APP-00 4557

ENVIRONMENTAL MANAGEMENT PLAN FOR THE STORAGE AND HANDLING OF INDUSTRIAL CARGO AT THE WALVIS BAY BULK TERMINAL IN THE PORT OF WALVIS BAY

ENVIRONMENTAL MANAGEMENT PLAN

Prepared by:

Prepared for:

August 2024

Project:	**ENVIRONMENTAL MANAGEMENT PLAN FOR THE STORAGE AND HANDLING OF INDUSTRIAL CARGO AT THE WALVIS BAY BULK TERMINAL IN THE PORT OF WALVIS BAY**	
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Report Approval	 **André Faul** Conservation Ecologist	

I _____ acting as the Proponent's representative (Walvis Bay Bulk Terminal (Pty) Ltd), hereby approve this report and confirm that the project description contained in herein is a true reflection of the information which the Proponent has provided to Geo Pollution Technologies. All material information in the possession of the Proponent that reasonably has or may have the potential of influencing any decision or the objectivity of this assessment is fairly represented in this report.

Signed at Walvis Bay Bulk Terminal on the 15 day of August 2024.

Walvis Bay Bulk Terminal (Pty) Ltd

94/388
Company Registration

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1 INTRODUCTION

Geo Pollution Technologies (Pty) Ltd (GPT) was appointed by Grindrod Terminals, operator of the Walvis Bay Bulk Terminal (WBBT), to assist in the renewal of the environmental clearance certificate (ECC) for their operations at the WBBT within the Port of Walvis Bay, Erongo Region (Figure 1-1). In order to renew the ECC, an updated environmental management plan (EMP) will be prepared for the Proponent. The EMP will provide management options to ensure environmental impacts of the terminal are minimised. The environment being defined in the Environmental Assessment Policy and Environmental Management Act as "land, water and air; all organic and inorganic matter and living organisms as well as biological diversity; the interacting natural systems that include components referred to in sub-paragraphs, the human environment insofar as it represents archaeological, aesthetic, cultural, historic, economic, paleontological or social values".

The EMP is thus a tool used to take pro-active action by addressing potential problems before they occur. This limits potential future corrective measures that may need to be implemented and allows for application of mitigation measures for unavoidable impacts. The ECC renewal is required in compliance with Namibia's Environmental Management Act (Act No 7 of 2007).

Figure 1-1 Project location

2 SCOPE

The scope of the EMP is to:

- Provide a brief overview of all components, and their operations, related to the facility.
- Summarise the legal and regulatory framework within which the plant operates.

- Provide a brief overview of the environment, i.e. the physical, biological, social and economic conditions, potentially impacted by the facility.
- To identify and assess potential impacts of the plant on the environment.
- Identify a range of management actions which could mitigate the potential adverse impacts to acceptable levels.
- To provide sufficient information to the relevant competent authorities and the Ministry of Environment, Forestry and Tourism to make informed decisions regarding the development.

3 METHODOLOGY

The following methods were used to prepare the EMP:

- Infrastructure and operational procedures were received from the Proponent and are described in the EMP.
- A legal register relevant to the project was compiled.
- Baseline information about the site and its surroundings was obtained from existing secondary information and is described in the EMP.
- Potential environmental impacts were identified and preventative and mitigating measures recommended in the EMP.

4 PROJECT DESCRIPTION

Grinrod is an international company focused on cost effective and efficient solutions to move cargo through trade corridors. Grinrod is the terminal operator of the WBBT in the port of Walvis Bay. The operations of the facility involves the handling and storage of bulk cargo, including metallic ores, lithium, petroleum coke and coal, using specialised equipment like cranes, forklifts and conveyor systems to ensure safe and efficient transfers between different transport modes. The handling of cargo involves loading and unloading vessels, road and rail trucks, along with the storage of various products for clients. The efficient handling and transportation of goods is a crucial component of the operations, ensuring products are moved smoothly and securely through the Port of Walvis Bay. section 4.1 to 4.5 provide an overview of the location, different components and operations. The general layout of the plant is presented in Figure 4-1.

Figure 4-1 Site layout

4.1 INFRASTRUCTURE

4.1.1 Storage warehouse

The facility has one storage warehouse (Photo 4-1) that covers an area of 750 m^2. The interior of the warehouse has three loading bays (Photo 4-4) that is directly connected to an underground conveyor system that can be connected to the main conveyor system. The roof has an open section (Photo 4-3) that allows for potential build-up of gasses to escape. The warehouse is only used when clients require it.

Photo 4-1 Outside view of the warehouse

Photo 4-2 Inside of the warehouse

Photo 4-3 Cut-out of the roof

Photo 4-4 Loading bays located in the warehouse

4.1.2 Conveyor lines

The facility utilises conveyor lines to move bulk cargo. The fixed line is only used to transport cargo from the docked vessels to the storage area. The conveyor line is elevated high off the ground (Photo 4-5), and runs north east from the dock, before it turns south east, where it crosses over the main port service road (Photo 4-7) towards the storage area. The conveyor line then slopes back to ground level (Photo 4-8 and Photo 4-9), where it moves underground to where the cargo is stored. The cargo is then moved from the fixed conveyer line to a mobile unit (Photo 4-10) to carry the cargo to the allocated open storage area.

Photo 4-5 **Conveyer line at the dock. Note it is not closed off on the side**

Photo 4-6 **Mobile conveyer unit with hopper that is used for initial loading from the vessel.**

Photo 4-7 **Conveyer line crossing the road towards the storage area**

Photo 4-8 **Conveyer lines splitting at the entrance to the storage area**

Photo 4-9 **Conveyer line going underground**

Photo 4-10 **Mobile conveyer unit inside storage yard**

4.1.3 Offices and supportive infrastructure

The on-site offices comprise a combination of a building and converted shipping containers that are adapted into office spaces. These offices provide the necessary administrative and operational support for the facility.

In addition to the offices, there is an ablution facility and a small workshop for conducting repairs and maintenance tasks, ensuring that equipment and machinery remain in good working order.

The facility is equipped with plastic water tanks that store water for firefighting and dust suppression, enhancing safety. The site incorporates a railway line, which is complemented by a weighbridge, allowing for the accurate measurement and management of cargo transported via rail. The yard is enclosed by a fence and has controlled entry points.

Photo 4-11 Office building and containers converted to office spaces

Photo 4-12 Maintenance building

Photo 4-13 Containers for storage of equipment

Photo 4-14 Property perimeter fence

4.2 OPERATIONS

4.2.1 Receiving and Distribution of Cargo

Bulk cargo is received and distributed via vessels docking in the port, by road (heavy motor vehicles) and by train utilising the railway lines.

4.2.1.1 *Vessel*

The facility receives and distributes cargo through vessels docking at berths 8 and 9. The unloading process begins with cranes equipped with grabbers, which lift the cargo from the vessel and deposit it into a hopper. This hopper channels the cargo onto a mobile conveyor system, which then transfers the load onto the main fixed conveyor line. This conveyor system transports the cargo to its designated storage area within the WBBT.

The loading of a vessel involves filling skips with the cargo stored in the WBBT. These skips are then transported by truck to the vessel, where the cargo is unloaded into the appropriate section of the ship. Skips are lifted from the trucks using cranes and lowered into the bulk cargo vessels' hold. Once the skip is close to tank top, the fastening chains on one end releases and the skip is lifted from the barge, leaving the ore behind. The skip is then placed on the quay and a forklift lifts it back onto the truck and it returns to the WBBT to be reloaded.

4.2.1.2 *Road*

Receiving and distributing cargo by road at the facility involves a flexible process. Cargo can be loaded and offloaded either into skips or directly onto trucks using front-end loaders or a mobile conveyor unit, depending on the nature of the material. Material can also be placed into bulk bags before being loaded onto the truck.

4.2.1.3 *Railway*

The offloading of railway carriages utilises a combination of front-end loaders and conveyor units. These machines transfer cargo from the rail cars into designated skips or directly onto the conveyors. The mobile conveyor system then moves the material to the main fixed conveyor line, which transports the cargo to its predetermined storage area within the WBBT.

For the loading of railway carriages, cargo is retrieved from the storage areas using front-end loaders or the conveyer system, depending on the material. The material is then loaded onto the carriages, which loads the cargo into the rail cars efficiently. For materials like PETCOKE, bulk bags can be used to further contain the cargo before loading, ensuring secure and dust-free transport.

The facility's integrated weighbridge on the railway line ensures that all cargo is accurately measured before the carriages are offloaded or dispatched.

Photo 4-15 Grabber to initially pick up cargo from the vessel

Photo 4-16 Hopper used to funnel the bulk cargo at the port

Photo 4-17 Rail way weigh bridge

Photo 4-18 Skips used for the transportation of cargo

4.2.2 Cargo Storage

The facility has a total storage capacity of approximately 200,000 tons, accommodating a wide range of cargo depending on clients' needs. The storage area is divided into three sections to ensure safe handling of different materials.

Area A is the largest of the three yards and has an interlocking surface, with a protective plastic layer underneath, to prevent groundwater contamination. This area primarily serves as the storage site for copper ore. Area B is designated for the storage of petroleum coke, Area B and C are not interlocked like area A

4.3 PRODUCTS

The facility is capable of handling various dry bulk and break-bulk commodities for both import and export markets. A full list of commodities are represented in Table 4-1.

