

**APP-002618**

**FUEL STORAGE AND HANDLING FACILITY ON ERF 1239,  
WALVIS BAY**

**ENVIRONMENTAL MANAGEMENT PLAN**



**Prepared by:**




**Prepared for:**




May 2021



<b>Project:</b>	<b>FUEL STORAGE AND HANDLING FACILITY ON ERF 1239, WALVIS BAY: ENVIRONMENTAL MANAGEMENT PLAN</b>	
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<b>Report Approval</b>	  <b>André Faul</b> Conservation Ecologist	

I David Roux acting as a representative of Manica Group Namibia (Pty) Ltd hereby confirm that the project description contained in this report is a true reflection of the information which the Proponent 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 and the report is hereby approved.

Signed at Walvis Bay on the 20<sup>th</sup> day of May 2021.

  
Manica Group Namibia (Pty) Ltd

Reg no. 06/00306/07  
Business Registration/ID Number



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## **LIST OF ABBREVIATIONS**

<b>AIDS</b>	Acquired Immune Deficiency Syndrome
<b>BE</b>	Biological/Ecological
<b>DWA</b>	Department of Water Affairs
<b>DEA</b>	Directorate of Environmental Affairs
<b>EA</b>	Environmental Assessment
<b>EIA</b>	Environmental Impact Assessment
<b>EMA</b>	Environmental Management Act No 7 of 2007
<b>EMP</b>	Environmental Management Plan
<b>EMS</b>	Environmental Management System
<b>EO</b>	Economic/Operational
<b>ES</b>	Environmental Classification
<b>GPT</b>	Geo Pollution Technologies
<b>HIV</b>	Human Immunodeficiency Virus
<b>IAPs</b>	Interested and Affected Parties
<b>IUCN</b>	International Union for Conservation of Nature
<b>LNAPL</b>	Light Non-Aqueous Phase Liquids
<b>m/s</b>	Meter per second
<b>mbs</b>	Meters below surface
<b>MEFT</b>	Ministry of Environment, Forestry and Tourism
<b>mm/a</b>	Millimetres per annum
<b>MSDS</b>	Material Safety Data Sheet
<b>NaCl</b>	Sodium chloride
<b>PC</b>	Physical/Chemical
<b>PPE</b>	Personal Protective Equipment
<b>ppm</b>	Parts per million
<b>SANS</b>	South African National Standards
<b>SC</b>	Sociological/Cultural
<b>SO<sub>2</sub></b>	Sulphur dioxide
<b>UNCCD</b>	United Nations Convention to Combat Desertification
<b>WHO</b>	World Health Organization





## GLOSSARY OF TERMS

**Alternatives** - A possible course of action, in place of another, that would meet the same purpose and need but which would avoid or minimize negative impacts or enhance project benefits. These can include alternative locations/sites, routes, layouts, processes, designs, schedules and/or inputs. The “no-go” alternative constitutes the ‘without project’ option and provides a benchmark against which to evaluate changes; development should result in net benefit to society and should avoid undesirable negative impacts.

**Assessment** - The process of collecting, organising, analysing, interpreting and communicating information relevant to decision making.

**Competent Authority** - means a body or person empowered under the local authorities act or Environmental Management Act to enforce the rule of law.

**Construction** - means the building, erection or modification of a facility, structure or infrastructure that is necessary for the undertaking of an activity, including the modification, alteration, upgrading or decommissioning of such facility, structure or infrastructure.

**Cumulative Impacts** - in relation to an activity, means the impact of an activity that in itself may not be significant but may become significant when added to the existing and potential impacts eventuating from similar or diverse activities or undertakings in the area.

**Environment** - As defined in the Environmental Assessment Policy and Environmental Management Act - “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, palaeontological or social values”.

**Environmental Impact Assessment (EIA)** - process of assessment of the effects of a development on the environment.

**Environmental Management Plan (EMP)** - A working document on environmental and socio-economic mitigation measures, which must be implemented by several responsible parties during all the phases of the proposed project.

**Environmental Management System (EMS)** - An Environment Management System, or EMS, is a comprehensive approach to managing environmental issues, integrating environment-oriented thinking into every aspect of business management. An EMS ensures environmental considerations are a priority, along with other concerns such as costs, product quality, investments, PR productivity and strategic planning. An EMS generally makes a positive impact on a company’s bottom line. It increases efficiency and focuses on customer needs and marketplace conditions, improving both the company’s financial and environmental performance. By using an EMS to convert environmental problems into commercial opportunities, companies usually become more competitive.

**Evaluation** – means the process of ascertaining the relative importance or significance of information, the light of people’s values, preference and judgements in order to make a decision.

**Hazard** - Anything that has the potential to cause damage to life, property and/or the environment. The hazard of a particular material or installation is constant; that is, it would present the same hazard wherever it was present.

**Interested and Affected Party (IAP)** - any person, group of persons or organisation interested in, or affected by an activity; and any organ of state that may have jurisdiction over any aspect of the activity.

**Mitigate** - The implementation of practical measures to reduce adverse impacts.

**Proponent (Applicant)** - Any person who has submitted or intends to submit an application for an authorisation, as legislated by the Environmental Management Act no. 7 of 2007, to undertake an

activity or activities identified as a listed activity or listed activities; or in any other notice published by the Minister or Ministry of Environment & Tourism.

**Public** - Citizens who have diverse cultural, educational, political and socio-economic characteristics. The public is not a homogeneous and unified group of people with a set of agreed common interests and aims. There is no single public. There are a number of publics, some of whom may emerge at any time during the process depending on their particular concerns and the issues involved.

**Scoping Process** - process of identifying: issues that will be relevant for consideration of the application; the potential environmental impacts of the proposed activity; and alternatives to the proposed activity that are feasible and reasonable.

**Significant Effect/Impact** - means an impact that by its magnitude, duration, intensity or probability of occurrence may have a notable effect on one or more aspects of the environment.

**Stakeholder Engagement** - The process of engagement between stakeholders (the proponent, authorities and IAPs) during the planning, assessment, implementation and/or management of proposals or activities. The level of stakeholder engagement varies depending on the nature of the proposal or activity as well as the level of commitment by stakeholders to the process. Stakeholder engagement can therefore be described by a spectrum or continuum of increasing levels of engagement in the decision-making process. The term is considered to be more appropriate than the term “public participation”.

**Stakeholders** - A sub-group of the public whose interests may be positively or negatively affected by a proposal or activity and/or who are concerned with a proposal or activity and its consequences. The term therefore includes the proponent, authorities (both the lead authority and other authorities) and all interested and affected parties (IAPs). The principle that environmental consultants and stakeholder engagement practitioners should be independent and unbiased excludes these groups from being considered stakeholders.

**Sustainable Development** - “Development that meets the needs of the current generation without compromising the ability of future generations to meet their own needs and aspirations” – the definition of the World Commission on Environment and Development (1987). “Improving the quality of human life while living within the carrying capacity of supporting ecosystems” – the definition given in a publication called “Caring for the Earth: A Strategy for Sustainable Living” by the International Union for Conservation of Nature (IUCN), the United Nations Environment Programme and the World Wide Fund for Nature (1991).

## 1 INTRODUCTION

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Manica Group Namibia (Pty) Ltd requested Geo Pollution Technologies (Pty) Ltd to prepare an environmental management plan (EMP) for an **existing** fuel handling and storage facility situated on erf 1239 in the industrial area of Walvis Bay. The property is currently zoned for industrial purposes. The facility stores illuminating paraffin which is transferred to tanker trucks for export to southern African countries. The Proponent further proposes to add one additional aboveground, self-contained (bunded) diesel tank to supply fuel to the proponent's freight and fleet vehicles (consumer fuel installation). General operations involve the receipt of illuminating paraffin and diesel from road tankers, dispensing fuel to tanker trucks and vehicles, operations of related infrastructure and day to day administrative tasks.

In order to comply with Namibian legislation, and to adhere to all codes and standards applied in their operations, Manica Group Namibia (Pty) Ltd wishes to apply for an environmental clearance certificate (ECC) for the fuel installation's operations in the Port of Walvis Bay. In support of the ECC application, the EMP will be submitted to the Ministry of Environment, Forestry and Tourism. The EMP provides management options to ensure environmental impacts of the facility 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. This document should be used as an on-site reference document during all phases (planning, construction (care and maintenance), operations and decommissioning) of the facility. All monitoring and records kept should be included in a report to ensure compliance with the EMP. Parties responsible for transgression of the EMP should be held responsible for any rehabilitation that may need to be undertaken. A Health, Safety, Environment and Quality policy as well as Environmental Policy could be used in conjunction with the EMP. Operators and responsible personnel must be taught the contents of these documents. Municipal or national regulations and guidelines must be adhered to and monitored regularly as outlined in the EMP.

