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AFRICAN DEVELOPMENT BANK GROUP

PROJECT : Strategic Expansion of the Walvis Bay Container Terminal Project

COUNTRY : Namibia

EXECUTIVE SUMMARY OF THE ENVIRONMENTAL AND SOCIAL ASSESSMENT

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ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT SUMMARY

Project Name: Strategic Expansion of the Walvis Bay Container Terminal
Country: Namibia
Project Number: P-NA-DD0-002

1. INTRODUCTION:

This summary is for the strategic expansion of the Walvis Bay container terminal project. The Walvis Bay port is managed by Namport, which is the national port authority in Namibia since 1994 and manages one other port. The port of Walvis Bay is situated at the west coast of Africa and provides an easier and much faster transit route between Southern Africa, Europe and America. The port of Walvis Bay is currently operating at its full capacity. The proposed strategic expansion of the container terminal is intended to alleviate congestion and to increase efficiency. Given the project description below; the project is classified as category one in line with the Bank's environment and social assessment procedures "ESAP". The transport system in Namibia consists of among others two major seaports one of which is the Walvis Bay port and it serves the mainland and the regional economies of Botswana, South Africa, Zambia, Zimbabwe and Democratic Republic of the Congo.

The biggest constraint on planning new facilities to accommodate increasing demand at the port of Walvis Bay is the shortage of land for the port. Namport therefore proposes to construct a new container facility on reclaimed land inside current port limits, just northwest of the current Berths 1 to 8 (Fig. 1). This will alleviate increasing pressure on the existing container terminal facility, and provide ample room for future expansion in throughput volumes. The project is also of national strategic importance, as it is believed that the Port of Walvis Bay can play an important role in facilitating trade in Sub-Saharan Africa. The proposed expansion is planned to cater for vessels with capacities of 5 000 to 8 000 TEUs, and for future port development, in three phases, shown in Figure 1. Phase 1 is anticipated to add a throughput capacity of at least 250 000 TEUs per annum to existing volumes. With a quay length of 550 m, this new berth will be able to accommodate 5 000 TEU container vessels. The entrance channel, turning basin and the area alongside the berth will have to be dredged to a depth of about – 14.1 m CD, to accommodate this vessel's draught, which averages around 12.5 m.

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2. PROJECT DESCRIPTION AND JUSTIFICATION:

The Port of Walvis Bay has not changed its layout for much of the last 30 years; the most recent change was the reconstruction of the current container berths. The Port consists of a commercial and a fishing harbour. The proposed expansion of the container terminal will increase the capacity of the commercial harbour. The project will involve dredging of the entrance channel and most of the dredged material will be suitable for developing a reclamation ground for the new container terminal. Unsuitable dredged material as is done for maintenance dredging; shall be disposed of at the existing spoil site approved by the Namibian authorities and according to the conditions stipulated in the approvals for this site at the deep sea (Fig.2). A further option is to dump soft sediments into the footprints of the later port development phases and implement suitable soil improvement measures to accommodate the settlement criteria of the terminal area.

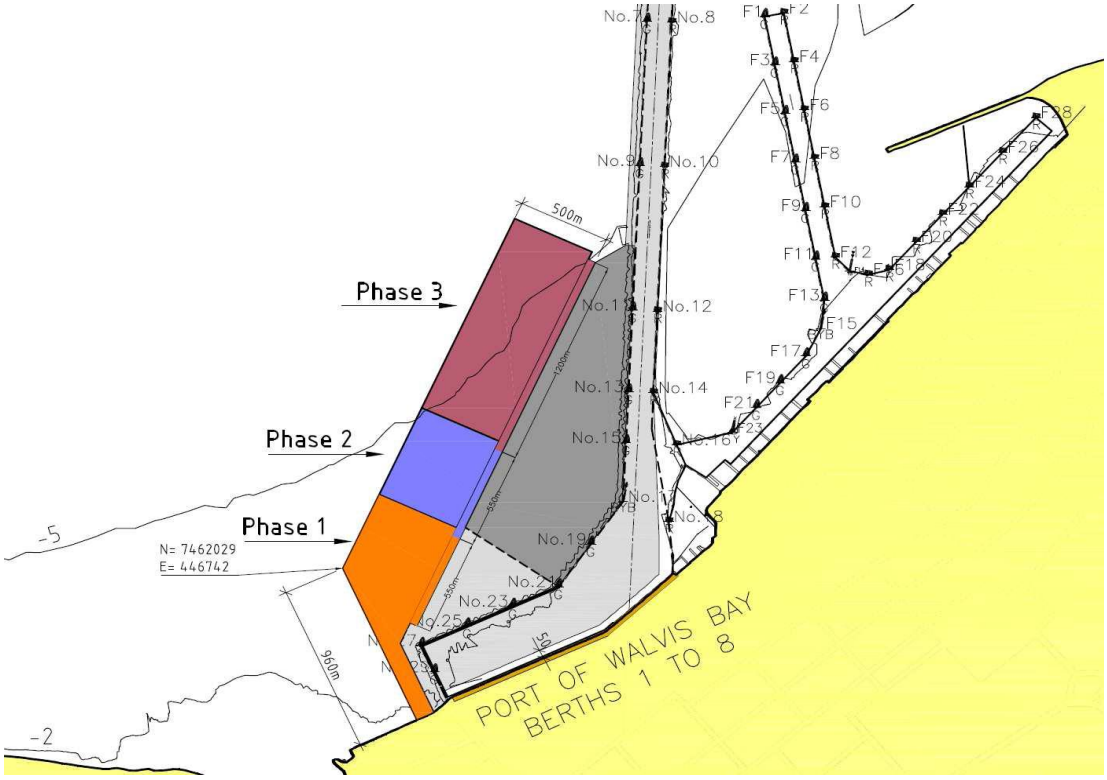

Figure 1: Three phases of proposed container terminal expansion **Source:Namport**