Table 4-1 Cargo to be stored and handled at WBBT

Cargo Type	Health Impacts	Environmental Hazard	Incompatibility	Flammability	Exposure Limits*
Copper Ore	Toxic if ingested or inhaled, causes skin and eye irritation.	Toxic to aquatic life with long-lasting effects.	Strong oxidizing agents, acids.	Not flammable	NIOSH REL 1 mg/m³ (as copper)
Iron Ore	May cause mechanical irritation to the skin and eyes.	Not considered toxic to the environment.	None identified.	Not flammable	No specific limit
Zinc Ore	May cause respiratory tract irritation.	Not considered toxic but can affect aquatic environments.	Strong acids and alkalis.	Not flammable	NIOSH REL 5 mg/m³ (as zinc oxide)
Lithium Ore	Causes skin and eye irritation, respiratory tract irritation.	No specific hazard identified.	Strong oxidizing agents.	Not flammable	OSHA PEL 5 mg/m³
Chrome Ore	Toxic if inhaled, causes skin and eye irritation.	Harmful to aquatic life.	Strong oxidizing agents.	Not flammable	NIOSH REL 0.5 mg/m³
Coal	May cause respiratory irritation, carcinogenic potential.	Can affect aquatic life.	Keep away from strong oxidizers.	Combustible under certain conditions.	No specific limit
Coal Anthracite [1]	May cause respiratory irritation, carcinogenic potential.	Can affect aquatic life.	Keep away from strong oxidizers.	Combustible under certain conditions.	No specific limit
PetCoke (petroleum coke)	May cause respiratory irritation.	Can affect aquatic life.	Strong oxidizing agents.	Combustible under certain conditions.	No specific limit
Manganese Ore	Toxic if inhaled or ingested, potential neurotoxin.	Harmful to aquatic life.	Strong oxidizing agents, acids.	Flammable solid.	NIOSH REL 1 mg/m³
Sulphur	Causes skin and eye irritation, may cause respiratory irritation.	Toxic to aquatic life with long-lasting effects.	Strong oxidizing agents, chlorates, nitrates.	Flammable and explosive if significant quantities of dust are airborne.	NIOSH REL 15 mg/m³ (hydrogen sulphide, 10 minutes)

*For metal ores the NIOSH REL for the elemental form of the metal are provided as no REL (or other exposure limits) for the ores are available. All values are time weighted averages (TWA) which is exposure over an eight hour period, except where stated otherwise. Where no NIOSH REL is available, the Namibian limit or OSHA permissible exposure limit (PEL) for respirable particulates (dust) are provided.

[1] Depending on the exact composition of the coal, it may also evolve coal ash decomposition products such as mercury, arsenic, selenium, cadmium and lead.

4.4 SAFETY, HEALTH, ENVIRONMENT AND QUALITY

The Proponent has acquired certification for three ISO standards, ISO 9001 (quality management), ISO 14001 (environmental management) and ISO 45001 (occupational health and safety management). Certification audits and regular surveillance audits are conducted by an external independent auditor that uses strict criteria to assess the implementation of these three standards. Adherence to the standards ensures that the Proponent is prepared to minimise the effect on, and the risks posed to, the workers, interested parties (neighbours), the environment and the quality of service that is provided.

Strict protocols are in place to ensure the protection of workers' and nearby receptors' health and safety. Access to the product storage area is controlled. Warning signs throughout the facility indicates the risk areas as well as the need to use personal protective equipment (PPE), access restrictions, no smoking, indications of electrical hazards, etc. It is the responsibility of the plant supervisor to ensure that only authorised personnel enter the premises, as well as to keep escape routes clear and visible. PPE include safety hats, goggles, and boots; gloves; dust masks; protective overalls; and hearing protectors when near motors and compressors.

Other safety and environmental control equipment include:

- Safety signs
- Fire extinguishers (CO_2 and dry chemical powder)
- Safety cables on all hoses
- Hoses certified annually by hydrostatic test
- Restricting access to critical plant parts
- Emegency lights
- Protection for moving parts of equipment.
- Operations manuals.
- Emergency plans
- Safety information of the products handled (MSDS, packaging).

4.4.1 Waste Management

On site waste are accumulated and stored in skips and removed by a third party licensed contractor. Waste water accumulating from rain, dust suppression and the fire system. The yard slopes slightly towards a channel located in the yard, water is collected in the channel and flows toward an underground pit and removed by a third party contractor.

4.4.2 Atmospheric Emissions and Dust

The main sources of air emissions will be:

- Solid particles are dispersed during the loading, offloading of bulk cargo and in windy conditions. Dust is minimised by dust suppression systems and sprinklers throughout the facility. Mobile sprinklers are placed on top of the bulk product heaps as a dust suppression method. Wind nets are also used as a method to contain dust. Bulk cargo like lithium ore is also covered with large sails to mitigate dust.
- Greenhouse gas emissions of exhaust gases from moving equipment and diesel engines.

Dust buckets are currently used to monitor the dust accumulation on a monthly basis. Alternatives such as a dust monitoring and analysing devices could be used to analyse and monitor dust in real time. This will allow for implementation of dust suppression measures in a proactive manner.

Photo 4-19 Wind net and misting system as a dust prevention measure

Photo 4-20 Mobile sprinkler at the top of copper ore

4.4.3 Noise Control

The main continuous sources of noise during plant operations will be moving equipment, generators, compressors and trucks in the vicinity of the plant.

4.4.4 Fire Fighting System

An emergency fire prevention and response plan is implemented for the facility. Prevention measures include:

- Emergency plan
- Portable fire extinguishers
- Sprinklers
- Safety warnings
- Regular emergency drills
- Emergency lights
- Portable fire extinguishers are strategically positioned throughout the plant area.

4.5 EMPLOYMENT

The operation of the terminal is carried out by a team composed of approximately sixty employees. The employees work in shifts, and the average amount of employees on site are approximately thirty to thirty-five.

5 ADMINISTRATIVE, LEGAL AND POLICY REQUIREMENTS

To protect the environment and achieve sustainable development, all projects, plans, programmes and policies deemed to have adverse impacts on the environment require an environmental assessment, as per the Namibian legislation. The legislation and standards provided Table 5-1 to Table 5-2 govern the environmental assessment process in Namibia and/or are relevant to the facility.

Table 5-1 Namibian law applicable to the facility and related operations

Law	Key Aspects
The Namibian Constitution	♦ Promotes the welfare of people ♦ Incorporates a high level of environmental protection ♦ Incorporates international agreements as part of Namibian law
Environmental Management Act Act No. 7 of 2007, Government Notice No. 232 of 2007	♦ Defines the environment ♦ Promotes sustainable management of the environment and the use of natural resources ♦ Provides a process of assessment and control of activities with possible significant effects on the environment
Environmental Management Act Regulations Government Notice No. 28-30 of 2012	♦ Commencement of the Environmental Management Act ♦ List activities that requires an environmental clearance certificate ♦ Provides Environmental Impact Assessment Regulations
Namibia Ports Authority Act Act No. 2 of 1994	♦ Provides for the establishment of the Namibian Ports Authority to undertake the management and control of ports ♦ Outlines the functions of the Namibian Ports Authority among which is the protection of the environment
Marine Resources Act Act No. 27 of 2000	♦ Provides for the conservation of the marine ecosystem and the responsible administration, conservation, protection and promotion of marine resources on a sustainable basis
Water Resources Management Act Act No. 11 of 2013	♦ Provides for management, protection, development, use and conservation of water resources ♦ Prevention of water pollution and assignment of liability
Local Authorities Act Act No. 23 of 1992, Government Notice No. 116 of 1992	♦ Defines the powers, duties and functions of local authority councils ♦ Regulates discharges into sewers
Public and Environmental Health Act Act No. 1 of 2015, Government Notice No. 86 of 2015	♦ Provides a framework for a structured more uniform public and environmental health system, and for incidental matters ♦ Deals with Integrated Waste Management including waste collection disposal and recycling; waste generation and storage; and sanitation
Labour Act Act No 11 of 2007, Government Notice No. 236 of 2007	♦ Provides for Labour Law and the protection and safety of employees ♦ Labour Act, 1992: Regulations relating to the health and safety of employees at work (Government Notice No. 156 of 1997)

Law	Key Aspects
Atmospheric Pollution Prevention Ordinance Ordinance No. 11 of 1976	♦ Governs the control of noxious or offensive gases ♦ Prohibits scheduled process without a registration certificate in a controlled area ♦ Requires best practical means for preventing or reducing the escape into the atmosphere of noxious or offensive gases produced by the scheduled process
Hazardous Substances Ordinance Ordinance No. 14 of 1974	♦ Applies to the manufacture, sale, use, disposal and dumping of hazardous substances as well as their import and export ♦ Aims to prevent hazardous substances from causing injury, ill-health or the death of human beings
Pollution Control and Waste Management Bill (draft document)	♦ Not in force yet ♦ Provides for prevention and control of pollution and waste ♦ Provides for procedures to be followed for licence applications
Foreign Investment Act 27 of 1990 (as amended by Foreign Investment Amendment Act 24 of 1993)	♦ Provides for the promotion of foreign investment in Namibia ♦ Considers environmental impacts associated with foreign investments.
Draft Wetland Policy of 2003	♦ Considering the proximity of the Walvis Bay Lagoon, a RAMSAR site, the Wetland Policy of 2003 is of importance and includes protection and conservation of wetlands and ecosystems.
National Marine Pollution Contingency Plan of 2017	♦ Coordinated and integrated national system for dealing with oil and other spills in Namibian waters.
Namport Safety, Health, Environment and Quality Policy	♦ Provides guidance to all members responsible for managing Safety, Health, Environment and Quality related aspects. ♦ Ensures compliance with all applicable legal SHEQ and related requirements.

Table 5-2 Municipal by-laws, guidelines and regulations

Municipal By-laws, Guidelines or Regulations	Key Aspects
Integrated Urban Spatial Development Framework for Walvis Bay	♦ Overall vision to transform Walvis Bay to being the primary industrial city in Namibia ♦ Aims to ensure that appropriate levels of environmental management is enforced for all developments in Walvis Bay
Integrated Environmental Policy of Walvis Bay (Agenda 21 Project)	♦ Indicates the directions that the Municipality of Walvis Bay will move towards in the forthcoming years to fulfil its responsibilities to manage the environment of Walvis Bay together with the town's residents and institutions ♦ Strong focus on conservation and protection of environment
Municipal By-law 19 and 20 on Effluents Entering Sewers	♦ Regulates the discharge of effluent into sewers and prohibits the introduction of certain wastes or products including steam into the sewers system.
Town Planning Scheme No. 35	♦ Manages and regulates development related to land use ♦ Proposes and identifies areas for specific future land use

Table 5-3 Relevant multilateral environmental agreements for Namibia and the project