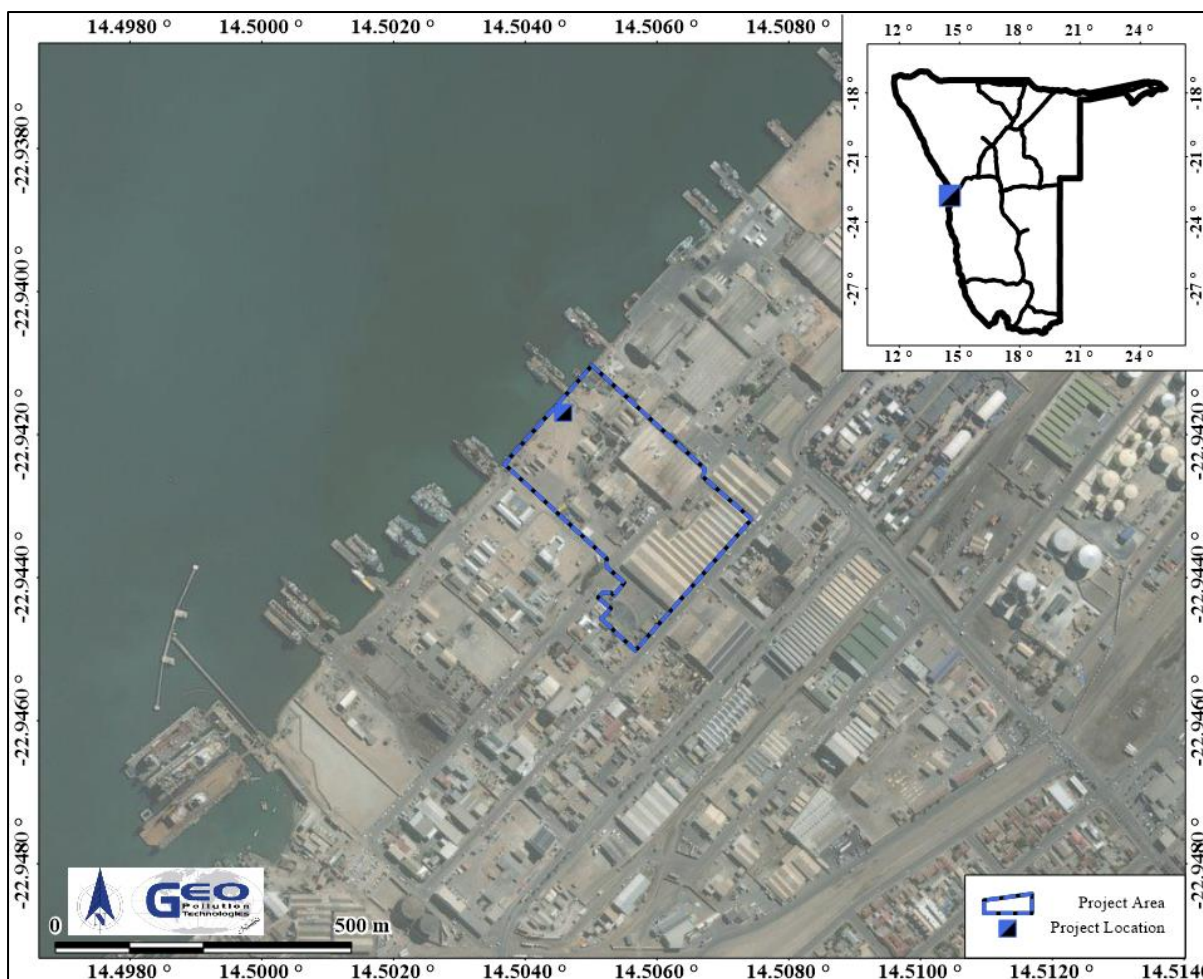
The EMP will be used to apply for an ECC in compliance with Namibia's Environmental Management Act (Act No 7 of 2007).

## 2 SCOPE

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The scope of the EMP is to:-

- ◆ Provide a brief overview of all components and related operations of the facility.
- ◆ Summarise the legal and regulatory framework within which the fuel storage facility operates.
- ◆ Provide a brief overview of the environment, i.e. the physical, biological, social and economic conditions, potentially impacted by the facility.
- ◆ To identify potential impacts of the facility 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.



**Figure 2-1. Project location**

### 3 METHODOLOGY

The following methods were used to prepare the EMP:

1. Baseline information about the site and its surroundings was obtained from primary information and existing secondary information.
2. Potential environmental impacts emanating from the operations, construction / maintenance and decommissioning of the facility were considered and possible enhancement measures were listed for positive impacts while mitigation / preventative measures were provided for negative impacts as part of the EMP.

### 4 FACILITY OPERATIONS AND RELATED ACTIVITIES

The fuel storage facility is situated on erf 1239 in the industrial area of Walvis Bay. It is anticipated that the installation of the additional self-contained tank for the storage and supply of diesel will commence once an ECC is issued by the MEFT and the various additional permits and licences are issued by the various regulatory bodies.

#### 4.1 EXISTING INFRASTRUCTURE

The facility currently hosts three horizontal, aboveground steel diesel storage tanks situated within an appropriately bunded area. Each tank has a capacity of 80 m<sup>3</sup>. The tanks were previously used for the storage of diesel and HFO and has since been converted to allow for the storage and bulk supply of illuminating paraffin.

## 4.2 PLANNED INFRASTRUCTURE

The proponent proposes the addition of a 67 m<sup>3</sup> self-contained (self-bunded) diesel tank on site. The tank will be used as a consumer fuel installation for the storage and supply of diesel mainly to road freight vehicles. These tanks are in essence containerised tanks, where the container acts as spill control around the tank, thus allowing for quick and easy addition of the tank without requiring significant construction activities. The pumps and dispensers are also contained within the container. The tank is placed on concrete beams and no other significant construction activities are thus required for the addition of the tank. Spill control infrastructure for all filling points will meet required specifications such as the use of drip trays or concrete surfaces connected to a catchment pit. The proposed infrastructure layout is presented in Figure 4-1, but the location of the diesel tank and associated spill slab may change slightly based on final designs.

## 4.3 OPERATIONAL ACTIVITIES

Diesel (50 ppm) and illuminating paraffin will be received from tanker trucks and stored in the respective aboveground storage tanks. Diesel will be dispensed to fleet vehicles via the contained dispensers by pump attendants as required. Illuminating paraffin will be dispensed to tanker trucks in bulk mainly for freight and export purposes. Regular reconciliation of fuel volumes will be performed to detect any possible losses. Any contaminated products will be disposed of at a registered waste oil recycler or approved hazardous waste disposal facility.

Additional operations of the facility may include daily administrative activities as well as general care and maintenance of the property. Any domestic waste produced will be stored in an enclosed, temporary waste storage area. From here it will be removed regularly and transported to, and disposed of at, an approved municipal waste disposal facility.

