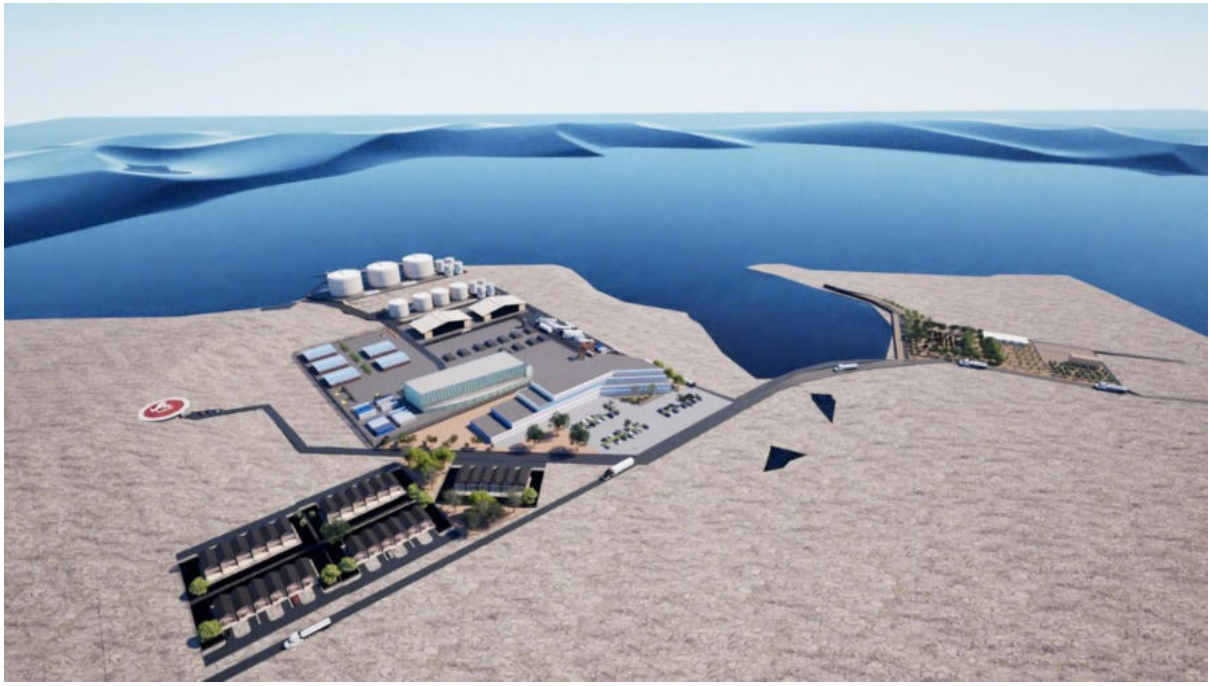
Environmental Management Plan (EMP)

Oil and Gas Logistics Hub – Lüderitz, Namibia



Report Compiled for:

Kizomba Integrated Logistics (Pty) Ltd

P O Box

Email Address: kkangueehi0@gmail.com

Application number:

Compiled by: **Augite Environmental Consulting**

909 City Street, Windhoek

Cell number: +264 817069027

Project Details:

The Environmental Management Plan for the Oil and Gas Logistics Hub in Luderitz, Karas Region

Environmental Management Practitioners

Name of representative of the EAP	***Education Qualifications***
Kaukurauee Ismael Kangueehi	***PhD, MSc, and BSc in Environmental Geochemistry***

Client

Name	***Position/Role***	***Address***
Kizomba Integrated Logistics (Pty) Ltd	***Kizomba Integrated Logistics (Pty) Ltd (Proponent)***	P O Box 26783, Windhoek

List of Abbreviations

- **CBD** – Convention on Biological Diversity
- **DEA** – Department of Environmental Affairs (now Directorate of Environmental Affairs under MEFT)
- **ECC** – Environmental Clearance Certificate
- **EIA** – Environmental Impact Assessment
- **EMP** – Environmental Management Plan
- **ECO** – Environmental Control Officer
- **ERT** – Emergency Response Team
- **ERP** – Emergency Response Plan
- **HSE** – Health, Safety and Environment
- **IAAP** – Interested and Affected Party
- **IFC** – International Finance Corporation
- **IUCN** – International Union for Conservation of Nature
- **MARPOL** – International Convention for the Prevention of Pollution from Ships
- **MEFT** – Ministry of Environment, Forestry and Tourism
- **MFMR** – Ministry of Fisheries and Marine Resources
- **MME** – Ministry of Mines and Energy
- **MOLIREC** – Ministry of Labour, Industrial Relations and Employment Creation
- **NAMPORT** – Namibian Ports Authority
- **NHC** – National Heritage Council
- **OSHA** – Occupational Safety and Health Administration
- **SEA** – Strategic Environmental Assessment
- **SME** – Small and Medium Enterprise
- **ToR** – Terms of Reference
- **UNEP** – United Nations Environment Programme
- **WHO** – World Health Organization

Table of Contents

List of Abbreviations 3
1. Introduction 7
Purpose of the EMP 7
Reasons for Conducting an EMP 7
Legal Compliance 7
Risk Management 8
1. Operational Guidance 8
2. Stakeholder Assurance 8
3. Adaptive Management 8
4. Sustainability and Legacy 8
2. Objectives of the Environmental Management Plan (EMP) 9
2.1 Guiding Principles 9
2.2 Practical Objectives 9
2.3 Alignment with Sustainability Goals 11
3. Legal and Institutional Framework 14
3.1 Environmental Management Act (No. 7 of 2007) and EIA Regulations (2012) 14
3.2 Marine Pollution (Control and Civil Liability) Act (No. 6 of 1981) 14
3.3 Water Act (No. 54 of 1956) and Water Resources Management Act (No. 11 of 2013) 15
3.4 Labour Act (No. 11 of 2007) 15
3.5 Public and Environmental Health Act (No. 1 of 2015) 15
3.6 National Heritage Act (No. 27 of 2004) 16
3.7 Petroleum (Exploration and Production) Act (No. 2 of 1991) 16
3.8 International Conventions and Standards 16
3.9 Institutional Responsibilities 16
4. Environmental Management Actions 20
4.1 Marine Environment 20
4.2 Terrestrial Environment 20
4.3 Socio-Economic Environment 21
4.4 Human Health and Safety 21
5. Rehabilitation and Decommissioning 24
5.1 Progressive Rehabilitation 24
5.2 Decommissioning of Infrastructure 24
5.3 Site Restoration 25
5.4 Social and Economic Transition 25
5.5 Decommissioning Plan and Regulatory Oversight 25

6. Monitoring and Reporting 29
6.1 Purpose of Monitoring 29
6.2 Monitoring Components 29
6.3 Monitoring Frequency 30
6.4 Reporting Requirements 30
6.5 Corrective Action 31
6.6 Independent Auditing 31
7. Emergency Response Plan 35
7.1 Objectives of the ERP 35
7.2 Types of Emergencies Anticipated 35
7.3 Response Structure and Roles 36
7.4 Prevention and Preparedness Measures 36
7.5 Response Procedures 37
7.6 Reporting and Investigation 37
7.7 Continuous Improvement 37
8. Emergency Response Plan (ERP) 38
8.1 ERP Objectives 38
8.2 Risk Identification 39
8.3 Preparedness and Prevention 39
8.4 Response Structure and Roles 40
8.5 Emergency Response Procedures 40
8.6 Communication Protocols 41
8.7 Reporting and Incident Investigation 41
8.8 Continuous Improvement 41
9. Training and Capacity Building 45
9.1 Objectives of Training and Capacity Building 45
9.2 Key Training Areas 45
9.3 Training Approach 46
9.4 Monitoring and Evaluation 46
9.5 Commitment to Local Capacity Building 46
10. Impact Mitigation and Significance Reduction 50
10.1 Marine Environment 50
10.2 Terrestrial Environment 50
10.3 Socio-Economic Environment 51
10.4 Human Health and Safety 51
10.5 Cumulative Impacts 52

10.6 Monitoring and Adaptive Management 52
11. Impact Mitigation and Significance Reduction 55
11.1 Marine Environment 55
11.2 Terrestrial Environment 55
11.3 Socio-Economic Environment 56
11.4 Human Health and Safety 56
11.5 Waste and Hazardous Substances 57
11.6 Cultural Heritage and Scenic Values 57
11.7 Cumulative Impacts 57
11.8 Adaptive Management 57
12. Institutional Responsibilities 58
12.1 Proponent Responsibilities 58
12.2 Environmental Control Officer (ECO) 58
12.3 Contractors and Subcontractors 59
12.4 Regulatory Authorities 59
12.5 Local Government and Community 60
12.6 Independent Auditors 60
13. Conclusion 64
Summary of Key Outcomes 64
Institutional Accountability 64
Adaptive Management and Continuous Improvement 64
Contribution to National and Regional Goals 65
Final Statement 65

List of Tables

Table 1. Objectives Matrix – Oil and Gas Logistics Hub, Lüderitz 12
Table 2. Legal Compliance Matrix 18
Table 3. Management Actions Matrix – Oil and Gas Logistics Hub, Lüderitz 22
Table 4. Rehabilitation and Decommissioning Matrix (Colour-Coded) 27
Table 5. Monitoring and Reporting Matrix – Oil and Gas Logistics Hub, Lüderitz 33
Table 6. Emergency Preparedness & Response Matrix – Oil and Gas Logistics Hub, Lüderitz 42
Table 7. Training and Capacity Building Matrix – Oil and Gas Logistics Hub, Lüderitz. 48
Table 8. Impact Significance Reduction Matrix – Oil and Gas Logistics Hub, Lüderitz. 53
Table 9. Institutional Responsibility Matrix – Oil and Gas Logistics Hub, Lüderitz 61

1. Introduction

The proposed Oil and Gas Logistics Hub in Lüderitz, Namibia, is a major development that will transform the town into a critical base for offshore oil and gas operations. The project involves dredging of approximately 1 million cubic metres of sediment, the construction of a 600-metre quay wall, and the development of supporting facilities such as fabrication workshops, warehouses, fuel and chemical storage areas, heavy equipment yards, and staff housing. With a capital cost estimated at USD 100 million, this project is anticipated to create around 500 direct jobs and over 5,000 indirect jobs, while generating an annual turnover of approximately USD 50 million.

While the economic and strategic benefits of the project are significant, it will also introduce potential environmental and social risks that need to be carefully managed. Lüderitz is an ecologically sensitive area, hosting diverse marine life—including fish stocks, seals, and penguins—as well as fragile desert landscapes, heritage resources, and a socio-economic environment that relies heavily on fisheries and tourism. The development of an Environmental Management Plan (EMP) is therefore critical to balance economic growth with environmental stewardship and social responsibility.

Purpose of the EMP

The EMP provides a structured framework for ensuring that environmental and social impacts identified during the scoping study and Environmental Impact Assessment (EIA) are managed throughout the construction, operation, and eventual decommissioning of the project. It translates high-level mitigation strategies into practical, implementable actions for contractors, operators, and regulators.

Reasons for Conducting an EMP

Legal Compliance

Namibia's Environmental Management Act (No. 7 of 2007) and associated regulations require all listed projects to have a clear environmental management strategy. The EMP ensures compliance with national legislation, as well as relevant international standards such

as MARPOL for marine pollution and IFC/World Bank guidelines for occupational and community health and safety.

Risk Management

The project involves high-risk activities such as dredging, hydrocarbon storage, and chemical handling. An EMP provides the risk control measures necessary to prevent, mitigate, and respond to accidents, spills, and other environmental or social incidents.

1. Operational Guidance

   The EMP is a tool for day-to-day management. It provides contractors, project managers, and environmental control officers with clear instructions on monitoring, mitigation, and reporting, ensuring environmental and social safeguards are integrated into routine operations.

2. Stakeholder Assurance

   The EMP demonstrates to stakeholders—including the Lüderitz community, fisheries, tourism operators, and government authorities—that the project will be implemented responsibly, with commitments to minimise harm and maximise benefits.

3. Adaptive Management

   Environmental and social conditions may change over time, particularly with cumulative pressures from other projects in Lüderitz. The EMP establishes an adaptive management framework that allows for continuous improvement and corrective action based on monitoring results.

4. Sustainability and Legacy

   Beyond compliance, the EMP ensures that the project leaves behind a positive legacy, including rehabilitated landscapes, improved infrastructure, strengthened local capacity, and preserved cultural and natural heritage.

2. Objectives of the Environmental Management Plan (EMP)

The Environmental Management Plan (EMP) for the Oil and Gas Logistics Hub in Lüderitz is designed to ensure that the project is carried out in a manner that protects the environment, safeguards human health, and maximises socio-economic benefits. The objectives of the EMP go beyond regulatory compliance to embed sustainability, accountability, and adaptive management into all phases of the project.