Agreement	Key Aspects
Benguela Current Convention of 2013	♦ The Convention is a formal treaty between the governments of Angola, Namibia and South Africa that sets out the countries' intention "to promote a coordinated regional approach to the long-term conservation, protection, rehabilitation, enhancement and sustainable use of the Benguela Current Large Marine Ecosystem, to provide economic, environmental and social benefits."
Convention on Biological Diversity (CBD)	♦ Primary goal is the conservation of biodiversity ♦ Prescribes the precautionary principle ♦ Parties to the convention are obliged to: ♦ Establish a network of protected areas; ○ Create buffer areas adjacent to these protected areas using environmentally sound and ○ sustainable development practices; and ○ Rehabilitate degraded habitats and populations of species.
The Convention on Wetlands of International Importance especially as Waterfowl Habitat (referred as the RAMSAR Convention)	♦ It is a framework for international cooperation in the conservation and wise use of wetlands and their resources. ♦ Recognizes the Walvis Bay Nature Reserve – a tidal lagoon consisting of Pelican Point, adjacent intertidal areas, sandbars serving as roosting sites and mudflats exposed during low tide (12,600 ha) as a Wetland of International Importance.
UN Convention for the Prevention of Marine Pollution from Land-based Sources	♦ Concerns itself with the protection of marine fauna and flora by preventing marine pollution from land-based sources. ♦ Contracted parties, are committed to take all possible steps to prevent pollution of the sea as well as the direct or indirect introduction of substances or energy by humans into the marine environment resulting in such adverse effects as harm to living resources and to marine ecosystems, hazards to human health, damage to services/ facilities or interference with other legitimate uses of the area.
International Convention on Oil Pollution Preparedness, Response and Cooperation of 1990	♦ International maritime convention establishing measures for dealing with marine oil pollution incidents nationally and in co-operation with other countries.
Abidjan Convention of 1981	♦ The Convention for Cooperation in the Protection, Management and Development of the Marine and Coastal Environment of the Atlantic Coast of the West, Central and Southern Africa Region ♦ Provides an overarching legal framework for all marine-related programmes in West, Central and Southern Africa.
Stockholm Declaration on the Human Environment, Stockholm 1972.	♦ Recognizes the need for a common outlook and common principles to inspire and guide the people of the world in the preservation and enhancement of the human environment

6 THE RECEIVING ENVIRONMENT

For purposes of this EMP, a detailed environmental description is not provided. However, this section briefly summarises the most important environmental characteristics of the study area, as well as a short statement on the potential impacts/implications of the port operations on each.

6.1 LOCALITY AND SURROUNDING LAND USE

The commercial harbour of the Port of Walvis Bay is situated centrally on the west coast of Namibia. The port town of Walvis Bay is the biggest coastal town of Namibia and originated around the harbour. The harbour holds its value due to the natural deep waters of the bay, protected by the Pelican Point sand spit. Walvis Bay was originally established as mainly a fishing and port town and these two industries remain the main driving force behind the town's economy. The port is surrounded by a variety of land uses including residential, business and industrial. The port itself, and therefore the area where the Proponent will be located, is zoned for harbour and railway use and surrounding port users constitute similar industries.

Of specific importance near the harbour are the Walvis Bay Lagoon, the salt works and the southern part of the bay west of the lagoon, which are the key components of a 12,600 ha Ramsar site (Wetland of International Importance). On land, Walvis Bay is further mostly surrounded by the Dorob National Park which falls under the management of the Ministry of Environment, Forestry and Tourism.

Implications and Impacts

On its land side, the port is surrounded by residential, commercial and industrial properties. Noise emanating from the Proponent's activities may negatively impact on residents directly neighbouring the port. In addition, development and operations of the port may lead to increased traffic impacts.

The Proponent will operate near a sensitive environment, the Walvis Bay Lagoon (RAMSAR Site) and environmental consideration should take its sensitivity into account.

6.2 CLIMATE

Namibia's climate is dominated by dry conditions for most of the year and particularly so in the west. The location of Namibia with respect to the Intertropical Convergence Zone, Subtropical High Pressure Zone and Temperate Zone is what determines the climate, with the Subtropical High Pressure Zone being the major contributor to the dry conditions (Atlas of Namibia Project, 2002; Bryant, 2010), see Figure 6-1.

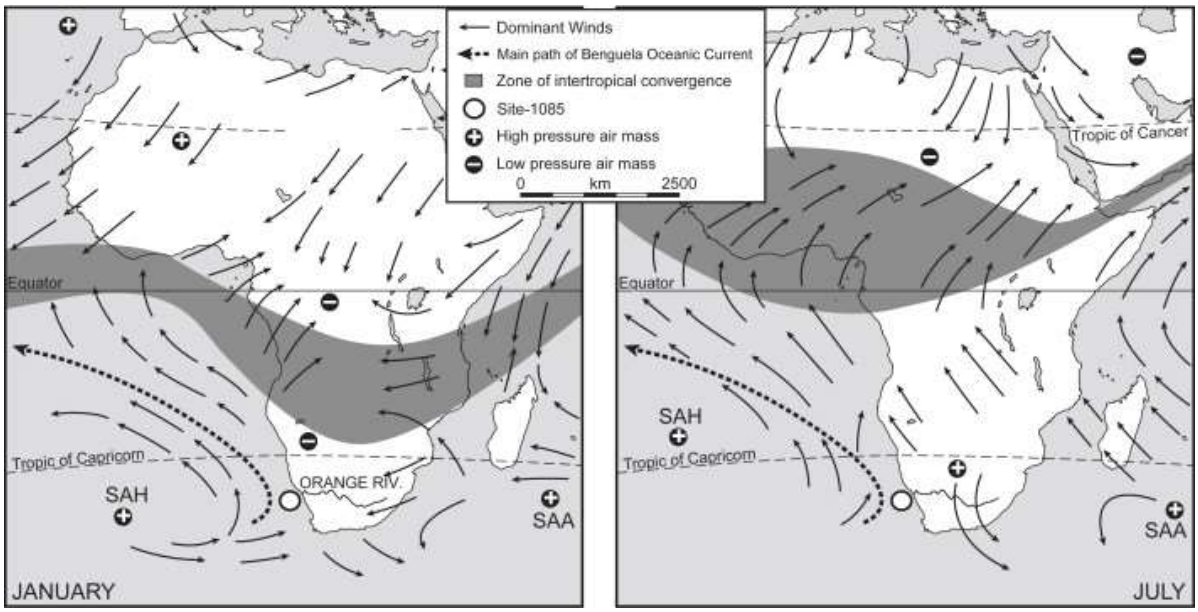

Figure 6-1 Map indicating the Intertropical Convergence Zone, Subtropical High Pressure Zone (SAH+), Benguela Current and Temperate Zone south of Tropic of Capricorn (not indicated) (from: http://www.meteoweb.eu)

Precipitation over Namibia is mainly controlled by the South Atlantic High (SAH), a high pressure cell (anticyclone) situated west of Namibia in the Subtropical High Pressure Zone. The SAH shifts during the year and is at higher latitudes in winter and lower latitudes in summer. In winter, as a result of being situated more north, the high pressure cell pushes any moisture originating from the Intertropical Convergence Zone northwards, preventing rain over Namibia. In summer, because the high pressure cell moves further south, and has less of an effect on the Intertropical Convergence Zone, moist air reaches Namibia, resulting in summer rains.

Studies indicate the presence of a thermal inversion layer at Walvis Bay. Originally this was thought to be at approximately 500 mamsl (Taljaard and Schumann 1940), but recent studies indicate it as low as 200 mamsl (Patricola and Chang, 2017; Corbett, 2018). A marine atmospheric boundary layer (MBL) exists offshore of the coastline that thins from more than 500 mamsl to 200 mamsl as it nears the coast (Figure 6-2). The MBL is a layer of cool, well-mixed, stable air that is capped by a thermal inversion (Patricola and Chang, 2016; Corbett 2018). This thermal layer or inversion layer will prevent the escape of pollutants such as smoke higher into the atmosphere. The MBL however contribute to high velocity wind speeds by funnelling the winds created by the SAH, resulting in what is referred to as the Benguela Low-Level Coastal Jet (Figure 6-2). Since the MBL overlap partially with the coastal plain, the wind generated by the Benguela Low-Level Coastal Jet also reaches inland, but diminishes relatively quickly further inland.

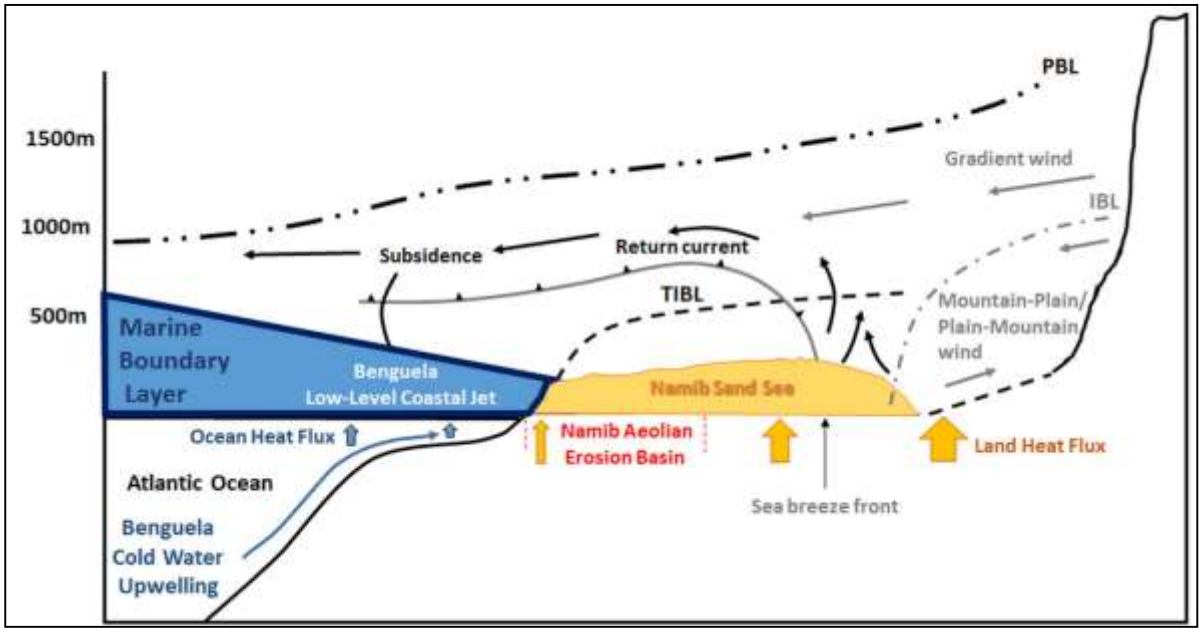

Figure 6-2 Marine atmospheric boundary layer (from: Corbett, 2018)

On a more localised scale, the climatic conditions on the central Namibian coast, and inland thereof (coastal plains), are strongly influenced by the cold Benguela Current, the SAH and the relatively flat coastal plains that are separated from the central highlands by a steep escarpment.

