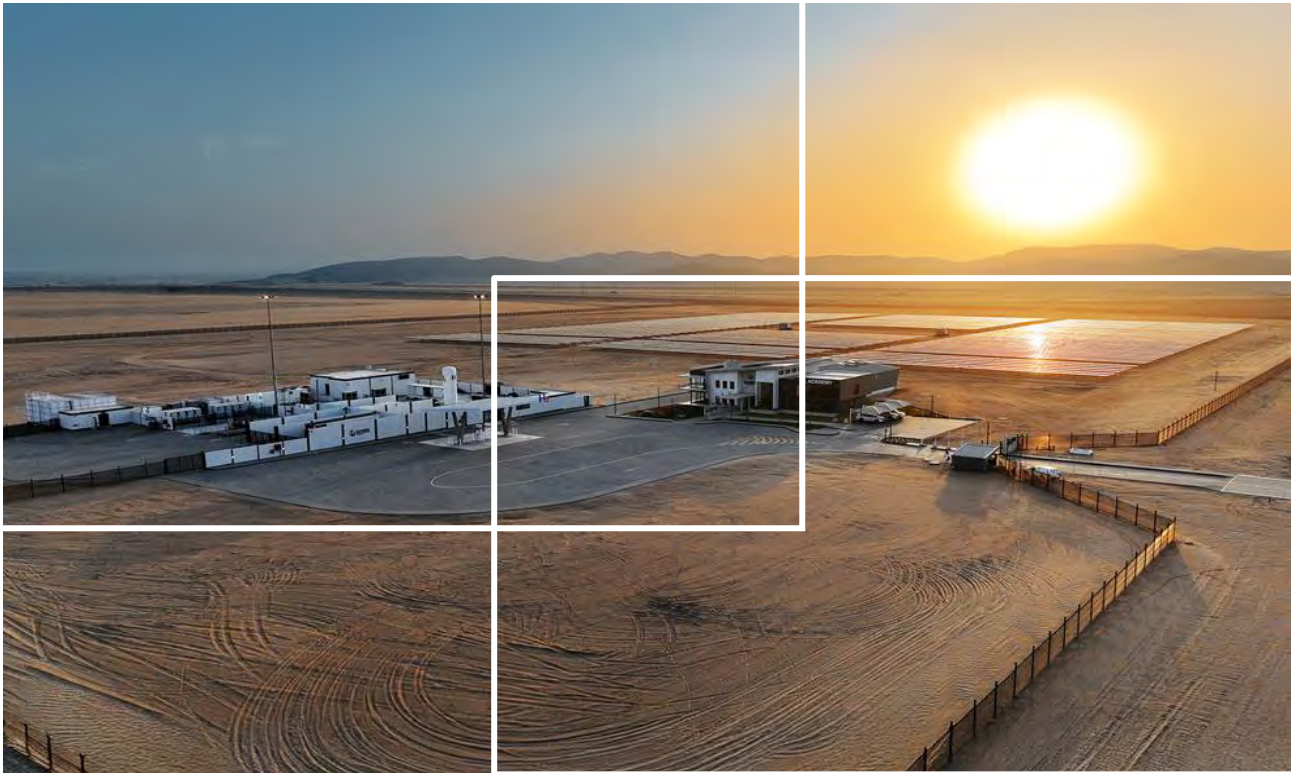




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REPORT:

UPDATED ESMP FOR THE GREEN HYDROGEN DEMONSTRATION PLANT ON FARM 58, WALVIS BAY, ERONGO REGION, NAMIBIA

PROJECT NUMBER: ECC-145-523-REP-03-D

REPORT VERSION: REV 01

DATE: 26 MARCH 2026



TITLE AND APPROVAL PAGE

Project Name:	Updated ESMP for the Green Hydrogen Demonstration Plant on Farm 58, Walvis Bay, Erongo Region, Namibia
Client Company Name:	Cleanergy Solutions Namibia (Pty) Ltd
Client Name:	Ms Liesbeth Verhaert
Ministry Reference:	ECC-2300257
Status of Report:	Final for Government Record of Decision
Date of issue:	26 March 2026
Review Period:	N/A

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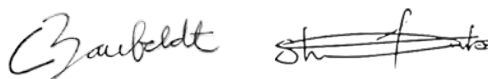
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TABLE OF CONTENTS

1	Introduction	8
1.1	Project background	8
1.2	Additions to the updated ESMP	8
1.3	Environmental regulatory requirements.....	11
1.4	Purpose and scope of this report.....	11
1.5	Management of this ESMP	11
1.6	Limitations, uncertainties and assumptions related to this ESMP	12
2	Environmental management framework.....	13
2.1	Objectives and targets	13
2.2	Organisational structure, roles and responsibilities.....	13
2.3	Contractors and subcontractors.....	16
2.4	Employment	16
3	Environmental management principles	17
3.1	Continual improvement.....	17
3.2	Best practice	17
3.3	Environmental monitoring	18
4	Communication and training.....	19
4.1	Communication.....	19
4.2	Environmental emergency and response	19
4.3	Complaints handling and recording.....	20
4.4	Training and awareness.....	20
4.5	Site induction.....	20
5	Incident Reporting.....	22
5.1	Minor incident or “near miss”	22
5.2	Serious incidents.....	22
5.3	Incident report and close out.....	22
6	Reporting, compliance and enforcement.....	24
6.1	Environmental performance management	24
6.2	Construction: environmental inspection and compliance monitoring.....	24
6.2.1	Daily compliance monitoring	24
6.2.2	Monthly compliance monitoring	24

6.3	Operations: environmental inspections and compliance monitoring	24
6.4	Reporting.....	24
6.5	Non-compliance.....	25
7	Monitoring and management programmes.....	26
7.1	Planning and pre-construction phase.....	26
7.1.1	Introduction	26
7.1.2	Objectives.....	26
7.2	Construction phase	35
7.2.1	Introduction	35
7.2.2	Objectives.....	35
7.3	Operational phase	53
7.3.1	Introduction	53
7.3.2	Objectives.....	53
7.4	Decommissioning/rehabilitation phase	69
7.4.1	Introduction	69
7.4.2	Objectives.....	69
8	Implementation of the ESMP	83

LIST OF TABLES

Table 1 – Roles and responsibilities.....	14
Table 2 - A list of environmental best practice measures to be implemented.....	17
Table 3 - Emergency contact details	19
Table 4 – Activities, mitigation and management measures associated with the planning and pre-construction phase of the additional Project components.....	27
Table 5 – Construction activities, management and mitigation measures associated with the construction phase of the additional Project components.....	36
Table 6 – Operational activities, management and mitigation measures associated with the operational phase	54
Table 7 – Decommissioning activities, management and mitigation measures associated with the decommissioning phase.....	70

LIST OF FIGURES

Figure 1 - Locality map of the existing GHDP Project, Erongo Region	9
Figure 2 - GHDP Site layout including the additional components	10

LIST OF APPENDICES

Appendix A – Archaeological chance finds procedure.....	84
Appendix B – Weed and seed inspection form.....	86

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
DEAF	Department of Environmental Affairs and Forestry
DWA	Department of Water Affairs
E	electrical/electronic
ECC	Environmental Compliance Consultancy (Pty) Ltd
e.g.	example
EIA	environmental impact assessment
EM	Environmental manager
EMA	Environmental Management Act, No. 7 of 2007
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
GHG	greenhouse gases
GPS	global positioning system
H ₂	hydrogen
HR	human resources
i.e.	that is
IEC	International Electrotechnical Commission
IFC	International Finance Corporation
km/h	kilometre per hour
L	litre

Abbreviation	Description
Ltd.	limited
m	metre
MAFWLR	Ministry of Agriculture, Fisheries, Water and Land Reform
MEFT	Ministry of Environment, Forestry and Tourism
MHI	major hazard installation
MLIREC	Ministry of Labour, Industrial Relation and Employment Creation
MIME	Ministry of Industries, Mines and Energy
MSDS	material safety data sheets
mtpd	metric tonnes per day
MW	megawatt
MWh	megawatt-hour
MWp	megawatt-peak
NHC	National Heritage Council
NH ₃	ammonia
NSR	noise-sensitive receptor
O&L	Ohlthaver & List Group
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 Cleanergy Solutions Namibia (Pty) Ltd (hereinafter referred to as “the Proponent” or “Cleanergy Solutions”) to update the environmental and social management plan (ESMP) for the Green Hydrogen Demonstration Plant (GHDP) on Farm 58, Walvis Bay, Erongo Region, Namibia.