The scope of works for construction will consist of dredging, reclamation and terminal construction, as follows:

<u>Dredging</u>

- Deepening of the approach channel.
- Dredging the basin between the proposed new container terminal and existing berths.
- Dredging at the quay wall of the new container terminal.

<u>Reclamation</u>

- Reclamation of the new container yard.

<u>Terminal construction</u>

- Construction of quay walls, rock revetments, container terminal surfacing,
- operations buildings and workshops

The intention is to obtain material for reclamation from two sources:

- Dredging of the basins in front of the new berths, and
- The extension, widening and deepening of the entrance channel.

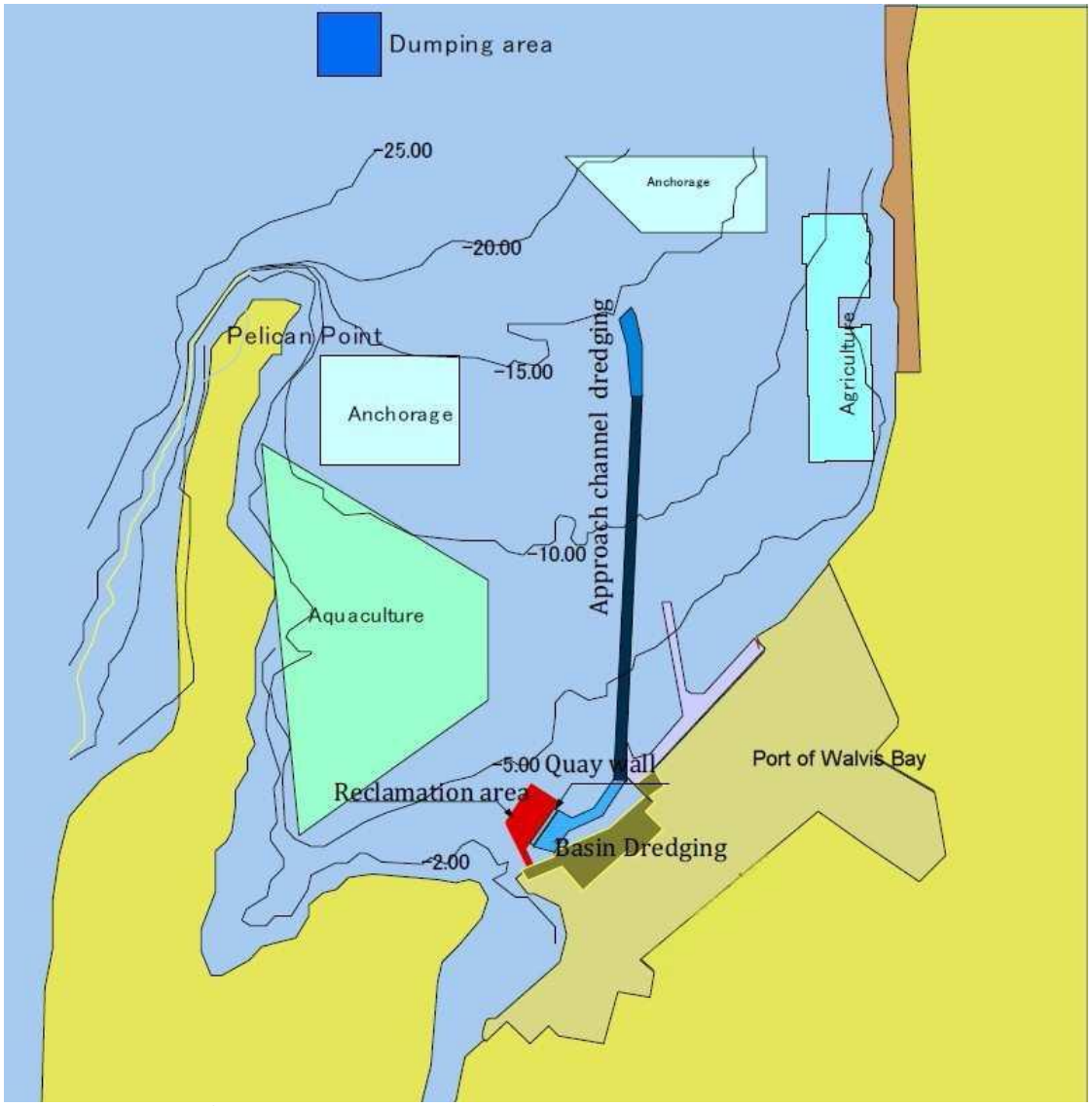

Figure 2: Target areas for the dredging and reclamation programme **Source: Namport/JICA**