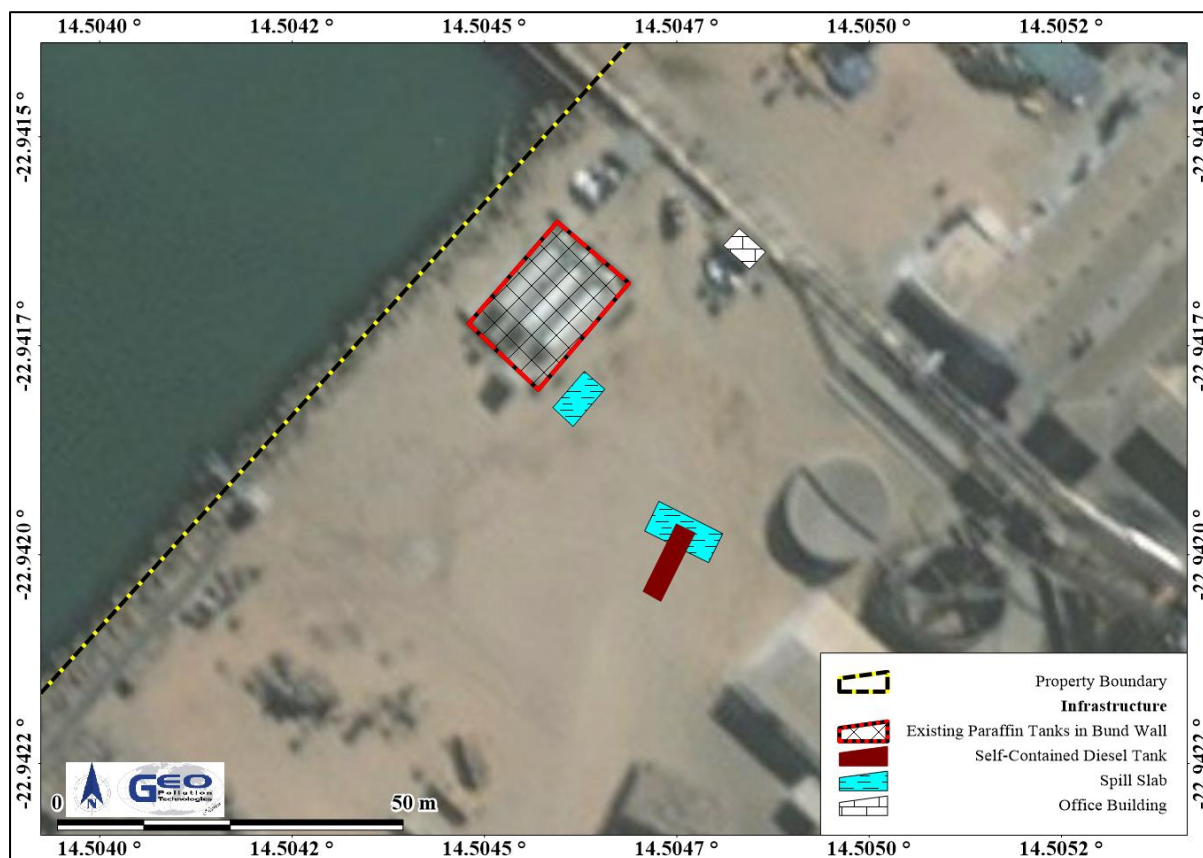


Figure 4-1. Preliminary site layout





**Photo 1. Illuminating paraffin storage tanks**



**Photo 2. Example of self-contained diesel tank**



**Photo 3. Northern view from project location**



**Photo 4. Southern view from project location**

## **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 in Table 5-1 to Table 5-4 govern the environmental assessment process in Namibia and/or are relevant to the facility.

**Table 5-1. Namibian law applicable to the fuel storage facility**

<b>Law</b>	<b>Key Aspects</b>
<b>The Namibian Constitution</b>	<ul style="list-style-type: none"> <li>◆ Promote the welfare of people.</li> <li>◆ Incorporates a high level of environmental protection.</li> <li>◆ Incorporates international agreements as part of Namibian law.</li> </ul>
<b>Environmental Management Act</b> Act No. 7 of 2007, Government Notice No. 232 of 2007	<ul style="list-style-type: none"> <li>◆ Defines the environment.</li> <li>◆ Promote sustainable management of the environment and the use of natural resources.</li> <li>◆ Provide a process of assessment and control of activities with possible significant effects on the environment.</li> </ul>
<b>Environmental Management Act Regulations</b> Government Notice No. 28-30 of 2012	<ul style="list-style-type: none"> <li>◆ Commencement of the Environmental Management Act.</li> <li>◆ List activities that requires an environmental clearance certificate.</li> <li>◆ Provide Environmental Impact Assessment Regulations.</li> </ul>

<b>Law</b>	<b>Key Aspects</b>
<b>Petroleum Products and Energy Act</b> Act No. 13 of 1990, Government Notice No. 45 of 1990	<ul style="list-style-type: none"> <li>◆ Regulates petroleum industry.</li> <li>◆ Makes provision for impact assessment.</li> <li>◆ Petroleum Products Regulations (Government Notice No. 155 of 2000).               <ul style="list-style-type: none"> <li>○ Prescribes South African National Standards (SANS) or equivalents for construction, operation and decommissioning of petroleum facilities (refer to Government Notice No. 21 of 2002).</li> </ul> </li> </ul>
<b>The Water Act</b> Act No. 54 of 1956	<ul style="list-style-type: none"> <li>◆ Remains in force until the new Water Resources Management Act comes into force.</li> <li>◆ Defines the interests of the state in protecting water resources.</li> <li>◆ Controls the disposal of effluent.</li> <li>◆ Numerous amendments.</li> </ul>
<b>Water Resources Management Act</b> Act No. 11 of 2013	<ul style="list-style-type: none"> <li>◆ Provide for management, protection, development, use and conservation of water resources</li> <li>◆ Prevention of water pollution and assignment of liability.</li> <li>◆ Not in force yet.</li> </ul>
<b>Local Authorities Act</b> Act No. 23 of 1992, Government Notice No. 116 of 1992	<ul style="list-style-type: none"> <li>◆ Define the powers, duties and functions of local authority councils.</li> <li>◆ Regulates discharges into sewers.</li> </ul>
<b>Public Health Act</b> Act No. 36 of 1919	<ul style="list-style-type: none"> <li>◆ Provides for the protection of health of all people.</li> </ul>
<b>Public and Environmental Health Act</b> Act No. 1 of 2015, Government Notice No. 86 of 2015	<ul style="list-style-type: none"> <li>◆ Provides a framework for a structured more uniform public and environmental health system, and for incidental matters.</li> <li>◆ Deals with Integrated Waste Management including waste collection disposal and recycling; waste generation and storage; and sanitation.</li> </ul>
<b>Labour Act</b> Act No 11 of 2007, Government Notice No. 236 of 2007	<ul style="list-style-type: none"> <li>◆ Provides for Labour Law and the protection and safety of employees.</li> <li>◆ Labour Act, 1992: Regulations relating to the health and safety of employees at work (Government Notice No. 156 of 1997).</li> </ul>
<b>Atmospheric Pollution Prevention Ordinance</b> Ordinance No. 11 of 1976	<ul style="list-style-type: none"> <li>◆ Governs the control of noxious or offensive gases</li> <li>◆ Prohibits scheduled process without a registration certificate in a controlled area.</li> <li>◆ Requires best practical means for preventing or reducing the escape into the atmosphere of noxious or offensive gases produced by the scheduled process.</li> </ul>
<b>Hazardous Substances Ordinance</b> Ordinance No. 14 of 1974	<ul style="list-style-type: none"> <li>◆ Applies to the manufacture, sale, use, disposal and dumping of hazardous substances as well as their import and export.</li> <li>◆ Aims to prevent hazardous substances from causing injury, ill-health or the death of human beings.</li> </ul>
<b>Pollution Control and Waste Management Bill (draft document)</b>	<ul style="list-style-type: none"> <li>◆ Not in force yet.</li> <li>◆ Provides for prevention and control of pollution and waste.</li> <li>◆ Provides for procedures to be followed for licence applications.</li> </ul>

**Table 5-2. Municipal By-laws, Guidelines and Regulations**

<b>Municipal By-laws, Guidelines or Regulations</b>	<b>Key Aspects</b>
<b>Integrated Urban Spatial Development Framework for Walvis Bay</b>	<ul style="list-style-type: none"> <li>◆ Overall vision to transform Walvis Bay to being the primary industrial city in Namibia.</li> <li>◆ Aims to ensure that appropriate levels of environmental management is enforced for all developments in Walvis Bay.</li> </ul>
<b>Integrated Environmental Policy of Walvis Bay (Agenda 21 Project)</b>	<ul style="list-style-type: none"> <li>◆ 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.</li> <li>◆ Strong focus on conservation and protection of environment.</li> </ul>

**Table 5-3. Standards or Codes of Practise**

<b>Standard or Code</b>	<b>Key Aspects</b>
<b>South African National Standards (SANS)</b>	<ul style="list-style-type: none"> <li>◆ The Petroleum Products and Energy Act prescribes SANS standards for the construction, operations and demolition of petroleum facilities.</li> <li>◆ SANS 10089-3:2010 is specifically aimed at storage and distribution of petroleum products at fuel retail facilities and consumer installations. <ul style="list-style-type: none"> <li>○ Provide requirements for spill control infrastructure</li> </ul> </li> </ul>

**Table 5-4. Relevant Multilateral Environmental Agreements for Namibia and the Development**

<b>Agreement</b>	<b>Key Aspects</b>
<b>Stockholm Declaration on the Human Environment, Stockholm 1972.</b>	<ul style="list-style-type: none"> <li>◆ 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.</li> </ul>
<b>1985 Vienna Convention for the Protection of the Ozone Layer</b>	<ul style="list-style-type: none"> <li>◆ Aims to protect human health and the environment against adverse effects from modification of the Ozone Layer are considered.</li> <li>◆ Adopted to regulate levels of greenhouse gas concentration in the atmosphere.</li> </ul>
<b>United Nations Framework Convention on Climate Change (UNFCCC)</b>	<ul style="list-style-type: none"> <li>◆ The Convention recognises that developing countries should be accorded appropriate assistance to enable them to fulfil the terms of the Convention.</li> </ul>
<b>Convention on Biological Diversity, Rio de Janeiro, 1992</b>	<ul style="list-style-type: none"> <li>◆ Under article 14 of The Convention, EIAs must be conducted for projects that may negatively affect biological diversity.</li> </ul>
<b>UN Convention for the Prevention of Marine Pollution from Land-based Sources</b>	<ul style="list-style-type: none"> <li>◆ Concerns itself with the protection of marine fauna and flora by preventing marine pollution from land-based sources.</li> <li>◆ 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.</li> </ul>



The project is listed as an activity requiring an ECC as per the following points from Section 9 of Government Notice No. 29 of 2012:

- ◆ 9.1 “The manufacturing, storage, handling or processing of a hazardous substance defined in the Hazardous Substances Ordinance, 1974.”
- ◆ 9.2 “Any process or activity which requires a permit, licence or other form of authorisation, or the modification of or changes to existing facilities for any process or activity which requires an amendment of an existing permit, licence or authorisation or which requires a new permit, licence or authorisation in terms of a law governing the generation or release of emissions, pollution, effluent or waste.”
- ◆ 9.4 “The storage and handling of a dangerous goods, including petrol, diesel, liquid petroleum gas or paraffin, in containers with a combined capacity of more than 30 cubic meters at any one location.”
- ◆ 9.5 “Construction of filling stations or any other facility for the underground and aboveground storage of dangerous goods, including petrol, diesel, liquid petroleum gas or paraffin.”

