.1 INTRODUCTION

Upon completion of the construction phase, the Project will move into the operational phase. This will involve the storage of ammonia at the terminal as previously stated in the ESMP.

7.3.2 OBJECTIVES

The purpose of this section is to provide a management framework for the identification of the management and control of operational activities with environmental aspects and key risks. It describes how activities will be controlled so that potential environmental and social impacts of the Project are prevented and minimised as far as reasonably practicable, and that statutory requirements and other legal obligations are fulfilled. Table 6 below shows the key environmental activities and mitigation measures associated with the operational phase of the Project.

Table 6 - Activities and mitigation measures associated with the operational phase

Operations objectives					
– The identification of the management commitments and control of operational activities – Prevent and minimise impacts as far as reasonably practicable					
ID	Aspect	Activity	Impact	Management commitments	Responsibility
1	Terrestrial environment and ecology	Vegetation clearing	Flora and fauna disturbance/loss and habitat fragmentation	– All workers on-site are to be notified to avoid any excluded areas or species.	– Project manager/HSE coordinator
2				– In undisturbed areas, especially offsite, avoid driving randomly through the area (i.e., “track discipline”), but rather stick to permanently placed roads/tracks. This will minimise the effect on localised potentially sensitive flora and habitats in the area.	
3				– Biodiversity monitoring must be undertaken in line with monitoring programme requirements. This program will include, but is not limited to, monitoring of the condition of habitats, ecosystems, species inventory and alien vegetation control.	
4			Increase in invasive alien species	– Make an effort to eradicate/destroy invasive alien plants encountered on site.	
5				– Make workers aware of alien species and weeds.	
6		Poaching	Loss of flora and fauna	– Prevent and stop the setting of snares (poaching), illegal collecting of veld foods	

				(e.g., tortoises, etc.), and indiscriminate killing of perceived dangerous species (e.g., snakes, etc.).	
7				- No plants, animals or birds may be collected, caught, consumed or removed from the site by any personnel on site.	
8		Access roads and entry of vehicles	Possible injury or death of animals or loss of plants	- Stick to speed limits that are established to result in fewer faunal road mortalities.	
Monitoring requirements					
- Daily visual inspections - Weekly checks on rehabilitation plants - Monthly monitoring and awareness - Biodiversity monitoring should be undertaken in line with monitoring programme requirements. This program will include, but is not limited to, monitoring of the condition of habitats, ecosystems, topsoil stockpiles, species inventory and alien vegetation control					
ID	Aspect	Activity	Impact	Management commitments	Responsibility
1	Safety and emergency	Accidental and uncontrolled fire	Safety hazard to employees, the surrounding environment and the community	- Equipment to be well maintained and serviced regularly and documented proof kept.	- Site manager
2				- Restrict movements of people to areas of activities only.	
3				- No open fire outside designated areas.	
4				- No cigarette buds are discarded but contained and disposed of at an appropriate facility.	
5				- Designated smoking areas.	

6				Proper fire hazard identification signage to be placed in areas that store flammable material (i.e. hydrocarbons and gas bottles).	
7				Avoid potential sources of ignition by prohibiting smoking in and around facilities.	
8				Firefighting equipment must always be at designated areas and must be maintained regularly.	
Monitoring requirements					
- Daily visual inspections - Weekly checks on fire hazard equipment - Monthly awareness - Any major ammonia liquid spills (> 200 L) should be reported to the competent authority- Ministry of Mines and Energy (MME) - All major petroleum product spills (> 200 L) should be reported to MME on Form PP/11 titled "Reporting of major petroleum product spill", issued by the ministry.					
ID	Aspect	Activity	Impact	Management commitments	Responsibility
1	Groundwater and surface water	Incidental hazardous/hydrocarbon spills or leaks	Groundwater and surface water contamination/pollution from wastewater of oil spills	Water saving measures shall be applicable at all times. No taps or pipes left to run, leaks to be detected immediately. No washing of vehicles on site.	HSE coordinator
2				Use of the portable chemical toilets instead of the environment must be strictly adhered to.	