During the dredging, bottom sediments will be excavated and sucked up for re-use in land reclamation and disposal at a different location as shown in figure 2. Cutter section dredgers and trailing suction hopper dredgers will be used for the dredging works in the target areas shown in Figure 2. The presently envisaged construction sequence is as follows:

- Construction of the causeway with rock and sand fill.
- Dumping of rock bund to form the outer perimeter of the reclamation area, and the installation of a geo-fabric membrane at the inner slope to retain the sand fill.
- Capital dredging of the approach channel. The entrance channel must be extended, widened and deepened.
- Capital dredging of a new turning circle, and deepening to -15.5 m opposite Berths 1-8 (Fig. 1). Basin dredging between the new container terminal and existing berths, and at the quay structures of the new terminal. Land reclamation for the new terminal area opposite Berths 4-8. For dredged sand spoil (lower layer) assumed to be relatively "clean", two alternatives are possible:
  - Land reclamation;
  - Designated spoil site (dumping area) outside the Bay (Fig. 2);

- Treatment/Compaction of reclamation to consolidate and construct the pavement.
- Construction and installation of buildings, services/utilities, roads and railway lines.
- Installation of equipment such as ship-to-shore quay cranes, rubber-tyred gantry cranes, etc.
- Finishing off

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3. POLICY, LEGAL AND ADMINISTRATIVE FRAMEWORK

The Government of the Republic of Namibia wants to ensure that the aims and objectives of sustainable development are achieved and maintained. Policies and statutes, and structures within Ministries, such as the Directorate of Environmental Affairs in the Ministry of the Environment and Tourism, have been established to deal with environmental issues.

The Constitution of the Republic of Namibia (1990)

Article 95 (1) of the Constitution provides that "the State shall actively promote and maintain the welfare of the people by adopting, inter alia, policies aimed at maintenance of ecosystems, essential ecological processes and biological diversity of Namibia and utilization of natural resources on a sustainable basis for the benefit of all Namibians both present and future; in particular the Government shall provide measures against dumping or recycling of foreign nuclear and toxic waste on Namibian Territory. "Article 101 of the Namibian Constitution further states that the principles embodied within the constitution" shall not of and by themselves be legally enforceable by any court, but shall nevertheless guide the Government in making and applying laws. The courts are entitled to have regard to the said principles in interpreting any laws based on them."

National Policies

In 1992, Namibia's Green Plan was formally tabled at the United Nations Conference on Environment and Development ("Earth Summit") in Rio de Janeiro, on behalf of the Republic of Namibia. It created a national common vision around its environmental issues, priorities and future actions, and drew together government, non-government organisations (NGOs), private sector and civil society towards a common future. The Green Plan led to Namibia's 12-Point Plan for Integrated and Sustainable Environmental Management in 1993, which was incorporated into the first 5-year National Development Plan (NDP1), 1994/5 – 1999/2000.

Vision 2030: Third National Development Plan of Namibia, 2006/7 – 20011/12

The plan was launched on the 26th November 2008, with goals derived from the Vision 2030. The overall theme of the NDP3 is accelerating economic growth and deepening rural development. Furthermore, it explicitly requires the expansion of the port of Walvis Bay and upgrading the national and regional corridor routes, expanding and upgrading the ship and rig repair industry, providing adequate Maritime rules, providing a rail link to Lüderitz Port and investigating other ports' developments in Namibia."

Environmental Assessment Policy, 1995

The Cabinet of the government of Namibia approved the Environmental Assessment (EA) Policy in August 1994, published as "Environmental Assessment Policy for Sustainable Development and Environmental Conservation, January 1995". It provides that all policies, projects and programmes should be subjected to EA procedures,

regardless of where these originate. These procedures must aim for a high degree of public participation, and consider the environmental costs and benefits of projects proposed.

Green Paper: Coastal Policy for Namibia (Feb 2009)

The Green Paper sets the overall framework for development in the coastal area. This will be used to draft Coastal Policy in the form of a White paper, with the final Namibian Coastal Policy planned to be completed by 2011. This will be followed by an Integrated Coastal Area Act to replace the outdated Sea Shore Ordinance (1958) referred to later in this chapter. The coastal policy process does not impact on the project at this time, but its general tenor should serve as a guideline.

Draft Wetland Policy of 2003

The Wetland Policy of 2003 aims to integrate sustainable management into decision-making at all levels by stating that: "Namibia shall manage national and shared wetlands wisely by protecting their biodiversity, vital ecological functions and life support systems for the current and future benefit of people's welfare, livelihoods and socio-economic development." The objectives of the policy are to: Protect and conserve wetland diversity and ecosystem functioning without compromising human needs; Promote the integration of wetland management into other sector policies; and 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.

The National Environmental Health Policy

Throughout construction, implementation and decommissioning of any of its components, operations in the port of Walvis Bay must be guided by the aim of this Policy, which includes facilitation of the improvement of the living and working environments of all Namibians, through pro-active preventative means, health education and promotion and control of environmental health standards and risks that could result in ill-health; and Ensure provision of a pro-active and accessible integrated and co-ordinated environmental health services at national, regional, district and local levels.