The anticlockwise circulation of the high pressure SAH and the action of the earth's Coriolis force results in strong southerly (longshore) winds blowing northwards up the coastline of Namibia (Bryant, 2010; Corbett, 2018). This longshore wind is responsible for upwelling of the cold, deep waters of the Benguela Current. As a result of the temperature difference between the cold surface water of the Benguela Current and the warm coastal plains, the southerly wind is diverted to a south south-westerly to south-westerly wind along the coast. At Walvis Bay the temperature gradient that forms over the warmer darker sands south of the Kuiseb River, compared with the cooler, lighter coloured gravel plain to the north of the river, leads to the formation of cyclonic circulation (localised low-pressure systems) centred over the dune area, due to warm air that rises over the dune area. This, together with topographical changes and land-use, causes a local deflection of wind flow over the Walvis Bay area, from south to southwest in Walvis Bay (Figure 6-3), to more southwest to westerly further inland, as well as

reduced wind speeds. The more low speed, westerly winds are for example experienced at the Walvis Bay Airport (Rooikop).

The winds are strongest in early to mid-summer (September to January) when the SAH is at its strongest and most persistent, and the temperature difference between the sea and the desert plains are at its greatest. Wind speeds then occasionally exceed 32 km/hr and usually peaks late morning to early afternoon. In winter, the SAH loses strength and the southerly to south-westerly winds are at their weakest. Winter winds do not have enough strength to reach far inland. Autumn to winter conditions do however promote the formation of east wind conditions (berg winds) that can reach speeds of more than 50 km/hr and transport a lot of sand. East winds occur when the inland plateau is cold with a localised high pressure cell, while a low pressure system is present at the coast. The high pressure cell forces air off the escarpment and as the air descents, it warms adiabatically as well as create a low pressure system due to the vertical expansion of the air column. The warm air flows toward the coastal low and as it passes over the Namib plains, it heats up even further. The wind manifests itself as very strong, warm and dry wind during the mornings to early afternoon, but dissipate in the late afternoon.

Throughout the year the prevailing night time regional wind is a weak easterly wind. This results when the mainland cools to below the temperature of the coastal water. This results in a coastal low versus an onshore high pressure system with first no wind in the early evening, when temperatures between water and land is similar, and then weak easterly winds as the temperature difference increase. Wind within the MBL remains dominated by the Benguela Low-Level Coastal Jet, causing a localised southerly wind over Walvis Bay, see Figure 6-2.

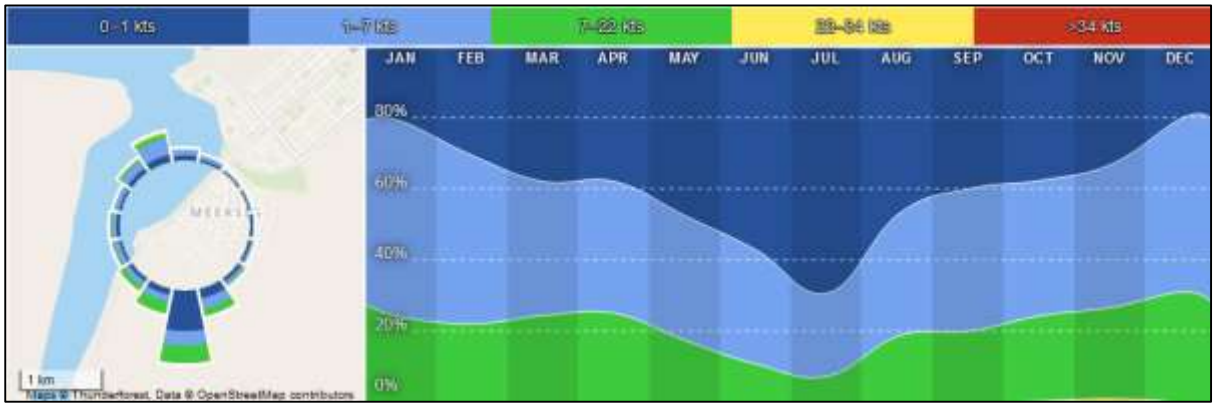

Figure 6-3 Wind direction and strength at the Walvis Bay Lagoon as measured between 2013 and 2024 (https://www.windfinder.com/windstatistics/walvis_bay_lagoon)

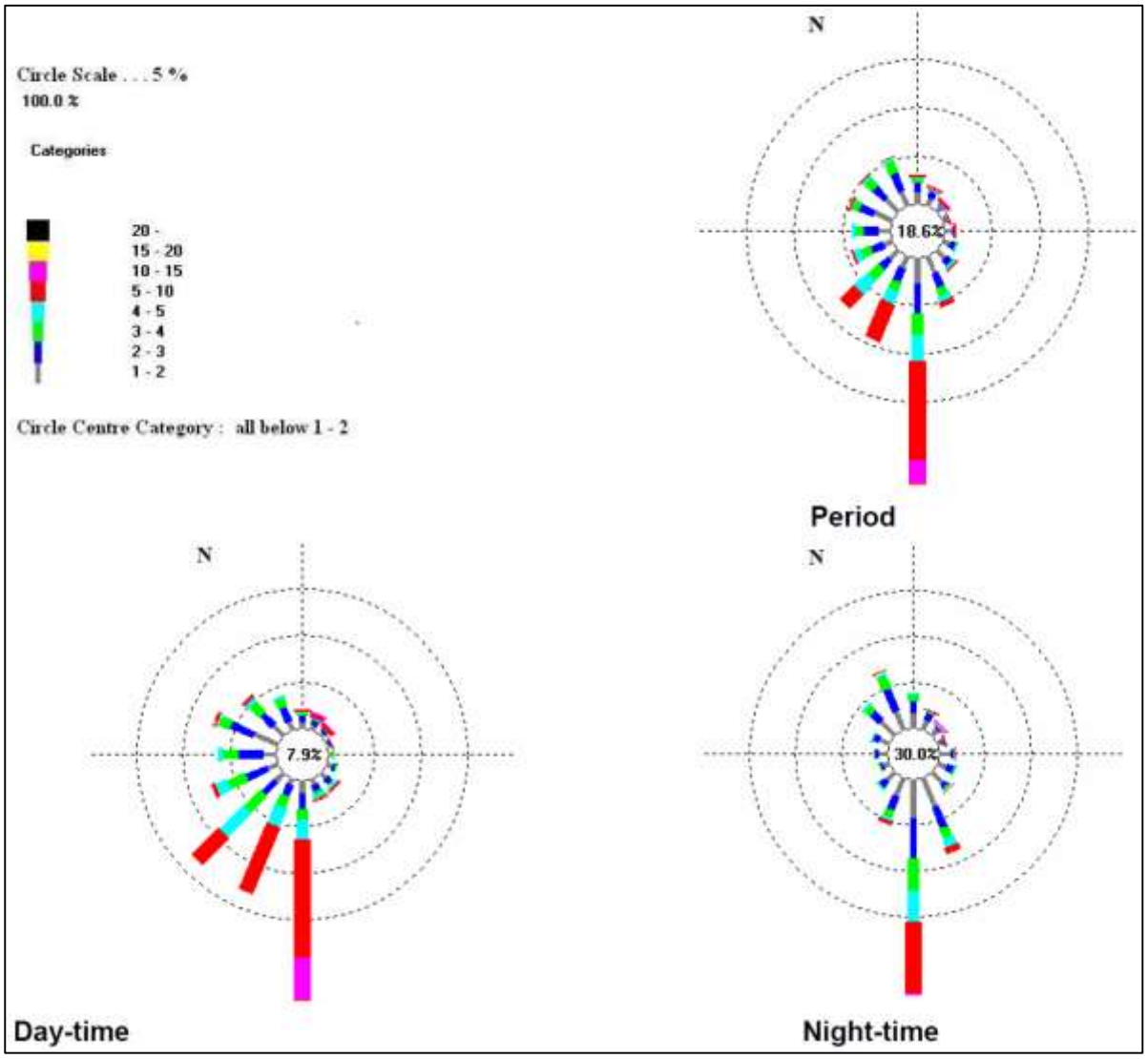

Figure 6-4 Period, daytime and night-time wind roses for Walvis Bay town for the period 2006 (Petzer, G. & von Gruenewaldt, R., 2008)

Temperature at Walvis Bay is strongly regulated by the cold Benguela current. As a result, there is typically limited variation between diurnal and seasonal temperatures. Average annual temperatures are approximately 18 °C to 19 °C with the maximum temperature seldom above 30 °C and minimums rarely below 5 °C (Figure 6-5). The only real temperature extremes are experienced during east wind conditions in the autumn to early winter months when temperatures can reach the upper thirties or even low forties. This results in these months having an average maximum temperature ranging from 30 °C to 35 °C. As one moves inland from Walvis Bay, daytime temperatures increases rather quickly while night time temperatures can get significantly colder in the desert environment.