3				- If grey water must be collected from washing facilities, such as sinks and showers, not including toilets, once tested, it must be recycled and: - o Used for dust suppression; - o Used to clean equipment.
4				- To maximise the re-use of water during the construction to minimise the use of clean water, no matter the source.
5				- Use water effectively and efficiently by following the reduce-recycle-reuse approach.
6				- A site-wide water balance will be kept and updated on a regular basis.
7				- Chemical and hydrocarbon spillages from vehicles, the storage terminal and pipelines will be cleaned up timeously to prevent contamination.
8				- The maintenance workshops areas will drain to a sump with silt traps and hydrocarbon collectors.
9				- All chemicals, bulk fuels, oils and grease and any other hazardous substance, will be stored and handled as per all applicable legislation and national standards.

10				– Silt will be tested and disposed of, if of a good quality.	
11		Inefficient use of water resources	Water shortage	– Ensure compliance with all legal obligations and sustainability considerations.	
12				– Monitor the use of water on a monthly basis and keep records of requirements.	
Monitoring requirements					
– Daily observations – Monthly water trends monitoring – Monitor the use of water and keep records of requirements.					
ID	Aspect	Activity	Impact	Management commitments	Responsibility
1	Soil	Wastewater/chemical pollution	Soil quality contamination	– Accidental spills and leaks (including absorption material) to be collected and cleaned as soon as possible.	– HSE coordinator
2				– In the event of spills and leaks, polluted soil must be collected and disposed of at an approved site.	
3				– Bioremediation of contaminated soil <i>in situ</i> following possible accidental spills must be conducted.	
Monitoring requirements					
– Daily observations – Weekly checks for potential soil contamination – Annual soil monitoring/rehabilitation					
ID	Aspect	Activity	Impact	Management commitments	Responsibility

1	Waste and wastewater management	Hazardous waste pollution	Impact on water sources and degradation of the environment	- The waste management plan must be kept on site during the construction phase.	- Project manager
2				- Certificates providing details of the safe disposal of waste from a permitted hazardous waste disposal site must be provided upon request.	
3				- Maintain waste record book for all discharges of wastes.	
4				- All non-compliances must be recorded and discussed at weekly site meetings and timeous remedial actions taken.	
5				- All guilty parties that are in contravention of the provisions set out for managing waste must be warned and penalised, and in the event of repeat offenses dismissed, according to the severity of the impact appropriate steps taken.	
6				- Hazardous waste will be removed and managed by an approved service provided.	
7				- All vehicles must be maintained regularly to prevent oil leakages.	
8				- Maintenance of vehicles must be completed at workshops in instances when emergency field maintenance is required, measures need to be put in place to avoid hydrocarbon spillages.	

9				Spilled oil or fuel must be treated as hazardous waste, disposed of as it occurs in the appropriate hazardous waste containers (sealable drums) on site, and removed off site regularly, or as required depending on volumes, to the closest licensed hazardous waste disposal site in the vicinity.	
10				All such waste must be provided to specialists in the handling and treatment of such materials.	
11				All hazardous substances (e.g., fuel, grease, oil etc.) or chemicals must be stored in a specific location on an impermeable surface which is bunded and facilities must be leads that must seal.	
12				Hydrocarbon and chemical liquid waste must be stored correctly and disposed of by registered companies.	
13				Hazardous and non-hazardous waste shall be always stored separately	
14				Safe disposal certificates must be kept and provided to the HSE/ESG manager on request.	
15		General waste	Impact on water sources, degradation of the environment, visual	The site areas must be kept tidy at all times	
16				All domestic and general waste produced daily must be contained.	

17			nuisance and sense of place	- No waste may be buried or burned on site.	
18				- No waste dumping shall be allowed on or around the construction site.	
19				- Waste containers (bins) must be emptied regularly and removed from site to the nearest official licensed waste disposal site, or to onsite approved landfill, if sought by the Proponent and approved by MEFT.	
20				- All recyclable waste needs to be taken to the nearest recycling depot if available.	
21				- Zero waste to landfill principles must be followed where relevant.	
22				- Enough separate waste containers (bins) for hazardous and domestic/general waste must be provided on site. These must be clearly marked.	
23				- Personnel must be sensitized to dispose of waste in a responsible manner and not to litter.	
24		Littering	Impact on water sources, degradation of the environment, visual nuisance and sense of place	- No littering by workers shall be allowed.	
25				- All litter on and around the site must be picked up and placed in the bins provided.	
26				- The site must always be kept tidy and free of litter. All domestic and general waste produced daily must be cleaned and contained daily.	