Namport's Safety, Health, Risk, and Environmental Policies

Namport conducts its business and planning in a manner that ensures the health and safety of their employees and of other persons, and gives proper regard to environmental protection. The responsibility for safety lies with all levels of operational management. All new infrastructure developments are required to follow the Environmental Impact Assessment process in order to minimise significant environmental risks and impacts and enhance social benefits. Environmental management and continual environmental improvement are thus an integral part of the Company's business, underpinned by:

ISO 14001 Environmental Management System (2000)
OHSAS 18001 (2007)
NOSCAR (annually)

Environmental Management Act 7 of 2007

The Environmental Management Act (2007) (EMA) was promulgated in December 2007 and is administered by the Directorate of Environmental Affairs (DEA), under the auspices of the Ministry of the Environment and Tourism. Its main objectives are to ensure that significant effects of activities on the environment are considered carefully

and timeously. It also ensures that there are opportunities for timeous participation by interested and affected parties throughout the assessment process.

The Water Resources Management Act 24 of 2004
This Act is administered by the Department of Water Affairs, Ministry of Agriculture, Water and Forestry (MAWF), and its objective is to ensure that Namibia's water resources are managed, developed, protected, conserved and used in ways which are consistent with or conducive to fundamental principles set out in section 3 of the Act.

Territorial Sea and Exclusive Economic Zone of Namibia Act 3 of 1990
The objective of this Act is to determine and define the territorial sea, internal waters, contiguous zone, exclusive economic zone and continental shelf of Namibia; and to provide for matters incidental thereto.

The Marine Resources Act 27 of 2000
The Act provides for the conservation of the marine ecosystem; for the responsible utilisation, conservation, protection and promotion of marine resources on a sustainable basis; and for the control of marine resources for these purposes.

The Namibian Ports Authority Act 2 of 1994
This gives the Port Authority jurisdiction within a demarcated port area, and places responsibility for protecting the environment within the port with the Port Authority. It does this in concurrence with other legislation and organs of state.

Labour Act of 1992: Regulations for the Health and Safety of Employees at Work
The Regulations relating to Health and Safety at the Workplace in terms of the Labour Act 6 of 1992 came into force on 31 July 1997. These regulations prescribe conditions at the workplace, and inter alia deal with the welfare and facilities at work-places, including lighting, floor space, ventilation, sanitary and washing facilities, usage and storage of volatile flammable substances, fire precautions, etc.;

Nature Conservation Ordinance 4 of 1975 (as amended 1996)
The Nature Conservation Ordinance deals with *in situ* and *ex situ* conservation by providing for the declaration of protected habitats as national parks and reserves, and for the protection of scheduled species wherever they occur. It regulates hunting and harvesting, possession of, and trade in listed species.

Atmospheric Pollution Prevention Ordinance 11 of 1976
The Ordinance provision on air pollution is administered by the Namibian Ministry of Health.

Hazardous Substances Ordinance 14 of 1974, and amendments
This ordinance provides for the control of toxic substances. It covers manufacture, sale, use, disposal and dumping as well as import and export.
Other relevant pieces of legislation include *Aquaculture Act 18 of 2002 and the Inland Fisheries Resources Act 1 of 2003.*

International Conventions and Protocols
Multilateral environmental agreements that are most relevant for the project include:

The Stockholm Declaration on the Human Environment, Stockholm 1972

The declaration refers to the fact that natural resources of the earth, including the air, water, land, flora and fauna and especially representative samples of natural ecosystems, must be safeguarded for the benefit of present and future generations through careful planning or management, as appropriate. Also that Man has a special responsibility to safeguard and wisely manage the heritage of wildlife and its habitat, which are now gravely imperilled by a combination of adverse factors. Nature conservation, including wildlife, must therefore receive importance in planning for economic development. The other component being that states shall take all possible steps to prevent pollution of the seas by substances that are liable to create hazards to human health, to harm living resources and marine life, to damage amenities or to interfere with other legitimate uses of the sea.

Convention on Biological Diversity, Rio de Janeiro, 1992

Namibia is accordingly now obliged under international law to ensure that its domestic legislation conforms to the CBD's objectives and obligations which requires ESIA's for projects that are likely to adversely affect biological diversity. It further requires that the EIA be aimed at avoiding or minimising such effects and where appropriate, allow for public participation in the assessment.

United Nations Law of the Sea Convention (1982)

This Convention is of relevance for marine pollution from seabed activities.

International Convention for the Prevention of Pollution from Ships (MARPOL 73/78)

Although not a signatory of MARPOL, the guidelines provided by the Convention on the prevention of pollution from ships 1973/1978 (MARPOL) are applied by Namport as an internal policy; specifically regulations for the prevention of pollution by oil, sewage and garbage from ships.

Convention on the Prevention of Marine Pollution by Dumping Wastes and Other Matter (London Convention, 1972)

The Convention contributes to the international control and prevention of marine pollution through dumping of certain hazardous materials etc.

Ramsar Convention (1971)

Wetlands are among the world's most productive environments, on which large numbers of plant and animal species depend for survival. They are also among the world's most threatened ecosystems. The Ramsar Convention covers all aspects of wetland conservation and wise use.

African Development Bank

The Bank's Environmental and Social Assessment Procedures are applicable to this project. The design, implementation and monitoring and evaluation modalities for the project have been informed by the Bank's environmental and social policies and guidelines. Considerations are premised on expectations for assessing and addressing environmental and social impacts in line with the Bank's Policy on Poverty Reduction, the Policy on the Environment, the Gender Policy, the Policy on Disclosure and Access to Information and the Cooperation with Civil Society Organizations – Policy and Guidelines, for instance.