Cleanergy Solutions is wholly owned by Compagnie Maritime Belge Technology (CMB.TECH. CMB.TECH), a Belgium based company that specialise in the design, construction and operations of large marine and industrial modes of transportation, that utilise hydrogen (H₂) and ammonia (NH₃). 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, located outside of Walvis Bay in 2024, on Farm 58. Cleanergy Solutions marked the grand opening of the green hydrogen production and refuelling facility on 18 September 2025.

The current environmental clearance certificate (ECC-2300257) for the GHDP is valid until 14 March 2026. This updated ESMP forms part of the environmental clearance certificate renewal and amendment application for the facility and associated activities. The proposed Project activities that trigger the amendment are described in section 1.2.

The location of the Project site is on portion 8 of Farm 58 and can be accessed via the Walvis Bay – Swakopmund highway (D1984) as shown in Figure 1.

1.2 ADDITIONS TO THE UPDATED ESMP

This ESMP is updated to include potential impacts that may be triggered by the proposed additional activities (as discussed below and in the amendment report) and to reflect the current operational activities of the Project. All proposed activities additions will be conducted within the existing Project footprint. An amendment report with an additional impact assessment has been compiled as part of the environmental clearance certificate amendment and renewal application.

The following components are planned to be incorporated into the GHDP Project (Figure 2):

- Extension of the solar park from 5 MWp to 100 MWp
- Battery extension from 5.9 MWh to 230 MWh
- 5 MW electrolyser (alkaline);
- The construction of an ammonia plant (4 mtpd);
- New utilities: Flare, Nitrogen Generation Unit, Water Treatment plant, and cooling water system.



Figure 1 - Locality map of the existing GHDP Project, Erongo Region

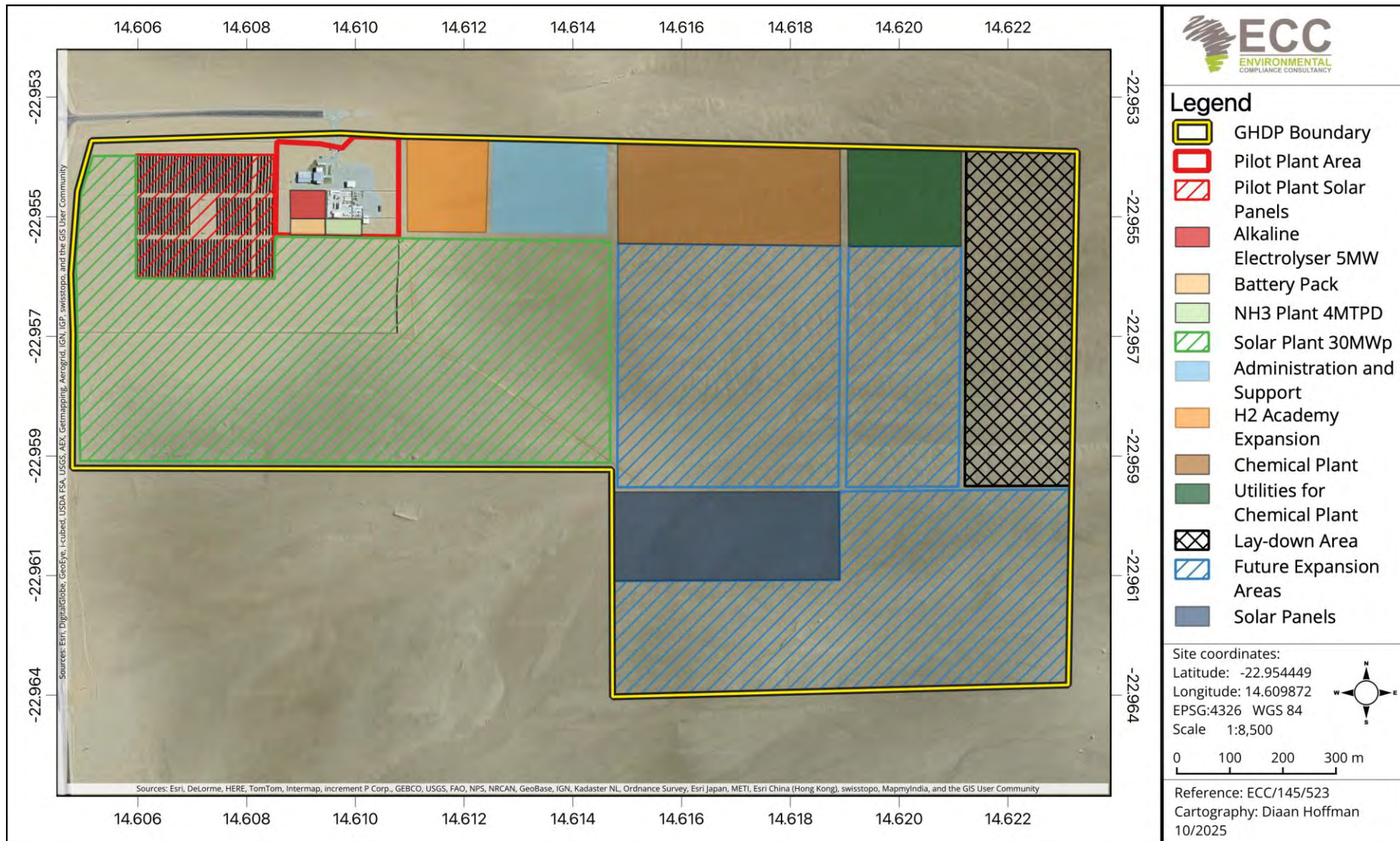


Figure 2 - GHDP Site layout including the additional components

1.3 ENVIRONMENTAL REGULATORY REQUIREMENTS

The proposed additional components required for the Project triggers listed activities as stipulated in the Environmental Management Act, No. 7 of 2007 (EMA) and its Regulations, promulgated in 2012. An environmental compliance report, amendment report (including an updated impact assessment) and an updated environmental and social management plan (ESMP) are required to be submitted as part of the renewal application to support the decision-making process for issuing an environmental clearance certificate. Bi-annual environmental EMP performance reports are submitted along with the supporting appendices for the compliance report.

This ESMP and has been compiled in terms of the requirements of the EMA and its 2012 Regulations.

1.4 PURPOSE AND SCOPE OF THIS REPORT

The ESMP provides a logical framework, mitigation measures and management strategies for the activities and aspects associated with the GHDP Project. This ensures that the potential environmental impacts and social issues 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 is based on the findings of the environmental and social impact assessment (ESIA) for the Project, as amended.

This ESMP is a live document and shall be reviewed at pre-determined intervals, updated 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 ESMP that is approved by the competent authorities (Ministry of Industries, Mines and Energy (MIME) and Ministry of Environment, Forestry and Tourism (MEFT)).

1.5 MANAGEMENT OF THIS ESMP

The Proponent will hold the environmental clearance certificate for the proposed Project, will be responsible for the implementation of this ESMP and will ensure that the required resources are in place to ensure efficient implementation of the mitigation and management measures. 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.

1.6 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 particularly important with regards to the handling, transfer and potential release of ammonia in both liquid and gaseous form and the potential risk of 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 presented in this ESMP is based on the Project description as provided in the compliance and amendment report (plus impact assessment). Where the design or operational method is different, this ESMP may require updating and additional assessments may be undertaken.