27				– Waste shall be collected and shall be removed regularly to avoid bad odours.	
Monitoring requirements					
– Daily observations – Weekly waste removal from site					
ID	Aspect	Activity	Impact	Management commitments	Responsibility
1	Air quality	Dust emissions from vehicles	Decrease the air quality on-site	– Vehicles and machinery are to be regularly serviced according to the manufacturers' specifications and kept in good working order to minimise exhaust emissions.	– Site manager
2				– Dust suppression measures during construction to be implemented through the use of water sprays or chemical binding agents.	
3		Emissions control and reporting	Mitigate the decrease in air quality on site	– Emissions control and related protective systems require regular inspection, testing and maintenance, by competent persons as per manufacturer specifications.	
4				– Regular reporting of the performance of the inspection, testing, maintenance, and monitoring systems is required monthly. The report should include the performance of the management system as well as the performance of the emission systems.	
5				– Should specialist studies indicate as such, additional air quality measures will be	

				implemented for the potential release of gases from the ammonia terminal.	
Monitoring requirements					
– Daily observations – Monthly air quality observations					
ID	Aspect	Activity	Impact	Management commitments	Responsibility
1	Climate change	Vehicle emissions	Increase in greenhouse gas (CO ₂) emissions	– Transition vehicle fleets from any potential diesel-powered to hybrid or electric powered vehicles, which have lower carbon emissions.	– The Proponent
2				– Create data classification points: this will involve classifying operational assets into groupings that allow for identification of emission “hotspots” and emission reduction opportunities.	
3				– Continual community engagement: Collaborate with local communities and stakeholders to develop long-term sustainable practices that align with environmental and social goals, thus minimising the overall impact of the Project.	
4		Aerial inspection for operations		– Immediate adoption of Drones that are battery powered or fueled by hydrogen fuel cells for aerial inspection is advised, with	

				permission from the competent authority.	
5		Energy-Efficient Air Conditioning		– Implementing advanced and environmentally friendly air conditioning technologies will significantly enhance energy efficiency within the project	
Monitoring requirements					
– Annual tracking emissions to identify opportunities for emission reductions, optimise energy use, and contribute to global efforts to mitigate climate change.					
ID	Aspect	Activity	Impact	Management commitments	Responsibility
1	Visual	Visual disturbance during operations	Visual nuisance and sense of place	– Maintenance of facilities.	– Site manager
2				– Good housekeeping.	
3				– Specialist studies completed will inform additional visual commitments that are required for operations.	
Monitoring requirements					
– Daily observations to ensure the site it kept neat and tidy					
ID	Aspect	Activity	Impact	Management commitments	Responsibility
1	Noise	Noise pollution during operations	Cause nuisance to neighbours and affect the hearing of employees	– Minimising noise levels to International Finance Corporation noise levels for residential areas (i.e. 55 dBA during the day and 45 dBA at night).	– Site manager
2				– A noise complaints register must be kept.	

3				– Enclosure of the flare to minimise noise during a potential operational emergency case.	
Monitoring requirements					
– Bi-annual environmental noise monitoring – Annual noise sampling – Any surveys must be designed and conducted by a trained specialist – Sampling must be carried out using a Type 1 Sound Level Meter (SLM) that meets all appropriate International Electro Technical Commission (IEC) standards and is subject to annual calibration by an accredited laboratory – The acoustic sensitivity of the SLM must be tested with a portable acoustic calibrator before and after each sampling session – The following acoustic indices must be recorded and reported: LAeq (T), statistical noise level LA90, LAFmin and LAFmax, octave band or 3rd octave band frequency spectra – The SLM must be located approximately 1.5 m above ground and no closer than 3.5 m to any reflecting surface – Efforts must be made to ensure that measurements are not affected by the residual noise and extraneous influences, e.g., wind, electrical interference and any other non-acoustic interference, and that the instrument is operated under the conditions specified by the manufacturer. It is good practice to avoid conducting measurements when the wind speed is more than 5 m/s, while it is raining or when the ground is wet – A detailed log and record must be kept. Records include site details, weather conditions during sampling and observations made regarding the acoustic environment of each site					
ID	Aspect	Activity	Impact	Management commitments	Responsibility
1	Heritage	Operations of development	Loss or damage to heritage sites	– Be aware of the no go zones as stipulated in the Heritage specialist study: ○ QRS 206/194 (S22.90312, E14.54781) ○ QRS 206/195 (S22.90096, E14.54655) ○ QRS 206/196 (S22.89784, E14.54572)	– Site manager
2				– In the unlikely event of a heritage site or archaeological site to be uncovered or discovered during either construction or	