2.1 Guiding Principles

The EMP is guided by the following principles:

- Prevention over Cure: Avoid impacts where possible, rather than relying on remediation.
- Precautionary Approach: Where scientific uncertainty exists, adopt the option that causes the least harm to the environment.
- Sustainability: Balance economic development with ecological integrity and social equity.
- Transparency: Ensure open and honest communication with stakeholders.
- Accountability: Define clear roles and responsibilities so that all parties are held accountable for environmental performance.
- Continuous Improvement: Use monitoring results to refine and improve mitigation measures over time.

2.2 Practical Objectives

The EMP aims to:

1. Operationalise Mitigation Measures

   Translate the mitigation strategies identified during the scoping study and Environmental Impact Assessment (EIA) into practical, actionable steps for contractors and operators.

2. Define Roles and Responsibilities

   Assign clear responsibilities to the proponent, Environmental Control Officer (ECO), contractors, and regulators to ensure that environmental and social safeguards are effectively implemented.

3. Provide Monitoring Frameworks
   Establish measurable indicators for air quality, water quality, biodiversity, noise, waste, and socio-economic performance, enabling regular monitoring and reporting.

4. Ensure Compliance
   Guarantee adherence to Namibia's Environmental Management Act (2007), sectoral laws, and international conventions such as MARPOL for marine pollution, IFC Performance Standards, and World Bank Group EHS Guidelines.

5. Protect Human Health and Safety
   Integrate occupational health and community safety into all activities, particularly in high-risk areas such as dredging, hydrocarbon handling, and heavy equipment operation.

6. Safeguard Heritage and Culture
   Ensure that archaeological resources, built heritage, and Lüderitz's scenic and cultural identity are respected and protected through proactive management.

7. Promote Socio-Economic Benefits
   Maximise job creation, skills development, and local procurement opportunities, while reducing potential negative impacts on fisheries, tourism, and local infrastructure.

8. Support Stakeholder Engagement
   Provide mechanisms for ongoing consultation, grievance redress, and transparent reporting to affected communities, local councils, and national authorities.

9. Enable Adaptive Management
   Build flexibility into environmental management so that strategies can be revised in response to new data, monitoring outcomes, or stakeholder concerns.

10. Plan for Rehabilitation and Closure
    Ensure that the site can be safely decommissioned at the end of its lifecycle, with progressive rehabilitation and a closure strategy that leaves a positive legacy.

2.3 Alignment with Sustainability Goals

The EMP also seeks to align the project with Namibia's Vision 2030, the Sustainable Development Goals (SDGs), and the country's commitments under the Paris Agreement. In particular, it supports:

- SDG 8 (Decent Work and Economic Growth): through job creation and skills transfer.
- SDG 14 (Life Below Water): by protecting marine ecosystems from dredging and spills.
- SDG 15 (Life on Land): by conserving desert biodiversity and preventing land degradation.
- SDG 11 (Sustainable Cities and Communities): by integrating Lüderitz's urban planning with industrial growth.

Table 1. Objectives Matrix – Oil and Gas Logistics Hub, Lüderitz

Objective	Key Action(s)	Indicator(s)	Responsible Party
Ensure Legal Compliance	Implement measures required under the Environmental Management Act (2007), MARPOL, IFC Standards.	Compliance reports submitted; no fines or violations issued.	Proponent; Environmental Control Officer (ECO).
Operationalise Mitigation Measures	Translate identified mitigation strategies into daily site procedures for construction and operation.	Site inspections show compliance; % of mitigation measures implemented.	ECO; Contractors.
Protect Marine Environment	Monitor turbidity, manage dredging timing, enforce spill prevention and emergency plans.	Weekly water quality results; number of spills/incidents reported.	Marine Specialist; ECO; Contractors.
Safeguard Terrestrial Environment	Limit vegetation clearance, stockpile and reuse topsoil, implement dust suppression.	Area cleared vs. approved footprint; dust monitoring results.	ECO; Contractors.
Promote Human Health & Safety	Implement Occupational Health and Safety Plan, provide PPE, run drills.	Number of accidents/incidents; % of workers trained in OHS.	Health & Safety Officer; Contractors.
Protect Heritage and Cultural Values	Conduct surveys; apply chance finds procedure; engage heritage authorities.	Heritage surveys completed; chance finds reported/resolved.	ECO; National Heritage Council.
Maximise Socio-Economic Benefits	Prioritise local hiring; train workforce; procure from local SMEs.	% of workforce from Lüderitz/ǁKaras; number of SME contracts awarded.	Proponent HR; Procurement Manager.
Stakeholder Engagement	Maintain communication channels; operate grievance mechanism; report quarterly.	Number of stakeholder meetings; grievance register entries resolved.	Proponent; ECO.
Adaptive Management	Regular review of monitoring data; adjust management measures where needed.	Updated EMP revisions; number of corrective actions implemented.	Proponent; ECO; MEFT.

Objective	Key Action(s)	Indicator(s)	Responsible Party
Plan for Rehabilitation & Closure	Implement progressive rehabilitation and prepare closure plan.	Area rehabilitated annually; approved closure plan in place.	Proponent; ECO; Contractors.

3. Legal and Institutional Framework

Environmental management in Namibia is underpinned by a robust legal and institutional framework, which provides the statutory basis for environmental protection, sustainable resource use, occupational health, and heritage conservation. The Oil and Gas Logistics Hub in Lüderitz must comply with the following key legislation, policies, and conventions:

3.1 Environmental Management Act (No. 7 of 2007) and EIA Regulations (2012)

This Act is the cornerstone of Namibia's environmental governance. It requires that all listed activities with potential environmental impacts undergo an Environmental Impact Assessment (EIA) and obtain an Environmental Clearance Certificate (ECC) from the Ministry of Environment, Forestry and Tourism (MEFT). The Act:

- Promotes the sustainable use of natural resources.
- Requires the development of Environmental Management Plans (EMPs).
- Establishes the "polluter pays principle."
- Provides for public participation in decision-making.

The 2012 EIA Regulations set out the procedures for conducting EIAs, including scoping, impact assessment, public consultation, and approval processes.

3.2 Marine Pollution (Control and Civil Liability) Act (No. 6 of 1981)

This Act regulates marine pollution arising from oil spills and other harmful substances discharged into Namibian waters. For the logistics hub, which involves fuel bunkering, hydrocarbon storage, and vessel operations, compliance with this Act is essential. The Act requires:

- Spill prevention measures and contingency planning.
- Liability and compensation mechanisms for pollution damage.
- Alignment with international conventions such as MARPOL.

3.3 Water Act (No. 54 of 1956) and Water Resources Management Act (No. 11 of 2013)

These Acts regulate the abstraction, use, and discharge of water resources in Namibia. Relevant provisions include:

- Control of wastewater and effluent discharges.
- Licensing for water abstraction and boreholes.
- Water quality standards to prevent contamination of marine and freshwater bodies.

For this project, the treatment of wastewater, stormwater management, and effluent discharge into Lüderitz Bay must comply with these Acts.

3.4 Labour Act (No. 11 of 2007)

The Labour Act provides for the safety, health, and welfare of employees. It requires employers to:

- Provide safe working conditions.
- Supply personal protective equipment (PPE).
- Implement accident reporting and compensation procedures.
- Prohibit child labour and unfair practices.

The logistics hub must implement a comprehensive Occupational Health and Safety (OHS) Plan, ensuring compliance with the Act.

3.5 Public and Environmental Health Act (No. 1 of 2015)

This Act focuses on protecting the health of communities from environmental risks. It addresses:

- Control of air and noise pollution.
- Safe management of waste, effluents, and hazardous substances.
- Protection of community health and well-being.

The hub's operations, which involve noise, emissions, and waste generation, must adhere to this Act to prevent negative health outcomes for Lüderitz residents.

3.6 National Heritage Act (No. 27 of 2004)

This Act protects archaeological, paleontological, and cultural heritage resources. It requires:

- Surveys and assessments of heritage sites prior to development.
- A chance finds procedure if artefacts are discovered during construction.
- Engagement with the National Heritage Council for permits and guidance.

Given Lüderitz's cultural and historical significance, this Act is directly relevant.

3.7 Petroleum (Exploration and Production) Act (No. 2 of 1991)

This Act regulates petroleum-related activities, including exploration, production, and associated infrastructure. While the logistics hub is primarily a support facility, compliance is necessary to align with national petroleum laws.

3.8 International Conventions and Standards

- MARPOL Convention: Prevents pollution from ships (oil, chemicals, sewage, garbage). The hub must ensure compliance during bunkering and vessel servicing.
- IFC Performance Standards and World Bank EHS Guidelines: Provide benchmarks for environmental and social risk management, occupational safety, and community engagement.
- Paris Agreement (2015): While Namibia is expanding hydrocarbon logistics, it must also align with commitments to reduce emissions and promote sustainable energy practices.

3.9 Institutional Responsibilities

- MEFT: Oversees EIA, ECC issuance, and EMP compliance.
- MFMR: Regulates fisheries, marine biodiversity, and aquaculture.

- Ministry of Labour, Industrial Relations and Employment Creation: Enforces worker health and safety standards.
- Lüderitz Town Council: Local infrastructure, service provision, and land use planning.
- National Heritage Council: Approval and oversight of heritage protection.
- Namibia Ports Authority (Namport): Regulates port operations and integration with national port systems.

Table 2. Legal Compliance Matrix

Law / Convention	Requirement	Project Obligation	Responsible Party	Monitoring Indicator
Environmental Management Act (No. 7 of 2007) & EIA Regulations (2012)	All listed activities require an Environmental Impact Assessment (EIA) and Environmental Clearance Certificate (ECC). EMP must be implemented.	Obtain ECC prior to construction; implement and update EMP; submit reports to MEFT.	Proponent; Environmental Control Officer (ECO).	ECC obtained and valid; quarterly compliance reports submitted.
Marine Pollution (Control and Civil Liability) Act (No. 6 of 1981)	Prevent and control oil/chemical pollution in Namibian waters; establish liability and response measures.	Develop and implement Oil Spill Contingency Plan; install spill kits and booms; train staff in emergency response.	Proponent; Contractors; Marine Safety Officer.	Spill response drills conducted; number of spills reported; audit of spill equipment.
Water Act (No. 54 of 1956) & Water Resources Management Act (No. 11 of 2013)	Regulate water use, wastewater discharge, and protection of water resources.	Obtain permits for effluent discharge; treat wastewater to acceptable standards; monitor stormwater quality.	Proponent; ECO; Contractors.	Water use licenses valid; effluent monitoring results within legal limits.
Labour Act (No. 11 of 2007)	Ensure safe and healthy working conditions; provide PPE; accident reporting.	Develop and implement OHS Management Plan; provide PPE; train workers; maintain incident log.	Proponent HR; Health & Safety Officer; Contractors.	Number of incidents reported; PPE distribution records; training attendance sheets.
Public and Environmental Health Act (No. 1 of 2015)	Protect public health from pollution, unsafe waste handling, and poor sanitation.	Segregate and dispose of waste safely; manage dust and noise levels; ensure safe	ECO; Waste Manager; Contractors.	Waste disposal records; air and noise monitoring reports;

Law / Convention	Requirement	Project Obligation	Responsible Party	Monitoring Indicator
		worker housing and sanitation.		sanitation inspection logs.
National Heritage Act (No. 27 of 2004)	Protect cultural, archaeological, and paleontological heritage. Apply chance finds procedures.	Conduct heritage surveys; demarcate heritage sites; stop works and notify authorities if artefacts are found.	ECO; Contractors; National Heritage Council.	Heritage survey reports; chance finds register; permits obtained.
Petroleum (Exploration and Production) Act (No. 2 of 1991)	Regulate petroleum-related support facilities and infrastructure.	Ensure fuel storage, transfer, and handling comply with petroleum safety standards.	Proponent; Contractors; Namport liaison.	Fuel handling records; inspection reports; Namport approvals.
MARPOL Convention	Prevent pollution from ships (oil, sewage, garbage, air emissions).	Ensure vessels comply with MARPOL Annexes; designate safe bunkering zones; enforce waste reception facilities.	Marine Safety Officer; Contractors; Namport.	Vessel inspection records; waste reception logs; MARPOL compliance certificates.
IFC Performance Standards & World Bank EHS Guidelines	Manage environmental and social risks to international standards.	Apply IFC standards to labour, community engagement, OHS, pollution prevention.	Proponent; ECO; HSE Manager.	Audit reports; stakeholder engagement records; OHS compliance audits.
Paris Agreement (2015)	Align with commitments to reduce emissions and promote sustainability.	Incorporate energy efficiency measures; monitor GHG emissions; explore renewable energy integration.	Proponent; ECO; Energy Manager.	Annual GHG report; % of renewable energy used; energy audit records.