2 ENVIRONMENTAL MANAGEMENT FRAMEWORK

This ESMP provides measures, guidelines and procedures for managing and mitigating potential environmental impacts and social issues. 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 the construction and operational activities of the Project 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);
- 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 utilisation 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 comply with the ESMP;
- Ensuring that any persons allocated specific environmental responsibilities are notified of their appointment and confirm that their responsibilities are clearly understood;
- 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; and
- 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 the ESMP requirements to ensure compliance are included / incorporated in the Project design and tender documents.
Project manager	– Responsible for ensuring compliance with this ESMP, including overseeing the construction work, daily 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 appointing Project team member to assume these responsibilities; – 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, contractors and their subcontractors participate in a site induction process before commencing work on the Project and maintain an up to date register; – Ensure that best environmental practices are undertaken throughout the Project lifespan; and, – Report any non-compliance or accidents to the regulatory authorities.
Site manager/supervisor	– Appointed to manage the performance of the construction, operational, maintenance and decommissioning activities;

Role	Responsibilities and duties
	– Responsible for implementation and compliance with this ESMP; – Managing the preparation and implementation of method statements or safe operation procedures (SOPs) for certain activities and ensuring that the Environmental manager reviews all method statements/SOPs to ensure that 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.
Environmental manager/ Occupational, 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; – Ensure that bi-annual reports are submitted to MEFT as stipulated in the conditions of the environmental clearance certificate; – Implement all relevant measures to target zero injuries incurred onsite; – Assessing impacts during all phases of the Project; – Ensuring a safe working environment; – Carrying out inductions to employees and or contractors for construction and operations activities; – Advise and instruct Project staff, contractors, sub-contractors on various safety, health and environmental related matters related to project implementation; – Oversee monitoring programs and ensure the implementation thereof; and – Ensuring the ESMP is updated, as and when required.
Employees/contractor employees/subcontractor	– Responsible for being compliant with this ESMP throughout the construction, operational and decommissioning works, in addition to:

Role	Responsibilities and duties
	- 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; and - Implementing any corrective measures as instructed by the Proponent, Project manager and/or Site manager to ensure compliance with the ESMP and safe Project operations.

2.3 CONTRACTORS AND SUBCONTRACTORS

Any contractors (including subcontractors) hired during the construction work, operational phase or decommissioning 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 impacts, to the Site manager; and
- Ensuring appropriate corrective or remedial action is taken to address all environmental impacts and incidents reported by employees and subcontractors.

2.4 EMPLOYMENT

The Proponent, 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 possess the required skills and experience, are considered first for construction and operational 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 (e.g. 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 compliance audit 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. This ESMP will be amended as required and follow up training, awareness or updates will be provided.

Ongoing aspect and hazard identification through the review of the ESMP and supporting management plans and 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; – GHDP equipment and structures to be maintained and serviced regularly; – Refueling at designated locations, where possible; – Ammonia neutralising 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; – Waste bins labelled; – Waste to be segregated onsite; 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; – Equipment and machinery to be maintained and serviced regularly; and – Use environmentally friendly substitutes for chlorofluorocarbons (CFCs), where feasible.
Noise	– Turn off equipment when not in use; – Equipment and machinery to be maintained and serviced regularly; – Construction power tools are only to be used during normal working hours; and – Outside working hours, the noise levels must be limited to the International Financial Corporation (IFC) industrial/commercial noise levels (70 dB(A) decibels during the day and 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 operational phase.

The monitoring program will comprise *inter alia*:

- Noise monitoring (e.g. effect on mammals, employees and noise sensitive receptors (NSRs) nearby);

- Biodiversity monitoring (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 important that personnel are appropriately informed and trained on how to properly implement the ESMP. It is also important that regular communication is 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 COMMUNICATION

Prior to and during all phases of the Project, 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;
- WhatsApp group (or preferred social communication mobile application tool);
- 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 construction and operational teams, including any sub-contractors, 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 and operational phases, communication between the management team shall include discussing any complaints received and actions to resolve them, any inspections, audits, 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 provides the contacts to be contacted 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 by the Site manager or direct complainant, 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 and operational activities impact the environment?
- What can be done to mitigate/manage the 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 in place. 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 Site manager/supervisor or the supervisor’s nominated representative:
 - a. Immediately and without delay;
 - b. Regardless of whether or not injury to personnel has occurred; and
 - c. Property or equipment has been damaged.
- 2) Written up and handed to the Site manager/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 Site 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.

Occupational incidents and accidents incurred by Project staff during construction or operations must be reported to the authorities (i.e. Occupational Safety & Health Department) at the Ministry of Labour, Industrial Relation and Employment Creation (MLIREC), by using form F.5.

Any spill that poses a risk to public or environmental health must be managed and reported to the nearest regional health directorate (Erongo Region) at Ministry of Health and Social Services (MoHSS) in accordance with the Public and Environmental Health Act, 2015 (Act No. 1 of 2015) and related health regulations, under the authority of the Ministry of Health and

Social Services (MoHSS). Additionally, the MEFT:DEAF and MAFWLR:DWA should also be informed.

In case of archaeological objects or heritage artefacts discovered on-site, the chance find procedure (Appendix A) must be followed and the NHC must be informed by the Project manager.

All correspondence and communication with the neighbouring stakeholders such as the Walvis Bay International Airport, Dune 7 Adventures, Namibian Defence Force (NDF) and Walvis Bay Municipality should be undertaken by the Project manager.

6 REPORTING, COMPLIANCE AND ENFORCEMENT

6.1 ENVIRONMENTAL PERFORMANCE MANAGEMENT

The developed management plans for environmental aspects and impacts covering the different Project phases identifies mitigation and monitoring measures, as well as the roles responsible for execution. The Project manager and Site manager will use these management plans 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 Project 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 observations will be undertaken by the Site manager (or nominated Site supervisor). Any environmental problem 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 a HSE representative to ensure that the standards and procedures set out in this ESMP are being complied with and that 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(s) taken and any necessary follow up measures required.

6.3 OPERATIONS: ENVIRONMENTAL INSPECTIONS AND COMPLIANCE MONITORING

Monthly 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(s) 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 with 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(s) 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 shortcomings.

7 MONITORING AND MANAGEMENT PROGRAMMES

7.1 PLANNING AND PRE-CONSTRUCTION PHASE

7.1.1 INTRODUCTION

During the planning and pre-construction phase, a strategic Project plan shall be developed based on the requirements outlined in this ESMP, required resources, permits and labour requirements.

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 associated with the Project are prevented and minimised to the greatest extent possible. Table 4 below presents the key environmental activities and mitigation measures associated with the planning and pre-construction phase of the Project.

Table 4 – Activities, mitigation and management measures associated with the planning and pre-construction phase of the additional Project components

Pre-construction and planning objectives

- The efficient 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	Site preparation and clearance	Fauna disturbance/loss	Limit the development to actual sites designated for construction and avoid affecting adjacent areas.	Project manager/OHSE coordinator
2				Avoid development and associated infrastructure in sensitive areas in the immediate area. This would minimise the negative impacts on the local environment, especially unique features serving as habitat to various vertebrate fauna species.	
3				Minimise areas cleared by ensuring that an early works construction plan or a construction management plan is in place and conveyed to contractors.	
4				Demarcate no-go areas, such as breeding sites.	
5				Educate/inform contractors and staff on protected species to avoid and the consequences of illegal collection of such species.	
6				Implement erosion control.	
Monitoring requirements					
Monthly monitoring.					

