

APP-0010386
JETTY CONSTRUCTION AND JETTY AND FLOATING DRY DOCK
OPERATIONS OF TUNACOR PROPERTIES IN THE FISHING
HARBOUR OF WALVIS BAY

UPDATED ENVIRONMENTAL MANAGEMENT PLAN



Assessed by:



Assessed for:



June 2022

Project:	JETTY CONSTRUCTION AND JETTY AND FLOATING DRY DOCK OPERATIONS OF TUNACOR PROPERTIES IN THE FISHING HARBOUR OF WALVIS BAY: UPDATED ENVIRONMENTAL MANAGEMENT PLAN
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Report Approval	 André Faul Conservation Ecologist

I Antony Pretorius acting as the Proponent's representative (Tunacor Properties Ltd), hereby confirm that we approve the Environmental Management Plan as presented in this document. All material information in the possession of the proponent that reasonably has or may have the potential of influencing the Environmental Management Plan was provided to the consultant.

Signed at Walvis Bay on the 30 day of JUNE 2022.


Tunacor Properties Ltd

53 / 32344 / 06
Company Registration Number

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1 BACKGROUND AND INTRODUCTION

In 2018, an environmental clearance certificate (ECC) was issued to Tunacor Properties (Pty) Ltd (“Tunacor”) for jetty construction and commissioning of a floating dry dock at their existing Tunacor facilities, on erven 3686 and 3687 in the fishing harbour of Walvis Bay (Figure 1-1). These activities were not yet initiated and it is the intention of Tunacor (the Proponent) to resume with the proposed activities. The main project activities include: 1) replacement of the existing wooden jetties; 2) extension of the existing concrete jetty; 3) commissioning of a floating dry dock in the water area; 4) installation of fuel and waste oil pipelines and storage tanks; and 4) the upgrade of selected infrastructure.

General jetty construction activities will include demolition of the existing wooden jetties and construction of concrete jetties by means of precast piles and concrete decks. Additional activities include installation of support infrastructure, local dredging and placement of scour protection where required. Major operational activities related to fishing include berthing of vessels, offloading of fish, restocking of vessels, loading/offloading of equipment, and general maintenance of vessels. Ship repair will also form a major part of jetty operations, as well as floating dry dock operations once commissioned. More detail on construction and operational processes are provided in section 2 and section 3.

Geo Pollution Technologies (Pty) Ltd was appointed by the Proponent to apply for renewal of the existing ECC. To renew the ECC, an updated environmental management plan (EMP) will be prepared for the proposed construction and operational activities on the properties. Renewal of the ECC is required as per the Environmental Management Act No. 7 of 2007 (EMA). The updated EMP will be submitted to the Environmental Commissioner, Ministry of Environment, Forestry and Tourism, in support of the renewal of the ECC. This report is an update of the EMP.

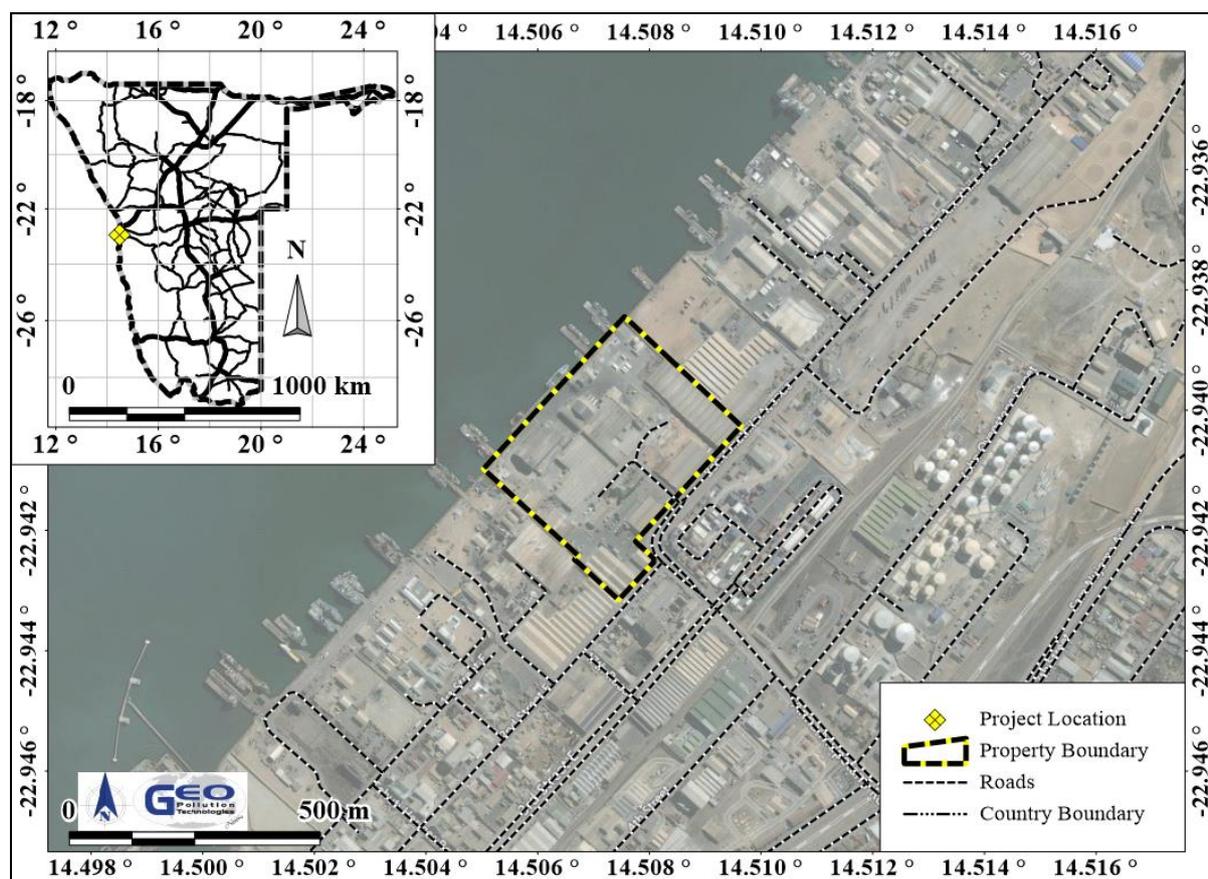


Figure 1-1 Project location

2 CONSTRUCTION AND RELATED ACTIVITIES

Activities related to the demolition of old jetties and construction of the new jetties are expected to commence after an environmental clearance certificate is granted to Tunacor. The original environmental impact assessment (EIA) addressed the proposed new infrastructure and construction activities on site (Faul et al., 2018). No changes in the infrastructure and construction activities are proposed for this updated EMP.

2.1 Jetties

Tunacor currently has one concrete jetty and two old wooden jetties. The wooden jetties will be demolished completely by removing all jetty structures, mostly consisting of wooden piles and a wooden deck. Two new concrete jetties of 120 x 16.5 m each will be constructed in their place. Jetty construction will be a phased approach with both jetties initially built to 78 m in length and later on extended to 120 m. One of these jetties will be constructed as a heavy duty jetty. Additionally, the existing concrete jetty of 77 x 12.5 m will be extended to 120 m in length. See Figure 1-2 for the proposed jetty masterplan.

The jetties will be similar to typical concrete jetties used in the port of Walvis Bay and will be constructed using similar techniques, that includes pile driving of precast concrete piles. The following is a brief description of the design and construction process for a jetty (refer to Figure 1-4 and Figure 1-5 for jetty design diagrams):

For the regular jetty, rectangular concrete piles of 19 m in length and 420 x 420 mm in size, as well as concrete sections of the jetty deck, will be cast on land. The jetty deck will generally be 250 mm thick but with an increased thickness of 650 mm over cross beams. For the jetty, six piles will be spaced over the width of the jetty (this is referred to as one jetty bay) and jetty bays will be 7 m apart over the length of the jetty. Only the first two jetty bays will have four piles each. Thus, sixty two piles will be installed in total for the 78 m jetties. Thirty six more piles in 6 jetty bays will be added during the second phase when the jetty is extended to 120 m.

The procedure and design for the heavy duty jetty is exactly the same as for the regular jetty. However, the piles will be approximately 600 x 600 mm in size and the jetty deck will be slightly thicker.

Piles will be driven approximately 8 m into the sediment. Each pile will be put in place with a crane where it will be supported by a temporary steel guide. Initially the pile penetrates the seabed under its own weight assisted by jetting. Jetting is a process by which the sediment underneath and around the pile is fluidized with seawater or air jets, allowing the pile to sink into the seabed. This process continues until the pile is about 1 m above its final position. For the last 1 m, the pile is driven into the seabed using a drop hammer consisting of a three tonne steel weight raised and dropped with a crane.

Installation of piles will take place one jetty bay at a time. The time required for the actual pile driving of piles with the drop hammer is approximately 20 minutes per pile. Once the piles for one jetty bay have been placed, a precast section of the jetty deck is put in place on the piles. The estimated time required for the construction of one jetty bay is one week. As the jetty bays are constructed the crane moves along the already completed section and continue construction of the jetty seawards.

Once the jetty has been completed all support infrastructure will be installed. This will include water supply lines, power lines, fuel and waste oil lines (on heavy duty jetty), conveyors for fish offloading, lighting, and a new seawater pump. Local dredging will also be performed to deepen berthing areas to -8 mCD. Any dredging related activities is covered in section 3.4. Scour protection may also have to be placed where required. This typically consist of rocks and/or fabric placed on the seabed to prevent sediment scour due to propeller movement of water.