4. Environmental Management Actions

The following management actions provide the practical framework for addressing potential impacts of the Oil and Gas Logistics Hub in Lüderitz. These actions are designed to guide project proponents, contractors, and environmental control officers in minimising environmental harm and ensuring compliance with Namibian legislation and international best practices.

4.1 Marine Environment

The marine ecosystem is the most sensitive receptor in Lüderitz, particularly given the scale of dredging required to construct the access channel and quay. Dredging activities may increase turbidity, smother benthic organisms, and interfere with marine mammals and seabirds. To manage these risks, a Dredge Management Plan will be implemented. This plan will include turbidity monitoring at defined control points, the use of silt curtains where practical, and the scheduling of dredging activities outside critical fish spawning and migration seasons. Spoil will be disposed of in designated areas that avoid ecologically sensitive habitats. Additionally, the project will maintain a fully resourced Oil Spill Contingency Plan that includes booms, skimmers, and trained personnel capable of rapid response. Collaboration with the Ministry of Fisheries and Marine Resources (MFMR) and local fishing associations will ensure that marine monitoring data is transparent and shared with key stakeholders.

4.2 Terrestrial Environment

The terrestrial environment in Lüderitz consists largely of desert soils and sparse vegetation that is highly vulnerable to disturbance. Vegetation clearance will be restricted strictly to the project footprint, and topsoil will be carefully stockpiled for use in rehabilitation. Dust suppression measures such as water spraying, covering of soil stockpiles, and speed limits on access roads will be employed to reduce airborne particulates, especially given Lüderitz's frequent strong winds. Noise from heavy equipment and construction machinery will be controlled through regular maintenance, silencers, and restrictions on night-time work. Visual impacts, though unavoidable, will be managed by careful placement of infrastructure, using neutral-toned building materials, and implementing landscaping buffers where possible. Heritage protection will form part of terrestrial management, with all ground-disturbing

activities subject to chance-finds procedures and consultation with the National Heritage Council.

4.3 Socio-Economic Environment

The logistics hub will bring significant socio-economic benefits, particularly in terms of job creation, skills transfer, and local business opportunities. However, it also poses risks of overburdening local services such as housing, water supply, health, and education. To maximise positive outcomes, the project will prioritise local employment and procurement, with training programmes to build skills in logistics, marine services, and oil and gas support functions. A transparent recruitment process will reduce tensions arising from labour in-migration. Worker accommodation will be planned in partnership with the Lüderitz Town Council to ensure adequate housing and utilities are available. To mitigate conflicts with fisheries and tourism, ongoing engagement forums will be maintained with affected groups. These will allow issues such as access to fishing grounds and visual changes to the landscape to be discussed and addressed collaboratively. A grievance redress mechanism will also be established to ensure that community concerns are heard and resolved in a timely and transparent manner.

4.4 Human Health and Safety

Human health and safety are of paramount importance in a project involving hydrocarbons, chemicals, heavy equipment, and dredging operations. A comprehensive Occupational Health and Safety (OHS) Management Plan will be implemented, covering construction and operational phases. All workers will undergo induction training, daily toolbox talks, and refresher courses on hazard awareness, safe work practices, and emergency procedures. Personal protective equipment (PPE) will be mandatory and regularly inspected. Hydrocarbon and chemical storage areas will be bunded, monitored for leaks, and equipped with firefighting systems. Emergency preparedness will include spill drills, fire evacuation exercises, and coordination with Lüderitz emergency services. Community safety will also be addressed, with strict traffic management measures to minimise risks to residents from heavy vehicle movements. Transparent reporting of incidents and continuous improvement measures will ensure a high standard of health and safety performance throughout the project lifecycle.

Table 3. Management Actions Matrix – Oil and Gas Logistics Hub, Lüderitz

Action	Objective	Implementation Measure	Monitoring Indicator	Responsible Party
Marine Dredging Control	Prevent excessive turbidity and protect marine life.	Implement Dredge Management Plan; restrict dredging to non-spawning periods; designate spoil disposal areas.	Turbidity readings within limits; number of marine monitoring reports submitted.	Marine Specialist; ECO; Contractors.
Oil Spill Prevention and Response	Avoid and minimise impacts of spills on marine and coastal environments.	Install bunded fuel storage; deploy spill kits and booms; train staff in spill response.	Spill drills conducted; incident log of spills; equipment inspection records.	Marine Safety Officer; ECO; Contractors.
Vegetation and Soil Management	Minimise disturbance to desert vegetation and prevent erosion.	Limit clearance to project footprint; stockpile topsoil for rehabilitation; stabilise disturbed areas.	Area cleared vs. approved footprint; rehabilitation progress reports.	ECO; Site Manager; Contractors.
Dust Suppression	Protect air quality and reduce nuisance to community.	Water spraying; cover stockpiles; enforce speed limits on access roads.	Dust monitoring results; number of complaints recorded.	ECO; Contractors.
Noise Management	Reduce disturbance to residents and wildlife.	Maintain equipment; fit silencers; limit noisy operations to daytime.	Noise monitoring records; complaints register.	ECO; Contractors.
Local Employment and Procurement	Maximise socio-economic benefits for Lüderitz.	Prioritise local hiring; train workers; procure from SMEs.	% of workforce hired locally; number of SME contracts awarded.	Proponent HR; Procurement Manager.

Action	Objective	Implementation Measure	Monitoring Indicator	Responsible Party
Housing and Services Support	Avoid overburdening Lüderitz infrastructure.	Provide worker accommodation; collaborate with Town Council on service upgrades.	Availability of worker housing; municipal engagement reports.	Proponent; Lüderitz Town Council.
Community Engagement	Maintain transparency and resolve grievances.	Hold stakeholder meetings; operate grievance redress system.	Number of meetings held; grievances resolved within timeframe.	Proponent; ECO.
Occupational Health and Safety (OHS)	Ensure safety of workers and contractors.	Conduct inductions; enforce PPE use; implement daily toolbox talks.	Number of incidents; OHS training attendance records; PPE inspection logs.	Health & Safety Officer; Contractors.
Cultural Heritage Protection	Preserve heritage resources during construction.	Conduct surveys; enforce chance finds procedure; liaise with Heritage Council.	Heritage permits obtained; chance finds register updated.	ECO; National Heritage Council.
Waste and Hazardous Materials Management	Prevent pollution from effluent, solid waste, and hydrocarbons.	Segregate waste; contract licensed disposal companies; bund hazardous storage.	Waste tracking records; inspection reports; audit of disposal certificates.	Waste Manager; ECO; Contractors.
Rehabilitation and Closure	Restore site condition after project phases.	Implement progressive rehabilitation; prepare closure plan with authorities.	Area rehabilitated annually; approved closure plan in place.	Proponent; ECO; Contractors.

5. Rehabilitation and Decommissioning

Rehabilitation and decommissioning form an integral part of the project lifecycle. While the Oil and Gas Logistics Hub in Lüderitz is expected to operate for decades, it is essential to plan from the outset for eventual closure, as well as for progressive rehabilitation during construction and operation. This ensures that environmental damage is minimised, long-term liabilities are reduced, and the site can be returned to a safe and stable condition at the end of its operational life.

5.1 Progressive Rehabilitation

Progressive rehabilitation will be undertaken wherever possible to reduce the overall disturbance footprint:

- Soil and Vegetation: Topsoil stripped during construction will be stockpiled, preserved, and later reused to restore cleared areas. Rehabilitation will prioritise the use of indigenous and drought-resistant species suited to Lüderitz's arid conditions.
- Visual Mitigation: Cleared areas not in immediate use will be stabilised and, where practical, re-contoured to blend with the surrounding desert landscape. This will minimise visual scarring of the coastal environment.
- Marine Environment: Where dredging has altered seabed morphology, adaptive management will be applied through monitoring, with the potential use of habitat enhancement techniques (e.g., artificial reef modules) if natural recovery is slow.

5.2 Decommissioning of Infrastructure

At the end of the hub's operational life, all infrastructure that is no longer required will be decommissioned in an environmentally responsible manner:

- Demolition and Removal: Warehouses, workshops, staff accommodations, fuel tanks, pipelines, and quay facilities will be dismantled and safely removed.
- Waste Management: Demolition waste will be sorted into recyclable and non-recyclable fractions, with hazardous materials disposed of through licensed facilities.

- Contaminated Sites: Hydrocarbon and chemical storage areas will be inspected for soil or groundwater contamination. Any contaminated soil will be excavated, treated, or safely disposed of, in line with Namibian regulations and international standards.

5.3 Site Restoration

After decommissioning, the site will be restored to a condition that is safe, stable, and suitable for future land uses:

- Surface Re-contouring: Areas will be re-contoured to natural topography where possible, preventing erosion and reducing dust generation.
- Revegetation: Indigenous vegetation will be reintroduced, with long-term monitoring to assess survival rates and habitat recovery.
- Public Safety: Decommissioned areas will be secured to ensure there are no risks from open excavations, unstable structures, or residual hazardous materials.

5.4 Social and Economic Transition

Decommissioning will also address the social and economic implications of project closure:

- Workforce Transition: A workforce downscaling plan will be implemented, including retraining opportunities and support for alternative livelihoods.
- Community Consultation: Stakeholders, including Lüderitz Town Council, fisheries, and tourism operators, will be engaged early in the decommissioning process to align restoration with local development priorities.
- Legacy Projects: Where possible, infrastructure such as roads, utilities, or buildings may be transferred for alternative community or municipal use.

5.5 Decommissioning Plan and Regulatory Oversight

A detailed Decommissioning Plan will be prepared and approved by MEFT before closure activities commence. The plan will outline the scope of decommissioning, environmental standards to be met, monitoring requirements, and timelines. Independent audits will ensure

compliance with Namibian legislation, and final site handover will only occur once the authorities are satisfied that environmental and safety standards have been achieved.

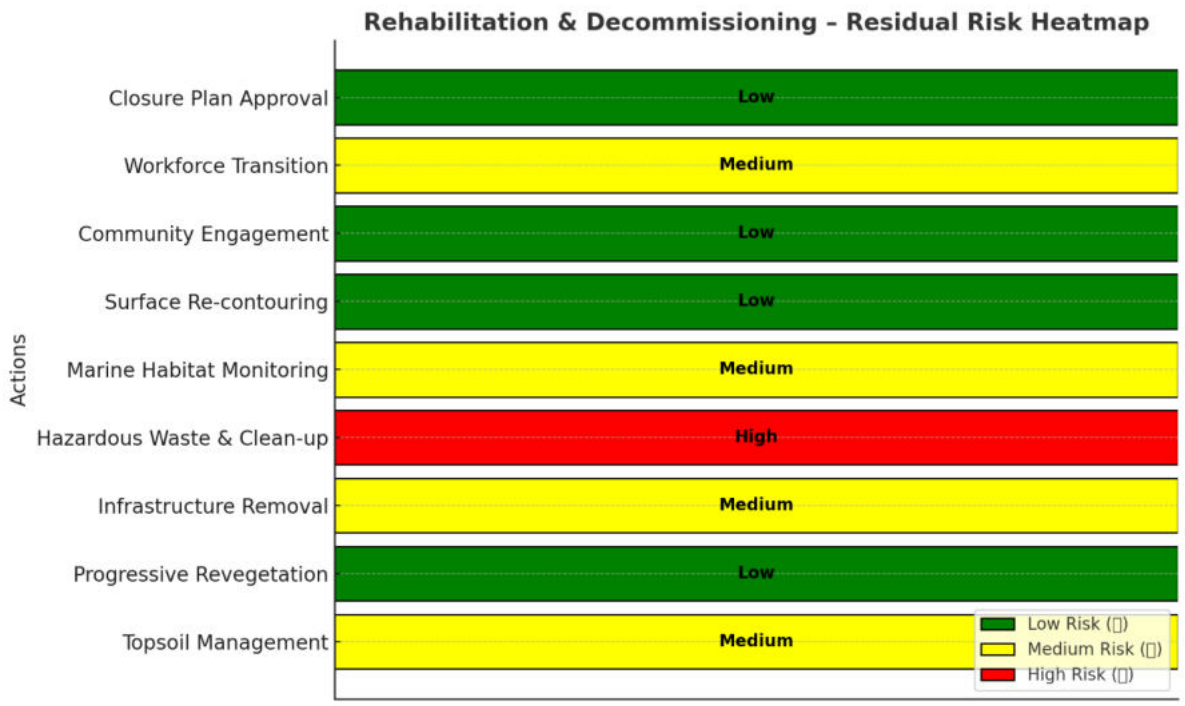


Table 4. Rehabilitation and Decommissioning Matrix (Colour-Coded)

Action	Timing	Implementation	Monitoring	Responsible Party	Residual Risk Significance
Topsoil Management	During construction and progressive rehabilitation.	Strip and stockpile topsoil; store under controlled conditions; reuse in rehabilitation.	Records of soil stockpiling and reuse; inspection of stockpile condition.	ECO; Contractors.	🟧 Medium – risk of erosion and soil loss if not managed.
Progressive Revegetation	Throughout construction and operation where areas are no longer needed.	Plant indigenous, drought-tolerant species; stabilise soils.	Vegetation survival rates; annual rehabilitation progress reports.	ECO; Contractors.	🟩 Low – manageable if monitored.
Infrastructure Removal	At project closure / decommissioning phase.	Dismantle warehouses, tanks, pipelines, staff facilities; remove safely.	Demolition records; waste disposal certificates; audit of cleared areas.	Proponent; ECO; Contractors.	🟧 Medium – potential risks from demolition waste and unsafe removal.
Hazardous Waste & Contamination Clean-up	At decommissioning or sooner if contamination detected.	Inspect hydrocarbon and chemical storage; treat contaminated soils; dispose through licensed facilities.	Soil/groundwater tests; hazardous waste manifests.	ECO; Waste Manager; Proponent.	🟥 High – contamination can cause long-term harm if unmanaged.
Marine Habitat Monitoring	During and after dredging; reassessed at decommissioning.	Conduct benthic surveys; monitor seabed recovery; apply artificial reefs if needed.	Monitoring reports; biodiversity recovery indices.	Marine Specialist; ECO; MFMR.	🟧 Medium – moderate risk to marine ecosystems.