The Bank's requirements necessitate that aspects linked to climate change considerations are closely examined.

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4. DESCRIPTION OF THE PROJECT ENVIRONMENT

Climate

The coastal zone at Walvis Bay lies within a "cool desert" region of Namibia, a unique biophysical environment that is due to the specific climatic conditions in the area are influenced by the South Atlantic anticyclone, the northward-flowing Benguela Current and the divergence of the south-east trade winds along the coast. Climatic conditions in the region vary from cool, foggy, windy and hyper-arid conditions along the coast, to dry and hot weather towards the inland areas from which it is separated by the Great Escarpment.

Temperature

Namibia is considered to be hot; however, temperatures are highly variable daily and seasonally. The average temperature maximum varies between 24°C and 19.3°C, and the average minimum between 9.1 °C and 16.5 °C. Highest temperatures are recorded during Berg Wind episodes when cold air from the interior flows towards the coast and is heated by compression (catabatic wind).

Rainfall and evaporation

The Bay has a mean annual rainfall of 13.5 mm. Most rain falls in summer between January and April, with the wettest month being March when about 50% of annual rainfall is recorded. Fog is a distinctive feature, and the Bay gets some moisture from 900 hours of coastal sea fogs per year. Monthly average humidity varies between 65% in December and 81% in January/March. Namibia, as a country, loses more water through evaporation than it receives in rain. Lower rates of evaporation at the coast are mainly due to cooler and more humid coastal conditions.

Surface Wind

The presence of the subtropical South Atlantic Anticylcone off the coast of Namibia strongly influences the wind pattern, generating gale force winds along the coast in all seasons, but being most frequent during mid-summer and spring. Although their strength decreases inland, their effect is noticeable for distances of up to 200 km from the coast. These strong coastal south-westerly winds carry sand inshore from the coast to the Namib Sand Sea and create upwelling cells which allow nutrient-rich water to be brought to the surface, therefore increasing fish resources. At the coast, the prevailing wind is southerly to south south-westerly with speeds that reach 10 m/s, while the predominant wind inland is north-easterly to easterly with speeds reaching approximately 3m/s. The coastal south-westerly winds bring cool, moist air into the coastal region.

Occasional hot, dry and powerful easterly wind during winter (or *Berg wind*) causes large quantities of dust and sand to be blown offshore, affecting sediment input into the coastal marine environment. These powerful offshore winds can exceed 50 km/h, producing sandstorms that considerably reduce visibility at sea and on land. Although they occur intermittently for about a week at a time, they have a strong effect on the coastal temperatures, which often exceed 30°C during 'berg' wind periods.

Air quality in Walvis Bay changes between March and August, when there are emissions and odours from fish canneries and fish meal factories. The prevailing SW winds blow these emissions and dust towards the residential and industrial districts. Temperature inversions typically occur between 600 m and 1 800 m above ground, and these could adversely affect air quality by restricting dispersal through trapping and concentrating pollutants beneath the inversion layer.

Physical Oceanography

The central Namibian coastline is influenced by major swells generated in the Roaring Forties, as well as significant sea waves generated locally by the persistent south-westerly winds. Apart from Walvis Bay and Swakopmund, wave shelter - in the form of west to north-facing embayments and coasts lying in the lee of headlands - is extremely limited. The Beguela Current Upwelling system is a major eastern boundary current system dominated by a wind-driven upwelling system. There is upwelling when frictional coupling of wind and water causes surface waters to move away from the coast, and water that wells up from below replaces these surface waters (Figure 4.2). This results in cold, nutrient-rich water from depths of 200 – 300 m reaching the surface along the coast. The nutrients support intensive primary production (phytoplankton) which provides food for zooplankton and, ultimately, the large biomass of pelagic fish. The largest upwelling cell centred on Lüderitz (Figure 4.3) results in large amounts of phyto- and zooplankton off Walvis Bay. Much of this is not utilised and sinks to the seafloor, contributing to the anoxic conditions that are characteristic of the marine environment in the vicinity of Walvis Bay.

Biotic Environment

The major feature of the Benguela system is upwelling, that is, strong ocean currents that carry nutrient-rich deep-ocean water to the surface to nourish single-celled algae and bacteria known as phytoplankton, and other sea life. The consequent high nutrient supply leads to high biological production and large fish stocks. Red tides (dinoflagellate and/or ciliate blooms), also referred to as Harmful Algal Blooms (HABs), low oxygen events and sulphur eruptions occur periodically in the Benguela system, with potentially catastrophic effects on the ecology of the system.

Phytoplankton and Harmful Algal Blooms (HABs)

The sediments in Walvis Bay contain high concentrations of free-swimming microalgae cysts that are primary producers in the aquatic food chain. The high primary production in the Benguela Current Upwelling System often results in the development of harmful algal blooms (HABs).