Pre-construction and planning objectives					
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.	– Project manager
2				– No open fire outside designated areas.	
3				– Cigarette buds are not to be discarded but should be 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		Risk of spillage of polluting materials and dangerous goods	Health hazard to employees, the surrounding environment and the community	– Relevant permits to be in place for the ammonia production plant and the effluent system.	
7				– Other hazardous chemicals/hydrocarbons are to be stored in bunded areas, that are impermeable and can contain 110% of the largest volume contained therein.	
8				– Training employees and toolbox talks.	
9				– Good housekeeping across the site.	
10				– Spill kits (including ammonia neutraliser kits) to be in designated areas across the site or available for use during refueling, fuel/chemical delivery or use. Absorption material should be available and at hand. Where sawdust is used it	

Pre-construction and planning objectives					
				must be cleaned up immediately and not left for long periods as this poses a fire hazard.	
11				– Should an ammonia leak occur, the area must be evacuated and avoided until all ammonia gas has evaporated.	
12		Health and safety incidences	Potential injury, disease or fatalities of employees, community and environment	– A health, safety and environment management plan must be developed and incorporated in planning the new design of the GHDP.	
13				– Adequate resources to be made available for the implementation and maintenance of the health, safety and environment plan.	
14				– Ensure designated areas for fire extinguishers and fire designs are incorporated in the site plan prior to construction.	
Monitoring requirements					
– Regular checks on fire safety equipment as required. – Monthly hazardous storage monitoring. – Annual monitoring of contaminated soil.					
ID	Aspect	Activity	Impact	Management commitments	Responsibility
1			Groundwater and surface	– Training through toolbox talks and induction.	– OHSE coordinator

Pre-construction and planning objectives					
2	Groundwater and surface water	Incidental hazardous/hydrocarbon spills or leaks	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 and disposed of at the permitted waste disposal site.	
5				- Portable chemical toilets will be provided during the construction phase. They will be routinely cleaned and sewage will be disposed of at a licenced sewage treatment plant. Safe disposal certificates are to be provided.	
6		Inefficient use of water resources	Water shortage	- Ensure compliance with all legal obligations.	
7				- Ensure laydown areas or maintenance workshops are located outside of stormwater catchment areas.	
8				- A 'good housekeeping' policy shall be adopted across the site area.	
Monitoring requirements					
- Daily observations. - Monthly water trends monitoring.					

Pre-construction and planning objectives					
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 general solid waste streams. All waste streams to be removed from site on a monthly 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.					
– Waste removal as required when skip is at capacity.					
ID	Aspect	Activity	Impact	Management commitments	Responsibility
1	Air quality	Dust emissions	Decrease ambient air quality on-site	– Dust suppression measures must be implemented to reduce dust.	– Project manager
2				– Vehicles must adhere to established site specific speed limits to avoid producing excessive dust.	
Monitoring requirements					

Pre-construction and planning objectives

- Daily observations.
- Monthly air quality observations.

ID	Aspect	Activity	Impact	Management commitments	Responsibility
1	Heritage	Pre-construction planning	Loss or damage to potential heritage sites/objects unearthed	– Renew heritage consent from the National Heritage Council (NHC). – NHC shall receive bi-annual updates through a bi-annual report.	– The Proponent

Monitoring requirements

- Obtain heritage consent from NHC.
- Submit progress updates to NHC on a biannual basis.

ID	Aspect	Activity	Impact	Management commitments	Responsibility
1	Health and safety	New additions to the GHDP	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;	– Project manager

Pre-construction and planning objectives					
				○ Any accidents or incidents must immediately be reported to the Project manager; ○ All incidents must be recorded in an incidental register; and ○ 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.	
Monitoring requirements					
– Daily compliance with management commitments. – Conducting an emergency preparedness and response report.					
ID	Aspect	Activity	Impact	Management commitments	Responsibility
1	Community	The construction of the ammonia plant (4 mtpd), electrolyser (alkaline), extension of the solar park and auxiliary systems	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 interested and affected parties (I&APs).	
3				– Appropriately incorporate I&APs consultations, questions and concerns in reporting.	
4				– A complaint register must be kept onsite.	
Monitoring requirements					
– Weekly checks of register. – Bi-annual updates to the community if requested from I&APs.					
ID	Aspect	Activity	Impact	Management commitments	Responsibility

Pre-construction and planning objectives					
1	Socio-economic	Creation of employment	Positive impact on local and regional economy and improved household livelihoods.	- Ensure that local residents are prioritised for job opportunities.	- HR manager
2				- Procurement from local businesses.	- Project manager
Monitoring requirements					
- HR recruitment policies.					
ID	Aspect	Activity	Impact	Management commitments	Responsibility
1	Rehabilitation	Decommissioning activities	Visual nuisance and sense of place	- Develop a rehabilitation plan to ensure the disturbed environment is re-instated to its natural ecological state.	- Project manager
Monitoring requirements					
- Development of a rehabilitation plan and update as necessary.					

7.2 CONSTRUCTION PHASE

7.2.1 INTRODUCTION

As part of the proposed amendment, new infrastructure will be developed within the Project site (as discussed in section 1.2). This section provides construction management and mitigation measures to ensure that construction activities remain compliant with the conditions stipulated in this ESMP throughout the construction phase. These management and mitigation measures are outlined 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 are mitigated, prevented and minimised as far as reasonably practicable, and that statutory requirements and other legal obligations are fulfilled.

Table 5 – Construction activities, management and mitigation measures associated with the construction phase of the additional Project components

Construction objectives					
– The management and control of construction activities. – Prevent and minimise environmental impacts as far as reasonably practicable.					
ID	Aspect	Activity	Impact	Management commitments	Responsibility
1	Terrestrial environment and ecology	Site preparation and clearance	Fauna disturbance/loss	– Limit the development to the actual sites designated for development and avoid affecting adjacent areas.	– Project manager/OHSE coordinator
2				– Initiate a suitable waste removal system as waste often attracts wildlife, which may result in human-wildlife conflict issues.	
3				– Minimise areas cleared by ensuring that an early works construction plan or a construction management plan is in place and conveyed to contractors.	
4				– Demarcate no-go areas, such as breeding sites.	
5				– Educate/inform contractors and staff on protected species to avoid and the consequences of illegal collection of such species.	
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				All 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) should have an internal weed and seed inspection completed prior to equipment being used (Appendix B).	
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. Poaching, trapping, or collection of wildlife is strictly prohibited. Only nuisance, pest, or dangerous animals posing an immediate risk to human safety may be removed by a trained professional.	
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	Adhere 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. - 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.	- Project manager - OHSE coordinator
2				Restrict movements of people to areas of activities only.	
3				No open fire outside designated areas.	

4			- No cigarette buds are to be discarded in open spaces. The cigarette buds are to be discarded in appropriate facilities.
5			- Designate 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/materials	- Relevant permits to be in place for the ammonia production plant.
11			- Maintain a site-specific ammonia spill response and evacuation plan.
12			- Conduct regular emergency response drills, including spill scenarios, evacuation and communication procedures.
13			- Install bunded areas, spill trays and impermeable flooring around ammonia storage tanks.
14			- A HAZOP study should be conducted to inform project designs, proper mitigations and controls.
15			- Spill kits (including ammonia neutraliser kits) to be 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.	
16				– Relevant permits to be in place for storage of potential fuel (diesel and petrol).	
17				– Training employees and toolbox talks.	
18				– Good housekeeping across the site.	
Monitoring requirements					
– Regular checks on fire safety equipment. – Conduct daily visual inspections of the ammonia plant and associated infrastructure. – Maintain a detailed register of all leaks, near misses, spills and corrective actions. – Keep updated records of all checks, repairs and replacements related to ammonia storage and handling systems. – Any major liquid anhydrous ammonia spills (> 200 L) should be reported to the competent authority - (MIME). – All major petroleum product spills (> 200 L) should be reported to MIME on Form PP/11 titled “Reporting of major petroleum product spill”, issued by the ministry. – All major hydrocarbon and wastewater spills (> 200 L) should be reported to MEFT:DEAF and MAFWLR:DWA, respectively.					
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 spills/ effluents	– Develop a training program that include fuels, chemicals handling, storage and spills emergency response plans.	– Project manager – OHSE coordinator
2				– Ensure temporary waste disposal facilities are in place and procedures are developed to be implemented for the off-site safe disposal of hazardous substances.	
3				– Provide portable chemical toilets to the construction workforce should there not be sufficient toilets on site. The toilets are to be routinely cleaned and sewage disposed of at a	

				licensed sewage treatment plant. Disposal certificates are to be kept on file.	
4				- All construction vehicles (4x4 vehicles and trucks) and equipment on site must be equipped with drip trays or oil spill kits: - 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. - 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 authorisation and prior to its entry on site each time.	
5				- All vehicles must be regularly maintained to prevent oil leakages, and the vehicle operator must complete a daily inspection checklist to ensure the vehicle is in good working condition.	
6				- 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 licenced hazardous waste disposal site.	
7				- All such waste must be provided to specialists in the handing and treatment of such materials.	
8				- 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 have leads that can seal. A register will be kept of all hazardous materials.	
9				- Appropriate spill kits. Spills must be cleaned up following the instruction outlined in the material safety data sheet (MSDS) documents.	
10				- Hydrocarbon and chemical liquid waste must be stored correctly and disposed of by registered companies.	