## **6 ENVIRONMENTAL CHARACTERISTICS**

This section lists pertinent environmental characteristics of the study area and provides a statement on the potential environmental impacts on each.

### **6.1 LOCALITY AND SURROUNDING LAND USE**

The facility is located on erf 1239 in Second Street East, Walvis Bay (22.9418°S, 14.5044°E) (Figure 2-1). The property is situated within the municipal area of Walvis Bay and is zoned for industrial use (Figure 6-1). The greater area is generally classified as an industrial/business area with a variety of industries linked to shipping, fishing, and transport industries. The site is neighboured to the southwest by the Navy (Ministry of Defence) and to the northeast by Tunacor Fisheries Limited and Wesco. There are no heritage or cultural sites located on or in close proximity to the site.

#### ***Implications and Impacts***

The site is situated in an area zoned mainly for industrial purposes. Fuel storage facilities are common within industrial areas and are allowed by the Walvis Bay Municipality’s Town Planning Scheme. No significant land use impact is expected on nearby establishments.

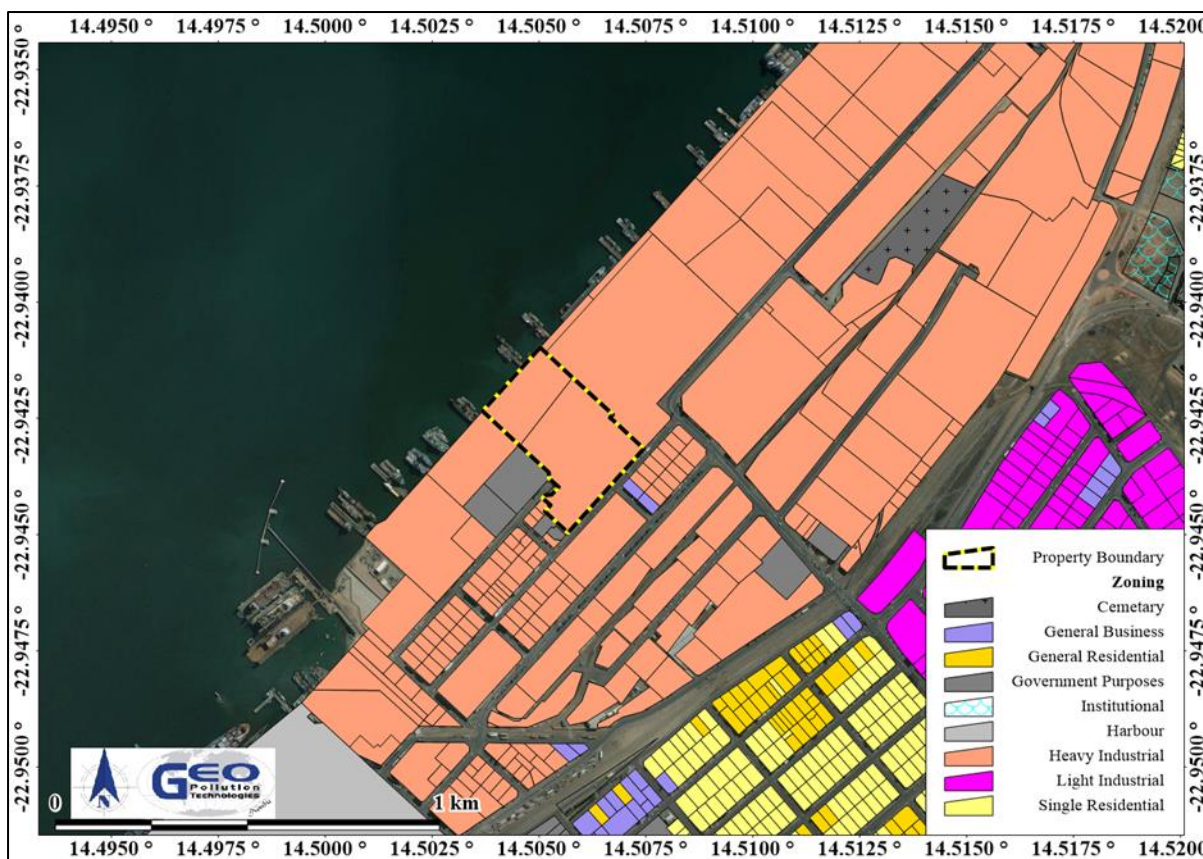
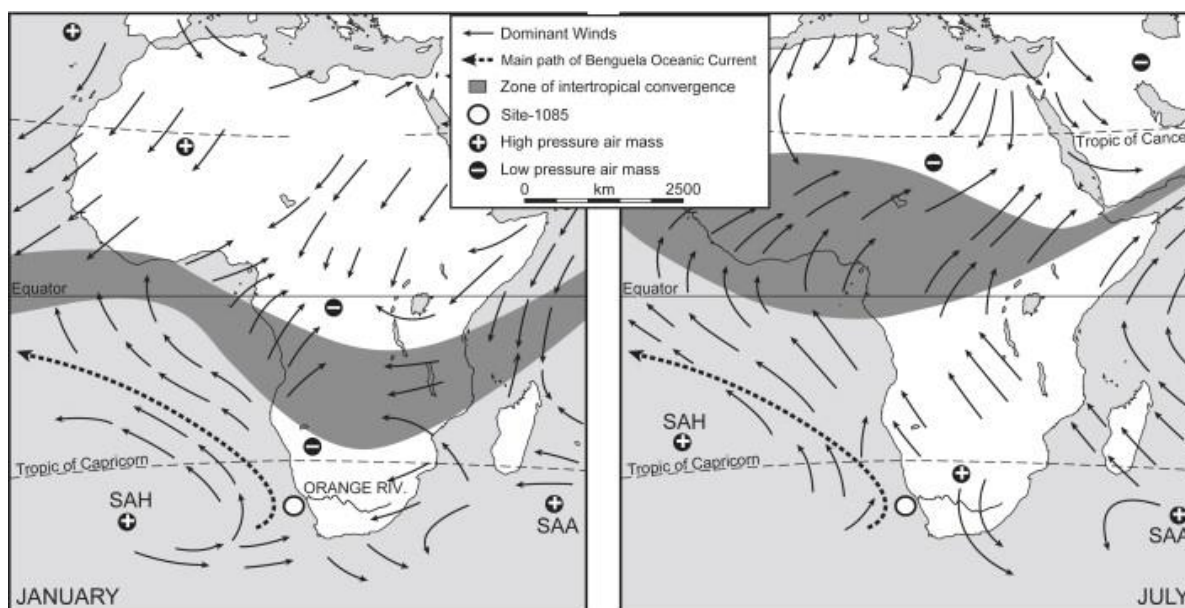


Figure 6-1. Surrounding land use

## 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, 2002; Bryant, 2010). 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.



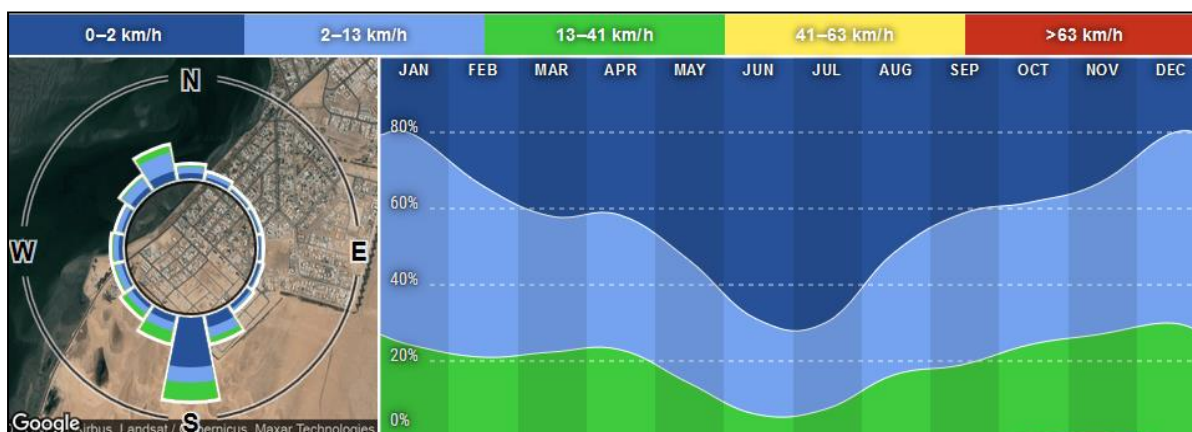
**Figure 6-2. Map indicating the Intertropical Convergence Zone, Subtropical High Pressure Zone (SAH+), Benguela Current and Temperate Zone south of Tropic of Capricorn (not indicated) (from: <http://www.meteoweb.eu>)**

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 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 result 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 plains 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. 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 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/h 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/h 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 descends, 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 winds during the mornings to early afternoon, but dies down late afternoon.