Sulphur Eruptions

Sedimentation of phytoplankton that thrive on the upwelled nutrients is a natural process in the Bay and its offshore environs. Nutrients brought to the surface with the upwelling deep-water are taken up by phytoplankton. Some of the phytoplankton are not grazed by zooplankton and they settle before the surface nutrient-poor water moves west. Most of the settled particles are then metabolised in the sediment, to enrich the incoming deep-water and taken to the surface again by upwelling. Phytoplankton that die and decay sink to the seabed can decay further due to bacteria that break them down. This decay process depletes oxygen, and it continues with bacteria that do not require oxygen to digest the organic matter. Instead, they utilise sulphate ions in sea water for oxidation, reducing to sulphide that combines with hydrogen to produce hydrogen sulphide (H_2S) gas as a by-

product. The gas accumulates on the ocean floor until it reaches a tipping point and rises to the surface, bubbling into the water column and turning it anoxic, known as "sulphur eruptions".

Benthic Fauna

The relatively straight and exposed Namibian coastline provides few suitable habitats for marine organisms that require sheltered environments. Walvis Bay and its lagoon comprise one such area. These benthic communities are generally ubiquitous throughout the Southern African West Coast region, being particular only to substratum type, wave exposure and/or depth zone. The central Namibian coast is characterised by low species richness, but the high productivity supports large numbers of organisms. One result of the frequent anoxic conditions is that most of the sediment surface in the Bay is devoid of other than bacterial life below a water depth of a few meters and even in this zone the diversity is reduced to a few opportunistic species that can tolerate recurrent anoxic conditions or recover fast after oxygen depletion. Polychaete worms are the most important component, and fishes in the northern Bay are a subset of those found on the adjacent coastline. The lagoon supports a fauna characterised by large populations of a relatively small number of species

Fishes

No systematic surveys of the fish fauna of Walvis Bay and the lagoon appear to have been undertaken.

Birds

A unique and abundant birdlife is present in Walvis Bay as a consequence of high productivity of sea life and plankton, due to the nutrient-rich Benguela current. In the Lagoon wading birds, rather than seabirds, predominate. The salt pans support up to half of the birds in the Lagoon, where they like to feed in the shallow pans that have a steady artificial influx of particles and nutrient-rich water that fuels the benthic and pelagic food-chain. These pans, through their extensive land reclamation and physical barrier to changing tides, have changed the ecology of the Lagoon. The birds of Walvis Bay and its lagoon have been the subject of numerous reports and papers which have highlighted its significance to both Palaearctic migrant birds as well as those from southern

Whales and Dolphins

Some 27 species of whales and dolphins are known to occur off the coast of Namibia

Sediment Regime in the lagoon

The Kuiseb River has reached the sea only 15 times since 1837 (Stengel, 1964). These floods occurred in 1837, 1848, 1849, 1852, 1864, 1881, 1885, 1893, 1904, 1917, 1923, 1931, 1934, 1942 and 1963. The 1934 flood is noteworthy in that the river flowed via its northern arm through Walvis Bay town. Unless a flood considerably larger than the flood of 1963 reaches the Kuiseb delta it is unlikely to add sediment directly into the lagoon. It is anticipated that, during the next major flood, the Kuiseb River will break out to sea over the beach ridge between the Kuiseb delta and the Atlantic Ocean and not into the bay

Water quality

The water quality of the harbour changes seasonally as a result of organically polluted sea- and freshwater discharges from the fish processing industry. Water transparency declines from Pelican Point toward the Bay, into the harbour and further into the Lagoon.

There is a high variation of water turbidity. Effluent and waste discharges from the fish processing industry require oxygen for neutralisation, which diminishes oxygen levels in the water. This forces mobile fauna to migrate away, and is a cause of sessile and sediment-dwelling organism mortality. In these oxygen-poor conditions, microbial communities such as anaerobic sulphate-reducing species take over and cause more emissions of sulphide that contribute to sulphur eruptions.

Fish factories

The fish processing plants in Walvis Bay draw process water from the bay and also discharge effluent into it. However, because of the frequently anoxic status of the receiving waters, the discharge of high BOD waste has become problematic. While it is advantageous for these factories to discharge into the bay it is clear that the effluent is compounding the already oxygen-stressed condition of the bay, particularly along its eastern shore.

Artisanal fishing

Artisanal scale beach purse-seine fishing takes place from the beaches immediately north of Walvis Bay town. The catch, mainly mullet, is intended mainly for own consumption but the surplus may be sold.

Conservation

There are plans to accord the marine component Marine Protected Area (MPA) status and the terrestrial area outside of the Walvis Bay Municipal area will be incorporated into the cabinet-approved Namib Skeleton Coast National Park. The salt-works and the southern part of the Bay west of the lagoon, are the key components of the 9 000 km 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. There are proposals to elevate the Ramsar site from a municipal nature reserve managed by the Walvis Bay Municipality to national status, perhaps as part of the Namib Skeleton Coast National Park

Ecotourism

In recent years Walvis Bay and the Lagoon have become increasingly important for ecotourism. Boat tours to view seals, dolphins and whales, pelicans and the guano platform north of Walvis Bay have become increasingly popular. The esplanade along the eastern shore of the lagoon affords the opportunity to view flamingos, pelicans, waders and other coastal birds from close range.

Aquaculture

The Namibian government has been promoting aquaculture. At present the main interest is in farming oysters for local consumption and for export to South Africa. One oyster farm is located in the primary evaporation pond of the salt-works while others are in the designated marine farm area in the lee of Pelican Point. While the flesh quality and growth rate of the oysters has been high, the risk of losses as a result of sulphur eruption is also high. Major losses were experienced in 2008.