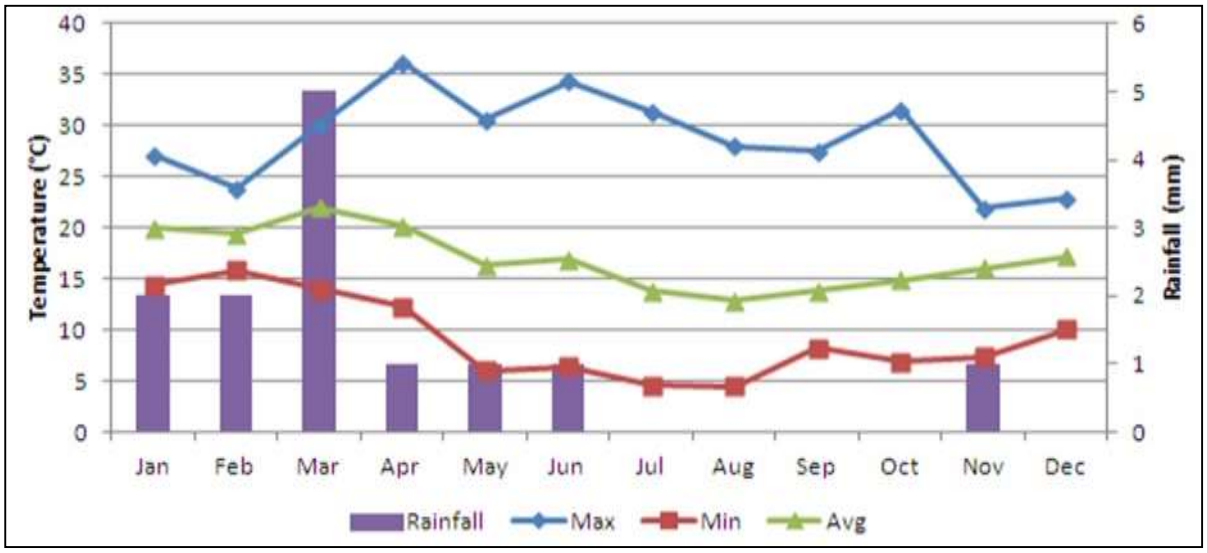

Figure 6-5 Temperature and rainfall at Walvis Bay (from: uMoya-NILU, 2020)

As explained above, the SAH severely limits the amount of rainfall over Namibia and especially at the coast and over the Namib Desert. As such, the average annual rainfall in Walvis Bay is below 50 mm (Figure 6-5), with 100% variation in annual rainfall. Infrequent, heavy rainfall does occur and typically results in rather chaotic conditions as Walvis Bay, and other coastal towns, has not been developed to cater for large volumes of storm water. Fog plays a very significant role as source of water for many plants and animals along Namibia's coast and the Namib Desert. Walvis Bay has up to 900 hours of fog per year and it results from the cold Benguela water cooling the humid air above it to such a temperature that the water vapour condenses to form fog and low level clouds (Mendelsohn et al., 2002).

Implications and Impacts

Due to the ability of the strong winds to carry dust to sensitive receptors, wind is an important factor to be considered for the Proponent's operations. Wind is predominantly a strong south-westerly wind with occasional northerly winds. This means dust pollution originating at the Proponent will normally be carried northeast, away from receptors such as surrounding neighbours, but towards port users, the ocean and to vessels that may be berthed nearby. During east winds, contaminants carried by wind will travel towards the new container terminal and the lagoon entrance.

In terms of climate change and sea level rise, the port should be safe in the short to medium term future.

6.3 CORROSION ENVIRONMENT

The Namibian coastline is well known for being a very corrosive environment, which may be attributed to the frequent occurrence of salt-laden fog, periodic winds and abundance of aggressive salts (dominantly sodium chloride and sulphates) in the soil. The periodic release of hydrogen sulphide (H_2S) from the ocean is also expected to contribute to corrosion potential. Figure 6-6 presents corrosion comparison data for a number of locations in southern Africa, including Walvis Bay. The combination of high moisture and salt content of the surface soil can lead to rapid deterioration of metal and concrete structures.

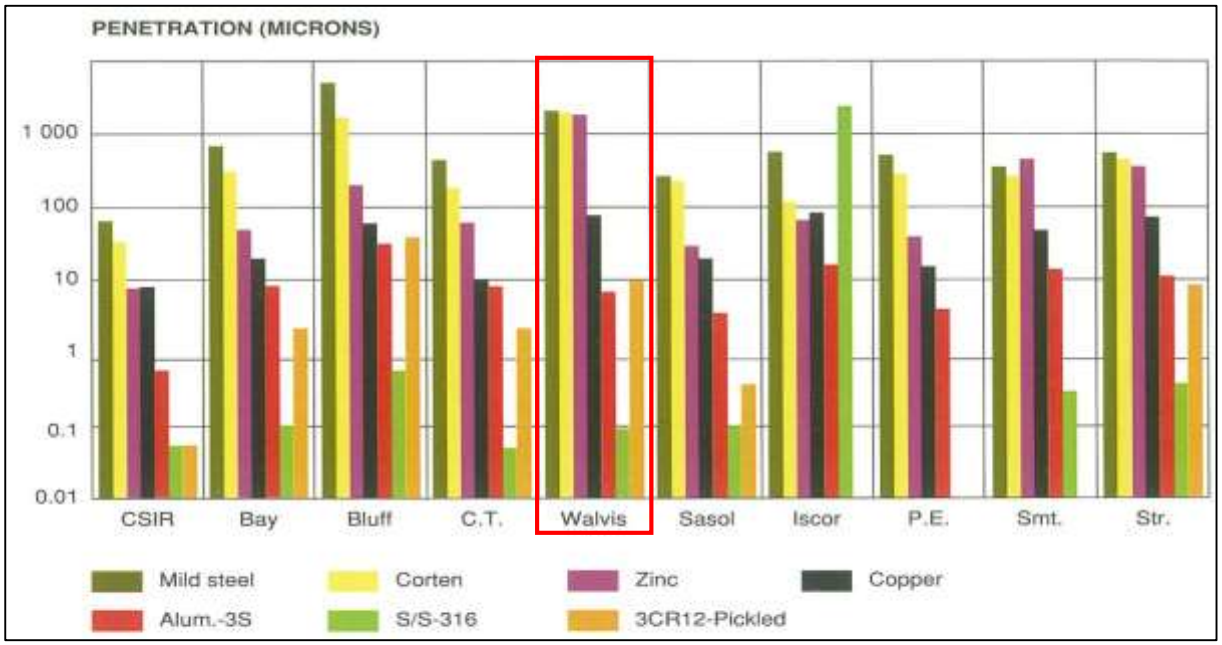

Figure 6-6 Twenty year corrosion exposure results in southern African towns (Callaghan 1991)

Implications and Impacts

Chemical weathering of metal and concrete structures is a concern. Due to the extreme corrosive environment the choice of building materials is important and regular maintenance is essential to maintain the integrity of all infrastructure.

6.4 FAUNA OF THE BAY

6.4.1 Birds

Walvis Bay falls within Important Bird Area (IBA) NA014 and NA013 (http://datazone.birdlife.org; Simmons et al. 1999). Important Bird Area NA014 can be regarded as the most important coastal wetland area in southern Africa. Of note is the Walvis Bay Lagoon, the salt works and the southern part of the bay west of the lagoon, which are the key components of the 12,600 ha RAMSAR site (Wetland of International Importance. It is important both as an over-wintering area for Palaearctic migrant wader species as well as for African species such as Greater and Lesser Flamingos, Great White Pelican and Chestnut-Banded Plovers. The sewerage ponds, situated about 3 km southeast of the study area, are regarded as sensitive artificial wetland. Although a manmade fresh water source, it is an attraction for pelicans and flamingos. The artificial wetland also support 53% of the duck and geese population in the area. The wetland is formed by the constant inflow of semi-purified water and supports extensive stands of reeds. There are flight paths for birds between the sewerage ponds, the lagoon and the offshore bird breeding platform (Ghwano Island) north northeast of the harbour.

Important Bird Area NA013 consist of the coastal area between Walvis Bay and Swakopmund, and is approximately 30 km long and 700 m wide. Bird counts on this exceed 13,000 shorebirds of approximately 31 species, most of which are Palearctic migrants. IBA NAO13 is not only the richest shoreline in terms of shorebird density anywhere in southern Africa, but also supports the densest colony of breeding Damara Terns known (Scott & Scott 2013). Important in this area is the guano platform, or bird island, that provides roosting and breeding sites to large numbers of birds.

Implications and Impacts

The aforementioned areas surrounding the harbour are important bird breeding and bird feeding grounds. Bright lights used at night, such as leading lights, has the potential of disorientating birds like flamingos that fly at night. This may lead to collisions with man-made structures.

6.4.2 Marine Animals

The marine mammals occurring at various times in the Walvis Bay area are cetaceans: Common Bottlenose Dolphins, the Namibian endemic Heaveside's Dolphins, Dusky Dolphins, Humpback Whales, Southern Right Whales and Pigmy Right Whales; as well as Cape Fur Seals. The Common Bottlenose Dolphin, Heaveside's dolphin and Cape Fur Seal are seen most frequently (daily), the Pigmy Right Whale less frequently (monthly) and the rest infrequently as they are seasonal or infrequent visitors. The Common Bottle Nose Dolphin with a population of less than a 100 individuals is thought of as quite unique in being one of the smallest mammal populations in Africa.

Namibia has quite a large population of Cape fur seals. A large colony are present at Pelican Point. Historically, Cape fur seal populations showed significant declines in population numbers due to overharvesting. However, the Namibian population has shown significant increases over the last two decades with new populations of seals establishing all along the coast.

The Namibian coastal waters are home to five species of turtles and all five species are listed as threatened under the IUCN which is controlled through CITES. The most common occurring turtles near the proposed development are the Leatherback Turtle and Green Sea Turtle, with the Hawksbill Sea Turtle occurring occasionally.

Implications and Impacts

Whales, dolphins and seals are often considered as flagship species to which people attach great inherent value. This is evident from the million dollar tourism industry based on the presence of these mammals. Pollution may have a negative impact on locally occurring populations. Increased ship traffic may also result in more frequent ship strikes with whales, dolphins and turtles. Excessive noise producing events in the marine environment may also negatively impact on marine mammals. Pollution of the marine environment may negatively impact on all marine animals. Dust from the stored commodities can end up in the ocean. Over time build-up of metals and elements occur in the sediment, leading to the bio accumulation and magnification of these elements in animals.

6.5 SOCIO ECONOMIC ENVIRONMENT

According to the preliminary results of the 2023 population and housing census, Walvis Bay has an urban population size of 51,618 and a total population (urban and rural combined) of 103,115 (Namibia Statistics Agency, 2024). Walvis Bay is the principal port of Namibia, and is an import/export facility for processed fish, mining products and beef, amongst others. The area is linked to Namibia's air, rail and road network, making the port well situated to service Zambia, Zimbabwe, Botswana, southern Angola and South Africa. The port and related industries provide secure employment to residents of the area. The fishing industry is the major employer of low skilled workers on a permanent and seasonal basis. The total employment of this sector is estimated at 2% of the total Namibian workforce. Based on the 2011 census, unemployment in Walvis Bay was at 21.8%, which is well below the Namibian rate of 37%. Economic activities relate mostly to businesses related to the harbour. The town is known as a business and industrial area.