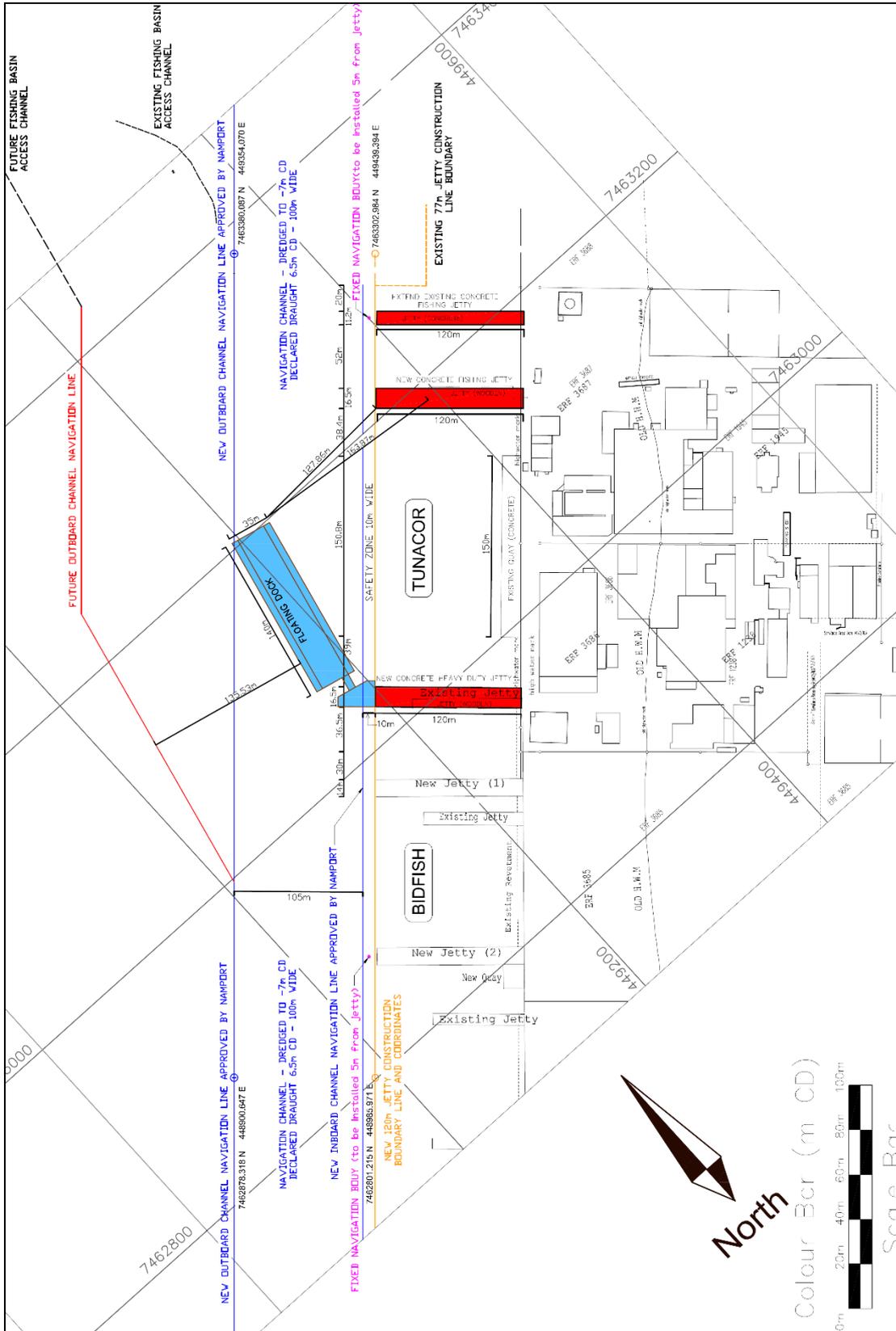


Figure 1-2 Proposed jetty masterplan

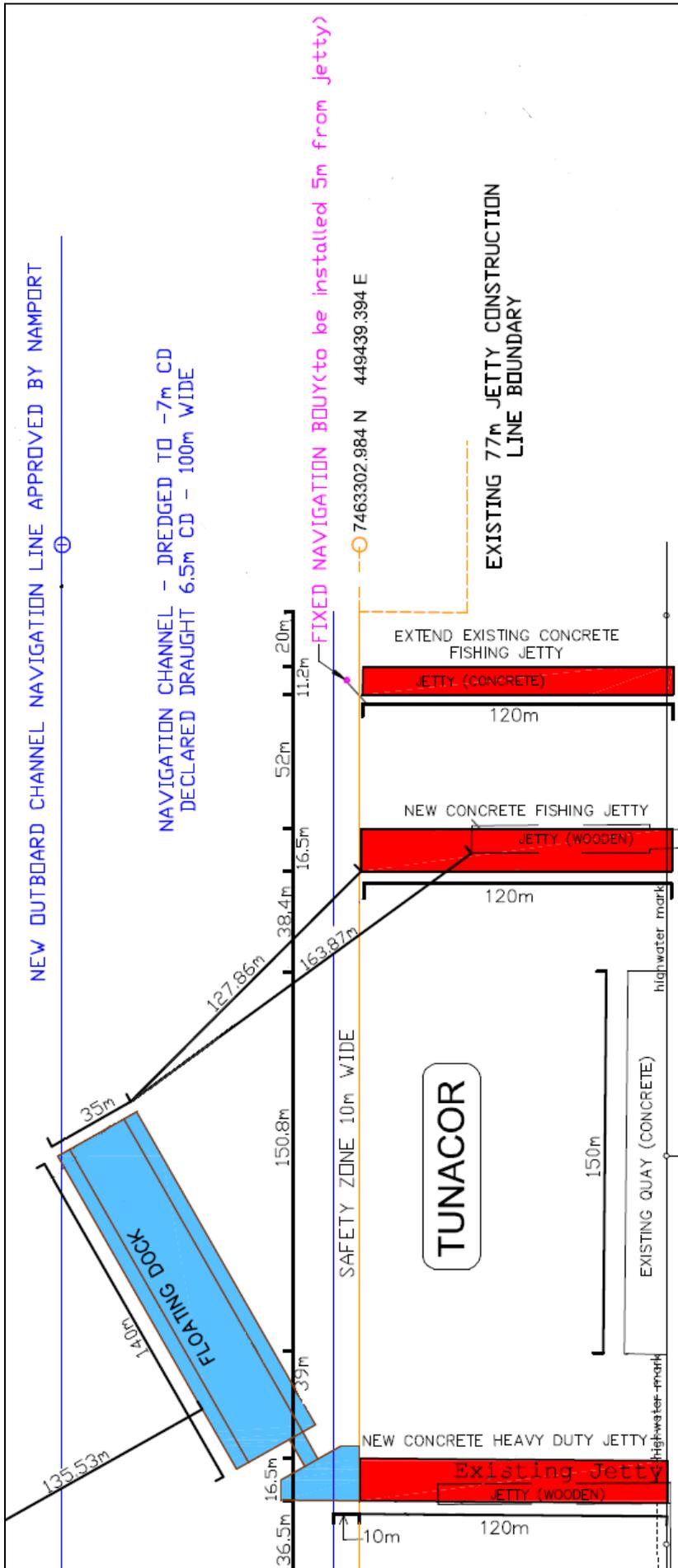


Figure 1-3 Jetty and floating dry dock layout

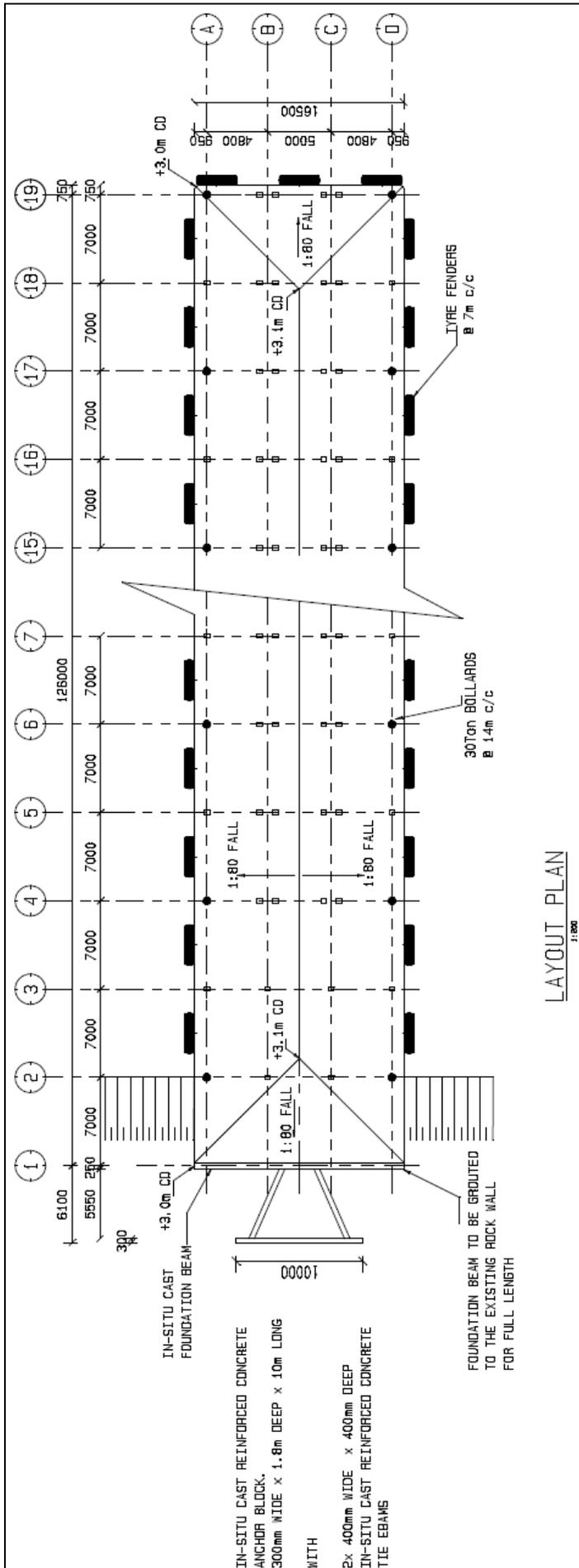


Figure 1-4 Jetty design – top elevation

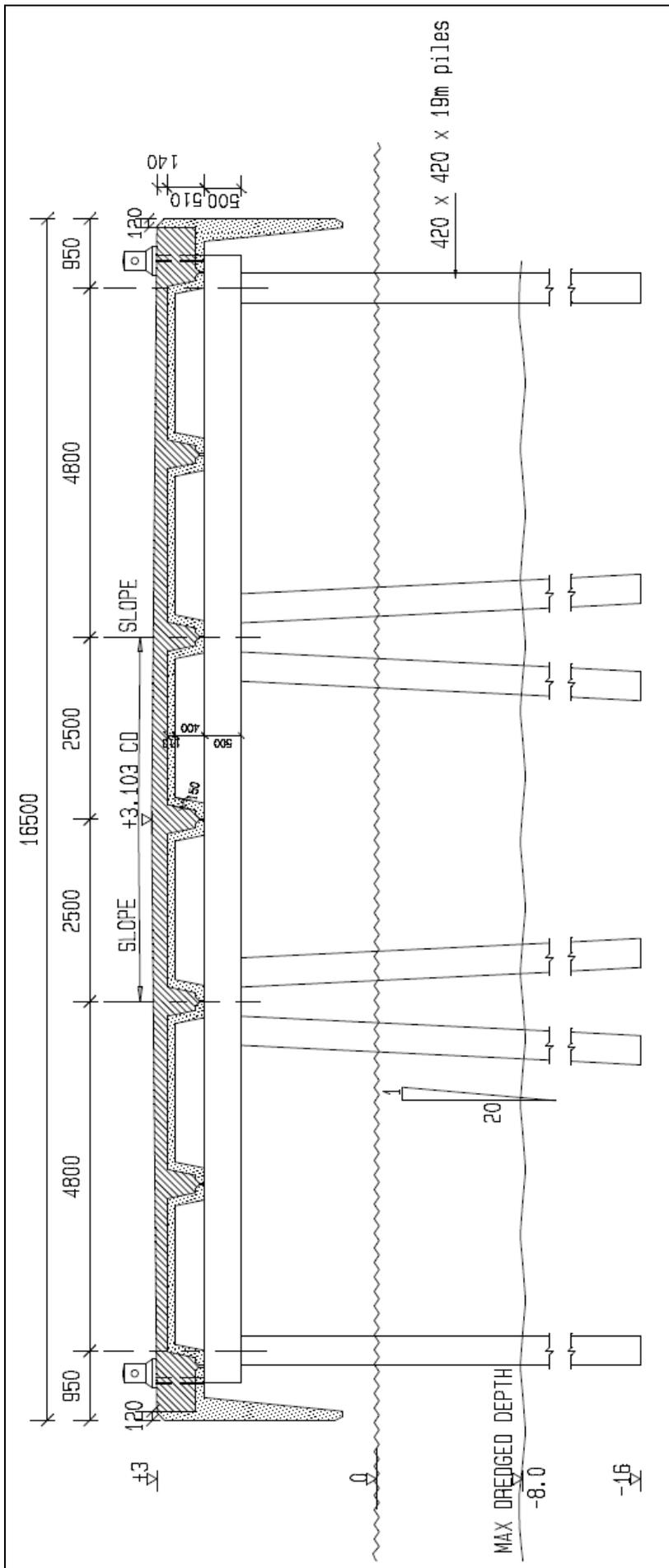


Figure 1-5 Jetty cross section

2.2 Floating Dry Dock

A floating dry dock is a submersible U-shaped structure used for dry docking of ships. The floating dry dock will be sourced internationally and moved to the Tunacor site by towing it with a tug or other vessel. It will have a lifting capacity of 8,000 t (Table 1-1). It will be anchored at the seaward end of the new heavy duty jetty at Tunacor (Figure 1-2). Some modifications to the jetty will be made to accommodate the floating dry dock, this will require some minor additional piling and concrete works. All support infrastructure like electrical and water supply for the operations of the floating dry dock will also be installed.

Table 1-1. Dry dock specifications

Width at Entrance	23.50 m
Width between inner walls	25.00 m
Length over keel blocks	139.50 m
Vessel draft maximum	5.80 m
Lifting capacity	8,000 t
Cranes	4 t, 7 t, 10 t
Thrust well / dock pit	8.5 m x 8.2 m x 2.4 m



Photo 1-1 Existing wooden jetty (southern) (with old seawater pump room)



Photo 1-2 Existing wooden jetty (eastern)



Photo 1-3 Existing concrete jetty



Photo 1-4 Vessel berthed at quay wall

2.3 Fuel and Waste Oil Infrastructure

Two aboveground bulk steel storage tanks, 250 m³ for waste oil and 1,000 m³ for marine gas oil (MGO), will be installed (Figure 1-6). All fuel related installations will be according to the appropriate South African National Standards (SANS) for bulk fuel installations. The tanks will

be located in suitably sized concrete bund areas to prevent accidental spills or tank failure from contaminating the environment.

Waste oil and MGO pipelines will be installed from the existing quay wall and the proposed heavy duty jetty to the storage tanks. From there, it is proposed that the pipelines will also go to erf 4570 in the industrial area of Walvis Bay (Figure 1-6). Fuel hydrants will be installed on the heavy duty jetty.

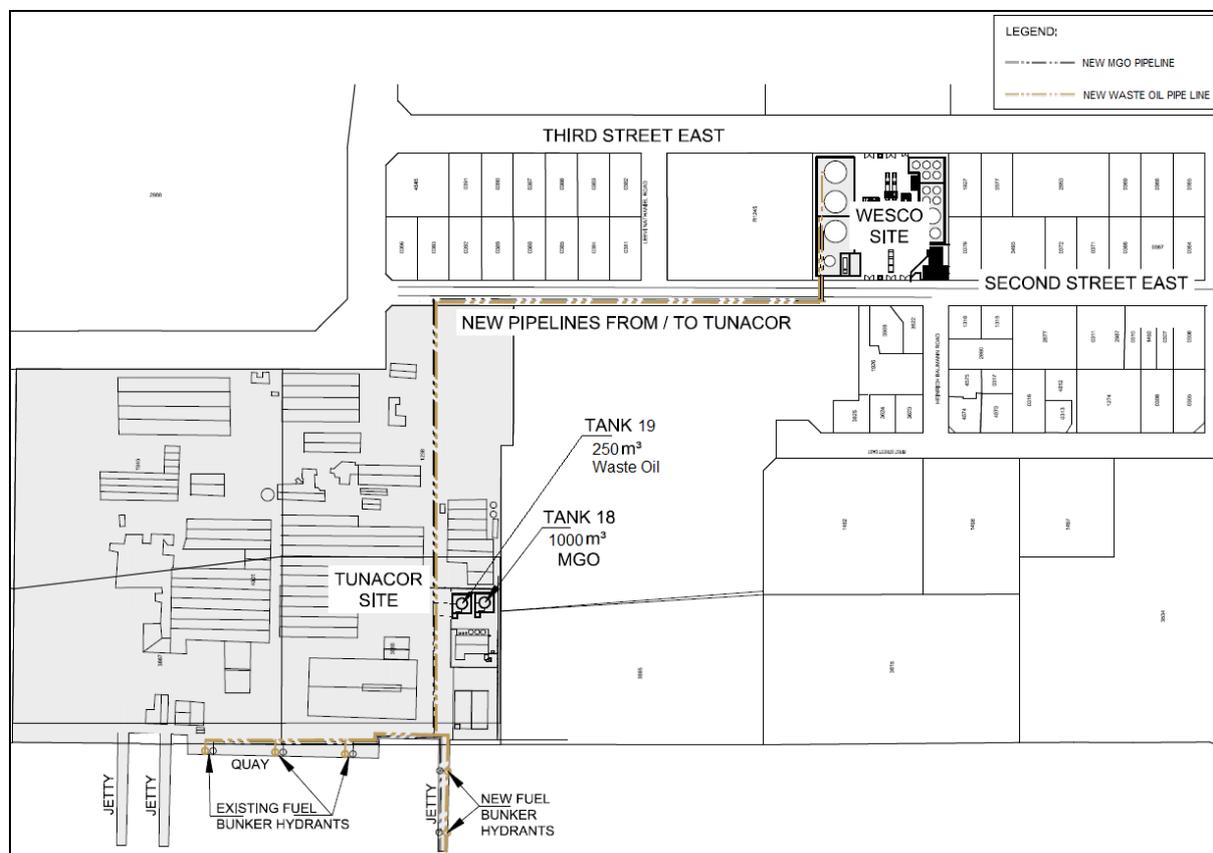


Figure 1-6 Location of waste oil and MGO tanks with reticulation