Action	Timing	Implementation	Monitoring	Responsible Party	Residual Risk Significance
Surface Re-contouring	During rehabilitation and final closure.	Re-shape disturbed land; stabilise against erosion.	Site inspection reports; erosion monitoring data.	ECO; Contractors.	🟩 Low – manageable with engineering controls.
Community Engagement on Closure	Prior to decommissioning.	Consult stakeholders on closure and legacy options.	Meeting records; integration of feedback in closure plan.	Proponent; ECO.	🟩 Low – social risks reduced through engagement.
Workforce Transition	During project wind-down and closure phase.	Develop retraining and livelihood programmes; support redeployment.	Number of workers retrained/redeployed; socio-economic reports.	Proponent HR; Local Authorities.	🟧 Medium – risk of unemployment and social tensions.
Closure Plan Approval	Before commencement of decommissioning.	Submit closure plan to MEFT; conduct independent audits.	Approved closure plan; audit reports; ECC for closure phase.	Proponent; MEFT; Independent Auditor.	🟩 Low – regulatory requirement manageable with compliance.

6. Monitoring and Reporting

Monitoring and reporting are essential components of environmental management, ensuring that mitigation measures are effectively implemented, impacts are properly tracked, and corrective action is taken where necessary. This section outlines the monitoring framework, performance indicators, and reporting requirements for the project.

6.1 Purpose of Monitoring

Monitoring serves multiple functions:

- Compliance Verification: To ensure the project adheres to the Environmental Clearance Certificate (ECC), EMP, and relevant Namibian legislation.
- Impact Tracking: To assess whether predicted environmental and social impacts occur as anticipated.
- Early Warning: To detect emerging issues (e.g., spills, turbidity, noise exceedances) before they escalate.
- Performance Evaluation: To measure the effectiveness of mitigation measures and adjust management actions where needed.
- Transparency and Accountability: To provide reliable information to regulators, stakeholders, and affected communities.

6.2 Monitoring Components

Monitoring will be structured across the biophysical, socio-economic, and operational domains:

- Marine Environment:
  Weekly monitoring of turbidity, dissolved oxygen, and potential contaminants during dredging; quarterly marine biodiversity surveys in collaboration with the Ministry of Fisheries and Marine Resources (MFMR).
- Terrestrial Environment:
  Dust and air quality measurements during construction, noise monitoring near residential and sensitive areas, and inspection of vegetation clearance boundaries.

- Waste and Hazardous Substances:
  Tracking of effluent volumes, solid waste segregation and disposal records, hydrocarbon storage inspections, and waste manifest audits.
- Human Health and Safety:
  Incident reporting, accident frequency rates, safety drill records, and occupational exposure monitoring for noise and emissions.
- Socio-Economic Indicators:
  Employment figures (with focus on local hiring), SME procurement records, worker housing audits, and community grievance register updates.

6.3 Monitoring Frequency

- Daily: Site inspections, PPE compliance, dust suppression checks.
- Weekly: Turbidity testing, equipment inspections, and safety toolbox meetings.
- Monthly: Waste management reports, noise monitoring, stakeholder grievance log reviews.
- Quarterly: Biodiversity surveys, socio-economic progress reports, training programme evaluations.
- Annually: Independent environmental audits, greenhouse gas (GHG) emissions assessments, EMP performance review.

6.4 Reporting Requirements

- Internal Reporting: Daily checklists by contractors; weekly summary reports by the Environmental Control Officer (ECO).
- Proponent Reporting: Monthly compliance reports to project management, highlighting incidents, corrective actions, and performance.
- Regulatory Reporting: Quarterly reports to the Ministry of Environment, Forestry and Tourism (MEFT) and relevant authorities (MFMR, Namport, National Heritage Council).

- Stakeholder Communication: Bi-annual community meetings, information fact sheets, and publication of key monitoring results to ensure transparency.

6.5 Corrective Action

If monitoring reveals non-compliance or significant deviations from predicted impacts, the ECO and proponent will:

- Investigate the cause of the issue.
- Implement corrective and preventive actions immediately.
- Document the response in monitoring records.
- Report actions taken to MEFT and affected stakeholders.

6.6 Independent Auditing

Independent third-party audits will be conducted annually to provide objective verification of the project's compliance with its EMP, ECC, and relevant legislation. These audits will also evaluate whether monitoring systems are sufficient and recommend improvements where necessary.

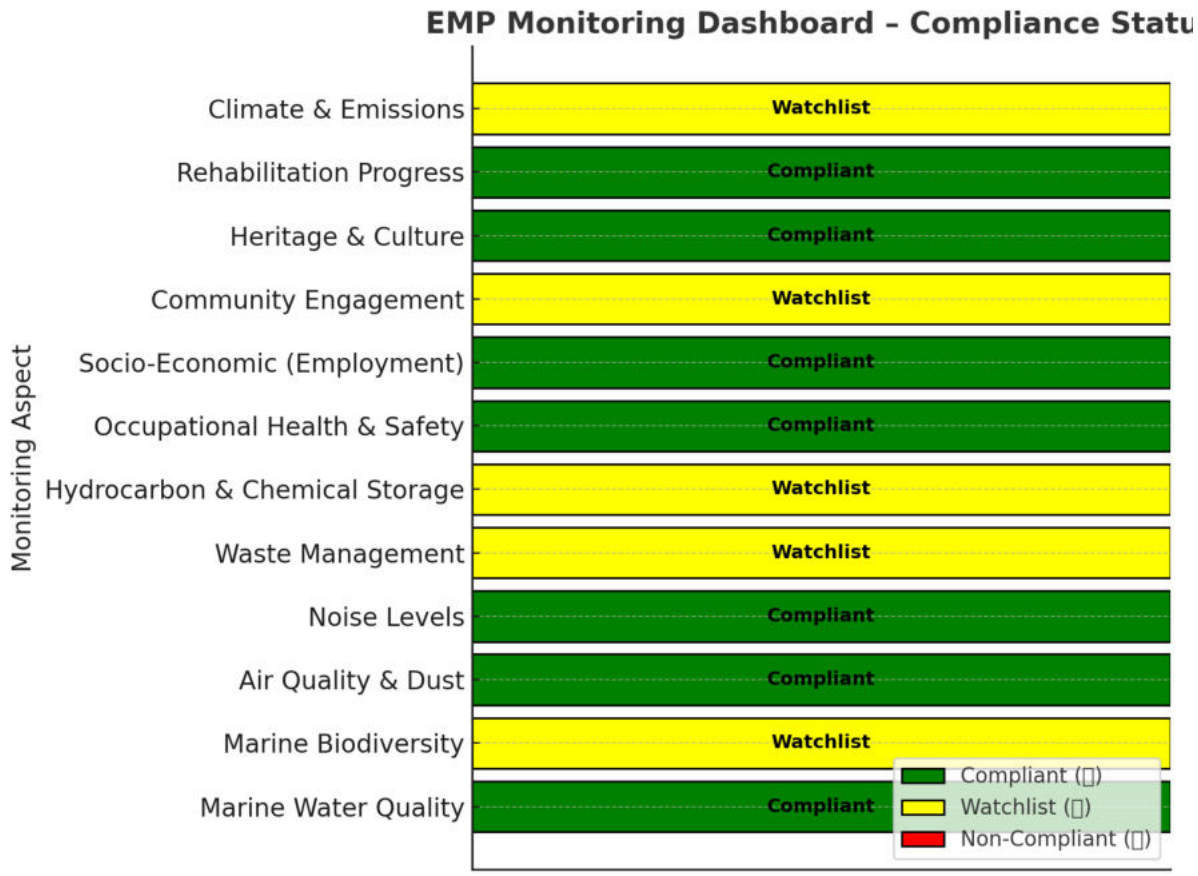

EMP Monitoring Dashboard – Compliance Statu
Monitoring Aspect
Climate & Emissions
Rehabilitation Progress
Heritage & Culture
Community Engagement
Socio-Economic (Employment)
Occupational Health & Safety
Hydrocarbon & Chemical Storage
Waste Management
Noise Levels
Air Quality & Dust
Marine Biodiversity
Marine Water Quality
Watchlist
Compliant
Compliant
Watchlist
Compliant
Compliant
Watchlist
Watchlist
Compliant
Compliant
Watchlist
Compliant
Compliant (□)
Watchlist (□)
Non-Compliant (□)

Table 5. Monitoring and Reporting Matrix – Oil and Gas Logistics Hub, Lüderitz

Aspect	Indicator	Frequency	Method	Responsible Party
Marine Water Quality	Turbidity levels; dissolved oxygen; hydrocarbon presence.	Weekly during dredging; quarterly otherwise.	In-situ turbidity sensors; water sampling and lab analysis.	Marine Specialist; ECO.
Marine Biodiversity	Presence/absence of key species; benthic recovery.	Quarterly surveys; annual review.	Transect dives; catch monitoring; photographic records.	Marine Specialist; MFMR.
Air Quality & Dust	Particulate matter (PM10/PM2.5); visible dust levels.	Weekly; daily spot checks in high wind events.	Air quality monitors; visual inspections.	ECO; Contractors.
Noise Levels	dB levels at site boundary and nearest residences.	Monthly; complaint-triggered checks.	Sound level meter; comparison with legal thresholds.	ECO; Contractors.
Waste Management	Volume of solid, liquid, and hazardous waste; disposal records.	Monthly reporting.	Waste manifests; inspection of storage areas.	Waste Manager; ECO.
Hydrocarbon & Chemical Storage	Integrity of bunds; spill occurrence.	Weekly inspections; after rainfall.	Visual checks; spill log audits.	HSE Officer; ECO.
Occupational Health & Safety	Number of incidents/accidents; PPE compliance.	Daily toolbox talks; monthly summary.	Incident register; inspections; safety audits.	Health & Safety Officer; Contractors.
Socio-Economic (Employment)	% of local workforce; training sessions conducted.	Monthly reporting.	HR records; training attendance logs.	HR Manager; Proponent.
Community Engagement	Number of meetings; grievances recorded/resolved.	Quarterly reporting.	Stakeholder meeting minutes; grievance register.	Proponent; ECO.

Aspect	Indicator	Frequency	Method	Responsible Party
Heritage & Culture	Chance finds reported; permits obtained.	Ongoing during excavation.	Site inspections; chance finds register.	ECO; National Heritage Council.
Rehabilitation Progress	Area rehabilitated; vegetation survival rate.	Annual reporting.	Site surveys; vegetation monitoring plots.	ECO; Contractors.
Climate & Emissions	GHG emissions inventory; fuel/energy use.	Annual reporting.	Energy audits; GHG reporting tools.	Proponent; ECO; Energy Manager.

7. Emergency Response Plan

The Emergency Response Plan (ERP) provides a framework for preventing, preparing for, and responding to accidents, incidents, or natural hazards that could occur during the construction, operation, or decommissioning of the Oil and Gas Logistics Hub. Its aim is to protect workers, surrounding communities, infrastructure, and the environment from harm, while ensuring a coordinated and effective response.