				operational phases of the Project, a “chance find” procedure (Appendix A) must be applied in the order they appear below: ○ If operating machinery or equipment, stop work; ○ Demarcate the site with danger tape; ○ Determine GPS position if possible; ○ Report findings to foreman; ○ Report findings, site location and actions taken to superintendent; ○ Cease any work in immediate vicinity; ○ Visit the site and consult with any potentially affected community to determine whether work can proceed without damage to findings; ○ Determine and demarcate the exclusion boundary ○ Site location and details to be added to the Project’s geographic information system (GIS) for field confirmation by an archaeologist; ○ Inspect site and confirm addition to Project GIS; ○ Advise the National Heritage Council (NHC) and request written permission to remove findings from work area; and	
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				Contact a certified professional to recover, package and label findings for transfer to the National Museum.	
Monitoring requirements					
- Environmental audits and inspections - Archaeological monitoring programme					
ID	Aspect	Activity	Impact	Management commitments	Responsibility
1	Road safety	Increased traffic volumes on existing roads	Road incidences/accidents	All employees must adhere to the speed limits and other road safety procedures, both on site, and on public roads. Include speed limits in the induction and enforce the speed limits.	Site manager
Monitoring requirements					
Environmental audits and inspections					
ID	Aspect	Activity	Impact	Management commitments	Responsibility
1	Health and safety	Operations of the development	Occupational health and safety of construction workers	Occupational health, safety and wellness policy/plan must be provided including: - Emergency response plan/Risk assessment - Competence and training - Use of appropriate PPE; - Complying with SOP; - Complying with all applicable national regulations and laws to minimise risks at the workplace; - Comply with all applicable supervision of activities;	Proponent

				○ Proper use and storage of material and equipment; ○ Any accidents or incidents must immediately be reported to the project manager; and ○ All incidents must be recorded in an incidental register ○ Occupational Health and Safety Training must be enforced and provided to employees.	
2			Community health and safety	- Adequate signage is to be in place to show restricted and potentially hazardous areas.	
3				- Emergency response plan.	
4				- Strategic partnerships with local authorities to allow for adequate response in the event of an incident.	
5			General health and safety	- Compliance with all statutory requirements, i.e., pressure vessel designs.	- The Proponent
6				- Compliance with applicable SANS codes, i.e., SANS 10087, SANS 10089, SANS 10108, etc.	
7				- Preparation and issuing of a safety document detailing safety and design features reducing the impacts from fires, explosions and flammable atmospheres to	

				the MHI assessment body at the time of the MHI assessment: ○ Including compliance to statutory laws, applicable codes and standards and world’s best practice; ○ Including the listing of statutory and non-statutory inspections, giving the frequency of inspections; and ○ Including the auditing of the built facility against the safety document.	
8				– Noting that codes such as IEC 61511 will be used to achieve these requirements.	
Monitoring requirements					
– Daily compliance – Weekly toolbox talks					
ID	Aspect	Activity	Impact	Management commitments	Responsibility
1	Socio-economic	Creation of employment	Positive impact on local community	– Ensure that local residents get the first opportunity to apply for positions were applicable.	– HR manager
2		Corporate based investments	Positive contribution to economic and social wellbeing	– Initiatives to support local small businesses, wildlife conservation and sponsorships opportunities	– Proponent
Monitoring requirements					
– HR recruitment policies.					

7.4 DECOMMISSIONING/REHABILITATION PHASE

7.4.1 INTRODUCTION

The decommissioning phase describes the closure phase assuming operations are complete. Decommissioning of the ammonia terminal Project is not foreseen for the immediate future. It is assumed that at a certain point, the development may require decommissioning, and the site will be reinstated back to a similar condition, or the infrastructure will be used for a similar project. Prior to decommissioning – conduct assessment.

7.4.2 OBJECTIVES

The purpose of this section is to provide a management framework for the identification of the management and control of activities with environmental aspects and key risks. Additionally, it provides an overview of how potential decommissioning activities will be controlled so that potential environmental and social impacts of the Project are prevented and minimised as far as reasonably possible (Table 7), and that statutory requirements and other legal obligations are fulfilled.