3 OPERATIONS AND RELATED ACTIVITIES

Operational activities will include fishing related jetty use as well as ship repair and floating dry dock operations.

3.1 Fishing Related Jetty Use

Jetty use related to the fishing industry includes the berthing of vessels returning with their catch. Fish is offloaded via conveyor or with a crane. While the vessels are docked at the jetty, some general ship maintenance and cleaning occurs. All waste on board is offloaded for disposal and the freshwater supply on board is replenished. The vessels are refuelled and restocked before heading back to sea. Some minor in-water maintenance and repair activities on fishing vessels include high pressure washing, steel work, carpentry, hydraulic and pneumatic work, crane operations, electrical work, electronic work, and internal combustion engine work.

Refuelling will take place from the onsite MGO tank. The MGO tank will receive fuel from erf 4570. The presence of the waste oil facilities also allow for the offloading of waste oil from fishing vessels when required. Waste oil will be temporarily stored in the onsite waste oil tank before being pumped erf 4570 for recycling purposes. Note that all activities related to erf 4570 is incorporated in a separate EIA and EMP, and performed under its own ECC.

3.2 Ship Repair

Ship repair may be on various types of commercial vessels and barges, including offshore oil and gas, fishing, bunkers, reefers, tankers, sub-sea construction and oil rig (floating or jack-up) vessels. The vessels will be berthed or docked on the floating dry dock, depending on the type of repairs or maintenance to be conducted.

3.2.1 Dry Docking of Vessels

In order to dry dock a vessel, the ballast tanks of the floating dry dock is filled with seawater so that the working platform is submerged and the vessel can be manoeuvred into the dock (Photo 1-5). The vessel is supported to keep upright when lifted out of the water. Once the vessel is in place, the water is pumped out of the ballast tanks into the sea. The entire structure floats so that the working platform and vessel are above the water (Photo 1-6). Ballast water contained in the vessel may also be released during the floating process. Ship repair and maintenance can then commence.