7.1 Objectives of the ERP

- Protect human life and minimise injuries.
- Prevent or reduce damage to the environment, property, and project infrastructure.
- Ensure a rapid, coordinated, and effective response to emergencies.
- Comply with Namibian legislation, including the Labour Act (2007) and Public and Environmental Health Act (2015), and with international standards (e.g., IFC/World Bank EHS Guidelines).
- Provide transparency and accountability to stakeholders and regulatory authorities.

7.2 Types of Emergencies Anticipated

The following emergency scenarios have been identified as relevant to the project:

- Marine Incidents: Oil or chemical spills, vessel collisions, or dredging accidents.
- Fires and Explosions: At hydrocarbon or chemical storage facilities, workshops, or during fuel transfer operations.
- Hazardous Materials Release: Accidental release of chemicals or fuel during storage, handling, or transport.
- Occupational Accidents: Injuries from heavy equipment, falls, or confined space incidents.
- Traffic Incidents: Road accidents involving heavy vehicles transporting fuel, chemicals, or equipment.
- Natural Hazards: Storm surges, strong winds, or flooding events affecting Lüderitz.

- Community Emergencies: Civil unrest, community health outbreaks, or security incidents.

7.3 Response Structure and Roles

A tiered emergency response structure will be maintained:

- Emergency Response Coordinator (ERC): The senior manager with overall responsibility during an emergency.
- Emergency Response Team (ERT): Trained personnel responsible for implementing the ERP, including fire wardens, spill responders, first aiders, and security officers.
- Environmental Control Officer (ECO): Ensures environmental aspects of emergencies are addressed (e.g., spill containment, reporting).
- Contractors: Required to have their own emergency procedures aligned with the project ERP.
- External Agencies: Lüderitz Fire Brigade, hospital, police, Namport, and MEFT will be integrated into emergency planning through formal agreements.

7.4 Prevention and Preparedness Measures

- Training and Drills: Regular training for staff on fire safety, spill response, and evacuation procedures. Mock drills conducted quarterly.
- Equipment and Infrastructure: Fire extinguishers, spill kits, first aid kits, alarms, and emergency lighting installed across the site.
- Communication Systems: Emergency hotlines, radios, alarms, and public address systems established.
- Evacuation Routes: Clearly marked escape routes and muster points identified in site layout plans.
- Mutual Aid Agreements: Coordination protocols established with Lüderitz emergency services.

7.5 Response Procedures

Each emergency type will have tailored response protocols:

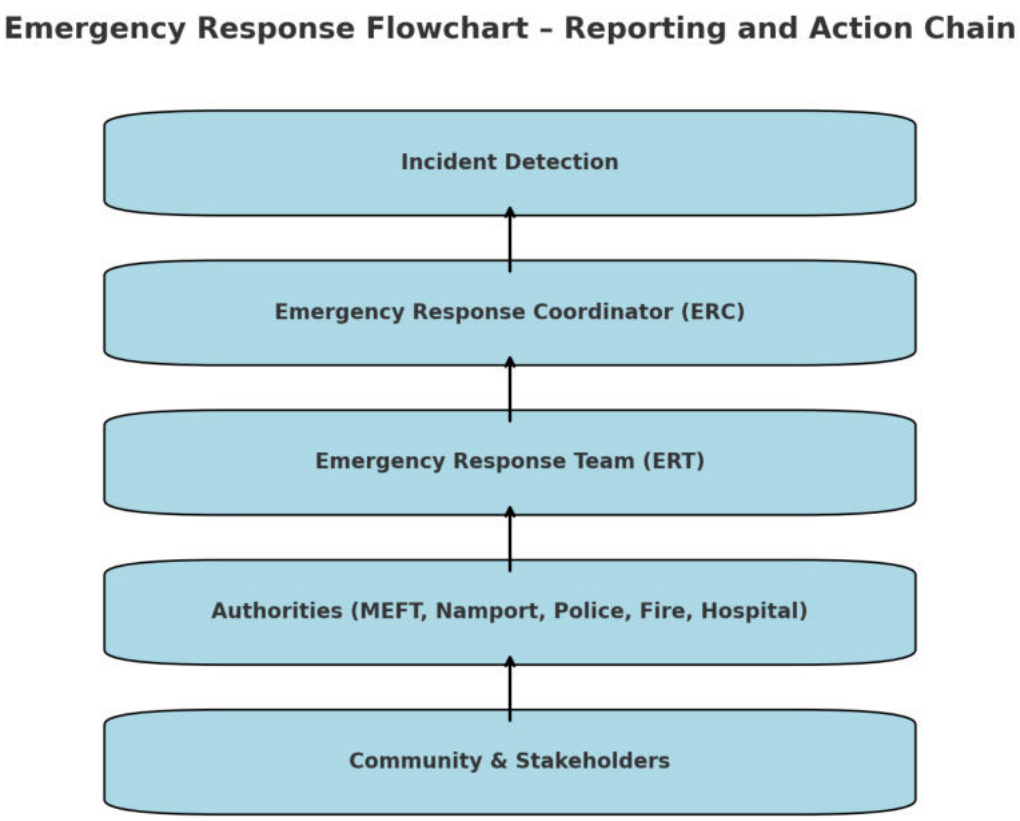
- Spill Response: Deploy booms, skimmers, and absorbents immediately; stop source of leak; notify ERC, ECO, and authorities.
- Fire Response: Raise alarm; evacuate non-essential personnel; fire wardens and trained staff attempt to extinguish using appropriate firefighting equipment; notify fire brigade.
- Medical Emergencies: First aid administered on-site; evacuation to Lüderitz hospital if needed; maintain accident register.
- Traffic Accidents: Secure site; provide medical aid; inform police and relevant authorities; record incident.
- Natural Hazards: Suspend operations; secure equipment; evacuate staff to safe shelters.

7.6 Reporting and Investigation

All emergencies will be documented and reported to the relevant authorities, including MEFT, Namport, and local emergency services. Incident investigations will be carried out within 48 hours, with corrective actions identified and integrated into updated procedures.

7.7 Continuous Improvement

The ERP will be reviewed annually or after major incidents. Lessons learned from drills, real events, and stakeholder feedback will be integrated into updated procedures, ensuring continuous improvement of emergency preparedness and response.



8. Emergency Response Plan (ERP)

The Emergency Response Plan (ERP) is a critical management tool for the Oil and Gas Logistics Hub in Lüderitz. Given the high-risk nature of operations—such as dredging, hydrocarbon storage, vessel traffic, and chemical handling—the ERP is designed to ensure preparedness, rapid response, and recovery from emergencies. It integrates legal compliance, international standards, and best practice into a unified system for protecting people, the environment, and infrastructure.

8.1 ERP Objectives

- Life Safety: Prioritise the protection of workers, contractors, and the local community.
- Environmental Protection: Prevent and contain marine and terrestrial pollution.

- Asset Protection: Safeguard project infrastructure and equipment from damage.
- Continuity of Operations: Minimise downtime and economic disruption.
- Regulatory Compliance: Fulfil obligations under Namibian law and international conventions (Labour Act, Public and Environmental Health Act, MARPOL).
- Community Assurance: Build confidence by demonstrating preparedness and transparency in emergency management.

8.2 Risk Identification

The ERP covers multiple categories of risk:

- Marine incidents: Oil and fuel spills, vessel collisions, dredging accidents.
- Fire and explosion: From fuel storage tanks, chemical warehouses, or vessel bunkering.
- Hazardous material releases: Leaks or spills of chemicals during handling or transfer.
- Occupational accidents: Injuries caused by heavy equipment, confined spaces, slips and falls.
- Traffic accidents: Collisions involving heavy vehicles moving between hub facilities and Lüderitz town.
- Natural hazards: Storm surges, strong winds, flooding, or extreme weather events.
- Community incidents: Civil unrest, medical emergencies, or contagious disease outbreaks.

8.3 Preparedness and Prevention

To ensure readiness, the following measures will be established:

- Emergency Response Teams (ERT): On-site personnel trained in fire-fighting, spill response, first aid, and evacuation procedures.
- Emergency Equipment: Fire extinguishers, hydrants, foam systems, spill booms, absorbents, first aid kits, and communication radios strategically located.

- Evacuation Planning: Clearly marked routes, muster points, and site maps displayed in all work areas.
- Training and Drills: Regular induction sessions for workers, quarterly emergency drills, and annual joint exercises with Lüderitz emergency services.
- Mutual Aid Agreements: Formal arrangements with the Lüderitz Fire Brigade, Police, Hospital, Namport, and MEFT for integrated response.

8.4 Response Structure and Roles

- Emergency Response Coordinator (ERC): Senior manager in charge during incidents; responsible for activating the ERP and coordinating with external agencies.
- Emergency Response Team (ERT): Specialised groups (fire wardens, spill responders, first aiders, security officers) mobilised under ERC direction.
- Environmental Control Officer (ECO): Ensures environmental considerations (spill containment, wildlife protection, reporting to MEFT) are prioritised.
- Contractors: Required to follow site ERP procedures and support coordinated response.
- External Agencies: Local authorities and national institutions provide reinforcement and legal oversight.

8.5 Emergency Response Procedures

- Spill Response: Stop source of spill → deploy booms and absorbents → notify ERC, ECO, and Namport → clean up and record incident.
- Fire and Explosion: Sound alarm → evacuate to muster points → deploy trained fire wardens with extinguishers/foam → call Fire Brigade → report to ERC.
- Medical Emergencies: Provide first aid → notify ERC and health officer → evacuate patient to Lüderitz Hospital if needed → record in accident log.
- Traffic Accidents: Secure site → provide aid → notify Police and ERC → investigate → update corrective measures.

- Natural Hazard Events: Suspend operations → secure critical assets → move staff to safe areas → coordinate with municipal emergency services.

8.6 Communication Protocols

- Internal: Immediate radio or alarm system notification; ERC command centre coordination.
- External: Rapid reporting to MEFT, Namport, MFMR, Police, and other mandated agencies.
- Community Notification: If the incident affects the public (e.g., spills, fire, air pollution), the Town Council and community representatives will be informed promptly.

8.7 Reporting and Incident Investigation

- All emergencies will be documented within 24 hours and reported to relevant authorities within statutory deadlines.
- Root-cause analysis will be carried out by the ECO and Health & Safety Officer.
- Lessons learned will be shared with staff and integrated into ERP revisions.

8.8 Continuous Improvement

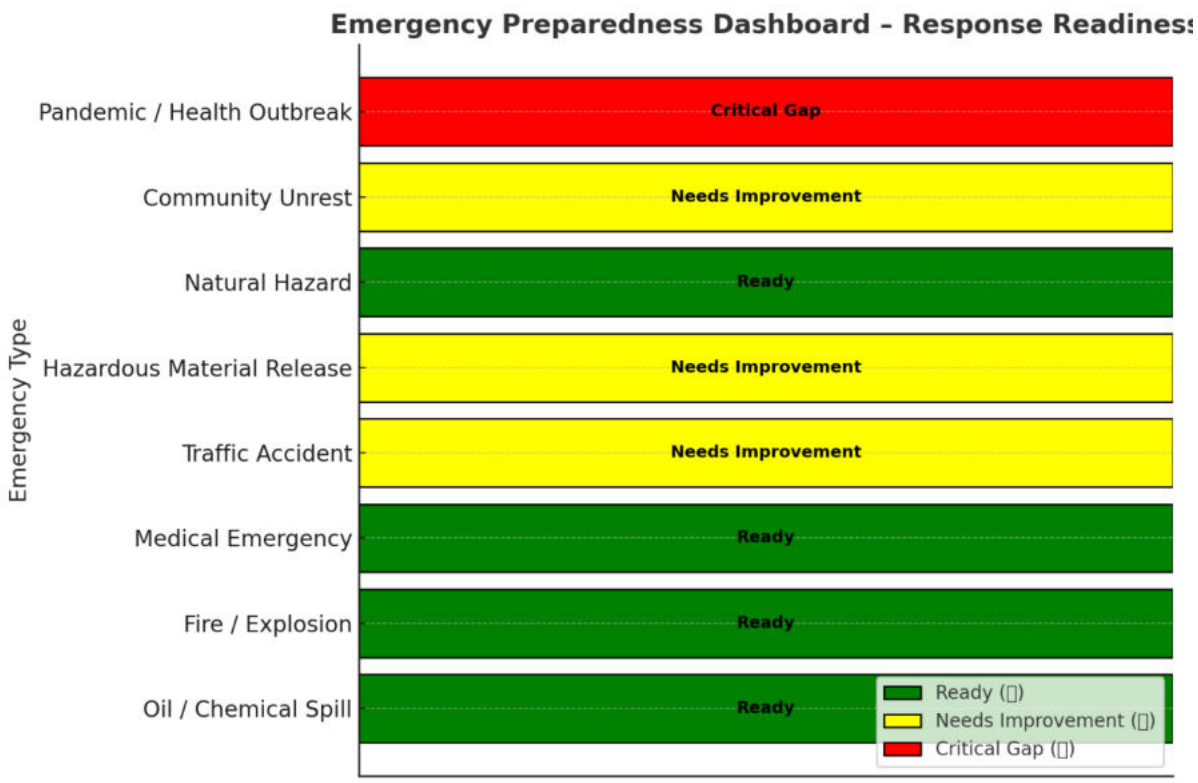
The ERP is a living document and will be:

- Reviewed annually or after any significant incident.
- Updated to incorporate lessons learned, regulatory changes, and stakeholder feedback.
- Audited by independent specialists at least once every two years.