Table 7 - Activities and mitigation measures associated with the decommissioning phase

Decommissioning objectives					
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1	Groundwater and surface water	Incidental hazardous/hydrocarbon spills or leaks	Groundwater and surface water contamination/pollution from wastewater of oil spills	Water saving measures shall be applicable at all times. No taps or pipes left to run, leaks to be detected immediately. No washing of vehicles on site.	HSE coordinator
2				Use of the portable chemical toilets instead of the environment must be strictly adhered to.	
Monitoring requirements					
- Daily observations - Monthly water trends monitoring					
ID	Aspect	Activity	Impact	Management commitments	Responsibility
1	Soil	Soil trampling	Possible erosion	Follow a process of recovery from soil compaction and ensure the quality is returned to same state prior to development as per the soil assessment report.	HSE coordinator
Monitoring requirements					
- Daily observations - Weekly checks for potential soil contamination - Annual soil monitoring/rehabilitation					
ID	Aspect	Activity	Impact	Management commitments	Responsibility
1	Waste and wastewater	Hazardous waste pollution	Impact on water sources and degradation of the environment	The waste management plan should be kept on site during the construction phase.	Project manager
2	management			Certificates providing details of the safe disposal of waste from a permitted hazardous waste disposal site must be provided upon request.	

3				- Maintain waste record book for all discharges of wastes.
4				- All guilty parties that are in contravention of the provisions set out for managing waste must be warned and penalised, and in the event of repeat offenses dismissed, according to the severity of the impact appropriate steps taken.
5				- Hazardous waste will be removed and managed by an approved service provided.
6				- All vehicles must be maintained regularly to prevent oil leakages.
7				- Spilled oil or fuel must be treated as hazardous waste, disposed of as it occurs in the appropriate hazardous waste containers (sealable drums) on site, and removed off site regularly, or as required depending on volumes, to the closest licensed hazardous waste disposal site in the vicinity.
8				- All such waste must be provided to specialists in the handing and treatment of such materials.
9				- All hazardous substances (e.g., fuel, grease, oil etc.) or chemicals must be stored in a specific location on an impermeable surface which is bunded and facilities should be leads that can seal.

10				– Hydrocarbon and chemical liquid waste must be stored correctly and disposed of by registered companies.	
11				– Hazardous and non-hazardous waste shall be always stored separately	
12		General waste	Impact on water sources, degradation of the environment, visual nuisance and sense of place	– The site area must be kept tidy at all times.	
13				– All domestic and general waste produced daily must be contained.	
14				– No waste may be buried or burned on site.	
15				– No waste dumping must be allowed on or around the site.	
16				– Waste containers (bins) must be emptied regularly and removed from site to the nearest official licensed waste disposal site, or to onsite approved landfill, if sought by the Proponent and approved by MEFT.	
17				– All recyclable waste needs to be taken to the nearest recycling depot if available.	
18				– Zero waste to landfill principles must be followed.	
19				– Enough separate waste containers (bins) for hazardous and domestic/general waste must be provided on site. These must be clearly marked.	
20				– Personnel must be sensitized to dispose of waste in a responsible manner and not to litter.	
21		Littering		– No littering shall be allowed.	

22			Impact on water sources, degradation of the environment, visual nuisance and sense of place	– All litter on and around the site must be picked up and placed in the bins provided.	
23				– The site must always be kept tidy and free of litter. All domestic and general waste produced daily must be cleaned and contained daily.	
24				– Waste shall be collected and shall be removed regularly to avoid bad odours.	
Monitoring requirements					
– Daily observations – Weekly waste removal from site					
ID	Aspect	Activity	Impact	Management commitments	Responsibility
1	Air quality	Dust emissions from vehicles	Decrease the air quality on-site	– Vehicles and machinery are to be regularly serviced according to the manufacturers' specifications and kept in good working order to minimise exhaust emissions.	– Site manager
Monitoring requirements					
– Daily observations – Monthly air quality observations					
1	Climate change	Vehicle emissions	Increase in greenhouse gas (CO ₂) emissions	– Transition vehicle fleets from any potential diesel-powered to hybrid or electric powered vehicles, which have lower carbon emissions.	– The Proponent
2				– Create data classification points: this will involve classifying operational assets into groupings that allow for identification of	