3.2.2 Scraping and Pressurized Water Cleaning

Biofouling of a ship's hull involves the growth of marine organisms like molluscs and algae on the submerged hull area (Photo 1-7). These organisms interfere with the ships manoeuvrability and increases drag and thus fuel usage. When dry docked, these organisms are manually scraped off before the ship's hull is washed using pressurized freshwater jets. All waste water and debris collect within the working platform ballast tank. Here all debris is left to settle before the water is pumped to sea. The settled debris is collected and disposed of at an approved municipal dump site.

3.2.3 Ultra-High Pressure Grit Blasting

Grit blasting will be by means of pressure abrasive blasting. An air compressor is connected to a blast hose and a blast pot (Photo 1-8). The blast pot contains the grit and is also pressurised. The grit is gravity fed into the blast hose and propelled through a blasting nozzle towards the surface to be blasted. Grit blasting is typically used to clean a surface of paint, rust or dirt. It is also used to treat surfaces before coating or as a post coating finish. Different types of blasting grit can be used, but typically in Walvis Bay copper slag is used (Photo 1-9). It is however known that copper slag may contained high levels of potentially hazardous heavy metals. From the sample results. It is therefore advised that garnet grit be used as a blasting medium as opposed to copper slag.

During grit blasting a significant amount of dust is produced which can include heavy metals like lead or tributyltin that used to be ingredients of ship paint as well as those present in the grit itself. To prevent the spread of dust and the contamination of the ocean, shrouds will be hanged around blasting areas and around the dry dock. Shrouds are typically lightweight sheeting or netting hanged vertically up to the top and over the dry dock to prevent windblown and scattered dust and particles from escaping the dry dock.

3.2.4 Waste and Waste Water Handling

During ship repair various contaminants collect on the floating dock and in the waste water entering the ballast and storage tanks. All dry waste will be removed and discarded at an approved hazardous waste facility. Waste water will be cleaned to such a standard that it can be discharged into the ocean. However, if waste water is contaminated and cannot be cleaned sufficiently, it will be discarded at an approved hazardous waste treatment or disposal facility.

3.2.5 General Ship Repair Activities

Repairs and maintenance on ships may include any of the following aspects:

- ◆ Industrial painting
- ◆ Steel (plate and structural pipe work)
- ◆ Carpentry
- ◆ Hydraulic and pneumatic

- ◆ Electrical and electronic
- ◆ Refrigeration and insulation
- ◆ Internal combustion engine work
- ◆ Mechanical and propulsion work
- ◆ Diving inspection and underwater repairs
- ◆ Heavy lifts to and from vessel and jetties
- ◆ Cleaning of hydrocarbon, freshwater, ballast, dry, sewerage and dry bulk tanks

Although some of the activities mentioned will occur on-site, others may occur at off-site specialist companies. This for example may include removal of propellers and propeller shafts, engines, pumps, etc., from the vessels and transporting them off-site to be repaired.

3.2.6 Vessel Re-Floating

Once all repairs and maintenance are complete the working platform are cleaned of all waste and potential pollutants and the vessels are re-floated. Seawater is pumped into the ballast tanks of the floating dry dock and the working platform is submerged to a depth sufficient for the vessel to float and be manoeuvred out to sea.

3.3 General Site Operations

General site operations related to the jetties and the floating dry dock includes:

- ◆ Waste removal (waste oil, scrap, general waste, dry bulk, sewerage disposal)
- ◆ Electricity supply
- ◆ Fresh water supply
- ◆ Bunker supply service for marine gas oil, heavy fuel oil, hydraulic oil and lubrication oil
- ◆ MGO and waste oil storage
- ◆ Laydown area for assorted equipment and material
- ◆ Workshop operations

3.4 Maintenance Dredging

As part of the general operations, some maintenance dredging of the area surrounding the jetties may have to be performed. This is to ensure that the water depth remains sufficient (-8 mCD) to allow the vessels safe entry and docking. Volumes to be dredged are minimal and dredging will proceed only when required.

Dredging will be conducted with a grab or backhoe dredger operated from the finished jetties. The grab or backhoe will be emptied into tipper trucks parked on the jetty. The truck will remain on the jetty to allow excess water to drain from the dredged material and back into the sea. Dredged sediments will then be disposed of at the municipal waste handling facility or other approved site.



Photo 1-5 Example of dry dock in process of being floated



Photo 1-6 Example of vessel on dry dock being repaired



Photo 1-7 Biofouling

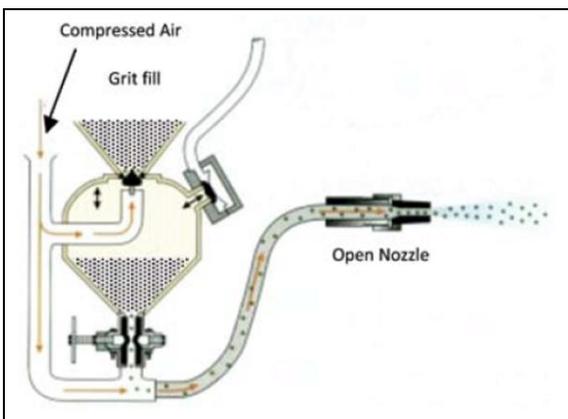


Photo 1-8 Typical pressure abrasive blast system (www.airbestpractices.com)



Photo 1-9 Typical slag used for blasting

4 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 4-1 to Table 4-4 govern the environmental assessment process in Namibia and/or are relevant to the project.

Table 4-1 Namibian law applicable or of specific interest

Law	Key Aspects
The Namibian Constitution	<ul style="list-style-type: none"> ◆ Promote 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	<ul style="list-style-type: none"> ◆ Defines the environment. ◆ Promote sustainable management of the environment and the use of natural resources. ◆ Provide 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	<ul style="list-style-type: none"> ◆ Commencement of the Environmental Management Act. ◆ List activities that requires an environmental clearance certificate. ◆ Provide Environmental Impact Assessment Regulations.
Namibia Ports Authority Act Act No. 2 of 1994, Government Notice No. 30	<ul style="list-style-type: none"> ◆ Provides for the establishment of the Namibian Ports Authority to undertake the management and control of ports.
Territorial Sea and Exclusive Economic Zone of Namibia Act Act No. 3 of 1990, Government Notice No. 28	<ul style="list-style-type: none"> ◆ Determine and define the territorial sea, internal waters, contiguous zone, exclusive economic zone and continental shelf of Namibia.
Marine Resources Act Act No. 27 of 2000, Government Notice No. 292	<ul style="list-style-type: none"> ◆ Provide for the conservation of the marine ecosystem and the responsible administration, conservation, protection and promotion of marine resources on a sustainable basis.
The Water Act Act No. 54 of 1956	<ul style="list-style-type: none"> ◆ Remains in force until the new Water Resources Management Act comes into force. ◆ Defines the interests of the state in protecting water resources. ◆ Controls the disposal of effluent. ◆ Numerous amendments.
Water Resources Management Act Act No. 11 of 2013	<ul style="list-style-type: none"> ◆ Provide for management, protection, development, use and conservation of water resources. ◆ Prevention of water pollution and assignment of liability. ◆ Not in force yet.
Dumping At Sea Control Act Act No. 73 of 1980, Government Notice No. 1149	<ul style="list-style-type: none"> ◆ Provide for the control of dumping of substances in the sea.

Law	Key Aspects
Marine Traffic Act Act No. 2 of 1981, Government Notice No. 282	<ul style="list-style-type: none"> ◆ Regulate marine traffic in Namibia.
Prevention and Combating of Pollution of the Sea by Oil Act Act No. 6 of 1981, Government Notice No. 342	<ul style="list-style-type: none"> ◆ Provides for the prevention of pollution of the sea where oil is being or is likely to be discharged.
Prevention and Combating of Pollution of the Sea by Oil Amendment Act Act No. 24 of 1991, Government Notice No. 150	<ul style="list-style-type: none"> ◆ Amends the Prevention and Combating of Pollution of the Sea by Oil Act of 1981 to be more relevant to Namibia after independence.
Aquaculture Act Act No. 18 of 2002	<ul style="list-style-type: none"> ◆ Regulates aquaculture activities to ensure sustainable development. ◆ Provides for water quality monitoring to protect aquaculture activities.
Local Authorities Act Act No. 23 of 1992, Government Notice No. 116 of 1992	<ul style="list-style-type: none"> ◆ Define the powers, duties and functions of local authority councils. ◆ Regulates discharges into sewers.
Regional Councils Act Act No. 22 of 1992; Government Notice No. 115	<ul style="list-style-type: none"> ◆ Sets out the powers, duties, functions, rights and obligations of Regional Councils. ◆ Provides the legal basis for the drawing up of Regional Development Plans.
Public and Environmental Health Act Act No. 1 of 2015, Government Notice No. 86 of 2015	<ul style="list-style-type: none"> ◆ 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	<ul style="list-style-type: none"> ◆ 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).
National Heritage Act of Namibia Act No. 27 of 2004	<ul style="list-style-type: none"> ◆ Provides for the protection and conservation of places and objects of heritage significance and the registration of such places and objects. ◆ Provides for reporting of heritage finds, issuing of permits, and archaeological impact assessments.
Namibia's Draft Wetland Policy (2004 Draft)	<ul style="list-style-type: none"> ◆ Aims to protect and conserve wetland diversity and ecosystem functioning without compromising human needs. ◆ Promote the integration of wetland management into other sector policies. ◆ Recognise and fulfil Namibia's international and regional obligations concerning wetlands, including those laid down in the Ramsar Convention and the SADC Protocol on Shared Water Systems.

Law	Key Aspects
Integrated Coastal Zone Management Bill of 2014	<ul style="list-style-type: none"> ◆ Aims at coastal management and give effect to Namibia's obligations in terms of international law regulating coastal management. ◆ Not adopted yet.
Hazardous Substances Ordinance Ordinance No. 14 of 1974	<ul style="list-style-type: none"> ◆ The ordinance's primary purpose is to prevent hazardous substances from causing injury, ill-health or the death of human beings.
Marine Notice No. 04 of 2018 Ministry of Works and Transport	<ul style="list-style-type: none"> ◆ Provides guidance on shipboard garbage management requirements in Namibia, in terms of the International Convention for the Prevention of Pollution from Ships (MARPOL).
National Marine Pollution Contingency Plan of 2017	<ul style="list-style-type: none"> ◆ Coordinated and integrated national system for dealing with oil spills in Namibian waters.