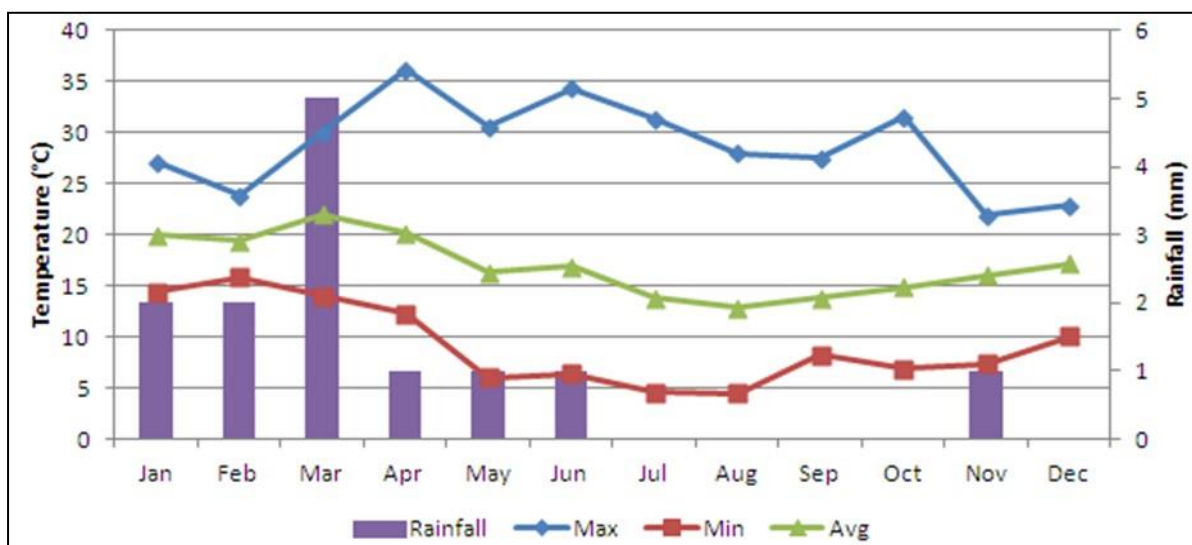
Throughout the year the prevailing night time wind is a weak easterly wind. This results from the mainland cooling to below the temperature of the coastal water. This results in a coastal low versus an onshore high pressure system with first no wind in the early evening, when

temperatures between water and land is similar, and then weak easterly winds as the temperature difference increase.



**Figure 6-3. Wind direction and strength at the Walvis Bay Lagoon as measured between 2013 and 2020 (From: [https://www.windfinder.com/windstatistics/walvis\\_bay\\_airport](https://www.windfinder.com/windstatistics/walvis_bay_airport))**

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 6-4). 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 6-4. 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 6-4), with variation in annual rainfall exceeding 100%. Infrequent, heavy rainfall do 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 stormwater. 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**

Water is a scarce and valuable resource in Namibia and Walvis Bay is characterized by low and extremely variable seasonal rainfall. This makes water an extremely vulnerable resource. Occasional flooding does occur and if the facility is not adequately designed may experience damage. Flooding may further result in uncontained pollution ending up in the ocean.

**6.3 CORROSIVE ENVIRONMENT**

Walvis Bay is located in a corrosive environment, which may be attributed to the frequent salt-laden fog, periodic winds and abundance of aggressive salts (dominantly NaCl and sulphates) in the soil. The periodic release of hydrogen sulphide (H<sub>2</sub>S) from the ocean is expected to contribute to corrosion. See Figure 6-5 for corrosion comparison data with other centres. The combination of high moisture and salt content of the surface soil can lead to rapid deterioration of subsurface metal (e.g. pipelines) and concrete structures. Chemical weathering of concrete structures due to the abundant salts in the soil is a concern.

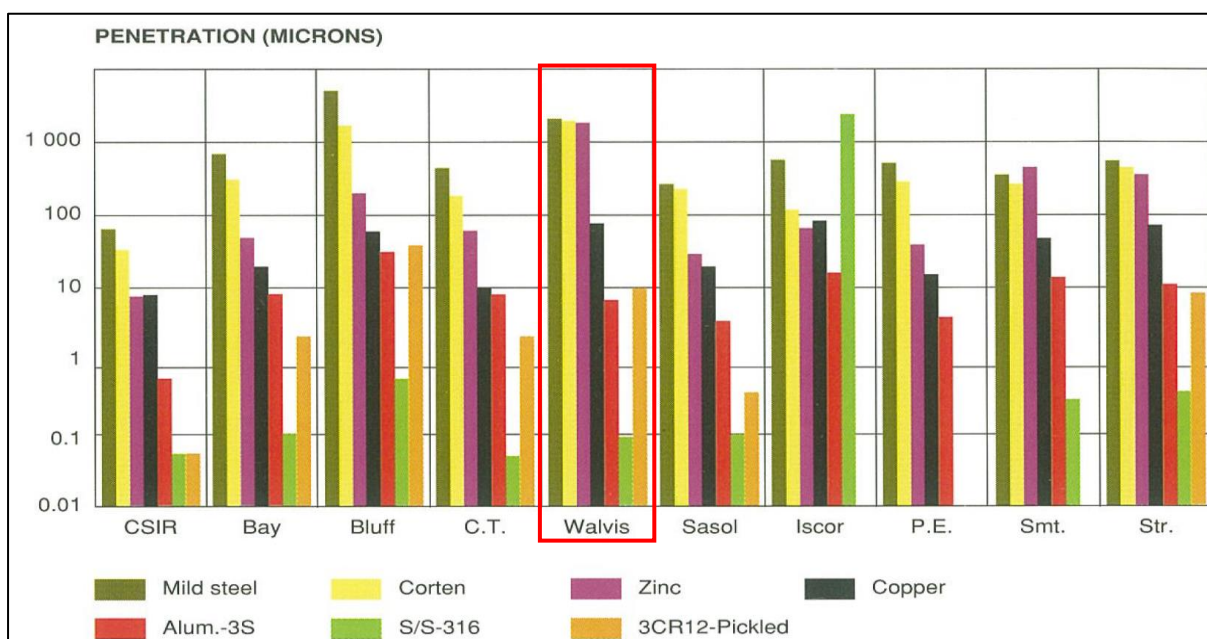


Figure 6-5. Twenty year corrosion exposure results in southern African towns (Callaghan 1991)

**Implications and Impacts**

Corrosion levels may be high and must be kept in mind when planning the installation and maintenance of the facility.

**6.4 TOPOGRAPHY AND DRAINAGE**

Walvis Bay is located in the Central Western Plain of Namibia. The Kuiseb River forms the southern boundary of this landscape group, with the Namib Dune Field being present south of the Kuiseb River. A bay is formed by a peninsula commonly known as Pelican Point. On the southern part of the bay is a lagoon which used to be the mouth of the Kuiseb River. Dune migration however forced the flow of the Kuiseb River to the north. This flow was stopped through the construction of a flood control wall to prevent flooding of the town of Walvis Bay, thus forcing the flood waters to move through the dune area to the lagoon. The Kuiseb River now rarely reaches the lagoon.

The topography is generally flat with a local gentle downward slope in a westerly direction toward the ocean. Drainage is poorly developed due to the lack of rainfall <50 mm/annum received in the area. A dune field is present southeast of Walvis Bay and also further to the northeast. These dunes generally migrate in a northerly direction. Further inland is the gravel plains of the central areas of the Namib Naukluft Park. Surface water around Walvis Bay is

limited to the marine salt pans, lagoon and ocean as well as a man-made wetland formed as a result of the sewage treatment works. The site and surrounding areas are generally flat.

#### ***Implications and Impacts***

Any pollutants that are not contained and are transported via surface water flow will be transported away from the project location and potentially pollute the Atlantic Ocean and surrounding areas. Therefore, the storage and use of fuel must be strictly controlled according to SANS 10089 standards.

### **6.5 GEOLOGY AND HYDROGEOLOGY**

Walvis Bay is located in the Central Western Plain of Namibia. The Kuiseb River forms the southern boundary of this landscape group, with the Namib Dune Field being present south of the Kuiseb River. Northerly dune migration is forcing the Kuiseb River in a northerly direction, with Kuiseb River paleochannels being present as far south as Sandwich Harbour.