The waters of the bay and lagoon at Walvis Bay provides the local and national community with a range of benefits. Small scale purse-seine fishing for mainly mullet occurs north of the town. Fish factories make use of the harbours water for the processing of fish. Tourists frequent Walvis Bay and especially the lagoon and bay where sightseeing and sunset boat tours to view seals, dolphins and whales and the rare sunfish (*Mola mola*), are very popular. Bird watching along the eastern shore of the lagoon is also a major tourist attraction. Mariculture, especially for mussels and oysters, has become important for both local and international markets. All the

aforementioned beneficial uses of the bay's natural environment would be seriously jeopardised if major environmental impacts occurred in the bay.

Table 6-1 Demographic characteristics of Walvis Bay, the Erongo Region and Nationally (Namibia Statistics Agency, 2024)

	Walvis Bay Urban	Erongo Region	Namibia
Population (Males)	26,212	122,322	1,474,224
Population (Females)	25,406	117,884	1,548,177
Population (Total)	51,618	240,206	3,022,401
Population Density (persons/km^2)	2,730.8	3.8	3.7

Walvis Bay is considered to have a high HIV vulnerability. Local and foreign businessmen, fishermen as well as truck drivers are mobile workers which have been identified to make more use of sex workers. There is a higher concentration of such local and foreign labourers in Walvis Bay. The town is also a destination site for internal migrants looking for work in the construction and fishing sectors. Such workers also make use of transactional sex which is supplied by mostly women, to supplement their income. The high prevalence to engage in commercial sex, increases the HIV probability and risk profile of the mobile and local community.

Implications and Impacts

Some skills development and training may also result from continual operations and revenue will be generated and livelihoods sustained.

The spending power of locals is likely to increase which may increase the occurrences of social ills such as alcohol or drug abuse.

6.6 CULTURAL, HERITAGE AND ARCHAEOLOGICAL ASPECTS

Walvis Bay does not have particularly rich heritage features or archaeologically significant aspects. The port area where the Proponent will be located has been developed long ago. No other object or building of specific archaeological or cultural significance is nearby.

Implications and Impacts

No implications or impacts expected.

7 ENVIRONMENTAL MANAGEMENT PLAN

The EMP provides management options to ensure impacts of the facility are minimised. An EMP is a tool used to take pro-active action by addressing potential problems before they occur. This should limit the corrective measures needed, although additional mitigation measures might be included if necessary. The environmental management measures are provided in the tables and descriptions below. These management measures should be adhered to during the various phases of the operation of the facility. This section of the report can act as a stand-alone document. All personnel taking part in the operations of the facility should be made aware of the contents in this section, so as to plan the operations accordingly and in an environmentally sound manner.

The objectives of the EMP are:

- to include all components of construction activities (upgrades, maintenance, etc.) and operations of the facility;
- to prescribe the best practicable control methods to lessen the environmental impacts associated with the project;
- to monitor and audit the performance of construction and operational personnel in applying such controls; and
- to ensure that appropriate environmental training is provided to responsible construction and operational personnel.

7.1 IMPLEMENTATION OF THE EMP

Various potential and definite impacts will emanate from the operations and decommissioning phases. The majority of these impacts can be mitigated or prevented. The impacts, risk rating of impacts as well as prevention and mitigation measures are listed below.

As depicted in the subsections below, impacts related to the operational phase are expected to mostly be of low to medium significance and can mostly be mitigated to have a low significance. The extent of impacts are mostly site specific to local and are not of a permanent nature. Due to the nature of the surrounding areas, cumulative impacts are possible and include noise pollution, traffic impacts and impacts on birds flying at night (bright lighting).

7.1.1 Planning

During the phases of planning for operations and decommissioning of the facility, it is the responsibility of Proponent to ensure they are and remain compliant with all legal requirements. The Proponent must also ensure that all required management measures are in place prior to and during all phases, to ensure potential impacts and risks are minimised. The following actions are recommended for the planning phase and should continue during various other phases of the project:

- Ensure that all necessary permits from the various ministries, local authorities and any other bodies that may govern the construction (maintenance) and operations of the facility are in place and valid.
- Ensure all appointed contractors and employees enter into an agreement which includes the EMP. Ensure that the contents of the EMP are understood by the contractors, sub-contractors, employees and all personnel present or who will be present on site.
- Make provisions to have a Health, Safety and Environmental (HSE) Coordinator to implement the EMP and oversee occupational health and safety as well as general environmental related compliance at the site.
- Make provisions to have a community liaison officer on site who will handle complaints and community input, and through whom, where reasonable, monitoring data can be requested. Communicate the contact details of the community liaison officer to neighbours and potential interested and affected parties when the project is initiated.
- Have the following on site where reasonable to deal with all potential emergencies:
    - Risk management / mitigation / EMP/ emergency response plan and HSE manuals;
    - Adequate protection and indemnity insurance cover for incidents;
    - Comply with the provisions of all relevant safety standards;

- Procedures, equipment and materials required for emergencies.

- If one has not already been established, establish and maintain a fund for future ecological restoration of the project site should project activities cease and the site is decommissioned and environmental restoration or pollution remediation is required.
- Establish and / or maintain a reporting system to report on aspects of construction activities, operations and decommissioning as outlined in the EMP.

7.1.2 Employment

An increase of skilled and professional labour resulted from, and is maintained by, the operations of the project. Employees are sourced locally as far as practically possible.

Desired Outcome: Provision of employment to local Namibians.

Actions

Mitigation:

- The Proponent must employ local Namibians where possible. If the skills exist locally, employees must first be sourced from the town, then the region and then nationally.

Responsible Body:

- Proponent

Data Sources and Monitoring:

- Bi-annual summary report based on employee records.

7.1.3 Skills, Technology and Development

During various phases of operations, training are provided to a portion of the workforce. Skills are transferred to an unskilled workforce for general tasks. The technology required for the development of the facility is often new to the local industry, aiding in operational efficiency. Development of people and technology are key to economic development.

Desired Outcome: To see an increase in skills of local Namibians, as well as development and technology advancements in associated industries.

Actions

Enhancement:

- If the skills exist locally, contractors and employees must first be sourced from the town, then the region and then nationally. Deviations from this practise must be justified.
- Skills development and improvement programs to be made available as identified during performance assessments.

Responsible Body:

- Proponent
- Contractors

Data Sources and Monitoring:

- Record should be kept of training provided.
- Ensure that all training is certified or managerial reference provided (proof provided to the employees) inclusive of training attendance, completion and implementation.
- Bi-annual summary report based on records kept.

7.1.4 Revenue Generation

The current operations generate revenue that are paid to the national treasury. An increase of skilled and professional labour will result from the operations of the project and related wages and salaries will be paid. Revenue will be generated through the contracting of port and related contractors' services.

Desired Outcome: Contribution to the local and national economy. Contribution to national treasury.

Actions

Enhancement:

- The Proponent must employ local Namibians and source Namibian contractors, goods and services as far as is practically possible. Deviations from this practise must be justified.

Responsible Body:

- Proponent

Data Sources and Monitoring:

- Bi-annual summary report based on employee records.

7.1.6 Demographic Profile and Community Health

The project is reliant on labour during the operational phase. Local construction teams in Walvis Bay will be used for general maintenance and upgrade activities. Community health may be exposed to factors such as communicable disease like HIV/AIDS and alcoholism/drug abuse, associated with increased spending power of the labour force. Foreign persons in the area may increase the cumulative risk of communicable disease in Walvis Bay.

Positive impacts will related to employees and contractors' increased economic resilience and improved livelihoods.

Desired Outcome: To prevent the in-migration and growth in informal settlements, prevent the spread of communicable disease and prevent / discourage socially deviant behaviour.

Actions:

Prevention:

- Employ local people from the area where possible, deviations from this practise should be justified appropriately.
- Adhere to all municipal by-laws relating to environmental health which includes, but is not limited to, sanitation requirements for workers on site.
- Appointment of reputable contractors.

Mitigation:

- Educational programmes for employees (especially truck drivers) on HIV/AIDs and general upliftment of employees' social status.

Responsible Body:

- Proponent

Data Sources and Monitoring:

- Facility inspection sheet for all areas which may present environmental health risks, kept on file.
- Bi-annual summary report based on educational programmes and training conducted.
- Bi-annual report and review of employee demographics.

7.1.7 Health, Safety and Security

Activities associated with the operations are reliant on human labour and therefore exposes them to health and safety risks. Activities such as the operation of machinery, falling from heights and handling of potentially hazardous materials (dermal contact and inhalation of ore and other industrial cargo dusts), poses risks to employees. If not contained, windblown dust may further pose health risk to neighbours and other nearby receptors.

Security risks are related to unauthorised entry, theft and sabotage.

Desired Outcome: To prevent injury, health impacts and theft.

Actions

Prevention:

- Implement and maintain an integrated health and safety management system, to act as a monitoring and mitigating tool, which includes operational, safe work and medical procedures, permits to work, emergency response plans, housekeeping rules, MSDS's and signage requirements (PPE, flammable etc.).
- Develop emergency response plans for all possible health, safety and security impacts and appoint responsible personnel in key positions to activate and oversee such plans when required.
- All Health and Safety standards specified in the Labour Act, or better, should be followed.
- Clearly label dangerous and restricted areas as well as dangerous equipment and products.
- Provide all employees with required and adequate personal protective equipment (PPE) including dust masks and protective clothing for workers in close proximity to, or working with, the dust producing cargo. Accidental inhalation, ingestion, dermal or eye contact with dust must be prevented at all times.
- Ensure that all personnel who will work on site receive adequate training on:
  - operation of equipment (e.g. front-end loaders, conveyors, etc.)
  - reading and understanding of MSDS instructions (take note that MSDS documents are not always 100% adequate and that some extra information for hazardous chemicals may be required).
  - Handling, segregation and containment of potentially hazardous substances.
  - identification of incompatible products and the need to separate them during storage (segregation).
  - identification of potential hazardous conditions or events.
  - first aid and actions to be taken should contact, inhalation or ingestion of harmful products occur.
  - firefighting and compatible firefighting media for specific products (see section 7.1.11).
- A MSDS file in which a particular MSDS can quickly be found, must be available on site.
- For specific potentially more dangerous products (e.g. highly reactive with other chemicals and substances, highly flammable, highly corrosive or poisonous), abridged emergency procedures can be prepared that summarise they key do's and don'ts for each of these chemicals.
- The contact details of all emergency services must be readily available.
- An emergency shower and eyewash station must present and inspected daily to ensure it is in working order and ready for use in an emergency.
- Regularly check and service the dust suppression systems to ensure optimal working conditions.
- Equipment on site must be stored in a way that does not encourage criminal activities (e.g. locked away to prevent theft).
- Security procedures and proper security measures must be in place to protect workers and prevent theft.