				emission “hotspots” and emission reduction opportunities.	
3				– Continual community engagement: Collaborate with local communities and stakeholders to develop long-term sustainable practices that align with environmental and social goals, thus minimising the overall impact of the Project.	
Monitoring requirements					
– Annual tracking of emissions					
ID	Aspect	Activity	Impact	Management commitments	Responsibility
1	Visual	Visual disturbance	Visual nuisance and sense of place	– Good housekeeping.	– Site manager
2				– Specialist studies completed will inform additional visual commitments that are required for operations.	
Monitoring requirements					
– Daily observations to ensure site is kept neat and tidy					
ID	Aspect	Activity	Impact	Management commitments	Responsibility
1	Noise	Noise pollution	Cause nuisance to neighbours and affect the hearing of employees	– Minimising noise levels to International Finance Corporation noise levels for residential areas (i.e. 55 dBA during the day and 45 dBA at night).	– Site manager

2		Vehicle based noise pollution		– Minimising individual vehicle engine, transmission, and body noise/vibration. This is achieved through the implementation of an equipment maintenance program.	–
3				– Minimising the need for trucks/equipment to reverse. This will reduce the frequency at which disturbing but necessary reverse warnings will occur. Alternatives to the traditional reverse 'beeper' alarm such as a 'self-adjusting' or 'smart' alarm must be used. These alarms include a mechanism to detect the local noise level and automatically adjust the output of the alarm is so that it is 5 to 10 dB above the noise level near the moving equipment.	
4		General noise pollution		– Unless it is an emergency situation, non-routine noisy activities such as construction, decommissioning, start-up and maintenance, must be limited to day-time hours.	
5				– A noise complaints register must be kept.	
6				– Enclosure of the flare will significantly reduce the noise from this source.	

Monitoring requirements

- Bi-annual environmental noise monitoring
- Annual noise sampling
- Any surveys shall be designed and conducted by a trained specialist

- Sampling shall be carried out using a Type 1 Sound Level Meter (SLM) that meets all appropriate International Electro Technical Commission (IEC) standards and is subject to annual calibration by an accredited laboratory
- The acoustic sensitivity of the SLM shall be tested with a portable acoustic calibrator before and after each sampling session
- The following acoustic indices shall be recorded and reported: $L_{Aeq}(T)$, statistical noise level L_{A90} , L_{AFmin} and L_{AFmax} , octave band or 3rd octave band frequency spectra
- The SLM shall be located approximately 1.5 m above ground and no closer than 3.5 m to any reflecting surface
- Efforts shall be made to ensure that measurements are not affected by the residual noise and extraneous influences, e.g., wind, electrical interference and any other non-acoustic interference, and that the instrument is operated under the conditions specified by the manufacturer. It is good practice to avoid conducting measurements when the wind speed is more than 5 m/s, while it is raining or when the ground is wet
- A detailed log and record shall be kept. Records shall include site details, weather conditions during sampling and observations made regarding the acoustic environment of each site

ID	Aspect	Activity	Impact	Management commitments	Responsibility
1	Heritage	Decommissioning of Project	Loss or damage to heritage sites	– Be aware of the no go zones as stipulated in the Heritage specialist study: ○ QRS 206/194 (S22.90312, E14.54781) ○ QRS 206/195 (S22.90096, E14.54655) ○ QRS 206/196 (S22.89784, E14.54572)	– Site manager
2				– In the unlikely event of a heritage site or archaeological site to be uncovered or discovered during either construction or operational phases of the Project, a “chance find” procedure (Appendix A) must be applied in the order they appear below: ○ If operating machinery or equipment, stop work; ○ Demarcate the site with danger tape;	

				○ Determine GPS position if possible; ○ Report findings to foreman; ○ Report findings, site location and actions taken to superintendent; ○ Cease any work in immediate vicinity; ○ Visit the site and consult with any potentially affected community to determine whether work can proceed without damage to findings; ○ Determine and demarcate the exclusion boundary ○ Site location and details to be added to the Project's geographic information system (GIS) for field confirmation by an archaeologist; ○ Inspect site and confirm addition to Project GIS; ○ Advise the National Heritage Council (NHC) and request written permission to remove findings from work area; and ○ Contact a certified professional to recover, package and label findings for transfer to the National Museum.	
Monitoring requirements					
– Environmental audits and inspections – Archaeological monitoring programme					
ID	Aspect	Activity	Impact	Management commitments	Responsibility