Following the breakup of West-Gondwana during the early Cretaceous (130 – 135 Ma ago), continental uplift took place, enhancing erosional cutback and the formation of the Namibian Escarpment. A narrow pediplain formed, mainly over Damara Age rocks. The South Central started filling in over the pediplain, with marine conditions established around 80 Ma ago. Towards the end of the Cretaceous (70 – 65 Ma ago) a relative level surface was created, on which later deposition of sediments took place. Marine deposition took place in the parts covered by the newly formed South Central Ocean, while terrestrial deposits took place on land. Further continental uplift moved the shoreline to its present position.

Northwards migration of sand covered parts of the exposed marine deposits, with Kuiseb floods also depositing material over the marine sediments. Depth to bedrock in Walvis Bay is expected to be deeper than 40 m below surface. Based on previous work conducted in the area, it is expected that the sediments under the project area would consist of medium to coarse grain sand with thin lenses of more clayey material and layers of shell material.

Groundwater in the area is expected less than 2 m below surface and related to seawater intrusion. Tidal fluctuations is expected to result a variation in groundwater depth.

#### ***Implications and Impacts***

Groundwater is not utilised in the area. Pollution of the groundwater is however still prohibited. Spill control structures installed and maintained to SANS specifications or better would successfully prevent pollution of groundwater, surface water or soil. The lack of surface cover at the site will result in the rapid infiltration of any uncontained pollution. Shallow groundwater will lead to rapid lateral spreading of hydrocarbon products spilled or leaked. This will further have potential to contaminate seawater or impact on underground utilities and may cause impacts on neighbouring properties.

### **6.6 SURFACE WATER**

No freshwater sources are found in close proximity to the fuel storage facility. The property is however situated 15 m from the shore of the Atlantic Ocean. Seawater is widely abstracted and used as processing water, mainly by surrounding fish factories.

#### ***Implications and Impacts***

Any pollutants that enter the Atlantic Ocean, whether through groundwater or directly from spills / leaks will deteriorate the quality of the aquatic environment. This will also reduce the quality of seawater used as processing water by other nearby users and potentially render it unusable, negatively impacting various operations.

### **6.7 PUBLIC WATER SUPPLY**

Public water supply to Walvis Bay and the surrounding developments is provided by NamWater from the NamWater Kuiseb Water Supply Scheme.

***Implications and Impacts***

The fuel storage facility is not expected to have an impact on public water supply. Furthermore it must adhere to SANS standards which should successfully prevent any spills or leaks.

**6.8 FAUNA AND FLORA**

The site is located within an industrial port set-up and has been cleared of all vegetation. No animals of particular significance is expected on site and will mostly include birds as a result of the nearby fish factories. The site is situated 15 m east of the Atlantic Ocean within the fishing harbour.

Of note nearby (> 3km southwest) 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 2 km southeast of the study area, are regarded as sensitive manmade wetlands. Although a manmade fresh water source, they are an attraction for pelicans and flamingos. These wetlands 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 is also a flight path for birds between the sewerage ponds and the offshore bird breeding platform (Ghwano Island) 8 km north of the site.

***Implications and Impacts***

The proposed fuel storage facility is located within an already disturbed industrial area. Thus no immediate threat to biodiversity in the area is expected, however, uncontrolled pollution may and can cause damage to any biodiversity surrounding the site, especially in the marine environment. Lighting used at night may blind or disorientate birds like flamingos that fly at night.

**6.9 DEMOGRAPHIC AND ECONOMIC CHARACTERISTICS**

At local level Walvis Bay has an urban population size of 62,096 (Namibia Statistics Agency, 2014) although the current estimate is around 90,000 to 100,000. Walvis Bay is the principal port of Namibia, and is an import/export facility for processed fish, mining products and beef. The area is linked to Namibia's air, rail and road network, making its port well situated to service Zambia, Zimbabwe, Botswana, Southern Angola and South Africa. 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. Economic activities relate mostly to businesses within the area and around the site.

**Table 6-1. Demographic Characteristics of Walvis Bay, the Erongo Region and Nationally (Namibia Statistics Agency, 2011)**

	Walvis Bay	Erongo Region	Namibia
<b>Population (Males)</b>	30,500	79,823	1,021,912
<b>Population (Females)</b>	29,000	70,986	1,091,165
<b>Population (Total)</b>	62,096	150,809	2,113,077
<b>Unemployment (15+ years)</b>	N/A	22.6%	33.8%
<b>Literacy (15+ years)</b>	N/A	96.7%	87.7%
<b>Education at secondary level (15+ years)</b>	N/A	71.8%	51.2%
<b>Households considered poor</b>	N/A	5.1%	19.5%

***Implications and Impacts***

The facility provides employment to people from the area. Some skills development and training will continue to benefit employees during the operational phase.

## **6.10 HERITAGE, CULTURAL AND ARCHAEOLOGICAL ASPECTS**

There are no churches, mosques or related buildings in close proximity to the site. No known archaeological resources have been noted in the vicinity since the urbanisation of the area. No other structures, sites or spheres of heritage of cultural significance was determined to be in close proximity to the site.

## **7 ENVIRONMENTAL MANAGEMENT PLAN**

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The purpose of this section is to list the most pertinent environmental impacts that are expected from the operational, construction (installation, upgrades, maintenance, etc.) and potential decommissioning activities of the facility.

### **7.1 OBJECTIVES OF THE EMP**

The EMP provides management options to ensure impacts of the facility is 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 (installation, 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 operational personnel in applying such controls; and
- ◆ to ensure that appropriate environmental training is provided to responsible operational personnel.

### **7.2 IMPLEMENTATION OF THE EMP**

Section 7.3 outline the management of the environmental elements that may be affected by the different activities. Impacts addressed and mitigation measures proposed are seen as minimum requirements which have to be elaborated on. Delegation of mitigation measures and reporting activities should be determined by the proponent and included in the EMP. The EMP is a living document that must be prepared in detail, and regularly updated, by the proponent as the project progress and evolve.

The EMP and ECC must be communicated to the site managers. A copy of the ECC and EMP should be kept on site. All monitoring results must be reported on as indicated. Reporting is important for any future renewals of the ECC and must be submitted to the Ministry of Environment, Forestry and Tourism. Renewal of ECC will require six monthly reports based on the monitoring prescribed in this 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 prevention and mitigation measures are listed below.

### **7.3 MANAGEMENT OF IMPACTS: OPERATIONS AND CONSTRUCTION**

The following section provide management measures for both the operational phase as well as construction activities related to facility.

#### **7.3.1 Planning**

During the phases of planning for operations, construction and decommissioning of the facility and proposed development, it is the responsibility of the 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 governs the construction activities and operations of the project are in place and remains valid. This includes the petroleum products licence and municipal approvals.
- ◆ Ensure that design parameters, where required, is approved by relevant authorities prior to construction activities at the facility.
- ◆ 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 Coordinator to implement the EMP and oversee occupational health and safety as well as general environmental related compliance at the site.
- ◆ Have the following emergency plans, equipment and personnel 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.
- ◆ 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.
- ◆ Submit bi-annual reports to the MEFT to allow for environmental clearance certificate renewal after three years. This is a requirement by MEFT.
- ◆ Appoint a specialist environmental consultant to update the EMP and apply for renewal of the environmental clearance certificate prior to expiry.

### **7.3.2 Skills, Technology and Development**

During various phases of the facility, training is provided to a portion of the workforce to be able to operate and maintain various features of the fuel storage facility according to the required standards. The addition of the diesel storage will further add to training requirements. Skills are transferred to an unskilled workforce for general tasks. Development of people and technology are key to economic development of the town, region and nationally.

**Desired Outcome:** To see an increase in skills of local Namibians, as well as development and technology advancements in the fuel industry.

#### **Actions**

##### **Mitigation:**

- ◆ If the skills exist locally, contractors must first be sourced from the town, then the region and then nationally. Deviations from this practice must be justified.
- ◆ Skills development and improvement programs to be made available as identified during performance assessments.
- ◆ Employees to be informed about parameters and requirements for references upon employment.
- ◆ The proponent must employ Namibians where possible. Deviations from this practise should be justified appropriately.

##### **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.

### **7.3.3 Revenue Generation and Employment**

Operations and construction activities of the facility relies on employment. Skilled and unskilled labourers are employed or contracted for various tasks of construction (installation and maintenance) and operations. Unskilled labour may be sourced locally while it is expected that skilled contractors within Namibia will be used for specialised work. The presence of the facility therefore contributes to employment creation in the skilled and unskilled labour sector.

**Desired Outcome:** Contribution to national treasury and 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.
- ◆ Deviations from this practice must be justified.

##### **Responsible Body:**

- ◆ Proponent

##### **Data Sources and Monitoring:**

- ◆ Summary report based on employee records.