Table 4-2 Relevant multilateral environmental agreements for Namibia

Agreement	Key Aspects
Stockholm Declaration on the Human Environment, Stockholm 1972	<ul style="list-style-type: none"> ◆ 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.
United Nations Framework Convention on Climate Change (UNFCCC)	<ul style="list-style-type: none"> ◆ The Convention recognises that developing countries should be accorded appropriate assistance to enable them to fulfil the terms of the Convention.
Convention on Biological Diversity, Rio de Janeiro, 1992	<ul style="list-style-type: none"> ◆ Under article 14 of The Convention, EIAs must be conducted for projects that may negatively affect biological diversity.
Abidjan Convention of 1981	<ul style="list-style-type: none"> ◆ 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.
Ramsar Convention of 1971 - The Convention on Wetlands of International Importance especially as Waterfowl Habitat	<ul style="list-style-type: none"> ◆ The Ramsar convention covers all aspects of wetland conservation and use. It has three main focus areas (www.ramsar.org): ◆ To designate suitable wetlands for the List of Wetlands of International Importance ("Ramsar List") and ensure their effective management. ◆ To work towards the wise use of all their wetlands through national land-use planning, appropriate policies and legislation, management actions, and public education. ◆ To cooperate internationally concerning transboundary wetlands, shared wetland systems, shared species, and development projects that may affect wetlands. ◆ The Walvis Bay Lagoon is a declared Ramsar site since 23 August 1995 and thus receives a certain level of protection.
International Convention for the Prevention of Pollution from Ships (MARPOL 1973)	<ul style="list-style-type: none"> ◆ Dealing with the prevention of pollution of the sea by oil, sewage and garbage from ships. ◆ Annex I –Regulations for the Prevention of Pollution by Oil.

Agreement	Key Aspects
	<ul style="list-style-type: none"> ◆ Annex II –Regulations for the Control of Pollution by Noxious Liquid Substances in Bulk. ◆ Annex III –Prevention of Pollution by Harmful Substances Carried by Sea in Packaged Form. ◆ Annex IV –Regulations for the Prevention of Pollution by Sewage from Ships. ◆ Annex V –Prevention of Pollution by Garbage from Ships. ◆ Annex VI –Regulations for the Prevention of Air Pollution from Ships.
International Convention for the Control and Management of Ships' Ballast Water and Sediments (BWM 2004)	<ul style="list-style-type: none"> ◆ Aims to prevent the spread of harmful aquatic organisms from one region to another, by establishing standards and procedures for the management and control of ships' ballast water and sediments.
Convention on the International Regulations for Preventing Collisions at Sea (COLREG 1972)	<ul style="list-style-type: none"> ◆ Among others, provides rules related to navigation to be followed by vessels at sea to prevent collisions.
International Convention on Oil Pollution Preparedness, Response and Cooperation (OPRC 1990)	<ul style="list-style-type: none"> ◆ International maritime convention establishing measures for dealing with marine oil pollution incidents nationally and in co-operation with other countries.

Table 4-3. Municipal by-laws, guidelines and regulations

Municipal By-laws, Guidelines or Regulations	Key Aspects
Integrated Urban Spatial Development Framework for Walvis Bay	<ul style="list-style-type: none"> ◆ 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)	<ul style="list-style-type: none"> ◆ 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.

Table 4-4 Standards or codes of practise

Standard or Code	Key Aspects
South African National Standards (SANS)	<ul style="list-style-type: none"> ◆ The Petroleum Products and Energy Act prescribes SANS standards for the construction, operations and demolition of petroleum facilities. ◆ SANS 10089-3:2010 is specifically aimed at storage and distribution of petroleum products at fuel retail facilities and consumer installations. ◆ SANS 10131 (2004) is aimed at above-ground storage tanks for petroleum products. ◆ Provide requirements for spill control infrastructure

4.1 The Environmental Management Act

The development is listed as a project requiring an environmental clearance certificate as per the following points from Section 2 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.
- ◆ “9.3 The bulk transportation of dangerous goods using pipeline, funiculars or conveyors with a throughout capacity of 50 tons or 50 cubic meters or more per day.”
- ◆ “9.4 The storage and handling of 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.”
- ◆ “10.1 The construction of – (c) railways and harbours; (e) any structure below the high water mark of the sea.”

5 OBJECTIVES OF THE EMP

The EMP provides management options to ensure impacts of the construction and operations 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 EMP acts as a stand-alone document, which can be used during the various phases (planning, construction, operational and decommissioning) of any proposed activity or development.

All contractors and sub-contractors taking part in both the construction and operations associated with the project should be made aware of the contents of the EMP, so as to plan the relevant activities accordingly in an environmentally sound manner.

The objectives of the EMP are:

- ◆ to include all components of the various activities;
- ◆ to prescribe the best practicable control methods to lessen the environmental impacts associated with the both construction and operation activities;
- ◆ to monitor and audit the performance of the operational personnel in applying such controls; and
- ◆ to ensure that appropriate environmental training is provided to responsible operational personnel.

Tunacor implements the ISO 14001 environmental management system (EMS). At the heart of this 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. For an EMS to be effective, it 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.

6 THE EMP

The following general guidance for the EMP is based on the findings of the initial EIA and risk assessment carried out by Geo Pollution Technologies (Faul et al., 2018)

6.1 Land Use, Planning, Design, Operations – Identified Impacts

The following is the summary of the identified impacts:

- ◆ Health, safety, security, noise, air quality and fire risks/impacts related to construction, piling, operational procedures of berthing and subsequent offloading and loading of vessels, performance of maintenance dredging, as well as floating dry dock and ship repair operations.
- ◆ Waste production and surface water contamination related to accidental spills, grit blasting and dredging.
- ◆ Marine mammal impacts associated with piling noise, debris and ship strikes.
- ◆ Bird collisions with man-made structures when birds flying at night become disorientated by bright lights.

6.2 Land Use, Planning, Design, Operations – Mitigating Measures

The following is a summary of the proposed Management Plan, which will make the facility safe taking into consideration all the risk perceptions raised by all stakeholders:

- ◆ Adhere to all health and safety regulations and issuing of personal protective equipment.
- ◆ Firefighting equipment and a firefighting plan present on site.
- ◆ Groundwater, surface water and soil pollution must be prevented through best practices.
- ◆ Noise pollution should at all times meet the minimum World Health Organization requirements to prevent hearing loss and not to cause a nuisance to nearby receptors.
- ◆ For dredging, the EIA and EMP documents for capital and maintenance dredging of Namport should be adhered to where applicable (Faul et al., 2022).
- ◆ All lighting should be directed downwards and unnecessary lighting should be switched off at night.

7 THE IMPLEMENTATION OF THE EMP

Table 7-1 to Table 7-4 outline the management of the environmental elements that may be affected by the different activities, grouped in each phase of development. These groups are as follows:

- ◆ Planning Phase
- ◆ Construction Phase
- ◆ Operational Phase
- ◆ Decommissioning Phase

The EMP is a living document that must be prepared in detail, and regularly updated, by the proponent (Tunacor) as the project progress and evolve.

The tables below act as a guideline for the EMP to be established by the proponent. Impacts addressed and mitigation measures proposed are seen as minimum requirements which have to be elaborated on. Delegation of mitigation and reporting activities should be determined by the proponent and included in the EMP. All monitoring results must be reported on as indicated..

Table 7-1 Planning for operations and future decommissioning of the project

Activity	Objective	Action	Timing	Proof of Compliance	Responsible Body
Compliance	To comply with all legal requirements for the construction and operations of the facility in Namibia.	<p>Apply for the necessary permits from the various ministries, local authorities and any other bodies that governs the construction and operations of the proposed activities.</p> <p>Have environmental clearance certificate, petroleum products licence and any other relevant permits and licences available on site.</p> <p>Finalise negotiations and resolve any outstanding issues, if any, over the allocation of user rights and zoning of the property on which the proposed activity will be located.</p>	Prior to commencement of construction	All contracts, permits, certificates and other legal documents on file.	Proponent
Appointments	To appoint reputable contractors and operational personnel and establish the EMP, a legal requirement that forms part of the contract with the contractor and employees.	<p>Appoint contractors and employees and enter into an agreement which includes the EMP.</p> <p>Ensure that the contents of the EMP are understood by the contractor, sub-contractors, employees and all personnel who will be present on site.</p>	Prior to commencement of construction and operations	Contracts on file	Proponent; Contractor
Management	Establish a management system to implement and monitor Health, Safety and Environment.	<p>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.</p> <p>Have the following emergency plans, equipment and personnel in place to deal with all emergencies:</p> <p>Risk Management / Mitigation / Environmental Management Plan/ Emergency Response Plan and HSE</p>	Prior to commencement of construction and operations	<p>Documentation on file</p> <p>Personal Protective Equipment (PPE) on site</p> <p>Signage related to restricted areas, dangerous areas, and PPE requirements on site</p> <p>Emergency response material on site</p>	Proponent; Contractor

Activity	Objective	Action	Timing	Proof of Compliance	Responsible Body
		<p>Manuals</p> <p>Adequate protection and indemnity insurance cover for incidents;</p> <p>Comply with the provisions of all relevant safety standards;</p> <p>Procedures, equipment and materials required for emergencies.</p>			
Restoration Fund/Insurance	<p>Make provision for future environmental restoration or pollution remediation if ever required.</p>	<p>Ensure sufficient funding/insurance for future ecological restoration of the project site should project activities cease and the site is decommissioned and/or when environmental restoration or pollution remediation is required.</p>	<p>Immediately after environmental clearance certificate is issued and during operations</p>	<p>Financial statements/proof of restoration fund/insurance</p>	<p>Proponent; Independent Specialist Consultant</p>
Reporting	<p>To establish a reporting system to report on monitoring aspects of operations and decommissioning as outlined in the EMP.</p>	<p>Establish a reporting system to report on aspects of construction, operations and decommissioning as outlined in the EMP.</p> <p>Submit monitoring reports in compliance with environmental clearance certificate conditions.</p>	<p>During construction, operations as well as possible future decommissioning of the development</p>	<p>Bi-annual Reports</p>	<p>Proponent; Contractor</p>
Environmental Clearance Renewal	<p>To renew the environmental clearance certificate every three years.</p>	<p>Appoint a specialist environmental consultant to update the EIA and EMP, based on monitoring results and apply for renewal of the environmental clearance certificate.</p>	<p>Prior to expiry of environmental clearance certificate</p>	<p>Renewed environmental clearance certificate</p>	<p>Proponent; Independent Specialist Consultant</p>