1	Road safety	Increased traffic volumes on existing roads	Road incidences/accidents	All employees must adhere to the speed limits and other road safety procedures, both on site, and on public roads. Include speed limits in the induction and enforce the speed limits.	Site manager
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Monitoring requirements

- Environmental audits and inspections

ID	Aspect	Activity	Impact	Management commitments	Responsibility
1	Community	Decommissioning of the ammonia terminal	Increase the probability of complaints/ social discomfort or anxiety	Engage with the surrounding communities and/ or all stakeholders about the construction activities.	Proponent
2				Consult and provide a platform for engagement with I&APs.	
3				Appropriately incorporate I&APs consultations, questions and concerns in reporting.	
4				A complaint register must be kept on site.	

Monitoring requirements

- Weekly checks of register

ID	Aspect	Activity	Impact	Management commitments	Responsibility
1	Health and safety	Decommissioning of the ammonia terminal	Occupational health and safety of construction workers	- Occupational health, safety and wellness policy/plan must be provided including: - Emergency response plan/Risk assessment - Competence and training - Use of appropriate PPE;	Proponent

				○ Complying with SOP; ○ Complying with all applicable national regulations and laws to minimise risks at the workplace; ○ Comply with all applicable supervision of activities; ○ Proper use and storage of material and equipment; ○ Any accidents or incidents must immediately be reported to the project manager; and ○ All incidents must be recorded in an incidental register.	
Monitoring requirements					
- Daily compliance - Weekly toolbox talks					
ID	Aspect	Activity	Impact	Management commitments	Responsibility
1	Socio-economic	Creation of employment	Positive impact on local community	- Ensure that local residents get the first opportunity to apply for positions were applicable.	- HR manager
Monitoring requirements					
- HR recruitment policies.					

8 IMPLEMENTATION OF THE ESMP

This environmental management plan:

- A. Has been prepared according to a contract with the Proponent
- B. Has been prepared based on information provided to ECC up to September 2024
- C. Is for the sole use of the proponent, for the sole purpose of an ESMP
- D. Must not be used (1) by any person other than the proponent or (2) for any purpose other than an ESMP
- E. Must not be copied without the prior written permission of ECC.

APPENDIX A – ARCHAEOLOGICAL CHANCE FINDS PROCEDURE

Introduction

Areas of proposed development activity are subject to heritage survey and assessment at the planning stage. These surveys are based on surface indications alone, and it is therefore possible that sites or items of heritage significance will be found during development work. The procedure set out here covers the reporting and management of such finds.

Scope: The “chance finds” procedure covers the actions to be taken from the discovery of a heritage site or item to its investigation and assessment by a trained archaeologist or other appropriately qualified person.

Compliance: The “chance finds” procedure is intended to ensure compliance with relevant provisions of the National Heritage Act, No. 27 of 2004), especially Section 55 (4): “a person who discovers any archaeological object must as soon as practicable report the discovery to the Council”. The procedure of reporting set out below must be observed so that heritage remains reported to the NHC are correctly identified in the field.

Roles and responsibilities

Operator - to exercise due caution if archaeological remains are found.

Foreman - To secure site and advise management timeously.

Superintendent - To determine safe working boundary and request inspections.

Third party archaeologist - To inspect, identify, advise management, and recover remains.

Procedure

Action by person identifying archaeological or heritage material:

- a) If operating machinery or equipment stop work,
- b) Identify the site with danger tape,
- c) Determine GPS position if possible, and
- d) Report findings to foreman.

Action by foreman:

- a) Report findings, site location and actions taken to superintendent, and
- b) Cease any works in immediate vicinity.

Action by superintendent:

- a) Visit site and determine whether work can proceed without damage to findings,
- b) Determine and mark exclusion boundary, and
- c) Site location and details to be added to Project GIS for field confirmation by archaeologist.

Action by archaeologist:

- a) Inspect site and confirm addition to Project GIS,
- b) Advise NHC and request written permission to remove findings from work area, and

c) Recovery, packaging and labelling of findings for transfer to National Museum.

In the event of discovering human remains:

a) Actions as above,

b) Field inspection by archaeologist to confirm that remains are human,

c) Advise and liaise with NHC and Police, and

d) Recovery of remains and removal to National Museum or National Forensic Laboratory, as directed.