Monitoring requirements

- Daily observations by the OHSE coordinator.
- Monthly water usage and quality 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 deterioration	- Accidental spills and leaks (including absorption material) to be collected and cleaned as soon as possible.	- OHSE coordinator
2				- In the event of spills and leaks, polluted soil must be collected and disposed of at a licenced site.	
3				- Limit the possibility of mixing 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 management	Hazardous and hydrocarbon waste pollution	Waste pollution and degradation of the environment	- The waste management plan must be kept on site during the construction phase.	- Project manager - Contractor employees
2				- Certificates providing details of the safe disposal of waste to a licenced hazardous waste disposal site must be kept on file and provided upon request.	
3				- Maintain waste record book for all discharged 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. In the event of repeated offenses, dismiss depending on the severity of the impact.	
6				- Hazardous waste will be removed and managed by an approved service provider.	
7				- Hazardous and non-hazardous waste shall always be stored separately.	
8				- Safe disposal certificates must be kept on file and provided to the OHSE on request.	
9		General waste	Visual nuisance and degradation	- The site areas must be kept tidy at all times (littering is prohibited).	

10			of the environment	- All domestic and general waste produced daily must be contained.	
11				- No waste may be buried or burned on site.	
12				- No waste dumping is allowed on or around the construction site.	
13				- Waste containers (bins) must be emptied regularly and removed from site to the nearest licenced waste disposal site.	
14				- All recyclable waste must be collected and transported to the nearest waste recycling depot, if available.	
15				- Adequate number of clearly labelled waste containers (bins) for hazardous and domestic/general waste must be provided on site.	
16				- Personnel must be sensitised to dispose of waste in a responsible manner and not to litter.	
17		Littering	Visual nuisance and degradation of the environment	- No littering by workers shall be allowed.	
18				- All litter on and around the site must be picked up and placed in the waste bins provided.	
19				- The site must always be kept tidy and free of litter. All domestic and general waste produced daily must be cleaned and contained daily.	
20				- Waste shall be collected and shall be removed regularly to avoid bad odours.	

Monitoring requirements

- Daily observations.
- Waste removal as required when skip is at capacity.

ID	Aspect	Activity	Impact	Management commitments	Responsibility
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1	Air quality	Dust emissions	Degradation of ambient air quality	– Dust suppression measures must be implemented such as wind barriers and dust screens.	– Project 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 trucks. Limit unnecessary travelling of vehicles on untreated roads and applying dust suppressants on regularly travelled or unpaved sections.	
4				– When trucks are required to use public roads, all mud shall be removed and the material transported must be covered to minimise windblown dust.	
5				– Venting and flaring systems shall be designed and operated to ensure safe dispersion of gases.	
Monitoring requirements					
– Daily observations.					
ID	Aspect	Activity	Impact	Management commitments	Responsibility
1	Climate change	Vehicle emissions	Increase in greenhouse gas (GHG) (e.g. carbon dioxide (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 refuelling 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 to 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	Development of infrastructure	Visual nuisance and altered sense of place	– Engage with the surrounding stakeholders regarding the commencement of construction activities.	– Project manager
2				– Good housekeeping.	
3				– Lighting during closure works shall be minimised to the level required for safety and positioned to avoid light glare or disturbance to nearby receptors.	
Monitoring requirements					
– Daily observations to maintain a neat and tidy environment.					
ID	Aspect	Activity	Impact	Management commitments	Responsibility
1	Noise	Noise pollution during construction	Nuisance to neighbours and stakeholders, business operators.	– Limit noisy activities to daytime hours only, typically 07:00 – 18:00.	– Project manager
2				– Schedule construction activities to prevent multiple high-noise tasks from occurring simultaneously.	

3		Occupational health and safety (hearing loss)	Equipment and machinery shall be maintained in good working order to minimise excessive noise from malfunctioning or poorly maintained assets.
4			A noise complaints register must be kept.
5			As the site or activity is near noise-sensitive receptors (NSRs), 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			Partial enclosures and noise screens only work if used correctly. Noise must face into the enclosure, not out. Avoid placing reflective surfaces such as parked vehicles opposite the open side of noise barriers, as this will reduce their effectiveness.
7			- Equipment must be sited as far away from NSRs as possible. Also: - Machines used intermittently must be shut down during period of no use 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.	
8				– Noise generated by vibrating machinery and equipment with vibrating parts must be reduced using vibration isolation mountings or proper balancing. Ensure sufficient lubrication of equipment and machinery.	
Monitoring requirements					
– The noise levels must be limited to the International Financial Corporation (IFC) industrial/commercial noise levels (70 dB(A) decibels during the day and at night). – Bi-annual environmental noise monitoring. – Annual noise sampling. – Any surveys must be designed and conducted by a trained specialist.					
ID	Aspect	Activity	Impact	Management commitments	Responsibility
1	Heritage	The construction of the ammonia plant (4 mtpd), electrolyser (alkaline), extension of the solar park and installation of auxiliary systems	Loss or damage to heritage sites	– In the unlikely event of a heritage site or archaeological site 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;	– Project manager

				○ Demarcate the site with danger tape; ○ Determine global positioning system (GPS) position if possible; ○ Report findings to foreman; ○ Report findings, site location and actions taken to superintendent; ○ Cease any works 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	Health and safety	The construction of the ammonia plant (4 mtpd), electrolyser (alkaline), extension of the solar park and installation of auxiliary systems	Occupational health and safety of construction workers	- Occupational health and safety policy/plan must be developed, covering: - 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; - 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; and - Occupational health and safety training must be enforced and provided to employees.	– Proponent
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				- Preparation and issuing of a safety document detailing safety and design features to reduce the impacts from fires, explosions and flammable atmospheres to the MHI assessment body at the time of the MHI assessment. This shall include: - o Compliance to statutory laws, applicable codes and standards and world's best practice; - o List of statutory and non-statutory inspections, giving the frequency of inspections; and - o 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.
- Preparing an emergency preparedness and response report.

ID	Aspect	Activity	Impact	Management commitments	Responsibility
1	Community	The construction of the ammonia plant (4 mtpd), electrolyser (alkaline), extension of the solar park and installation of auxiliary systems	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 and stakeholders.	
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.	– Project manager and OHSE coordinator
2				– Line management to discuss topics with teams.	
3				– OHSE staff will be employed by contractor staff to brief staff on their company safety, health and environment (SHE) topics and those of the Proponent.	
4				– Awareness will be distributed by various channels as deemed appropriate.	
5				– Daily site inspections to ensure OHSE requirements are adhered to; ○ OHSE files to be maintained per shift; and ○ Incident reports covering OHSE 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: ○ Explanation of the importance of complying with the ESMP; ○ Discussion of the potential environmental impacts of the construction activities;	

				○ Employees’ roles and responsibilities, including emergency preparedness; ○ Explanation of the mitigation measures that must be implemented when particular work groups carry out their respective activities; and ○ Explanation of the specific mitigation measures within this ESMP, with particular emphasis on provisions that may not be widely understood.	
7				– Improve awareness of ambient air quality and consideration regarding wind speed and direction when undertaking dust generating activities.	
Monitoring requirements					
– Project manager to request attendance registers be completed by all personnel and contractors’ construction crew attending induction, toolbox talks and training sessions – Environmental audits and inspections.					
ID	Aspect	Activity	Impact	Management commitments	Responsibility
1	Socio-economic	Creation of employment	Positive impact on local and regional economy and improved household livelihoods	– Ensure that local residents are prioritised for job opportunities, where applicable.	– HR manager
2				– Procurement of goods, materials and equipment from local suppliers.	– Project manager
Monitoring requirements					
– HR recruitment policies.					