Table 6. Emergency Preparedness & Response Matrix – Oil and Gas Logistics Hub, Lüderitz

Emergency Type	Response Actions	Resources Needed	Responsible Party	Reporting Timeline
Oil / Chemical Spill (Marine or Onshore)	Stop source of leak; deploy spill booms and absorbents; notify ERC and ECO; initiate clean-up; report to authorities.	Spill kits, booms, absorbents, trained spill response team, vessels for containment.	ERC; Spill Response Team; ECO.	Immediate notification; written report within 24 hrs; MEFT/MFMR update within 48 hrs.
Fire / Explosion	Sound alarm; evacuate non-essential staff; deploy fire extinguishers/foam; call Fire Brigade; secure fuel/chemical storage.	Fire extinguishers, foam systems, alarms, PPE, trained fire wardens.	ERC; Fire Wardens; Contractors; Lüderitz Fire Brigade.	Immediate notification; formal incident report within 24 hrs.
Medical Emergency	Provide first aid; call on-site medical officer; evacuate to hospital if required; record in incident register.	First aid kits, ambulance, trained first aiders, emergency contact list.	Health & Safety Officer; ERC; First Aiders.	Immediate medical referral; report to Labour Ministry and MEFT within 48 hrs if severe.
Traffic Accident (On-site or Access Roads)	Secure accident area; provide medical aid; notify ERC, Police, and ECO; investigate and record incident.	First aid kits, traffic cones/barriers, emergency vehicles.	ERC; Health & Safety Officer; Contractors; Namibian Police.	Immediate to Police; written report within 72 hrs.
Hazardous Material Release (Chemical Storage)	Evacuate area; isolate leak; apply containment and neutralisation; notify ECO and ERC; dispose of waste safely.	Chemical PPE, containment kits, ventilation systems, MSDS sheets.	ERC; ECO; Hazardous Materials Team.	Immediate notification; written report within 24 hrs; MEFT follow-up report.
Natural Hazard (Storm Surge,	Suspend operations; secure equipment; move staff to shelters; monitor weather updates.	Weather monitoring systems, shelters,	ERC; Site Manager; ECO; Contractors.	Immediate notification to staff; MEFT update within 5 days.

Emergency Type	Response Actions	Resources Needed	Responsible Party	Reporting Timeline
Flood, Strong Winds)		communication radios, emergency kits.		
Community Unrest / Security Incident	Notify security team; restrict access to site; liaise with Police and community leaders; activate stakeholder communication.	Security personnel, communication channels, liaison officers.	ERC; Security Manager; Lüderitz Police.	Immediate notification; stakeholder briefing within 48 hrs.
Pandemic / Health Outbreak	Enforce hygiene and sanitation protocols; provide PPE and medical screening; reduce workforce exposure.	Sanitation supplies, PPE, medical staff, isolation facilities.	ERC; Health & Safety Officer; Local Health Authority.	Immediate health notification; ongoing weekly reports.


Emergency Preparedness Dashboard – Response Readiness
Emergency Type
Pandemic / Health Outbreak
Community Unrest
Natural Hazard
Hazardous Material Release
Traffic Accident
Medical Emergency
Fire / Explosion
Oil / Chemical Spill
Critical Gap
Needs Improvement
Ready
Needs Improvement
Needs Improvement
Ready
Ready
Ready
Ready (□)
Needs Improvement (□)
Critical Gap (□)

9. Training and Capacity Building

The successful implementation of the Environmental Management Plan (EMP) relies heavily on the competence and awareness of project staff, contractors, and local stakeholders. Training and capacity building are therefore integral to the Oil and Gas Logistics Hub project in Lüderitz, ensuring that all personnel understand their roles and responsibilities in environmental protection, health and safety, and community engagement.

9.1 Objectives of Training and Capacity Building

- Knowledge Transfer: Equip workers and contractors with practical skills to implement mitigation measures effectively.
- Compliance: Ensure adherence to the Environmental Management Act (2007), Labour Act (2007), Public and Environmental Health Act (2015), and international standards (IFC, MARPOL).
- Local Empowerment: Prioritise the recruitment, training, and upskilling of Namibian workers, especially from Lüderitz and the ǁKaras Region.
- Sustainability: Build a workforce capable of maintaining high environmental and safety standards over the project's lifetime and beyond.
- Adaptive Management: Foster a culture of continuous learning, where lessons from monitoring, audits, and stakeholder feedback inform training programmes.

9.2 Key Training Areas

1. Environmental Awareness: General induction on the EMP, environmental sensitivity of Lüderitz Bay, and individual responsibilities.
2. Marine Protection: Training in dredging controls, turbidity monitoring, and oil spill prevention and response.
3. Waste Management: Segregation, storage, transportation, and safe disposal of effluent, solid waste, and hazardous materials.
4. Occupational Health and Safety (OHS): Use of PPE, hazard identification, incident reporting, emergency drills.

5. Emergency Preparedness: Response protocols for spills, fires, explosions, medical emergencies, and natural hazards.
6. Cultural Heritage Awareness: Procedures for chance finds and reporting of archaeological artefacts.
7. Community Engagement: Communication skills, grievance handling, and stakeholder interaction protocols.
8. Skills Development: Technical training for heavy equipment operation, chemical handling, and marine logistics to enhance local capacity.

9.3 Training Approach

- Induction Training: Mandatory for all employees and contractors before commencing work on site.
- Refresher Training: Conducted quarterly to maintain high awareness levels.
- Specialist Training: Targeted sessions for the Emergency Response Team, spill response units, and health & safety officers.
- On-the-Job Training: Skills transfer through mentorship, apprenticeships, and contractor partnerships.
- Community-Oriented Training: Workshops and awareness campaigns for local stakeholders, particularly on safety, employment opportunities, and environmental stewardship.

9.4 Monitoring and Evaluation

- Attendance registers, training certificates, and feedback forms will be maintained.
- Training effectiveness will be evaluated through audits, drills, and monitoring results.
- Annual reviews will update training content based on emerging risks and lessons learned.

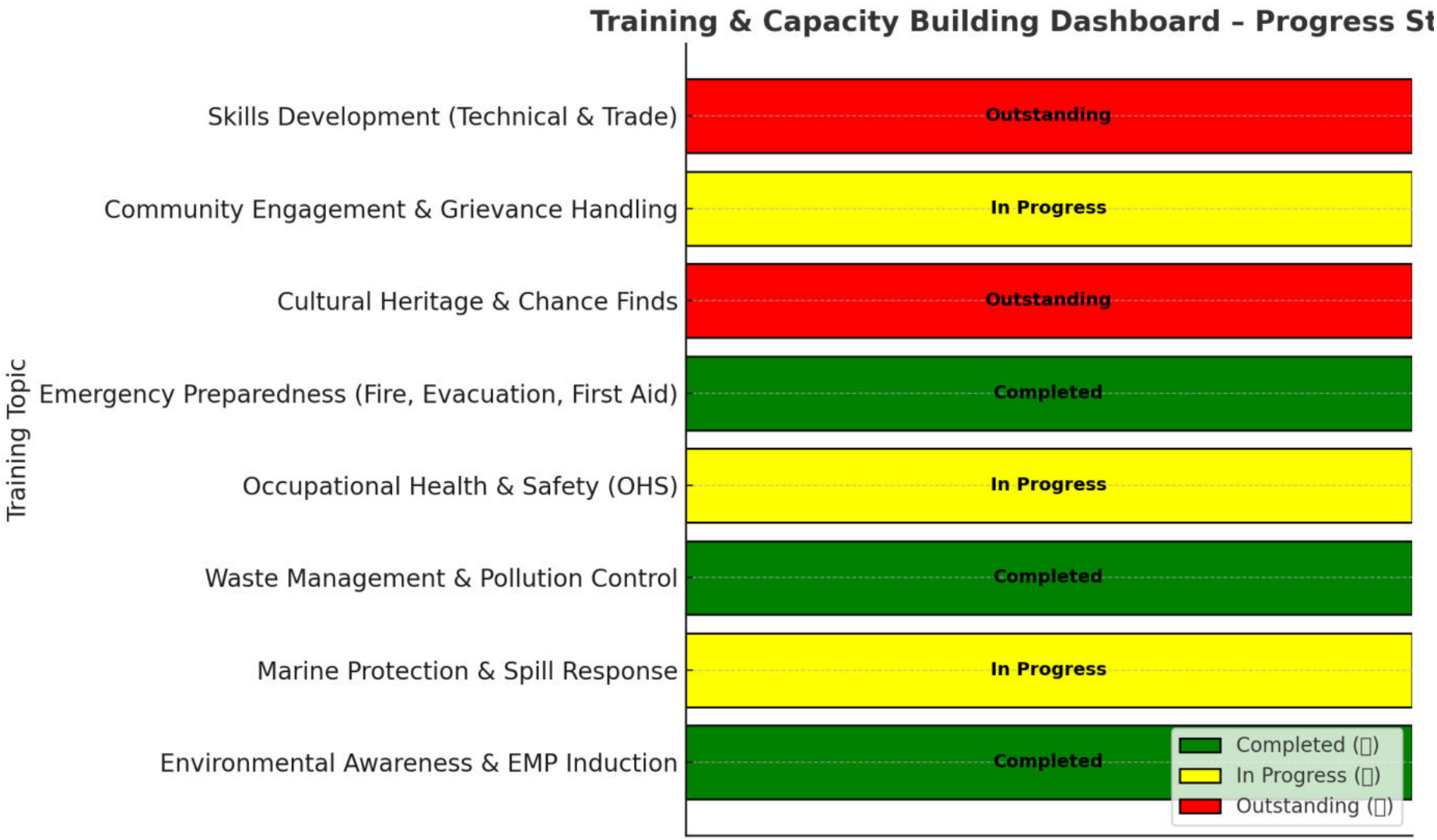
9.5 Commitment to Local Capacity Building

The project proponent is committed to maximising socio-economic benefits by:

- Hiring locally wherever possible.
- Collaborating with vocational training centres and universities for internships and training placements.
- Creating long-term capacity for Namibians to participate not only in this project but in future oil, gas, and logistics developments.

Table 7. Training and Capacity Building Matrix – Oil and Gas Logistics Hub, Lüderitz.

Topic	Frequency	Target Group	Responsible Party	Monitoring Indicator
Environmental Awareness & EMP Induction	At induction (before site entry); refresher annually.	All employees and contractors.	ECO; Proponent HSE Manager.	Attendance records; signed induction checklists.
Marine Protection & Spill Response	Initial training; refresher every 6 months; drills quarterly.	Marine team; ERT; contractors handling fuels/chemicals.	Marine Safety Officer; ECO.	Spill drill records; number of staff trained; incident logs.
Waste Management & Pollution Control	Quarterly training sessions.	Waste handlers; contractors; general staff.	Waste Manager; ECO.	Waste disposal audits; segregation compliance scores.
Occupational Health & Safety (OHS)	Induction; monthly toolbox talks; refresher annually.	All staff, including contractors.	HSE Officer; Contractors.	PPE compliance rates; number of incidents reported.
Emergency Preparedness (Fire, Evacuation, First Aid)	Drills every 3 months; refresher annually.	All staff; ERT; contractors.	ERC; Fire Wardens; First Aiders.	Drill participation logs; response times; incident reports.
Cultural Heritage & Chance Finds	At induction; refresher every 2 years.	Construction staff; ECO; contractors.	ECO; National Heritage Council liaison.	Heritage awareness training records; chance finds log updates.
Community Engagement & Grievance Handling	Annual training; refresher as needed.	Community liaison staff; managers; ECO.	Proponent Community Liaison Officer.	Number of grievances resolved; stakeholder engagement reports.
Skills Development (Technical & Trade)	Ongoing; structured programmes annually.	Local workforce; apprentices; contractors.	HR Manager; Training Institutions; Proponent.	% of workforce trained; local employment statistics; training certificates issued.