#### **7.3.4 Demographic Profile and Community Health**

The project relies on labour for operations and construction activities. The facility is an existing facility and the scale of the project is limited and it is not that is has / will result in changes in the demographic profile of the local community. Exposure to factors such as communicable disease like HIV/AIDS, often associated with the transport industry, as well as alcoholism/drug abuse may impact the local community.

**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 only local people from the area, deviations from this practice should be justified appropriately.
- ◆ Adhere to all municipal by-laws relating to environmental health which includes but is not limited to sand and grease traps for the various facilities and sanitation requirements.
- ◆ Prohibit illegal parking on and around the site.

**Mitigation:**

- ◆ Educational programmes for employees on HIV/AIDs and general upliftment of employees' social status.
- ◆ Appointment of reputable contractors.

**Responsible Body:**

- ◆ Proponent

**Data Sources and Monitoring:**

- ◆ Facility inspection sheet for all areas which may present environmental health risks, kept on file.
- ◆ Summary report based on educational programmes and training conducted.

### **7.3.5 Fuel Supply**

The addition of the self-contained diesel storage to the facility will aid in securing fuel supply to the fleet and operational vehicles. The storage and distribution of illuminating paraffin further aids in securing the supply to various industries throughout the Southern African Developing Community.

**Desired Outcome:** Ensure a secure fuel supply remains available.

#### **Actions**

##### **Mitigation:**

- ◆ Ensure compliance to the petroleum regulations of Namibia.
- ◆ Proper management to ensure constant supply.
- ◆ Record supply problems and take corrective actions.

##### **Responsible Body:**

- ◆ Proponent

##### **Data Sources and Monitoring:**

- ◆ Record supply problems and corrective actions taken and compile a bi-annual summary report.

### **7.3.6 Traffic**

The facility may increase the traffic flow to the site as a result of tanker trucks delivering and collecting diesel and illuminating paraffin. An increase in traffic to and from the site may increase congestion and increase the risk of incidents and accidents. In turn, by providing diesel to fleet and operational vehicles at the site, where cargo is collected, the amount of trucks needing to refuel in town will be reduced, mitigating traffic impacts at the already congested fuel retail facilities in town.

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

#### **Actions**

##### **Prevention:**

- ◆ Erect clear signage regarding access and exit points at the facility.

##### **Mitigation:**

- ◆ Tanker trucks delivering fuel and trucks collecting fuel should not be allowed park within Second Street East outside of designated parking areas or to obstruct any traffic of entrances / exists of facilities in surrounding streets.
- ◆ 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.
- ◆ Trucks entering and existing the facility should not be allowed to make sharp turns on Second Street East, as this may result in traffic issues and damage to the road infrastructure.

##### **Responsible Body:**

- ◆ Proponent

##### **Data Sources and Monitoring:**

- ◆ Any complaints received regarding traffic issues should be recorded together with action taken to prevent impacts from repeating itself.
- ◆ A report should be compiled of all incidents reported, complaints received, and action taken.

### 7.3.7 Health, Safety and Security

Activities associated with the construction and operational phases are reliant on human labour and therefore exposes them to health and safety risks. Activities such as the operation of machinery and handling of hazardous chemicals (inhalation and carcinogenic effect of some petroleum products), poses the main risks to employees. Security risks are related to unauthorized entry, theft and sabotage.

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

#### **Actions**

##### **Prevention:**

- ◆ Clearly label dangerous and restricted areas as well as dangerous equipment and products.
- ◆ Equipment that will be locked away on site must be placed in a way that does not encourage criminal activities (e.g. theft).
- ◆ Provide all employees with required and adequate personal protective equipment (PPE).
- ◆ Ensure that all personnel receive adequate training on operation of equipment / handling of hazardous substances.
- ◆ All Health and Safety standards specified in the Labour Act should be complied with.
- ◆ Implementation of maintenance register for all equipment and fuel/hazardous substance storage areas.

##### **Mitigation:**

- ◆ Selected personnel should be trained in first aid and a first aid kit must be available on site. The contact details of all emergency services must be readily available.
- ◆ Implement and maintain an integrated health and safety management system, to act as a monitoring and mitigating tool, which includes: colour coding of pipes, operational, safe work and medical procedures, permits to work, emergency response plans, housekeeping rules, MSDS's and signage requirements (PPE, flammable etc.).
- ◆ Security procedures and proper security measures must be in place to protect workers and clients, especially during cash in transit activities.
- ◆ Strict security that prevents unauthorised entry.

##### **Responsible Body:**

- ◆ Proponent
- ◆ Contractors

##### **Data Sources and Monitoring:**

- ◆ Any incidents must be recorded with action taken to prevent future occurrences.
- ◆ A 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.

### 7.3.8 Fire

Operational and maintenance activities may increase the risk of the occurrence of fires. The site is located in a developed area which may increase the difficulty of fighting fires. Fuel, especially illuminating paraffin, is highly flammable and therefore presents a fire risk.

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

#### **Actions:**

##### **Prevention:**

- ◆ Ensure all chemicals are stored according to MSDS and SANS instructions.
- ◆ Maintain regular site, mechanical and electrical inspections and maintenance.
- ◆ Clean all spills / leaks.
- ◆ Special note must be taken of the regulations stipulated in sections 47 and 48 of the Petroleum Products and Energy Act, 1990 (Act No. 13 of 1990).
- ◆ Follow SANS standards for design, operation and maintenance of the facility, this includes refuelling locations and distances from boundaries.
- ◆ All dispensers must be equipped with devices that cut fuel supply during fires.
- ◆ The proponent should liaise with the local Fire Brigade to ensure that all fire requirements are met. This includes, but is not limited to SANS 10400 T: 2011.

##### **Mitigation:**

- ◆ A holistic fire protection and prevention plan is needed. This plan must include an emergency response plan, firefighting plan and spill recovery plan.
- ◆ Special note must be taken of the regulations stipulated in sections 47 and 48 of the Petroleum Products and Energy Act, 1990 (Act No. 13 of 1990).
- ◆ Maintain firefighting equipment, good housekeeping and personnel training (firefighting, fire prevention and responsible housekeeping practices).

##### **Responsible Body:**

- ◆ Proponent
- ◆ Contractors

##### **Data Sources and Monitoring:**

- ◆ A register of all incidents must be maintained on a daily basis. This should include measures taken to ensure that such incidents do not repeat themselves.
- ◆ A 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.



### 7.3.9 Air Quality

Fuel vapours are released into the air during refuelling of bulk storage tanks and tankers as well as at the proposed filling points. Prolonged exposure may have carcinogenic effects. Dust may be generated by vehicles accessing the site as well as during any construction activities.

**Desired Outcome:** To prevent health impacts and minimise the dust generated.

#### **Actions**

##### **Mitigation:**

- ◆ Personnel issued with appropriate masks where excessive dust or vapours are present.
- ◆ A complaints register should be kept for any dust related issues and mitigation steps taken to address complaints where necessary e.g. dust suppression.
- ◆ Employees should be coached on the dangers of fuel vapours.
- ◆ Vent pipes must be properly placed as per SANS requirements.

##### **Responsible Body:**

- ◆ Proponent
- ◆ Contractors

##### **Data Sources and Monitoring:**

- ◆ Any complaints received regarding dust or fuel vapours should be recorded with notes on action taken.
- ◆ All information and reporting to be included in a bi-annual report.

### 7.3.10 Noise

Construction (maintenance and upgrades) may generate noise. During operations, noise pollution will exist due to vehicles accessing the site to offload fuel or collect fuel. The facility is however situated in an industrial area with high ambient noise levels, thus noise impacts is not expected to negatively affect neighbouring receptors and is mostly related to hearing loss.

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

#### **Actions**

##### **Prevention:**

- ◆ Follow World Health Organization (WHO) guidelines on maximum noise levels (Guidelines for Community Noise, 1999) to prevent hearing impairment.
- ◆ All machinery must be regularly serviced to ensure minimal noise production.

##### **Mitigation:**

- ◆ Hearing protectors as standard PPE for workers in situations with elevated noise levels.

##### **Responsible Body:**

- ◆ Proponent
- ◆ Contractors

##### **Data Sources and Monitoring:**

- ◆ WHO Guidelines.
- ◆ Maintain a complaints register.
- ◆ Report on complaints and actions taken to address complaints and prevent future occurrences.

### 7.3.11 Waste production

Waste is produced during the operational phase. Waste may include hazardous waste associated with the handling of hydrocarbon products etc. Domestic waste may be generated by the facility and related operations. Waste presents a contamination risk and when not removed regularly may become a fire hazard. Construction (maintenance) waste, if any, may include building rubble and discarded equipment contaminated by hydrocarbon products. 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 disposal storage facilities are available.
- ◆ Ensure waste cannot be blown away by wind.
- ◆ Prevent scavenging (human and non-human) of waste.
- ◆ All regulation and by-laws relating to environmental health should be adhered to.