7.3 OPERATIONAL PHASE

7.3.1 INTRODUCTION

Upon completion of the construction phase, the Project will transition into the operational phase. The operational phase entails the continuous production of hydrogen and ammonia using processes designed to minimise fossil fuel consumption, reduce greenhouse gas emissions, promote efficient resource use and environmental protection. This includes the new listed Project activities.

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 impacts. It describes how operational activities will be controlled so that potential environmental and social impacts are prevented and minimised as far as reasonably practicable, and that statutory requirements and other legal obligations are fulfilled. Table 6 below provides the key environmental activities and mitigation measures associated with the operational phase of the Project.

Table 6 – Operational activities, management and mitigation measures associated with the operational phase

Operation 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	Site operations	Fauna disturbance/loss	– Avoid open water bodies or uncovered sumps that may attract wildlife.	– Project manager/OHSE coordinator
2				– Regularly inspect equipment and infrastructure for trapped or injured fauna.	
3				– Maintain a suitable waste removal system as waste often attracts wildlife, which may result in human-wildlife conflict issues.	
4				– Secure all process areas to prevent entry of fauna into hazardous zones.	
5				– Demarcate no-go areas, such as breeding sites.	
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				– Remove invasive alien plant species as soon as they are detected, using appropriate mechanical or chemical methods.	
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. Poaching, trapping, or collection of wildlife is strictly prohibited. Only nuisance, pest, or dangerous animals posing an immediate risk to human safety may be removed by a trained professional.	
11				– Educate/inform staff on protected species to avoid the consequences of illegal collection of such species.	
12		Access roads and entry of vehicles	Possible injury or death of animals	– Adhere 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 operations. – Biodiversity monitoring should be undertaken in line with monitoring programme requirements.					
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. Such records must be kept on file.	– OHSE coordinator / Environmental manager
2				– Restrict movements of onsite employees and visitors to areas of activities only.	
3				– No open fire outside designated areas.	
4				– Cigarette buds are to be discarded appropriately in ashtrays.	
5				– Designate smoking areas.	
6				– Ensure proper fire hazard identification signage is in place 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	- The ammonia production plant must be developed and operated in accordance with applicable international standards, best practice guidelines, and established safety and operational procedures.
11			- Maintain a site-specific ammonia spill response and evacuation plan
12			- Conduct regular emergency response drills, including spill scenarios, evacuation, and communication procedures.
13			- Install bunded areas, spill trays, and impermeable flooring around ammonia storage tanks.
14			- Spill kits (including ammonia neutraliser kits) to be in 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.
15			- Relevant permits to be in place for storage of potential fuel (diesel and petrol) as required. Fuel storage of > 600 L requires a Consumer Installation Certificate and ≥ 30 000 L requires a Petroleum Storage Licence.

16			- Toolbox talks shall be conducted routinely and shall address operational hazards, permit-to-work requirements, confined spaces, hot works and lessons learned from incidents or near-misses.
17			- Maintain good housekeeping across the site.

Monitoring requirements

- Weekly checks on fire hazard equipment.
- Conduct daily visual inspections across all work areas of the ammonia plant.
- Toolbox talks to be conducted monthly and prior to high-risk operational or maintenance activities.
- Maintain a detailed register of all leaks, near misses, spills and corrective actions.
- Keep updated records of all checks, repairs and replacements related to ammonia storage and handling systems.
- Any major liquid anhydrous ammonia spills (> 200 L) should be reported to the competent authority (i.e. MIME).
- All major petroleum product spills (> 200 L) should be reported to MIME on Form PP/11 titled "Reporting of major petroleum product spill", issued by the ministry.
- All major hydrocarbon and wastewater spills (> 200 L) should be reported to MEFT:DEAF and MAFWLR:DWA, respectively.

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 spills/ effluents	- Reverse osmosis system performance shall be monitored regularly, including recovery rates, pressure, membrane integrity and effluent quality.	- OHSE coordinator / Environmental manager
2				- Wastewater generated from reverse osmosis operations shall be included in the overall effluent management system and shall not be discharged directly to the environment without appropriate treatment and authorisation.	
3				- Any chemicals used for reverse osmosis operation and membrane cleaning (e.g. antiscalants, cleaning agents) shall be stored in bunded areas and managed in accordance with chemical handling procedures.	

4				– Ensure temporary waste disposal facilities are in place and procedures are established to be implemented for the off-site safe disposal of hazardous substances.	
5				– Bunding and secondary containment shall be provided around all chemical storage areas, process units and potential pipelines.	
6				– All vehicles must be maintained regularly to prevent oil leakages.	
7				– 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.	
8				– 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.	
9				– All such waste must be provided to specialists in the handing and treatment of such materials.	
10				– 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.	
11				– Appropriate spill kits – refer to MSDS documents.	

12				Hydrocarbon, chemical liquid waste and sewage waste must be stored correctly and disposed of by registered companies.	
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Monitoring requirements

- Daily observations by the OHSE 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.	OHSE coordinator / Environmental manager
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 management		Waste pollution and degradation	The waste management plan must be kept on site at all times.	Project manager

2		Hazardous and hydrocarbon waste pollution	of the environment	- Certificates providing details of the safe disposal of waste from a permitted hazardous waste disposal site must be provided upon request.	- Site manager
3				- Maintain waste record book for all discharges of wastes.	
4				- Waste storage areas shall be regularly inspected and maintained to prevent leaks, spills, odours, or pest attraction.	
5				- Any waste-related incidents or non-conformances shall be recorded, investigated and corrective actions implemented.	
6				- Hazardous and hydrocarbon waste will be removed and managed by an approved service provided.	
7				- Hazardous and non-hazardous waste shall be always stored separately.	
8				- Safe disposal certificates must be kept and provided to the OHSE/ESG manager on request.	
9		General waste	Visual nuisance and degradation of the environment	- The site areas must be kept tidy at all times	
10				- All domestic and general waste produced daily must be contained.	
11				- No waste may be buried or burned on site.	
12				- Waste management practices shall be reviewed periodically to ensure ongoing compliance with legal requirements, best practice and operational changes.	

13				Waste containers (bins) must be emptied regularly and removed from site to the nearest official licenced waste disposal site.	
14				All recyclable waste needs to be taken to the nearest waste recycling depot, if available.	
15				Zero waste to landfill principles must be followed where relevant.	
16				Adequate number of clearly labelled waste containers (bins) for hazardous and domestic/general waste must be provided on site.	
17				Personnel must be sensitised to dispose of waste in a responsible manner and not to litter.	
18		Littering	Visual nuisance and degradation of the environment	No littering by workers shall be allowed.	
19				All litter on and around the GHDP site must be picked up and placed in the waste bins provided.	
20				The site must always be kept tidy and free of litter. All domestic and general waste produced daily must be cleaned and contained daily.	
21				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	Atmospheric emissions	Deterioration of ambient air quality	All process units, storage tanks, pipelines, and transfer systems shall be designed, operated and maintained to minimise atmospheric emissions,	OHSE coordinator /

				including ammonia, hydrogen, nitrogen oxides (NO _x) and particulate matter, where applicable.	Environmental manager
2				– Fugitive emissions shall be controlled through the use of closed systems, appropriate seals, pressure relief systems, and leak detection and repair (LDAR) programmes.	– Site manager
3				– Routine inspections and maintenance of equipment, valves, flanges, compressors, and piping shall be conducted to identify and rectify leaks promptly.	
4				– When trucks need to use public roads, the vehicles must be cleaned of all mud and the material transported must be covered to minimise windblown dust.	
5				– Vehicles and machinery are to be regularly serviced according to the manufacturers' specifications and kept in good working order to minimise exhaust emissions.	
6				– Records of inspections, maintenance, monitoring results, incidents and corrective actions for equipment and vehicles shall be retained on site and reviewed periodically to assess the effectiveness of air quality management measures.	
Monitoring requirements					
– Daily observations. – A hygiene survey shall be conducted on a biennial (every two years) basis. – Complaint register.					
ID	Aspect	Activity	Impact	Management commitments	Responsibility

1	Climate change	Vehicle emissions	Increase in GHG emissions	– Transition vehicle fleets from any potential diesel-powered to hybrid or electric powered vehicles, which have lower carbon emissions.	– The Proponent
2		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	Visual disturbance during operations	Visual nuisance and altered sense of place	– The Proponent shall operate and maintain the facility in a manner that minimises visual intrusion on the surrounding landscape and neighbouring receptors.	– The Proponent – Project manager – Site manager
2				– Good housekeeping practices shall be maintained at all times to prevent clutter, accumulation of waste or deterioration of visible infrastructure.	
3				– Any visually intrusive damage, corrosion or deterioration of buildings and equipment shall be repaired in a timely manner.	
4				– Complaints from stakeholders shall be recorded, investigated and addressed where practicable.	
5				– Lighting during closure works shall be minimised to the level required for safety and positioned to avoid light glare or disturbance to nearby receptors.	