Table 7-2 The construction phase

Impact	Nature	Mitigation	Monitoring	Responsible Body
Employment	The facility plays an important role in supporting employment within the town and Namibia as a whole through the appointment of various contractors	Develop and maintain a contractor management program, inclusive of compliance reviews of service level agreements etc.	Bi-annual summary report based on contractor records.	Proponent
Skills, Technology & Development	Enhanced skills and technology transfer to the Erongo coastal region and subsequent promotion of economic development.	Reputable contractors must be appointed.	Bi-annual summary report based on contractor records.	Proponent
Revenue	The Proponent will appoint contractors and revenue will be generated. This will contribute to local and national economic resilience.	Appoint local Namibian contractors as far as is practically possible.	Bi-annual summary report based on contractor records.	Proponent
HIV/AIDS, In-migration, Informal Settlements and Property Prices	New developments attract job seekers. This may lead to an increased influx to Walvis Bay or other areas of the coast. This can result in growth in informal settlements, increased spread of HIV/AIDS, and an increase in social ills. This may in turn have a negative impact on property prices in the area.	Appoint reputable, local Namibian contractors as far as is practically possible.	Bi-annual summary report based on contractor records.	Proponent
Health and Safety	Risks include work related injuries such as falling from heights, accidents involving vehicles and machinery, and falling into the sea which may result in drowning or hypothermia.	<p>All health and safety standards specified in the Labour Act should be complied with.</p> <p>All industry specific health and safety procedures and regulations applicable should be in place and adhered to.</p> <p>Implement and maintain an integrated health and safety management system, to act as a monitoring and mitigating tool, which includes:</p> <ul style="list-style-type: none"> • operational, safe work, first aid and medical procedures; • permit to work system for dangerous work; • job hazard analysis and standard operating procedures where required; • emergency response plans and drills; 	<p>Health and safety management system.</p> <p>Any health, safety and security incidents must be recorded with remedial action taken and actions to prevent future occurrences.</p> <p>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</p>	Proponent; Contractor

Impact	Nature	Mitigation	Monitoring	Responsible Body
		<p>Mitigation</p> <ul style="list-style-type: none"> • lockout tagout protection when servicing or maintaining potentially dangerous equipment; • housekeeping programmes; • MSDS's and signage requirements (PPE, flammable etc.); • a medical surveillance program; • hygiene and ergonomic survey for the site; <p>Selected staff should be trained in first aid and first aid kits must be readily available together with the contact numbers for emergency ambulance and professional medical services.</p> <p>Clearly label dangerous and restricted areas as well as dangerous equipment and products. Clearly indicate compulsory personal protective equipment (PPE) requirements for specific areas.</p>	<p>structures were inspected and maintained.</p>	
Security	Risks associated with theft and sabotage	<p>Ensure that security measures are in place and that access to the premises is strictly controlled.</p>	<p>A register of all incidents must be maintained. This should include measures taken to ensure that such incidences are not repeated.</p> <p>All information and reporting to be included in a bi-annual report.</p>	Proponent; Contractor
Traffic Impacts	Traffic impacts which can occur during delivery of equipment and building materials	<p>Regulation of traffic during deliveries for construction.</p> <p>Diversion or management of traffic if needed.</p> <p>Appropriate signage and warnings.</p> <p>Proper planning prior to construction.</p>	<p>Visual observation of impacts on traffic.</p> <p>Any traffic complaints received must be taken up with the relevant authorities and discussed with the Proponent</p> <p>All information and reporting to be included in a bi-annual report.</p>	Proponent; Contractor

Impact	Nature	Mitigation	Monitoring	Responsible Body
Noise	Noise due to presence of heavy machinery on site and pile driving activities	<p>The site is situated in an industrial area and no limitations on the operating hours exist.</p> <p>The Walvis Bay Municipality does not have any guidelines with respect to noise levels. Labour Act, 1992: Regulations relating to the health and safety of employees at work and the World Health Organization (WHO) guideline on maximum noise levels (Guidelines for Community Noise, 1999) to prevent hearing impairment should be followed.</p> <p>Hearing protectors must be issued as part of PPE if required.</p>	Any complaints received regarding excessive noise should be recorded with notes on action taken. Any negative effects caused from excessive vibrations should be recorded as well.	Proponent; Contractor
Fire	The possibility of a fire during construction when flammable materials or existing fuel storage catches fire	<p>Prepare a holistic fire protection, prevention and response plan. This plan must include evacuation plans and signage, an emergency response plan and a firefighting plan.</p> <p>Personnel training (safe operational procedures, firefighting, fire prevention and responsible housekeeping practices).</p> <p>Maintain firefighting equipment at approved intervals and keep a maintenance register.</p> <p>Ensure good housekeeping to reduce fire risks associated with accumulated waste materials, dry vegetation, etc.</p> <p>Storage and handling of flammable products should be according to their Material Safety Data Sheet (MSDS) instructions.</p>	<p>Supervision of work is required and reports of safe and unsafe practice to be brought to the attention of the HSE.</p> <p>Any incidents reported must be recorded together with steps taken to mitigate the impacts.</p> <p>All information and reporting to be included in a bi-annual report once construction finishes.</p>	Proponent; Contractor
Waste Production	Construction and domestic waste generated on site which may include hazardous wastes	<p>Develop and implement a waste management program, this should include waste reduction and recycling initiatives and regular inspection and maintenance of waste storage and disposal areas.</p> <p>Appoint reputable contractors and ensure proper waste handling and disposal (importantly on the segregation of waste according to the different waste streams and their appropriate disposal locations).</p> <p>Ensure adequate temporary waste storage facilities are available that prevents waste being blown away by wind</p>	<p>A register of hazardous waste disposal should be kept. This should include type of waste, volume as well as disposal method/facility.</p> <p>Any complaints received regarding waste should be recorded with notes on action taken.</p>	Proponent; Contractor

Impact	Nature	Mitigation	Monitoring	Responsible Body
Groundwater, Surface Water and Soil Contamination	Waste water, rubble and any other waste products not being contained may end up in the ocean. This may include hydrocarbons from spills or leaks.	<p>and prevent scavenging (human and non-human) of waste. Waste should be disposed of regularly. Liaise with the local authority regarding waste and handling of hazardous waste.</p> <p>Regular inspections and maintenance of all construction vehicles to ensure no leaks are present. All waste must be removed from the site and disposed of timeously. Any waste entering the ocean must be removed without delay.</p>	<p>All information and reporting to be included in a bi-annual report.</p> <p>Any incidents or complaints received regarding contamination should be recorded with notes on action taken.</p> <p>All information and reporting to be included in a bi-annual report.</p>	Proponent; Contractor
Marine Mammal Impact	Combined impacts on marine mammals associated with construction activities	<p>Suggested mitigation measures include for each impact are as follows;</p> <p>1) Noise Pollution</p> <ul style="list-style-type: none"> • All activities known to produce noise at a level known to cause major disturbances to marine mammals should be tightly controlled and monitored. • Sound proof all machinery known to cause disturbances and ensure all receive good maintenance. • Ensure the use of modern and well maintained ships • Prior to any blasting that may need to take place it is imperative that a MMO (Marine Mammal Observers) or PAM (Passive Acoustic Monitoring) operator is used to ensure that no cetaceans are in the operational area. • The use of acoustic deterrent devices are not recommended. <p>2) Mitigation zone should be minimum distance of 1,000 m from the source of sound for explosions, if any.</p> <p>3) Hydrocarbon Pollution</p> <ul style="list-style-type: none"> • National Marine Pollution Contingency Plan should be followed in the event following hydrocarbon 	<p>Any complaints received regarding stranding of marine mammals must be reported directly to relevant authorities.</p> <p>Entanglements must be kept and sent to Marine Mammal Department and Dolphin Projects</p> <p>Any ships seen to be approaching any marine mammal species must be reported to relevant authorities</p> <p>All information and reporting to be included in a bi-annual report.</p>	Proponent; Contractor

Impact	Nature	Mitigation	Monitoring	Responsible Body
Impact on Bird Species	Bright lights used at night causing birds flying at night to become disorientated resulting in collisions with manmade structures.	<p>pollution.</p> <p>4) Entanglement/ingestion of human generated debris</p> <ul style="list-style-type: none"> ● Namibia is a signatory of MARPOL (International Convention for the Prevention of Pollution from Ships) therefore all construction sites and ships must adhere to MARPOL rules at all times. ● Records of all entanglements must be made and sent to the Marine Mammal Department situated at the Ministry of Fisheries and Marine Resources of Swakopmund and to Dolphin Projects. <p>5) Ship interactions and Strikes</p> <ul style="list-style-type: none"> ● Ships must not approach any marine mammals <p>During the construction phase all lighting to be installed must face downwards and towards the work areas.</p>	Regular inspection must be performed to monitor for bird impacts. All information and reporting to be included in a bi-annual report.	Proponent; Contractor
Utilities, Infrastructure and Seabed Scouring	Any damage caused to existing infrastructure and services supply like water or electricity where present. Scouring of the seabed caused by vessel propellers.	Appointing qualified and reputable contractors is essential. The contractor must determine exactly where amenities and pipelines are situated before construction commences (utility clearance e.g. ground penetrating radar surveys). Liaison with the Municipality and suppliers of services is essential Scour protection should be installed where necessary to protect the seabed from scouring and to prevent siltation of adjacent berthing areas. Emergency procedures available on file. Regular maintenance dredging to be performed when necessary.	Any complaints received and incidents that occurred should be recorded with notes on action taken. A report should be compiled bi-annually of all complaints reported, incidents and monitoring performed.	Proponent; Contractor
Visual Impact	This is an impact that affects the aesthetic appearance.	Regular maintenance and general upkeep of the facility will ensure continuous low visual impact.	All information and reporting to be included in a bi-annual report.	Proponent; Contractor