Training & Capacity Building Dashboard – Progress St
Training Topic
Skills Development (Technical & Trade)
Community Engagement & Grievance Handling
Cultural Heritage & Chance Finds
Emergency Preparedness (Fire, Evacuation, First Aid)
Occupational Health & Safety (OHS)
Waste Management & Pollution Control
Marine Protection & Spill Response
Environmental Awareness & EMP Induction
Outstanding
In Progress
Outstanding
Completed
In Progress
Completed
In Progress
Completed
Completed (□)
In Progress (□)
Outstanding (□)

10. Impact Mitigation and Significance Reduction

Mitigation is the cornerstone of environmental management, aimed at preventing, reducing, or compensating for potential adverse impacts associated with the Oil and Gas Logistics Hub in Lüderitz. The mitigation hierarchy (avoidance, minimisation, rehabilitation, and offsetting) underpins the approach, ensuring that significant impacts are systematically reduced to acceptable levels. This section explains the strategies for biophysical, social, and cumulative impacts and shows how they contribute to significance reduction.

10.1 Marine Environment

The most sensitive component of the receiving environment is the Lüderitz Bay marine ecosystem, which may be affected by dredging, vessel traffic, spills, and effluent discharge. To mitigate these impacts:

- Avoidance: Dredging will be scheduled outside peak breeding and spawning seasons for key marine species. Navigation routes will be designed to avoid sensitive habitats such as kelp beds and seal colonies.
- Minimisation: Use of silt curtains, real-time turbidity monitoring, and adaptive dredging techniques will minimise suspended sediments. Double-hulled fuel tanks and bunded storage areas will reduce the risk of hydrocarbon leaks.
- Rehabilitation: Areas affected by dredging will be monitored for benthic recovery. Artificial substrates or seeding of benthic organisms may be applied if natural recovery is slow.
- Residual Risk Reduction: These measures will reduce high-significance risks (e.g., spills, sediment smothering) to low-to-medium significance, making impacts manageable through monitoring.

10.2 Terrestrial Environment

Construction activities, land clearance, and facility operations will affect terrestrial habitats around Lüderitz. To address these:

- Avoidance: Project infrastructure will be confined to already disturbed or low-sensitivity areas wherever possible.
- Minimisation: Dust suppression through water spraying, noise reduction using mufflers, and restricted working hours near residential areas will reduce disturbance.
- Rehabilitation: Exposed soil will be stabilised through re-vegetation with native plants after construction, preventing erosion.
- Residual Risk Reduction: Initially moderate terrestrial risks (dust, noise, erosion) will be reduced to low significance with active monitoring.

10.3 Socio-Economic Environment

The logistics hub will generate both positive and negative socio-economic impacts. To optimise benefits and reduce risks:

- Avoidance: Avoid resettlement or displacement of local communities by situating facilities within industrial zones.
- Minimisation: Traffic management plans will be enforced to reduce congestion and accidents, while workforce housing guidelines will prevent strain on local infrastructure.
- Enhancement: Local hiring, SME participation, and vocational training programmes will amplify positive economic impacts.
- Residual Risk Reduction: Risks to community safety and infrastructure will be brought from medium significance to low through targeted planning, while positive impacts such as employment will be maximised.

10.4 Human Health and Safety

Safety risks arise from exposure to emissions, occupational hazards, and accidents. Mitigation includes:

- Engineering Controls: Installation of emission scrubbers, PPE requirements, and fire detection systems.

- Procedural Controls: Safety inductions, hazard identification, job safety analyses (JSAs), and regular drills.
- Emergency Preparedness: Strong ERP implementation ensures quick response to incidents.
- Residual Risk Reduction: Health and safety risks, often high without controls, will be reduced to low-to-medium levels and continuously monitored through safety audits.

10.5 Cumulative Impacts

The logistics hub adds to other existing activities in Lüderitz (fishing, shipping, aquaculture, tourism). Mitigation measures will be designed to:

- Coordinate vessel traffic with Namport to avoid congestion.
- Align dredging schedules with other port users to reduce combined turbidity effects.
- Collaborate with aquaculture operators to monitor water quality.
- Residual Risk Reduction: Cumulative impacts will remain medium significance, but adaptive co-management will prevent escalation to high.

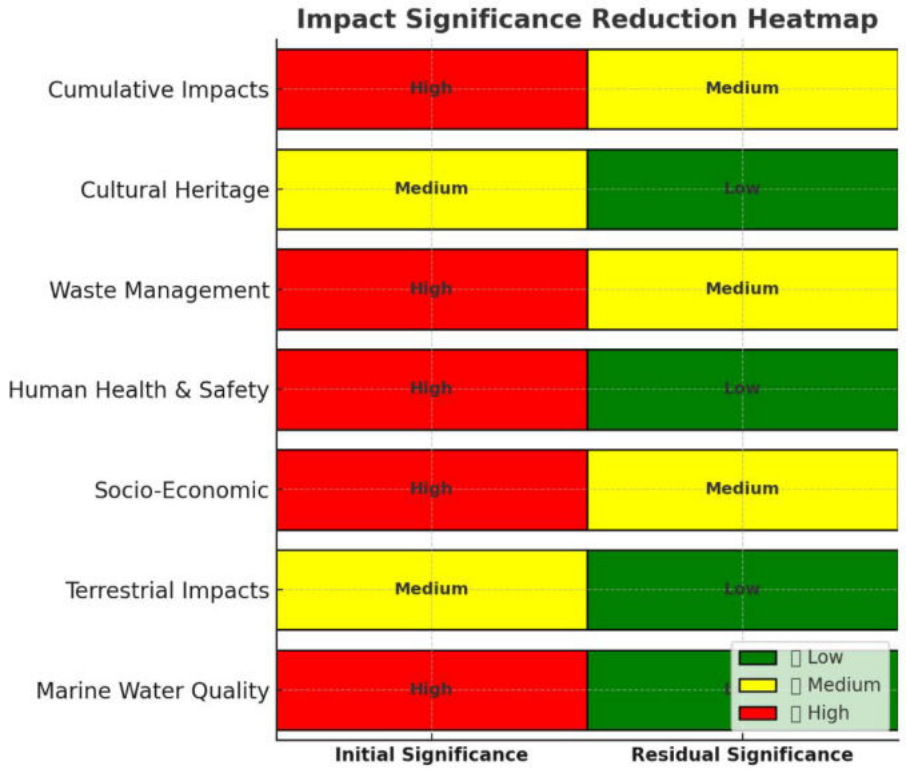
10.6 Monitoring and Adaptive Management

Mitigation measures will be coupled with rigorous monitoring. If indicators show impacts remain higher than predicted, the EMP will trigger adaptive actions, such as halting dredging during sensitive periods or increasing waste treatment measures. This feedback loop ensures progressive reduction of impact significance over the project lifecycle.

Table 8. Impact Significance Reduction Matrix – Oil and Gas Logistics Hub, Lüderitz.

Impact	Initial Significance	Mitigation Measures	Residual Significance	Monitoring
Marine Water Quality (dredging, turbidity, spills)	🟥 High	Use silt curtains; real-time turbidity monitoring; adaptive dredging; double-hulled fuel tanks; spill kits and booms on standby.	🟧 Medium → 🟩 Low (with continuous monitoring)	Weekly turbidity sampling; spill drill records; quarterly biodiversity surveys.
Terrestrial Impacts (dust, noise, land disturbance)	🟧 Medium	Dust suppression (water spraying); noise mufflers; vegetation clearance boundaries; restricted working hours near communities.	🟩 Low	Monthly noise and dust monitoring; ECO inspections.
Socio-Economic (traffic safety, congestion, housing pressure)	🟥 High	Traffic management plan; dedicated access routes; worker housing guidelines; community liaison and grievance mechanisms.	🟧 Medium	Monthly traffic audits; grievance log reviews; workforce housing inspections.
Human Health & Safety (accidents, emissions, fire/explosion)	🟥 High	PPE requirements; safety inductions; fire detection/suppression systems; job safety analyses (JSAs); quarterly emergency drills.	🟧 Medium → 🟩 Low (for most risks)	Incident logs; accident frequency rates; safety audit reports.
Waste Management (effluent, solid, hazardous materials)	🟥 High	Segregation; bunded storage; licensed disposal; waste tracking manifests; hydrocarbon interception systems.	🟧 Medium	Monthly waste reports; hydrocarbon storage inspections.
Cultural Heritage (chance finds, scenic impacts)	🟧 Medium	Chance finds procedure; consultation with National Heritage Council; buffer zones for sensitive sites.	🟩 Low	ECO site inspections; heritage log updates.

Impact	Initial Significance	Mitigation Measures	Residual Significance	Monitoring
Cumulative Impacts (with fishing, aquaculture, shipping)	High	Coordination with Namport on traffic; align dredging with other users; joint monitoring with aquaculture operators.	Medium	Quarterly stakeholder coordination meetings; shared monitoring reports.



11. Impact Mitigation and Significance Reduction

The Oil and Gas Logistics Hub in Lüderitz has the potential to generate environmental and social impacts of varying magnitude, some of which may be highly significant without management intervention. The purpose of this section is to demonstrate how the project applies a mitigation hierarchy—avoidance, minimisation, rehabilitation, and compensation/offsets—to reduce impacts to acceptable levels.

The significance of impacts before and after mitigation is assessed against the sensitivity of the receiving environment, drawing on baseline studies, impact pathways, and management commitments. These outcomes are presented in Table 9.1: Impact Significance Reduction Matrix (Annex X) and visually summarised in Figure 9.1: Impact Significance Heatmap (Annex X).

11.1 Marine Environment

The Lüderitz Bay marine ecosystem is sensitive to dredging, spills, and vessel activity. Without controls, dredging could smother benthic organisms and degrade water quality.

- Avoidance: Scheduling dredging outside peak spawning seasons and routing vessels away from kelp beds and seal colonies.
- Minimisation: Deployment of silt curtains, real-time turbidity monitoring, and bunded fuel storage to reduce risks of suspended sediments and spills.
- Rehabilitation: Monitoring benthic recovery post-dredging, with artificial substrates applied if natural recolonisation is slow.
- Significance Reduction: As shown in Table 9.1, impacts on marine water quality reduce from High (🟥) to Low (🟩) with mitigation, illustrated visually in Figure 9.1.

11.2 Terrestrial Environment

Construction and operations will generate dust, noise, and localised disturbance.

- Avoidance: Siting infrastructure within disturbed zones where possible.

- Minimisation: Water spraying for dust suppression, acoustic mufflers for equipment, and restricted working hours near sensitive receptors.
- Rehabilitation: Re-vegetation with native species and erosion control on exposed soils.
- Significance Reduction: As reflected in Table 9.1, terrestrial risks decrease from Medium (🟧) to Low (🟩).

11.3 Socio-Economic Environment

Socio-economic impacts include both risks (traffic, housing pressure) and opportunities (employment, SME growth).

- Avoidance: Project facilities confined to industrial zones to prevent displacement.
- Minimisation: Traffic management plan, worker housing guidelines, and community grievance mechanisms.
- Enhancement: Local employment targets, SME procurement policies, and skills development programmes.
- Significance Reduction: Initially high risks (🟥) are reduced to Medium (🟧) (Table 9.1), while positive benefits are amplified.

11.4 Human Health and Safety

Operations carry occupational and community safety risks.

- Engineering Controls: Fire detection systems, bunded hydrocarbon storage, PPE enforcement, and emission controls.
- Procedural Controls: Safety inductions, daily toolbox talks, and job safety analyses.
- Emergency Preparedness: ERP drills and coordination with Lüderitz emergency services.
- Significance Reduction: As reflected in Table 9.1, safety risks are reduced from High (🟥) to Low (🟩) or Medium (🟧) depending on hazard type, also shown in Figure 9.1.

11.5 Waste and Hazardous Substances

Waste streams (solid, effluent, hydrocarbons) pose contamination risks.

- Mitigation: Waste segregation, bunded chemical storage, licensed disposal, and spill contingency planning.
- Significance Reduction: Risks are lowered from High (🟥) to Medium (🟧), as presented in Table 9.1.

11.6 Cultural Heritage and Scenic Values

Chance finds or scenic disruptions may occur.

- Mitigation: Implementation of chance finds procedures, consultation with the National Heritage Council, and avoidance of high-visibility sensitive zones.
- Significance Reduction: Impacts reduce from Medium (🟧) to Low (🟩), per Table 9.1.

11.7 Cumulative Impacts

Cumulative effects with aquaculture, fishing, and shipping could amplify pressures.

- Mitigation: Coordination with Namport on vessel traffic, aligned dredging schedules, and shared monitoring programmes with aquaculture operators.
- Significance Reduction: With coordination, cumulative impacts reduce from High (🟥) to Medium (🟧), illustrated in both Table 9.1 and Figure 9.1.

11.8 Adaptive Management

The EMP is structured to evolve in response to monitoring results. If impacts exceed predicted levels, additional measures will be applied, ensuring progressive reduction of residual significance.