Monitoring requirements

- Daily observations to maintain a neat and tidy environment.

ID	Aspect	Activity	Impact	Management commitments	Responsibility
1	Noise	Noise pollution	Nuisance to neighbours and occupational health and safety issues (hearing loss)	– GHDP shall operate in a manner that minimises noise emissions and disturbance to surrounding receptors as per International Finance Corporation noise levels for industrial areas (i.e.industrial/commercial: 70 dBA during the day and at night at site).	– OHSE coordinator / Environmental manager – Site manager
2				– A noise complaints register must be kept.	
3				– Routine inspection and maintenance of noise-generating equipment shall be undertaken to prevent excessive noise due to wear, damage, or malfunction.	
4				– Employees working in designated high-noise areas shall be provided with appropriate PPE., i.e., ear plugs.	

Monitoring requirements

- Bi-annual environmental noise reporting.
- Any surveys must be designed and conducted by a trained specialist.

ID	Aspect	Activity	Impact	Management commitments	Responsibility
1	Heritage	GHDP operations	Loss or damage to heritage sites	– 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;	– Project manager – Site manager

				○ 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 works in immediate vicinity; ○ Visit the site 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 GIS database for field confirmation by an archaeologist; ○ Inspect site and confirm addition to Project GIS; ○ Advise the 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	Health and safety	GHDP operations	Occupational health and safety of employees	– Occupational health and safety policy/plan must be developed including: ○ Emergency response plan/risk assessment; ○ Competence and training;	– Proponent – Project manager – Site manager

				○ 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; ○ All incidents must be recorded in an incidental register; and ○ 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.	
5				– Compliance with applicable SANS codes, i.e., SANS 10087, SANS 10089, SANS 10108, etc.	
6				– Preparation and issuing of a safety document detailing safety and design features to reduce 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.	
7				– Noting that codes such as IEC 61511 will be used to achieve these requirements.	
Monitoring requirements					
– Daily compliance. – Monthly toolbox talks. – Preparing an emergency preparedness and response report.					
ID	Aspect	Activity	Impact	Management commitments	Responsibility
1	Community	GHDP operations	The probability of complaints/social discomfort or anxiety	– Consult and provide a platform for engagement with I&APs and stakeholders.	– Proponent – Project manager
2				– Appropriately incorporate I&APs consultations (upon request), questions and concerns in reporting.	
3				– A complaints 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	Socio-economic	Employment creation	Positive impact on local community	– Ensure that local residents are prioritised for job opportunities.	– 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
3				– Procurement of goods, spare parts and materials from local suppliers.	
4		Development of the hydrogen academy	Skill development and capacity building	– Contribution to national capacity building, reduce reliance on foreign technical expertise, and support the long-term sustainability of the hydrogen industry in Namibia.	– Proponent
Monitoring requirements					
– HR recruitment policies.					

7.4 DECOMMISSIONING/REHABILITATION PHASE

7.4.1 INTRODUCTION

The decommissioning phase refers to the closure stage once operations have ceased. Decommissioning of the GHDP is not anticipated in the immediate future. At the decommissioning phase, the site will be rehabilitated to a condition similar to its pre-development state, or the existing infrastructure may be repurposed for a similar project. Prior to any decommissioning activities, a detailed assessment will be undertaken to include shutdown procedures, dismantling and alternative uses for materials/systems.

7.4.2 OBJECTIVES

The purpose of this section is to provide a management framework for the management and control of decommissioning activities with environmental aspects and key impacts. 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 and that statutory requirements and other legal obligations are fulfilled. This will ensure that the likelihood of the residual impacts is minimised to the greatest extent possible. The management and mitigation measures to be implemented during the decommissioning phase are provided in (Table 7).

Table 7 – Decommissioning activities, management and mitigation measures associated with the decommissioning phase

Decommissioning objectives					
– The identification of the management commitments during the decommissioning phase. – Prevent and minimise impacts as far as reasonably practicable.					
ID	Aspect	Activity	Impact	Management commitments	Responsibility
1	Terrestrial environment and ecology	Project closure / decommissioning	Fauna disturbance/loss	– Where practicable, decommissioning activities shall be scheduled to avoid sensitive periods for fauna, such as breeding or nesting seasons.	– Project manager/OHSE coordinator
2				– Disturbed areas shall be rehabilitated progressively following decommissioning, using indigenous or locally sourced plant species where feasible.	
3				– Regularly inspect equipment and infrastructure for trapped or injured fauna.	
4				– Maintain a suitable waste removal system as waste often attracts wildlife, which may result in human-wildlife conflict issues.	
5				– Secure all process areas to prevent entry of fauna into hazardous zones.	
6				– Educate/inform contractors and staff on protected species to avoid and the consequences of illegal collection of such species.	
7			Increase in invasive alien species	– All decommissioning equipment and vehicles shall be inspected and, where necessary, cleaned prior to entering and leaving the site to prevent the transfer of seeds or plant materials.	

8				– Alien invasive plant species identified on site shall be controlled or removed using appropriate mechanical methods.	
9		Poaching	Loss of flora and fauna	– No plants, animals or birds may be collected, caught, consumed or removed from the site by personnel on site.	
10				– Educate/inform staff on protected species to avoid and the consequences of illegal collection of such species.	
11		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

- Flora and fauna management measures shall be reviewed and updated as required throughout the decommissioning phase.
- Post-decommissioning monitoring shall be undertaken.

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.	– OHSE coordinator / Environmental manager
2				– Restrict movements of people to areas of activities only.	
3				– No open fire outside designated areas.	
4				– Cigarette buds are to be ashtray.	
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	Risk of spillage of hydrocarbons, chemicals or other dangerous goods/material			- Control and reduce the potential risk of fire by segregating and safe temporary storage of materials during decommissioning.	
8				- Avoid potential sources of ignition by prohibiting smoking in and around facilities.	
9				- Firefighting equipment must always be at designated areas during decommissioning.	
10				- All hydrocarbons, chemicals, fuels, oils, and hazardous materials shall be identified, removed, and handled in accordance with approved decommissioning and waste management plans.	
11				- Remaining chemicals and hazardous materials shall be drained, isolated and removed from the plant.	
12				- Refuelling, maintenance, and dismantling activities shall be undertaken in designated areas to minimise the risk of spills.	
13				- Spill kits (including ammonia neutraliser kits) to be 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.	
14				- All spill incidents shall be recorded, investigated and corrective actions implemented to prevent recurrence.	

15				Only licenced and approved contractors shall be used for the transport, treatment and disposal of hazardous wastes.	
Monitoring requirements					
- Weekly checks on fire safety equipment. - Maintain a detailed register of all leaks, near misses and spills, including corrective actions. - Any major liquid anhydrous ammonia spills (> 200 L) should be reported to the competent authority - (MIME). - All major petroleum product spills (> 200 L) should be reported to MIME on Form PP/11 titled "Reporting of major petroleum product spill", issued by the ministry. - All major hydrocarbon and wastewater spills (> 200 L) should be reported to MEFT:DEAF and MAFWLR:DWA, respectively.					
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 spills/ effluents	All remaining wastewater, effluents and process residues shall be identified, collected, treated, and disposed of in accordance with the effluent discharge licence issued by the Ministry of Agriculture, Fisheries, Water and Land Reform (MAFWLR): Department of Water Affairs (DWA).	- OHSE coordinator / Environmental manager - Project manager
2				Tanks, pipelines and supporting systems shall be fully drained, flushed and cleaned prior to dismantling or removal.	
3				Temporary wastewater handling and storage areas shall be appropriately lined, bunded and managed to prevent leaks or uncontrolled discharges.	
4				A decommissioning plan shall be developed to avoid unnecessary disturbance near watercourses, drainage lines or sensitive hydrological features.	