Impact	Nature	Mitigation	Monitoring	Responsible Body
Cumulative Impact	<p>Negative cumulative impacts are likely due to the industrial nature of the project area and include traffic, noise, pollution of the environment and impacts on birds. Positive impacts relate to employment and economic development.</p>	<p>Addressing each of the individual impacts as discussed and recommended in the EMP would reduce the cumulative impact.</p> <p>Directing lighting downwards and minimizing the number of lights used would decrease the potential impact on flying birds.</p> <p>Reviewing bi-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..</p>	<p>Bi-annual reports based on all other impacts must be reviewed o give an overall assessment of the impact of the construction phase.</p>	<p>Proponent; Contractor</p>

Table 7-3 The operational phase

Criteria	Nature	Mitigation	Monitoring	Responsible Body
Dredging Impact – Air Quality	This is an impact that affects the quality of the air in the area. During dredging activities there is a risk of gaseous emissions engulfing personnel. Hazardous gasses are likely to be Hydrogen Sulphide (H ₂ S) and Methane (CH ₄) that are formed and trapped in the decaying organic matter layer on the seafloor. During dredging H ₂ S may be released and it is very dangerous and can be fatal to humans for concentrations anywhere from 300 to 600 ppm. H ₂ S is initially discerned as a rotten egg smell. Within a short period the olfactory nerves becomes fatigued and it is no longer detected. At this stage it may be thought that the gas is no longer present, but the contrary could be true.	During dredging H ₂ S levels in the ambient air must be monitored. Should levels become elevated dredging must be stopped and all personnel in the vicinity of the dredging area evacuated. Dredging activities must comply with the capital and maintenance dredging EIA and EMP of Nampoort (Faul et al. 2022)	Dredging activities must comply with the capital and maintenance dredging EIA and EMP of Nampoort (Faul et al. 2022) All data to be compiled in a bi-annual report.	Contractor, Proponent
Dredging Impact – Surface Water Contamination	The suspension of sediments in the water column as a result of dredging and the deterioration of water quality as a result of potential toxic contaminants in suspended sediments	Dredging activities must comply with the capital and maintenance dredging EIA and EMP of Nampoort (Faul et al. 2022)	Dredging activities must comply with the capital and maintenance dredging EIA and EMP of Nampoort (Faul et al. 2022). All data to be compiled in a bi-annual report.	Contractor, Proponent
Dredged sediments disposal impacts	Land based disposal of dredged sediments may be detrimental to the environment where it is disposed of as a result of toxic contaminants present in such sediments. Improper containment of dredged sediments in tipper trucks on route to	Dredging activities must comply with the capital and maintenance dredging EIA and EMP of Nampoort (Faul et al. 2022). Dredged material must be disposed of at an approved municipal waste treatment facility. Transport of dredged sediments must adhere to traffic and transport regulations as stipulated in the Road Traffic and	Dredging activities must comply with the capital and maintenance dredging EIA and EMP of Nampoort (Faul et al. 2022) Record must be kept of all volumes of dredged material	Contractor, Proponent

Criteria	Nature	Mitigation	Monitoring	Responsible Body
	the disposal site.	Transport Act Regulations (2001)	disposed of. All data to be compiled in a bi-annual report.	
Skills, Technology & Development	Enhanced skills and technology transfer to the Erongo coastal region and subsequent promotion of economic development.	Training must be provided to Namibians to ultimately employ a predominantly Namibian workforce. Deviations from this practice should be justified appropriately.	Bi-annual summary report based on actual training and the enhancement of skills and transfer of technology should be compiled.	Proponent
HIV/AIDS, In-migration, Informal Settlements and Property Prices	Increased spread of HIV/AIDS; Increased influx to Walvis Bay or other areas of the coast; Increased informal settlement and associated problems; Property prices.	Restricted employment for local people only should be practiced. Deviations from this practice should be justified appropriately. Educational programs on HIV/AIDS.	Bi-annual summary report based on educational programmes and training conducted. Bi-annual report and review of employee demographics.	Proponent
Employment	The facility plays an important role in providing employment to locals.	If skills exist locally Namibians must be employed. Alternatively training must be provided to Namibians to ultimately employ a predominantly Namibian workforce. Deviations from this practice should be justified appropriately.	Bi-annual summary report based on employee records.	Proponent
Health & Safety	Risks include: <ul style="list-style-type: none"> ● Work related injuries such as falling from heights accidents involving vehicles or falling into the sea. ● Exposure to harmful chemicals such as hydrocarbons or those contained in grit blasting dust. ● Injury due to high velocity grit blasting particles. 	All Health and Safety standards specified in the Labour Act and other applicable legislation should be complied with. Follow all Namport regulations related to security which includes the IMO guidelines for maritime security as provided in The International Ship and Port Facility Security Code (ISPS Code). All staff members must be briefed about potential health risks and injuries on site. All staff must at all times wear personal protective equipment (PPE). Safe working conditions must be provided when working	Any incidents must be recorded with action taken to prevent future occurrences. A report should be compiled bi-annually of all incidents reported. The report should contain dates when training were conducted and when safety equipment and structures were inspected and maintained.	Proponent

Criteria	Nature	Mitigation	Monitoring	Responsible Body
Security	Risks associated with theft and sabotage	<p>at heights or in confined spaces.</p> <p>Selected personnel should be trained in first aid.</p> <p>The contact details of all emergency services must be readily available.</p> <p>Ensure that security measures are in place and that access to the premises is strictly controlled.</p>	A register of all incidents must be maintained. This should include measures taken to ensure that such incidences are not repeated.	Proponent
Noise Pollution	Noise will exist due to heavy vehicles like cranes operating on site as well as due to grit blasting activities.	<p>The site is situated in an industrial area and no limitations on the operating hours exist.</p> <p>The Walvis Bay Municipality does not have any guidelines with respect to noise levels. Labour Act, 1992: Regulations relating to the health and safety of employees at work and the World Health Organization (WHO) guideline on maximum noise levels (Guidelines for Community Noise, 1999) to prevent hearing impairment should be followed.</p> <p>Hearing protectors must be issued as part of PPE if required.</p>	<p>Any complaints received regarding excessive noise should be recorded with notes on action taken. Any negative effects caused from excessive vibrations should be recorded as well.</p> <p>Noise monitoring must be conducted if regular complaints are received.</p> <p>All complaints and additional data, if available, to be compiled in a report bi-annually.</p>	Proponent
Waste Production	<p>Any waste produced as a result of the operations of the jetties including waste material brought off the vessels.</p> <p>Grit blasting waste and contaminated water on the floating dry docks.</p> <p>Ship repair related waste material including waste oils and fuel.</p>	<p>Develop and implement a waste management program, this should include waste reduction and recycling initiatives and regular inspection and maintenance of waste storage and disposal areas.</p> <p>All waste produced must be collected and sent to the appropriate disposal facility or recycled where possible.</p> <p>Due to the potential toxic nature of waste water and blast material, it should be disposed of in an appropriate way at an appropriately classified waste disposal facility. Material Safety Data Sheet instructions for disposal should be</p>	<p>The Proponent must collect and keep a 1 kg sample of spent grit blasting material from each ship being blasted for future analysis if required.</p> <p>Implement and report on the environmental monitoring programme.</p> <p>A register of hazardous waste disposal should be kept. This</p>	Proponent; Specialist consultant (environmental toxicology and pollution)

Criteria	Nature	Mitigation	Monitoring	Responsible Body
<p>Groundwater, Surface Water and Soil Contamination</p>	<p>Waste water, and any rubbish removed from vessels and any oil or fuel spills resulting from refuelling of the vessels.</p> <p>Grit blasting dust and contaminated water on the floating dry dock that enters the ocean.</p>	<p>followed.</p> <p>Due to the polluting potential of ship repair facilities, an environmental monitoring programme must be drafted and implemented. Specialist advice must be obtained to develop a monitoring programme with practical and useful sampling and analysis parameters (e.g. water, sediment, biological). As part of this, baseline conditions must be determined prior to commissioning of the floating dry dock.</p> <p>Alternative blasting techniques and grit should be investigated that will reduce the potential environmental impact.</p> <p>All waste must be disposed of appropriately and timeously.</p> <p>Special care must be taken during refuelling procedures of vessels to prevent spills or leaks. Use spill control and spill catchment measures where appropriate.</p> <p>Regular inspection and maintenance of equipment is required.</p> <p>Grit blasting during strong winds must be prohibited.</p> <p>Use of shrouds during grit blasting to contain dust.</p> <p>Due to the potential toxic nature of slags used as an abrasive medium, the use of garnet grit, as opposed to copper slag or platinum slag, should be favoured as an abrasive medium.</p> <p>The thruster pit must be adequately covered to prevent any contaminants from entering the water in the pit that will eventually be pumped into the ocean.</p> <p>All contaminated materials and water on floating dry docks must be treated as waste and disposed of at an appropriate facility and not released into the ocean.</p> <p>Monitoring must be conducted as per the environmental monitoring programme to be prepared.</p>	<p>should include type of waste, volume as well as disposal method/facility.</p> <p>Any complaints received regarding waste should be recorded with notes on action taken.</p> <p>All data to be compiled in a bi-annual report.</p> <p>All hydrocarbon spills must be reported to the Ministry of Mines and Energy.</p> <p>The Proponent must collect and keep a 1 kg sample of spent grit blasting material from each ship being blasted for future analysis if required.</p> <p>Implement and report on the environmental monitoring programme</p> <p>A once-off water analysis regime must be performed to analyse pressure cleaning water collected in ballast tanks before such water is released into the ocean. This will determine whether this practice should be allowed to continue.</p> <p>A register of hazardous waste disposal should be kept. This</p>	<p>Proponent; Specialist Consultant</p>