##### **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).
- ◆ Spill catchment areas / drip trays should be cleaned regularly and contaminated waste disposed of as hazardous waste.
- ◆ 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.

##### **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.
- ◆ The spill catchment areas and equipment must be regularly inspected and all hydrocarbons removed once detected.
- ◆ All information and reporting to be included in a bi-annual report.

### **7.3.12 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 site is predicted as the site is currently void of natural fauna and flora. Pollution of the marine environment may however negatively impact on marine animals. Impacts are therefore mostly related to pollution of the marine environment. Bright lighting used at night may disorientate birds flying at night and cause collisions of birds with man-made structures.

**Desired Outcome:** To avoid pollution of and impacts on the ecological environment.

#### **Actions.**

##### **Mitigation:**

- ◆ Report any extraordinary sightings to the Ministry of Environment, Forestry and Tourism.
- ◆ Mitigation measures related to waste handling and the prevention of groundwater, surface water and soil contamination should limit ecosystem and biodiversity impacts.
- ◆ Avoid scavenging of waste by fauna.
- ◆ Direct all lights down to working surfaces and use minimal lighting at night.
- ◆ The establishment of habitats and nesting sites at the facility should be avoided where possible.

##### **Responsible Body:**

- ◆ Proponent

##### **Data Sources and Monitoring:**

- ◆ All information and reporting to be included in a bi-annual report.

### **7.3.13 Groundwater, Surface Water and Soil Contamination**

Operations entail the storage and handling of hydrocarbons (illuminating paraffin and diesel) which present a contamination risk. Illuminating paraffin is known to be very toxic to aquatic organisms, and special care should be taken when stored and handled. Contamination may either result from failing storage facilities, or spills and leaks associated with fuel handling. The facility is situated 15 m from the Atlantic Ocean, any uncontained pollution may contaminate the marine environment.

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

#### **Actions**

##### **Prevention:**

- ◆ Spill control structures and procedures must be in place according to SANS standards or better on all areas where fuel is handled.
- ◆ All fuelling should be conducted on surfaces provided for this purpose. E.g. The use of drip trays / concrete slabs with regularly maintained seals between slabs.
- ◆ The procedures followed to prevent environmental damage during service and maintenance, and compliance with these procedures, must be audited and corrections made where necessary.
- ◆ Proper training of operators must be conducted on a regular basis (Fuel handling, spill detection, spill control).

##### **Mitigation:**

- ◆ Any spillage of more than 200 litre must be reported to the Ministry of Mines and Energy.
- ◆ Spill clean-up means must be readily available on site as per the relevant MSDS.
- ◆ Any spill must be cleaned up immediately.
- ◆ The spill catchment traps and drip trays should be cleaned regularly and waste disposed of at a suitably classified hazardous waste disposal facility.

##### **Responsible Body:**

- ◆ Proponent
- ◆ Contractors

##### **Data Sources and Monitoring:**

- ◆ A report should be compiled bi-annually of all spills or leakages reported. The report should contain the following information: date and duration of spill, product spilled, volume of spill, remedial action taken, comparison of pre-exposure baseline data (previous pollution conditions survey results) with post remediation data (e.g. soil/groundwater hydrocarbon concentrations) and a copy of documentation in which spill was reported to Ministry of Mines and Energy.

#### **7.3.14 Visual Impact**

This impact is not only associated with the aesthetics of the site, but also the structural integrity. The existing facility as well as proposed diesel installation forms part of the industrial landscape associated with the area. The site should be kept clean, tidy and maintained to ensure it remains aesthetically pleasing and does not add the urban decay.

**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.

##### **Responsible Body:**

- ◆ Proponent
- ◆ Contractors

##### **Data Sources and Monitoring:**

- ◆ A maintenance record should be kept.
- ◆ A report should be compiled of all complaints received and actions taken.

### **7.3.15 Cumulative Impact**

Possible cumulative impacts associated with the operational phase include increased traffic in the area and possible hydrocarbon spills. The facility will have a negative cumulative impact on traffic flow on surrounding streets, it will however have a positive impact on traffic in other areas of town.

**Desired Outcome:** To minimise cumulative all 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:**

- ◆ Annual summary report based on all other impacts must be created to give an overall assessment of the impact of the operational phase.

#### **7.4 DECOMMISSIONING AND REHABILITATION**

Decommissioning is not foreseen during the validity of the environmental clearance certificate. Decommissioning was however assessed as construction activities include modification and decommissioning. Should decommissioning occur at any stage, rehabilitation of the area may be required. Decommissioning will entail the complete removal of all infrastructure including buildings and underground infrastructure. 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 WHO standards and 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 Environmental Management Plan 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.

#### **7.5 ENVIRONMENTAL MANAGEMENT SYSTEM**

The proponent could implement 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; and
- ◆ Periodic (internal and external) audits and reviews of environmental performance and the effectiveness of the EMS.
- ◆ The EMP

## **8 CONCLUSION**

The operations of the facility has a positive impact on Walvis Bay by generating revenue and contributing locally to skills transfer and training which in turn develops the local workforce during operations of the facility. The addition of the diesel storage facility will further aid in ensuring a reliable supply of fuel to fleet vehicles as well as reducing traffic impact at fuel retail facilities in town.

Negative impacts can successfully be mitigated. SANS standards relating to the petroleum industry and prescribed by Namibian law must be followed during all operations of the fuel storage and handing facility. Noise pollution should at all times meet the prescribed WHO requirements to prevent hearing loss and not to cause a nuisance. Fire prevention should be adequate, and health and safety regulations should be adhered to in accordance with the regulations pertaining to relevant laws and internationally accepted standards of operation. Any waste produced must be removed from site and disposed of at an appropriate facility or re-used or recycled where possible. Hazardous waste must be disposed of at an approved hazardous waste disposal site.

The EMP should be used as an on-site reference document for the operations of the facility. Parties responsible for transgressing of the EMP should be held responsible for any rehabilitation that may need to be undertaken. The proponent could use an in-house Health, Safety, Security and Environment Management System in conjunction with the environmental management plan. All operational personnel must be taught the contents of these documents.



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## **Appendix A: Consultants' 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 130 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 (Pty) Ltd.
Name of Staff	:	ANDRÉ FAUL
Profession	:	Environmental Scientist
Years' Experience	:	18
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	:	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
Basic Fire Fighting	EMTSS, 2017

**PROFESSIONAL SOCIETY AFFILIATION:**

Environmental Assessment Professionals of Namibia (Practitioner and Executive Committee Member)

**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	+130
Research Reports & Manuals:	5
Conference Presentations:	1

**ENVIRONMENTAL GEOLOGIST****Wikus Coetzer**

Wikus has 6 years' experience in environmental science related fields with 4 years' experience in conducting environmental impact assessments and preparation of environmental management plans. He holds an honours degree in Environmental Sciences – Environmental Geology from the Northwest-University Potchefstroom (NWU) South Africa. He first completed a B.Sc. degree in Geology and Botany in the required time also from the Northwest University Potchefstroom, South Africa. His honours project focused on the rehabilitation and phytoremediation of various tailings types and soils.

He has working experience as an environmental monitor / assisting environmental officer at Petra Diamonds, Cullinan Diamond Mine (CDM) where he gained a proper understanding of environmental monitoring responsibilities as well as legislations, regulations and the implementation of EMS/ISO14001. He started working at Geo Pollution Technologies in 2017, and regularly conducts/assists and report on environmental impact assessments, environmental management plans and pollution surveys.

**CURRICULUM VITAE WIKUS COETZER**

Name of Firm	:	Geo Pollution Technologies (Pty) Ltd.
Name of Staff	:	WIKUS COETZER
Profession	:	Environmental Geologist
Nationality	:	South African
Position	:	Environmental Geologist
Specialisation	:	Environmental Geology/ Geochemistry
Languages	:	Afrikaans – speaking, reading, writing English – speaking, reading, writing

**EDUCATION AND PROFESSIONAL STATUS:**

B.Sc. Environmental and Biological Sciences – Geology & Botany  
B.Sc. (Hons.) Environmental Sciences – Environmental Geology

: NWU Potchefstroom 2013  
: NWU Potchefstroom 2014

First Aid Class A                    EMTSS, 2017  
Basic Fire Fighting                EMTSS, 2017

**AREAS OF EXPERTISE:**

Knowledge and expertise in:

- ◆ Phytoremediation
- ◆ Environmental Geology / Geochemistry
- ◆ Environmental Monitoring
- ◆ Environmental Compliance
- ◆ Environmental Impact Assessments
- ◆ Environmental Management Plans

**EMPLOYMENT:**

2017 - Date:                    Geo Pollution Technologies  
2015 - 2016:                Petra Diamonds CDM – Environmental monitor / Assisting environmental officer  
2015:                        Petra Diamonds CDM – Graduate program: Environmental Officer  
2014:                        NWU Potchefstroom department of Geo and Spatial Sciences – Research assistant

**PUBLICATIONS:**

Contract Reports: +40