- Strict security that prevents unauthorised entry into the site, especially during times when passenger vessels visits the port.

Mitigation:

- For all emergency situations, the appropriate emergency response plan must be implemented as soon as possible in order to minimize the magnitude of impacts or prevent such impacts from developing into more severe impacts.

Responsible Body:

- Proponent
- Contractors

Data Sources and Monitoring:

- Receive chemical composition analysis results of various ores and products to be handled from the mines and scrutinize the results for any carcinogenic (or other hazardous) gangue material like asbestos or arsenic. Should any such material be present, additional safety measures must be implemented to ensure that no workers or nearby receptors are exposed to dust.
- If regular complaints are received regarding dust, air quality monitoring results must be investigated and corrective action taken. Switching to a real-time dust monitoring system will allow for a pro-active approach to dust prevention. Monitoring to be advised on by an independent specialist (monitoring protocol to be followed).
- Any incidents must be recorded with action taken to prevent future occurrences.
- Industry standards and protocols, etc.
- A bi-annual report should be compiled of all incidents reported. The report should contain dates when training were conducted and when safety equipment and structures were inspected and maintained.

7.1.8 Traffic

The operations of the client will increase the volume of trucks accessing the port area. This will increase traffic on the roads through town, to and from the port. Heavy motor vehicles may result in an increased, cumulative impact on the road surface of the area, especially when turning on these roads. Trucks may block neighbouring port users' access roads and increase the likelihood of accidents and incidents.

Desired Outcome: Minimum impact on traffic and no transport or traffic related incidents.

Actions

Mitigation:

- Trucks delivering or collecting goods should not be allowed to obstruct any traffic in surrounding areas and the town.
- Trucks associated with the facility should not be allowed to park or overnight in the port area or near the entrance/exit gates, and may only overnight at areas designated for this purpose.
- Adhere to The Road Traffic and Transport Regulations, 2001 and all other applicable legislation related to road transport and maximum axle loads.
- If any traffic impacts are expected, traffic management should be performed to prevent these.
- The placement of signs to warn and direct traffic will mitigate traffic impacts.

Responsible Body:

- Proponent

Data Sources and Monitoring:

- The Road Traffic and Transport Regulations, 2001.
- Any complaints received regarding traffic issues should be recorded together with action taken to prevent impacts from repeating itself.
- A bi-annual report should be compiled of all incidents reported, complaints received, and action taken.

7.1.9 Air Quality Related Impacts

Reduced air quality as a result of exhaust gases (greenhouse gases) of trucks and trains visiting the property. This may have localised health impacts, but are expected to disperse relatively quickly due to the prevailing south-westerly winds in Walvis Bay. It will however still contribute to greenhouse gas emissions that in turn contribute to climate change. The contribution of greenhouse gas emissions from pumps and trucks related to this project is not considered to be significant, but does have a cumulative nature when considering the entire operational area of the port.

Air quality as a result of windblown dust can cause health effects, especially through chronic inhalation of such dust, in the nearby communities. The risk is related to the toxic/irritant nature respirable fractions (PM10) and thoracic fraction (PM2.5) of dust when chemicals and dry bulk cargo are not contained.

Desired Outcome: To prevent health impacts and to reduce greenhouse gas emissions.

Actions

Prevention:

- All cargo delivered to or dispatched from the site must be suitably contained and secured to prevent product loss and dust.
- Operators of equipment used to load and offload trucks and rail cars must be suitably trained.
- Should any bagging or debagging operations (bag cutting) occur on site, ensure it is within an enclosed space or during windless conditions and that all debagging personnel wear adequate PPE.
- Maintain dust suppression systems and perform dust suppression when needed, such as during windy conditions.
- If dust originates from the conveyor system, measures should be investigated to close the conveyor.

Mitigation:

- Implement a dust monitoring programme, preferably real-time) to firstly serve as an indicator when dust cannot be successfully contained to the site and dust suppression measures must be initiated. Secondly, since the WBBT is not the only facility handling bulk cargo, dust monitoring results can aid in identifying the Proponent's contribution to dust problems in the Port, when complaints are received.

Responsible Body:

- Proponent
- Contractors

Data Sources and Monitoring:

- Dust monitoring stations should be strategically placed around the facility.
- Any complaints received regarding dust must be recorded, investigated and the problem rectified.
- Any incidents must be recorded with action taken to prevent future occurrences.
- A bi-annual report should be compiled of all incidents and complaints reported. The report should contain dates when safety equipment and structures were inspected and maintained.

7.1.11 Fire

Operational activities may increase the risk of the occurrence of fires if proper maintenance and housekeeping are not conducted. Some product stored on site is flammable and / or static in nature and chemical dry bulk cargo dust (fines) suspended in the air can become flammable, and even explosive, if present in excessive quantities.

The conveyor system traversing over neighbouring sites (e.g. nearby liquid mud plant), present a special risk as it can generate static electricity when operational and failing bearings may generate significant heat. Flammable vapours or suspended dust fines can then potentially ignite.

Desired Outcome: To prevent property damage, possible injury and impacts caused by uncontrolled fires.

Actions:

Prevention:

- A holistic fire protection and prevention plan is needed for flammable products. This plan must include an emergency response plan, firefighting plan and spill recovery plan, and should include specific substances handled at the site. The plan should consider risks posed to and by neighbouring properties.
- Ensure sufficient firefighting and fire prevention measures are in place for the specific products being stored and handled on site. This includes specific fire suppressants compatible with the materials used/stored.
- Prepare and regularly update the firefighting and prevention plan and equipment according to the materials stored on site, keeping in mind the activities on neighbouring properties.
- Share the requirements for firefighting on site with Namport.
- Regular personnel training (firefighting, fire prevention and responsible housekeeping practices).
- Include fire drills with neighbouring properties to ensure co-operation in case of an emergency.
- Ensure all materials are stored strictly according to MSDS instructions. This include segregation of incompatible products.
- Maintain regular site, mechanical and electrical inspections and maintenance. This should include ensuring that all grounding (earthling) structures are in place.
- Clean all spills / leaks immediately.

Mitigation:

- For any fire related emergency situation, the appropriate emergency response plan must be implemented as soon as possible in order to minimize the magnitude of impacts or prevent such impacts from developing into more severe impacts.

Responsible Body:

- Proponent
- Contractors

Data Sources and Monitoring:

- A register of all incidents must be maintained. This should include measures taken to ensure that such incidents do not repeat themselves.
- A bi-annual report should be compiled of all incidents reported. The report should contain dates when fire drills were conducted and when fire equipment was tested and training given.

7.1.12 Noise

Noise pollution will exist due to heavy motor vehicles and locomotives accessing the site to load and offload cargo, front-end loaders offloading and moving cargo, conveyors, etc. As the site is situated in a port area, noise impacts are expected. The cumulative impact of noise sources originating from the port is however a nuisance in the nearby residential areas. The maintenance or upgrade phases may generate excessive noise for short periods of time.

Desired Outcome: To prevent any nuisance and hearing loss due to noise generated.

Actions

Prevention:

- The Health and Safety Regulations of the Labour Act and World Health Organization (WHO) guideline on maximum noise levels (Guidelines for Community Noise, 1999) to prevent hearing impairment for workers on site and not to be a nuisance to communities should be considered during the construction and operational phases.
- Confine noise generating operational activities to daytime hours as far as possible.
- The nuisance created by audible warning signals on trucks and forklifts should be prevented by switching to a flashing light or 'broadband white noise' system.

Mitigation:

- Hearing protectors as standard PPE for workers in situations with elevated noise levels.
- All machinery, such as conveyors, must be regularly serviced to ensure minimal noise production.

Responsible Body:

- Proponent
- Contractors

Data Sources and Monitoring:

- Health and Safety Regulations of the Labour Act and WHO Guidelines.
- Maintain a complaints register.
- Bi-annual report on complaints and actions taken to address complaints and prevent future occurrences.

7.1.13 Waste production

Various waste streams will result from the operational phase and development of the facility. Waste may include hazardous waste associated with the handling of hazardous products and contaminated packaging material (e.g. maintenance). Domestic waste will be generated by the facility and related operations. Waste presents a contamination risk and when not removed regularly, may become a fire hazard. Contaminated soil and water is considered as a hazardous waste.

Desired Outcome: To reduce the amount of waste produced, and prevent pollution and littering.

Actions

Prevention:

- Waste reduction measures should be implemented and all waste that can be re-used / recycled must be kept separate.
- Ensure adequate temporary waste storage facilities are available.
- Ensure waste cannot be blown away by wind.
- Prevent scavenging (human and non-human) of waste.

Mitigation:

- Waste should be disposed of regularly and at appropriately classified disposal facilities, this includes hazardous material (empty chemical containers, contaminated rugs, paper, water and soil).
- See the material safety data sheets available from suppliers for disposal of contaminated products and empty containers.
- Liaise with the municipality regarding waste and handling of hazardous waste.
- Due to the nature of some hazardous materials, the containers they are packed in should be disposed of in an appropriate way at an appropriately classified waste disposal facility. See the material safety data sheets available from suppliers for disposal methods.
- To prevent people from using potentially contaminated containers for transport or holding of drinking water, all containers that will be discarded must be crushed or punctured prior to disposal.

Responsible Body:

- Proponent
- Contractors

Data Sources and Monitoring:

- A register of hazardous waste disposal should be kept. This should include type of waste, volume as well as disposal method/facility.
- Any complaints received regarding waste should be recorded with notes on action taken. All information and reporting to be included in a bi-annual report.

7.1.14 Ecosystem and Biodiversity Impact

The nature of the operational activities is such that the probability of creating a habitat for flora and fauna to establish is low. No significant impact on the biodiversity of the area is predicted as the site is void of natural fauna and flora. Excessive lighting used at night and especially those that are directed upwards may however blind birds like flamingos that fly at night. This may result in disorientation of birds and collisions with structures. Further impacts will mostly be related to pollution of the marine environment.

Desired Outcome: To avoid pollution of and impacts on the ecosystem and biodiversity.

Actions.