5				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 licenced hazardous waste disposal.	
6				Spill prevention and response measures, including spill kits and trained personnel shall be implemented throughout decommissioning.	
7				Any spills, leaks, or effluent releases shall be contained and cleaned up immediately and contaminated soils or materials shall be removed and disposed of at licenced facilities.	
Monitoring requirements					
- Following decommissioning, groundwater and surface water monitoring shall be conducted at previously established monitoring points to confirm that no residual contamination remains. - Monitoring results shall be compared to baseline conditions and any identified impacts shall trigger remediation actions.					
ID	Aspect	Activity	Impact	Management commitments	Responsibility
1	Soil	Wastewater/chemical pollution	Soil quality contamination	Areas affected by spills, contamination, or chemical residues shall be identified and remediated prior to revegetation.	- OHSE coordinator / Environmental manager - Project manager
2				Slopes, drainage lines, and other sensitive areas shall be stabilised to prevent erosion, sedimentation or surface runoff impacts.	
3				The progress and success of rehabilitation shall be monitored periodically, with corrective actions implemented as required.	

4				Records of rehabilitation activities, including soil handling, contamination remediation, plantings and monitoring shall be maintained and made available to MEFT as part of closure plan reporting.	
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 - Annual soil monitoring/rehabilitation					
ID	Aspect	Activity	Impact	Management commitments	Responsibility
1	Waste management	Hazardous waste pollution	Waste pollution and degradation of the environment	The waste management plan must be adhered to.	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				Waste storage areas shall be regularly inspected and maintained to prevent leaks, spills, odours, or pest attraction.	
5				Any waste-related incidents or non-conformances shall be recorded, investigated, and corrective actions implemented.	
6				Hazardous waste will be removed and managed by an approved service provided.	

7				- Hazardous and non-hazardous waste shall be always stored separately.	
8				- Safe disposal certificates must be kept and provided to the OHSE/ESG manager on request.	
9		General waste	Waste pollution and degradation of the environment	- The site area must be kept tidy at all times.	
10				- All domestic and general waste produced daily must be contained.	
11				- No waste may be buried or burned on site.	
12				- Waste management practices shall be reviewed periodically to ensure ongoing compliance with legal requirements, best practice, and operational changes.	
13				- Waste containers (bins) must be emptied regularly and removed from site to the nearest official licenced waste disposal site.	
14				- All recyclable waste needs to be taken to the nearest waste recycling depot, if available.	
15				- Zero waste to landfill principles must be followed where relevant.	
16				- Adequate number of labelled waste containers (bins) for hazardous and domestic/general waste must be provided on site.	
17				- Personnel must be sensitised to dispose of waste in a responsible manner and not to litter.	
18		Littering	Visual nuisance and degradation	- No littering by workers shall be allowed.	
19				- All litter on and around the GHDP site must be picked up and placed in the waste bins provided.	

20			of the environment	The site must always be kept tidy and free of litter. All domestic and general waste produced daily must be cleaned and contained daily.	
21				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	Atmospheric emissions	Alteration of ambient air quality	Vehicles and machinery are to be regularly serviced according to the manufacturers' specifications and kept in good working order to minimise exhaust emissions.	- OHSE coordinator / Environmental manager - Project manager

Monitoring requirements

- Daily observations.
- Monthly air quality monitoring shall be undertaken to verify compliance with applicable occupational exposure limits.

ID	Aspect	Activity	Impact	Management commitments	Responsibility
1	Climate change	Vehicle emissions	Increase in GHG emissions	Transition vehicle fleets from any potential diesel-powered to hybrid or electric powered vehicles, which have lower carbon emissions.	The Proponent

Monitoring requirements

- Optimise global efforts to mitigate climate change.

ID	Aspect	Activity	Impact	Management commitments	Responsibility
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1	Visual	Visual disturbance during closure	Visual nuisance and sense of place	– All dismantling and demolition activities shall be planned and managed to avoid unnecessary clutter, debris, and visual intrusion.	– The Proponent – Project manager
2				– Temporary structures, equipment, and materials shall be kept tidy and removed promptly when no longer required.	
3				– Any visually prominent damage, such as corrosion, soil exposure, or spoil piles, shall be rectified or rehabilitated as part of the closure activities.	
4				– Stakeholder complaints regarding visual disturbance shall be recorded, investigated, and addressed where practicable.	
5				– Lighting during closure works shall be minimised to the level required for safety and positioned to avoid light glare or disturbance to nearby receptors.	
Monitoring requirements					
– Daily observations to maintain a neat and tidy environment. – Post-closure inspections as per the closure plan shall verify that the site has been rehabilitated, visual impacts are minimised, and the area is restored to a stable and acceptable visual condition.					
ID	Aspect	Activity	Impact	Management commitments	Responsibility
1	Noise	Noise pollution	Cause nuisance to neighbours and affect occupational health and safety	– Minimise noise emissions and disturbance to surrounding receptors as per IFC noise levels for industrial areas (i.e., industrial: 70 dBA during the day and at night).	– OHSE coordinator / Environmental manager
2			(hearing loss)	– Noise-generating activities such as demolition, dismantling, heavy vehicle movements and	– Project manager

				equipment operation shall be scheduled to avoid sensitive periods (e.g., nighttime, breeding seasons) where practicable.	
3				– Equipment and machinery shall be maintained in good working order to minimise excessive noise from malfunctioning or poorly maintained assets.	
4				– Temporary noise barriers, enclosures or mufflers shall be used where necessary to reduce noise emissions from high-impact activities.	
5				– Complaints or incidents related to noise shall be recorded, investigated and corrective actions implemented promptly.	
Monitoring requirements					
– The noise levels must be limited to the International Financial Corporation (IFC) industrial/commercial noise levels (70 dB(A) decibels during the day and at night). – Any surveys must be designed and conducted by a trained specialist.					
ID	Aspect	Activity	Impact	Management commitments	Responsibility
1	Heritage	Project decommissioning	Loss or damage to heritage sites	– In the unlikely event of a heritage site or archaeological site to be uncovered or discovered during the decommissioning phase, 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;	– Project manager

				○ Report findings, site location and actions taken to superintendent; ○ Cease any works in immediate vicinity; ○ Visit the site 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 GIS database for field confirmation by an archaeologist; ○ Inspect site and confirm addition to Project GIS; ○ Advise the 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	Health and safety	Project decommissioning	Occupational health and safety of employees	– Occupational health and safety policy/plan must be updated including: ○ Emergency response plan/risk assessment ○ Competence and training; ○ Use of appropriate PPE; ○ Complying with SOP;	– Proponent – Project manager

				○ 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; ○ All incidents must be recorded in an incidental register; and ○ 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.
Monitoring requirements						
– Daily compliance. – Monthly toolbox talks.						
ID	Aspect	Activity	Impact	Management commitments	Responsibility	
1	Community	Project decommissioning	Likelihood of complaints/social discomfort or anxiety	– Consult and provide a platform for engagement with I&APs and stakeholders	– Proponent	
2				– Appropriately incorporate I&APs consultations, questions and concerns in reporting.		
3				– A complaint register must be kept on site.		
Monitoring requirements						

– Weekly checks of register.					
ID	Aspect	Activity	Impact	Management commitments	Responsibility
1	Socio-economic	Employment creation	Positive impact on local community and household livelihoods	– Ensure that local residents are prioritised for job opportunities where 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 February 2026.
- 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 identification tape,
- c) Determine GPS position if possible, and
- d) Report findings to Site supervisor or manager.

Action by Site supervisor or manager:

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

Action by Project manager:

- 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.

APPENDIX B – WEED AND SEED INSPECTION FORM