Criteria	Nature	Mitigation	Monitoring	Responsible Body
Ecosystem and Biodiversity Impact	<p>Noise related to piling during construction and operational noise may impact on marine mammals.</p> <p>Introduction of alien species through ballast water.</p> <p>Environmental contamination by chemicals, spray paint, hydrocarbons or other forms of waste can have detrimental effects on wildlife. This is especially true for contamination of the ocean through windblown grit blasting dust.</p> <p>Excessive lighting used at night and especially those that are directed upwards blinds birds like flamingos that fly at night. This may result in disorientation of birds and collisions with structures.</p> <p>Marine mammal entanglement with, or ingestion of, human generated debris.</p>	<p>Prevent contamination of the environment as per Groundwater, Surface Water and Soil Contamination mitigation.</p> <p>Use minimum lighting required at night and direct all lights downwards to work surfaces.</p> <p>To prevent alien species introduction the floating dry dock and its tug boat must follow the IMO Guidelines on Biofouling. This include, exchange ballast water once just outside the Namibia Exclusive Economic Zone and again just inside this zone. All foreign vessels on route to the floating dock for repairs or maintenance must follow the same guidelines and procedure.</p> <p>All activities known to produce noise at a level known to cause major disturbances to marine mammals should be tightly controlled and monitored. Sound proof all machinery known to cause disturbances and ensure all receive good maintenance.</p> <p>Records of all entanglements must be made and sent to the Marine Mammal Department situated at the Ministry of Fisheries and Marine Resources of Swakopmund and to Dolphin Projects.</p> <p>Ships may not approach any marine mammals.</p>	<p>should include type of waste, volume as well as disposal method/facility.</p> <p>Any complaints received regarding groundwater, surface water and soil pollution should be recorded with notes on action taken.</p> <p>All data to be compiled in a bi-annual report.</p>	
			<p>Monitoring as per Groundwater, Surface Water and Soil Contamination monitoring.</p> <p>Any extraordinary faunal sightings must be reported to MEFT.</p> <p>Regular inspection must be performed to monitor for bird impacts. Mitigation measures must be investigated and implemented if required.</p> <p>All data to be compiled in a bi-annual report.</p>	Proponent

Criteria	Nature	Mitigation	Monitoring	Responsible Body
Dust and Air Quality	Windblown dust during grit blasting of ships and overspray of paints can reduce air quality during strong winds which regularly occur in Walvis Bay.	<p>Due to the potential toxic nature of dust created its dispersion in the air should be prevented.</p> <p>The following controls are typical measures for mitigating dust:</p> <ul style="list-style-type: none"> ● Mesh netting that enclose the front and rear ends of the docks must be used at all times. ● The Proponent must install a real time wind monitoring station that records wind speed and direction on a daily basis. Grit blasting must be stopped when wind speeds are high enough to disperse dust to nearby receptors. ● Alternative blasting techniques such as wet blasting or centrifugal shot blasting should be used in areas where dispersion of dust cannot be prevented. ● Due to the potential toxic nature of slags used as an abrasive medium, the use of garnet grit, as opposed to copper slag or platinum slag, should be favoured. <p>The World Health Organization - Hazard prevention and control in the work environment: Airborne dust (WHO, 1999) should be consulted.</p>	<p>Wind data should be recorded on a daily basis.</p> <p>Any complaints regarding dust should be recorded and investigated. The problem area should be correlated with wind direction and speed.</p> <p>A report should be compiled bi-annually of all complaints reported, incidents and monitoring performed.</p>	Proponent
Maritime Traffic	Floating dock commissioning and operations may impact on marine traffic in the nearby navigation channel.	All clients must adhere to all Namport regulations and follow all procedures for reporting any ship movement to Port Control who will direct marine traffic and give permissions for movement.	Ships Logs	Proponent; Contractors
Visual Impact	This is an impact that affects the aesthetic appearance.	Regular maintenance and general upkeep of the facility will ensure continuous low visual impact.	A report should be compiled bi-annually of all complaints reported.	Proponent
Fire Impact	The possibility of a fire during refuelling or when fishing vessels have leaks or short circuits in electrical systems.	<p>Storage and handling of flammable products should be according to their Material Safety Data Sheet (MSDS) instructions.</p> <p>A holistic fire protection and prevention plan is needed.</p> <p>All fire precautions and fire control at the facility must be</p>	<p>Supervision of work is required and reports of safe and unsafe practice to be brought to the attention of the HSE.</p> <p>Any incidents reported must</p>	Proponent

Criteria	Nature	Mitigation	Monitoring	Responsible Body
		<p>up to date.</p> <p>Firefighting measures as per the MSDS of products should be adhered to where relevant.</p>	<p>be recorded together with steps taken to mitigate the impacts.</p> <p>All data to be compiled in a bi-annual report.</p>	
<p>Cumulative Impact</p>	<p>Possible cumulative impacts associated with the operational phase include increase in noise due to increased harbour activity. Increased ship traffic may be expected. The impact on the marine environment in terms of pollutants entering the water may increase.</p> <p>The cumulative effect of lighting on birds due to industrial developments may increase the risk of collisions and interference with bird flight paths at night.</p> <p>Air quality impacts as a result of dust generated during blasting will contribute to reduced air quality and water contamination.</p>	<p>Addressing each of the individual impacts as discussed and recommended in the EMP would reduce the cumulative impact.</p> <p>Directing lighting downwards and minimizing the number of lights used would decrease the potential impact on flying birds.</p> <p>Reviewing bi-annual 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.</p>	<p>Bi-annual summary reports based on all other impacts must be reviewed to gain an overall assessment of the impact of the Operational Phase.</p>	<p>Proponent</p>

Table 7-4 Decommissioning phase

Criteria	Nature	Mitigation	Monitoring	Responsible Body
Waste Production	Upon decommissioning waste will be produced in the form of building rubble, obsolete equipment and structures, obsolete or residual products and equipment or structures that can be used elsewhere or sold as scrap.	<p>To reduce the amount of waste all re-usable equipment must be removed to another site owned by the Proponent or sold.</p> <p>Those items that cannot be used again must be recycled or scrapped in the appropriate manner.</p> <p>Upon demolition of any structures the waste and rubble must be removed from the property and taken to an approved dumpsite designated by the Walvis Bay Municipality.</p> <p>Rehabilitation if necessary are to be done using funds designated for the purpose.</p>	Regular visual inspection. A register of waste produced and disposal methods should be maintained.	Proponent; Contractor
Employment	Decommissioning of the facility may lead to retrenchments or re-location of staff no longer required.	<p>Plan in advance for meeting the Labour Acts requirements for retrenching of staff if required.</p> <p>Where possible staff can be relocated to another facility or town where business continues in the same way.</p>	During normal operations of the facility a bi-annual report must be compiled that includes the appropriate plans for handling of employees should the facility be decommissioned. The report should include budgeting for retrenchments and possible alternative positions elsewhere.	Proponent
Noise	Noise pollution will exist due to heavy vehicles accessing the site to collect waste and rubble.	<p>The Walvis Bay Municipality does not have any guidelines with respect to noise levels. Labour Act, 1992: Regulations relating to the health and safety of employees at work and the World Health Organization (WHO) guideline on maximum noise levels (Guidelines for Community Noise, 1999) to prevent hearing impairment should be followed.</p> <p>All personnel must be issued with hearing protectors and neighbours must be notified of the time and duration of decommissioning. Notice of the start of the decommissioning should be given to the local authorities with an invitation to give feedback at any time with regards the noise impact.</p>	A complaints register must be maintained, in which any complaints from the community must be logged. Complaints must be investigated and, if appropriate, acted upon.	Proponent; Contractor

Criteria	Nature	Mitigation	Monitoring	Responsible Body
Visual Impact	This is an impact that affects the aesthetic appearance	Visual impact could pose one of the most significant impacts. Visual impacts could be limited through keeping all decommissioned areas clean and orderly at all times. Good housekeeping also reduces the risk of injuries. Notice of the start of the decommissioning should be given to the local authorities with an invitation to give feedback at any time with regards the visual impact.	A complaints register must be maintained, in which any complaints from the community must be logged. Complaints must be investigated and, if appropriate, acted upon.	Proponent; Contractor
Surface Water Contamination	Hazardous waste or waste from building materials, as well as normal waste must be prevented from entering the ocean.	All precautions are to be taken to prevent contamination of the ocean. Any remaining hazardous materials must be disposed of at a municipal hazardous waste disposal site. A final baseline survey must be conducted in accordance with the environmental monitoring programme.	A baseline study must be carried out after the decommissioning. This is to assess the condition of seafloor sediment and surface water. Comparisons with operational baseline data is to be made and any discrepancies must be addressed before the site can be signed over.	Proponent; Specialist Consultant
Health, Safety and Security	During the decommissioning phase risks to human beings are present.	The decommissioning of a jetty can cause health and safety risks to workers. Occupational exposures are normally related to physical injury or contact with hazardous substances during handling. For this reason adequate measures must be brought in place to ensure safety of staff on site, and includes: (Provide forms for all end users who monitor) <ul style="list-style-type: none"> ● Proper training of operators; ● First aid treatment and medical assistance; ● Emergency treatment; ● Protective clothing, footwear, gloves and belts; safety goggles and shields; ● Manuals and training regarding the correct handling of materials should be in place and updated as new or updated MSDS' become available. ● 24-hour security surveillance in case of opportunistic activities. 	A register of all incidents must be maintained. This should include measures taken to ensure that such incidences are not repeated.	Proponent; Contractor

8 CONCLUSIONS

The above updated EMP, if properly implemented will help minimise adverse impacts on the environment. Where impacts occur, immediate action must be taken to reduce the escalation of effects associated with these impacts. To ensure the relevance of this document to the specific stage of project, it needs to be reviewed throughout all phases.

The EMP should be used as an on-site reference document during all phases of the proposed project, and auditing should take place in order to determine compliance with the EMP for the proposed site, and Parties responsible for transgression of the EMP should be held responsible for any rehabilitation that may need to be undertaken.

Monitoring reports must be submitted to the Ministry of Environment, Forestry and Tourism every six months (bi-annually) to allow for the future renewal of the ECC.

9 REFERENCES

Faul A, Botha P, Coetzer W. 2022. Update of the Environmental Impact Assessment for the Capital and Maintenance Dredging of Walvis Bay Harbour

Faul A, Botha P, Coetzer W. 2018. Environmental Impact Scoping Assessment for the Jetty Construction and Jetty and Floating Dry Dock Operations of Tunacor Properties in the Fishing Harbour of Walvis Bay