Mitigation:

- Report any extraordinary ecological sightings to the Ministry of Environment, Forestry and Tourism.
- Mitigation measures related to dust suppression, waste handling and the prevention of groundwater, surface water and soil contamination should limit ecosystem and biodiversity impacts.
- Avoid scavenging of waste by fauna.
- The establishment of habitats and nesting sites at the facility should be prevented where possible.
- Lights used at night should be kept to a minimum and should be directed downwards to the working surfaces. If problem areas are identified, corrective action should be implemented to prevent future bird strikes.

Responsible Body:

- Proponent

Data Sources and Monitoring:

- Record any bird strikes and identify problem areas.
- All information of extraordinary ecological sightings to be included in a bi-annual report.

7.1.15 Groundwater, Surface Water and Soil Contamination

Cargo that are not contained can contaminate the environment. The property is paved on storage area A, and runoff is contained in a separator pit. Pollution of soil and groundwater is thus not likely. However, dust that is not contained can reach sensitive receptors, like the nearby ocean, during times of strong wind. Oil, hydraulic fluid and fuel leaks from vehicles may also present a pollution risk. The conveyer system transferring cargo can fail and / or break, and may result in a catastrophic event, with contaminants entering the ocean, or causing a fire, and in extreme cases explosions if significant airborne dust is present. This may result in soil, water and atmospheric pollution.

Desired Outcome: To prevent the contamination of water and soil.

Actions

Prevention:

- Regularly inspect and maintain all infrastructure to minimise the chances of infrastructure failure.
- Proper dust suppression to prevent dust blown into the surrounding environment.
- Training of operators must be conducted on a regular basis (e.g. forklift operators) to limit product containment damage due to incorrect handling.

Mitigation:

- Regularly inspect the premises for any spills and clean without delay.
- Clean-up action must be taken immediately for all instances where dust is not contained (e.g. spillages and torn bags) or spillages occur (e.g. trucks or locomotives leaking fuel, hydraulic fluid or oil; or paints and solvents during construction and maintenance)

Responsible Body:

- Proponent
- Contractors

Data Sources and Monitoring:

- The procedures followed to prevent environmental damage during service and maintenance, and compliance with these procedures, must be audited and corrections made where necessary.
- A report should be compiled bi-annually of all spills. The report should contain the following information: date and duration of spill, product spilled, volume of spill, remedial action taken, etc.

7.1.16 Visual Impact

This is an impact that not only affects the aesthetic appearance, but also the integrity of the facility. The site is within an area zoned for port use.

Operations will be kept tidy and neat which will promote effectiveness and pollution prevention while being aesthetically pleasing. The project is located in close proximity to the docking area for passenger vessels and good housekeeping is important to maintain a good image of the Proponent and of Namport.

Desired Outcome: To minimise aesthetic impacts associated with the facility.

Actions

Mitigation:

- Regular waste disposal, good housekeeping and routine maintenance on infrastructure will ensure that the longevity of structures are maximised and a low visual impact is maintained.
- All structures and infrastructure constructed on site should be in line with the visual character of the surroundings as far as practically possible.

Responsible Body:

- Proponent
- Contractors

Data Sources and Monitoring:

- A bi-annual report should be compiled of all complaints received and actions taken.

7.1.17 Cumulative Impact

The main cumulative impact associated with the operational phase is traffic frequenting the site, noise, and dust should it not be contained. This will have a cumulative impact on traffic flow on surrounding street areas and outside the port, noise at nearby residential areas and the environment.

The cumulative effect of lighting on birds due to various developments in and around the port may also increase the incidences of collisions and interference with bird flight paths at night.

Desired Outcome: To minimise all cumulative impacts associated with the facility.

Actions

Mitigation:

- Addressing each of the individual impacts as discussed and recommended in the EMP would reduce the cumulative impact.
- Reviewing biannual and annual reports for any new or re-occurring impacts or problems would aid in identifying cumulative impacts and help in planning if the existing mitigations are insufficient.

Responsible Body:

- Proponent

Data Sources and Monitoring:

- Review bi-annual summary reports based on all other impacts to gain an overall assessment of the impact of the operational phase.

7.2 DECOMMISSIONING AND REHABILITATION

Decommissioning is not foreseen during the validity of the environmental clearance certificate. Decommissioning was however assessed. Should decommissioning occur at any stage, rehabilitation of the area may be required. Decommissioning will entail the complete or partial removal of infrastructure not forming part of post decommissioning use. Any pollution present on the site must be remediated. The impacts associated with this phase include noise and waste production as structures are dismantled. Noise must be kept within Health and Safety Regulations of the Labour Act and WHO standards. Waste should be contained and disposed of at an appropriately classified and approved waste facility and not dumped in the surrounding areas. Future land use after decommissioning should be assessed prior to decommissioning and rehabilitation initiated if the land would not be used for future purposes. The EMP for the facility will have to be reviewed at the time of decommissioning to cater for changes made to the site and implement guidelines and mitigation measures.

7.3 ENVIRONMENTAL MANAGEMENT SYSTEM

The Proponent currently implements an Environmental Management System (EMS) for their operations. An EMS is an internationally recognized and certified management system that will ensure ongoing incorporation of environmental constraints. At the heart of an EMS is the concept of continual improvement of environmental performance with resulting increases in operational efficiency, financial savings and reduction in environmental, health and safety risks. An effective EMS would need to include the following elements:

- A stated environmental policy which sets the desired level of environmental performance;
- An environmental legal register;
- An institutional structure which sets out the responsibility, authority, lines of communication and resources needed to implement the EMS;
- Identification of environmental, safety and health training needs;
- An environmental program(s) stipulating environmental objectives and targets to be met, and work instructions and controls to be applied in order to achieve compliance with the environmental policy;
- Periodic (internal and external) audits and reviews of environmental performance and the effectiveness of the EMS; and
- The EMP.

8 CONCLUSION

The operational impacts of the WBBT, particularly related to dust generation, are considered the most significant environmental concerns requiring priority management. Dust emissions can have far-reaching effects on air quality and surrounding environments, making it essential to address this issue proactively.

Various potential and definite impacts will emanate from the maintenance, upgrades, operations and decommissioning phases. The majority of the negative impacts can be mitigated or prevented, while positive impacts should be enhanced. Impacts related to the operational phase are expected to mostly be of low to medium significance and can mostly be mitigated to have a low significance. The extent of impacts are mostly site specific to local and are not of a permanent nature. Due to the nature of the surrounding areas, cumulative impacts are possible and include noise pollution, traffic impacts and impacts on birds flying at night (bright lighting).

This EMP report specifies some of the enhancement measures aimed at increasing the positive impacts of the project. This include maximising the appointment of Namibian companies and citizens for support services. The EMP also describes a monitoring programme to be carried out by the Contractor. Baseline studies to determine preconstruction concentrations of chemical of concern concentrations in the soil is advised where possible. Take care not to damage installed surface covers without permission of Namport.

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Appendix A: Current ECC

Current ECC

ECC – 02167 Serial: pcXGKs2167

REPUBLIC OF NAMIBIA

MINISTRY OF ENVIRONMENT, FORESTRY AND TOURISM

OFFICE OF THE ENVIRONMENTAL COMMISSIONER

ENVIRONMENTAL CLEARANCE CERTIFICATE

ISSUED

In accordance with Section 37(2) of the Environmental Management Act (Act No. 7 of 2007)

TO

Walvis Bay Bulk Terminal (Pty) Ltd
P. O. Box 652, Walvis Bay

TO UNDERTAKE THE FOLLOWING LISTED ACTIVITY

Walvis Bay Bulk Terminal - Bulk Storage and Handling of Metallic Ore Situated in Walvis Bay Port, Erongo Region.

Private Bag 13306 WINDHOEK NAMIBIA
09 MAY 2022
ENVIRONMENTAL COMMISSIONER

Issued on the date: 2022-05-09
Expires on this date: 2025-05-09

(See conditions printed over leaf)

Reduce Reuse Recycle

NAMIBIA WASTE TEASE BIN

This certificate is printed without erasures or alterations

Appendix B: Consultant's Curriculum Vitae

ENVIRONMENTAL SCIENTIST **André Faul**

André entered the environmental assessment profession at the beginning of 2013 and since then has worked on more than 230 Environmental Impact Assessments including assessments of the petroleum industry, harbour expansions, irrigation schemes, township establishment and power generation and transmission. André's post graduate studies focussed on zoological and ecological sciences and he holds a M.Sc. in Conservation Ecology and a Ph.D. in Medical Bioscience. His expertise is in ecotoxicological related studies focussing specifically on endocrine disrupting chemicals. His Ph.D. thesis title was The Assessment of Namibian Water Resources for Endocrine Disruptors. Before joining the environmental assessment profession he worked for 12 years in the Environmental Section of the Department of Biological Sciences at the University of Namibia, first as laboratory technician and then as lecturer in biological and ecological sciences.

CURRICULUM VITAE ANDRÉ FAUL

Name of Firm	:	Geo Pollution Technologies CC.
Name of Staff	:	ANDRÉ FAUL
Profession	:	Environmental Scientist
Years' Experience	:	23
Nationality	:	Namibian
Position	:	Environmental Scientist
Specialisation	:	Environmental Toxicology
Languages	:	Afrikaans – speaking, reading, writing – excellent
		English – speaking, reading, writing – excellent

EDUCATION AND PROFESSIONAL STATUS:

B.Sc. Zoology/Biochemistry	:	University of Stellenbosch, 1999
B.Sc. (Hons.) Zoology	:	University of Stellenbosch, 2000
M.Sc. (Conservation Ecology)	:	University of Stellenbosch, 2005
Ph.D. (Medical Bioscience)	:	University of the Western Cape, 2018

First Aid Class A	EMTSS, 2017, OSH-Med 2022
Basic Fire Fighting	EMTSS, 2017, OSH-Med 2022

PROFESSIONAL SOCIETY AFFILIATION:
Environmental Assessment Professionals of Namibia (Practitioner)

AREAS OF EXPERTISE:
Knowledge and expertise in:
- Water Sampling, Extractions and Analysis
- Biomonitoring and Bioassays
- Biodiversity Assessment
- Toxicology
- Restoration Ecology

EMPLOYMENT:

2013-Date	:	Geo Pollution Technologies – Environmental Scientist
2005-2012	:	Lecturer, University of Namibia
2001-2004	:	Laboratory Technician, University of Namibia

PUBLICATIONS:

Publications:	5
Contract Reports	+230
Research Reports & Manuals:	5
Conference Presentations:	1