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5. SOCIO-ECONOMICS OF WALVIS BAY

Walvis Bay is situated in the Erongo region.

Demography of Erongo

The Erongo Region is one of the most affluent regions in Namibia, with the second highest per capita income in Namibia of N$ 16 819 per annum. Only 0.4% of households in the Erongo Region spend more than 80% of their income on food while 5.3% of households spend 60 – 79% of their income on food. In comparison to this, 0.6% of households in the Khomas Region spend more than 80% of their income on food while 3% of households spend between 60 and 79% of their income on food, and in the Kunene Region, 11.2% of households spend more than 80% of income on food while 25.7% spend between 60 and 79% on food. Excluding the figures for Walvis Bay, the regional population grew from 55 470 to 79 722, at an annual rate of some 3.7%. If this is compared to the national growth rate of 2.6%, and a fertility rate that is lower than the national average, the high rate of population growth in the region should clearly be contributed to in-migration to the main coastal towns. The mining development in the Region resulted in an increased in-migration to the coastal towns.

Its sex ratio is 115 males for every 100 females, and the average number of children per woman declined from 5.1 in 1991 to 3.2 in 2001. Average household size is 3.8, and the mortality index declined from 51 per 1000 live births in 1991 to 42 in 2001. Males head 65% of all households in the Erongo region. The literacy rate for 15 years and older is 92%, 7% more than the 85% recorded in 1991 and higher than the national average of 81%.

Walvis Bay town is the most populous with 26% of the total regional population. About 20% of the population in the Erongo region were born in other regions; 65% of these are male, indicating the migration of mainly male workers from the other regions to the coast in search of employment.

Employment in Erongo

The economy of the region is mainly based on natural resources and is slowly becoming more diversified due to expansion in the mining industry. The largest industry in the region is the fishing industry, mostly based at Walvis Bay, followed by the mining and exploration industry. The third biggest income generating activity of the Erongo Region is tourism. In 1998 three times as many foreign tourists visited the Erongo region than Namibians. Corresponding figures for 2008 are not yet available.

Over a ten-year period to 2001, there was an increase in the proportion of the population inside the labour force who were unemployed, which suggests that not all migrants to the region succeed in finding gainful employment. The proportion of employed females is 58 % compared to 72% for males. Over the same period, wages and salaries decreased by 6 % but business activities increased by 5 %. This indicates that more people in the region are establishing their own businesses, with the economy slowly diversifying.

Access to Services in Erongo

Access to safe water and proper sanitation are two indicators for development and poverty. From 1991 to 2001 there was no increase or decrease of access to safe drinking water. However, the Regional Poverty profile of the Erongo region for 2005 indicates that 3% of the population has to cover 1 km or more to get water. One out of 5 households in the rural areas relies on unsafe water for drinking and cooking. From 1991 to 2001, the proportion of the population that did not have access to toilet facilities increased by 11%,

showing that access to proper sanitation in the Erongo region is decreasing instead of improving. The medical services in the Erongo region is provided by three state hospitals, two private hospitals and 6 health centres. In urban areas, 90% of households have their garbage regularly collected, while 1 out of 5 people in rural households dump their garbage at the roadside.

Settlement Patterns in Erongo
About 80 % of the population in the Erongo region live in the urban areas. Only 20% of households live in improvised housing (shacks). Compared to other regions in the country, relatively little land has been acquired for resettlement purposes, mainly because the Erongo Region has an arid landscape which is not suitable for resettlement purposes.

Socio-economic overview of Walvis Bay
The Port of Walvis Bay has a potential for considerable expansion; more than 70% of the industries in Walvis Bay are either directly or indirectly dependent on the fishing industry. The container terminal expansion is likely to diversify the industry base and have a positive impact on the development of Walvis Bay. Walvis Bay has about 15 operating fish processing industries. Potential negative impacts from dredging include spreading of pollutants to aquaculture farms, and clogged factory intakes if turbidity levels are high. Aquaculture is promoted in the Bay because of the benefits associated with the general high productivity of the upwelling Benguela current and protection from its high energy by the Pelican Point spit. Oyster farming is the most commercially successful. Aquapark was established in the Bay by MFMR as part of its objective to have a fully established aquaculture industry by 2030. The first phase of the Aquapark consists of 26 allotments, of which 25 are for aquaculture. The population of Walvis Bay was 60 000 in 2006, and it is expected to double within 11 to 12 years mainly through in-migration. Most people are employed by Namport, in the fishing industry and the processing of sea salt. Its population increases by up to 10 000 in the period March to August when workers come to Walvis Bay for jobs in the fishing industries. With cargo handling expected to increase after the expansion of the container terminal, this will most likely result in increased employment levels.

There are certain social characteristics of the Walvis Bay area which are nuanced by gender dynamics. Gender-based violence is a problem in the area. The dominance of patrilineal traditions and expectations make it very difficult for women to accept employment opportunities that would cause them to be separated from their partners. The social vulnerability that is afforded to women manifests itself in imbalances in sexual relations, specifically with male partners who may work in areas far away from their female partners, take on other partners and increase the exposure of all parties to sexually transmitted infections.