The effectiveness of this approach is summarised in Table 9.1 and Figure 9.1, which provide a transparent record of how predicted high and medium impacts are systematically reduced through structured mitigation.

12. Institutional Responsibilities

Effective implementation of the Environmental Management Plan (EMP) for the Oil and Gas Logistics Hub in Lüderitz requires coordination across multiple institutional levels. Each actor has a defined role, ensuring that environmental safeguards, regulatory compliance, and social commitments are delivered consistently throughout the project lifecycle.

12.1 Proponent Responsibilities

The project proponent bears **primary responsibility** for EMP implementation and compliance.

- **EMP Implementation:** Ensure that all mitigation, monitoring, and management actions are executed across construction, operation, and decommissioning.
- **Resource Allocation:** Provide financial, human, and technical resources to meet environmental obligations.
- **Contractor Management:** Integrate EMP clauses into contracts and monitor compliance of all contractors and subcontractors.
- **Reporting:** Submit quarterly and annual environmental performance reports to the Ministry of Environment, Forestry and Tourism (MEFT).
- **Stakeholder Engagement:** Maintain communication with the Lüderitz Town Council, local communities, and other stakeholders.

12.2 Environmental Control Officer (ECO)

The ECO serves as the **independent on-site custodian** of environmental compliance.

- **Monitoring & Inspections:** Conduct daily and weekly inspections to verify adherence to EMP measures.
- **Non-Compliance Management:** Issue site instructions, record incidents, and recommend corrective actions.

- **Reporting:** Compile monthly reports for the proponent and regulators.
- **Capacity Building:** Provide toolbox talks and awareness sessions to staff and contractors.
- **Liaison Role:** Act as a bridge between project operations, regulators, and affected communities.

12.3 Contractors and Subcontractors

Contractors are directly responsible for **implementing EMP obligations in their work packages**.

- **Compliance:** Ensure construction, dredging, and operational activities follow mitigation and monitoring requirements.
- **Training:** Provide workers with induction and refresher training in line with the EMP.
- **Incident Reporting:** Immediately notify the ECO and proponent of accidents, spills, or non-compliances.
- **Documentation:** Maintain waste manifests, safety records, and training registers for audit purposes.

12.4 Regulatory Authorities

Namibian government ministries and institutions have oversight roles to enforce compliance:

- **Ministry of Environment, Forestry and Tourism (MEFT):** Issues Environmental Clearance Certificates (ECC), receives compliance reports, and conducts inspections.
- **Ministry of Mines and Energy (MME):** Oversees petroleum storage, licensing, and safety standards.
- **Ministry of Fisheries and Marine Resources (MFMR):** Ensures marine ecosystem protection, especially during dredging and vessel operations.
- **Namport (Namibian Ports Authority):** Coordinates port traffic, berth allocation, and compliance with port safety regulations.

- **National Heritage Council:** Provides guidance on chance finds, archaeological discoveries, and scenic protection.
- **Ministry of Labour, Industrial Relations and Employment Creation:** Monitors workplace safety, labour rights, and health compliance.

12.5 Local Government and Community

Local institutions ensure that **community interests are represented and protected**.

- **Lüderitz Town Council:** Oversees local development planning, infrastructure coordination, and community consultation.
- **Regional Council (ǁKaras Region):** Provides regional oversight and integrates the project into broader development frameworks.
- **Community Stakeholders:** Participate through public consultations, grievance mechanisms, and joint monitoring forums.

12.6 Independent Auditors

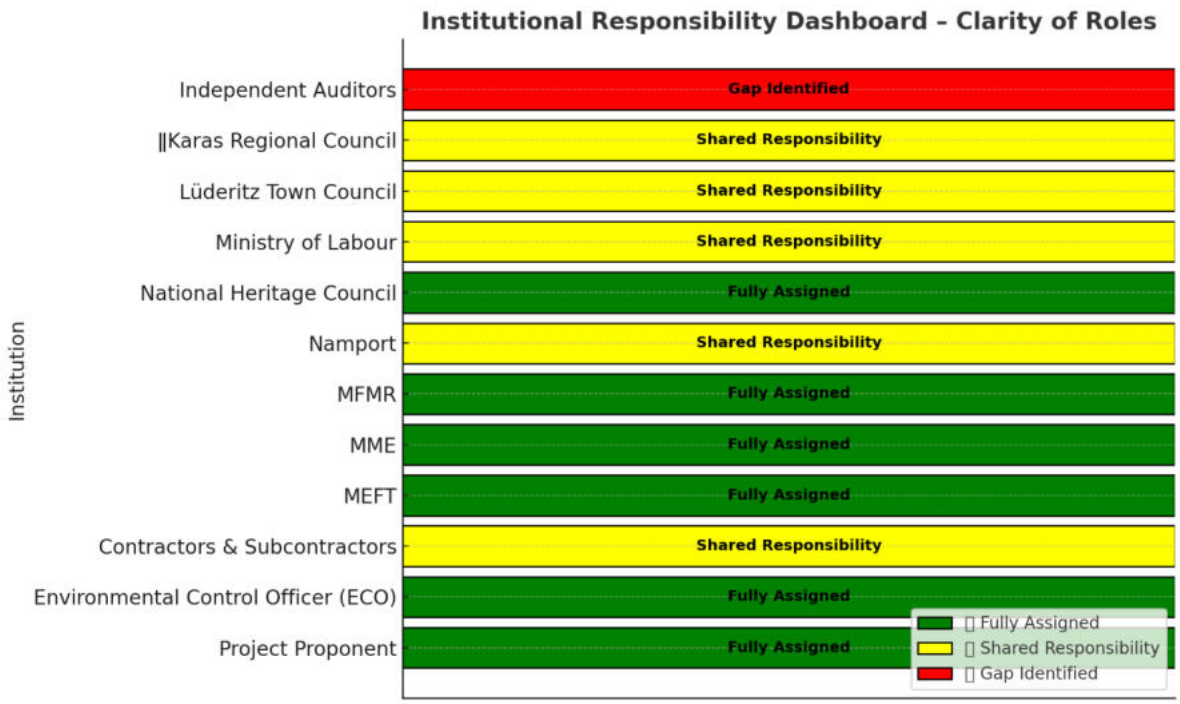
Independent specialists may be engaged to conduct **annual or bi-annual audits** of the EMP.

- **Objective Review:** Verify that EMP commitments are implemented effectively.
- **Recommendations:** Provide corrective actions and highlight areas for continuous improvement.
- **Certification:** Independent audits provide credibility to compliance reports submitted to MEFT and other regulators.

Table 9. Institutional Responsibility Matrix – Oil and Gas Logistics Hub, Lüderitz.

Institution / Role	Key Role	Obligations	Reporting Requirement	Monitoring Indicator
Project Proponent	EMP Implementation & Oversight	Provide resources; integrate EMP into contracts; ensure mitigation and monitoring measures are applied.	Quarterly and annual reports to MEFT.	Compliance rate of EMP actions; financial/resource allocation records.
Environmental Control Officer (ECO)	Independent Compliance Oversight	Conduct inspections; issue site instructions; verify mitigation and monitoring; provide training/toolbox talks.	Monthly reports to Proponent and MEFT.	Number of inspections completed; non-compliance notices issued/resolved.
Contractors & Subcontractors	Day-to-Day Implementation	Apply EMP measures during construction/dredging; provide induction and refresher training; incident reporting.	Immediate incident notifications; weekly compliance updates to ECO.	Waste manifests; safety training attendance; incident/accident logs.
MEFT (Ministry of Environment, Forestry & Tourism)	Regulatory Authority	Issue ECC; oversee compliance through inspections; enforce corrective actions if necessary.	Receipt of quarterly/annual proponent reports; field inspections as needed.	Number of audits conducted; compliance with ECC conditions.
MME (Ministry of Mines & Energy)	Petroleum Oversight	Regulate petroleum storage, safety, and licensing in accordance with law.	Periodic audits; licensing renewals.	Inspection reports; valid licences maintained.
MFMR (Ministry of Fisheries & Marine Resources)	Marine Ecosystem Protection	Oversee dredging, marine biodiversity protection, and fisheries co-existence.	Review of quarterly marine monitoring results.	Turbidity levels, benthic recovery surveys, fisheries feedback.

Institution / Role	Key Role	Obligations	Reporting Requirement	Monitoring Indicator
Namport (Namibian Ports Authority)	Port Coordination	Manage berth allocation; ensure safe vessel operations; enforce port regulations.	Coordination meetings with proponent; operational logs.	Vessel traffic data; safety incident logs.
National Heritage Council	Heritage Oversight	Review chance finds; provide permits; ensure cultural/archaeological protection.	Incident reports of finds within 48 hours.	Chance finds register; heritage compliance audits.
Ministry of Labour, Industrial Relations & Employment Creation	Worker Health & Safety	Monitor workplace safety, labour conditions, and compliance with occupational health regulations.	Immediate reporting of serious incidents; annual compliance review.	Workplace inspection records; accident frequency rates.
Lüderitz Town Council	Local Authority	Support integration with town planning; community engagement; infrastructure coordination.	Quarterly stakeholder meetings; updates on grievances and local benefits.	Grievance register; council feedback reports.
ǁKaras Regional Council	Regional Development Oversight	Align project with regional socio-economic goals; provide oversight.	Annual development coordination reports.	Regional development indicators; integration with regional plans.
Independent Auditors	External Verification	Conduct annual/bi-annual EMP audits; verify compliance independently.	Submission of independent audit reports to MEFT and stakeholders.	Number of audit findings closed; auditor certification statements.


Institutional Responsibility Dashboard – Clarity of Roles
Institution
Independent Auditors
‖Karas Regional Council
Lüderitz Town Council
Ministry of Labour
National Heritage Council
Namport
MFMR
MME
MEFT
Contractors & Subcontractors
Environmental Control Officer (ECO)
Project Proponent
Gap Identified
Shared Responsibility
Shared Responsibility
Shared Responsibility
Fully Assigned
Shared Responsibility
Fully Assigned
Fully Assigned
Fully Assigned
Shared Responsibility
Fully Assigned
Fully Assigned
Fully Assigned
Shared Responsibility
Gap Identified

13. Conclusion

The Environmental Management Plan (EMP) for the proposed Oil and Gas Logistics Hub in Lüderitz has been developed to ensure that the project is implemented in a manner that safeguards the environment, enhances socio-economic benefits, and complies fully with Namibian legislation and international best practice. Through its structured framework of mitigation, monitoring, and adaptive management, the EMP provides a robust mechanism for managing risks while maximizing opportunities for sustainable development.

Summary of Key Outcomes

The EMP demonstrates that although the project carries potentially significant environmental and social impacts—particularly in relation to marine ecology, dredging activities, hazardous material management, and community health and safety—these impacts can be effectively mitigated to medium or low significance levels. This is achieved through a clear hierarchy of avoidance, minimisation, rehabilitation, and compensation, supported by legally binding commitments and auditable management tools such as matrices, dashboards, and monitoring indicators.

The project will also generate substantial socio-economic benefits, including the creation of approximately 500 direct jobs and over 5,000 indirect jobs, local skills development, and expanded opportunities for small and medium enterprises in Lüderitz and the wider ǁKaras Region. These positive contributions are balanced by proactive measures to minimise risks of congestion, safety incidents, and housing pressures, ensuring that development is inclusive and socially responsible.

Institutional Accountability

The EMP assigns clear institutional responsibilities, ensuring that accountability is embedded at every level of project execution. The proponent retains overall responsibility for implementation, supported by the Environmental Control Officer, contractors, and regulatory oversight by institutions such as MEFT, MFMR, MME, Namport, and the Lüderitz Town Council. Independent audits and community engagement mechanisms further strengthen governance, transparency, and trust**.**

Adaptive Management and Continuous Improvement

The EMP is designed as a living document, adaptable to new information and monitoring results. Should unanticipated impacts arise, the proponent is obligated to strengthen mitigation

measures and update the EMP accordingly. This ensures that environmental management is not static but evolves with changing conditions, stakeholder expectations, and regulatory requirements.

Contribution to National and Regional Goals

By facilitating oil and gas logistics operations, the project will reinforce Namibia's strategic position as a regional energy hub. At the same time, it aligns with national policies such as Vision 2030, the National Energy Policy, and the Environmental Management Act (No. 7 of 2007). Importantly, the EMP ensures that development is pursued without compromising ecological integrity, cultural heritage, or community well-being.

Final Statement

In conclusion, the EMP provides a comprehensive, enforceable, and transparent framework for managing environmental and social risks associated with the Oil and Gas Logistics Hub in Lüderitz. It demonstrates that the project can proceed responsibly, balancing economic growth with environmental protection and social development. With effective implementation, ongoing monitoring, and strong institutional collaboration, the logistics hub can serve as a model of sustainable industrial development in Namibia.