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6. PROJECT ALTERNATIVES

The criterion for alternatives considered:
Point 1: To avoid adverse impact to the lagoon environment.
Point 2: To harmonize the plan with other development plans.
Point 3: To make the layout expandable for further port expansion.
Point 4: To limit the cost for the first phase construction not more than about 20% of the original expansion plan.

For point 1, there is no alternative site at the south of the bay for port expansion. The site has to be selected significantly distant from the mouth of the lagoon at the east side of the approach channel.

For Point 2, the alternative sites including access should not conflict with the city planning or naval base requirements. The land use plan of the northern shore of Walvis Bay indicates a "potential site for a cargo handling facility (restricted to "clean" goods)," the site is almost exposed to the open sea and considered not technically feasible, as it requires huge amount of dredging plus breakwater.

For Point 3, considerable water area or land is required in the vicinity of the first phase construction.

Point 4 is considered critical to make the alternative plan viable. Dredging, the most costly components of marine works in shallow water like Walvis Bay, has to be limited in laying out the alternative plans.

As a result of the above considerations, three alternatives were selected:

Alternative A

In this option, the existing approach channel will be used and from its mid-way to the harbour a new channel is diverted to the south-southeast. A turning basin is provided offshore of the existing north breakwater. A man-made island will be built with the dredged materials to shelter the harbour basin. The access to the island from the coast will be extended from the land strip between the naval base and planned residential area along the coast. The reclamation will only be possible with a proper distance from the existing north breakwater of the port. The access road will be extended from the exiting right of way reaching behind the naval base. The railway will be extended from the existing railway tracks connecting the chanting yard behind the port. A switch-back will be necessary to alter the train direction. The second phase expansion of Alternative A is considered next to first phase reclamation. Additional dredging and reclamation will be needed. Further expansion, however, should be a man-made island further offshore. In expanding offshore, attention should be paid to the fact that there is a very soft silty seabed found by the resistivity survey.

Alternative B

The site of Alternative B is fairly close to the site considered for the "Future Bulk Cargo Handling Terminal". However, the berth of this alternative will be laid out in a manner that it is protected from waves coming from the west while the man-made island will be located nearer to the shore. The berth will be laid out sheltered from the waves coming from the west and the terminal will be behind the berth. A new approach channel would be dredged from the offshore water and a turning basin would be provided in front of the planned berth. The access to the island from the location would be the same as Alternative A. The access road and railway will be laid out similar to Alternative A. The second phase expansion of Alternative B will be considered to the north next to the first phase.

Alternative C

Alternative C is a variation on Alternative B. The berth and marine terminal will be separated. The berth will be laid out sheltered from the waves while the terminal will be moved closer to the coast. Future expansion will be less costly than other alternatives. As the berth is located at almost the same location as Alternative B, the numerical simulation of waves and currents in Alternative C is omitted. The second phase expansion of Alternative C may be to the north next to the first phase. However, conflicts with the city planning will become a serious issue as the expansion will block the sea horizon from the planned "Upmarket Residential" area. Expansion will depend on compromises with city planning.

Evaluation of Alternatives

		Original Expansion	Contingent alternatives		
			A	B	C
Layout	**Quay Wall and Reclamation**	Reclaim at the south of the bay offshore from the existing berths. The causeway is rather short.	Reclaim at the north of the bay. Berth alignment is on east-west. The causeway is long.	Reclaim at the north of the bay. Berth alignment is on north-south. The causeway is long.	Similar to B. But the berth is separated from the container yard
	Navigation Channel	Use the existing approach channel by deepening and widening.	Divert to the southeast from the existing approach channel.	Excavate a new channel from the entrance to SSE direction.	**Layout** Similar to B
	Access from land	Extend the existing port road and rail tracks.	Use a land strip between Navy Base and "Up-market Residential" shown in the city plan		
Construction Period and Remarks		Need 30 months. Use CSD and TSHD for dredging and 3 sets of drilling machines for cast-in-situ concrete piles.	35 months Need a temporary jetty , a pre-cast yard (2.0 ha) and gat barge for revetment works Others are same as Original plan.	38 months Similar to A except pre-cast yard (1.0 ha)	36 months Similar to B
Items to Evaluate	**Environmental Impact**	Augment the speed of tidal current at both the lagoon entrance and oyster farm.	Will not augment the speed of tidal current at the lagoon entrance but the oyster farm.	Will not augment the speed of tidal current at both the lagoon entrance and oyster farm.	May be similar to B (no numerical simulation is done).
	Siltation on Channel and Basin	Phase 1 497,000 m3/year Master Plan 611,000 m3/year	Phase 1 626,000 m3/year Master Plan 402,000 m3/year	Phase 1 774,000 m3/year Master Plan 604,000 m3/year	
	Navigation	Confirmed safe for ship manoeuvring simulation.	Prevailing south winds may make turning and berthing comparatively difficult.	May be safer than A.	Similar to B.
	Harbour Calmness (Phase 1)	99.9% available for loading and unloading.	99.9% available for loading and unloading.	89.8% available for loading and unloading. Need a breakwater.	Similar to B.
	Access from Land	Extend the existing road and railway.	Require the consensus from the municipality government and Navy in laying out the causeway.		
Cost (Million N$)	**Civil Works**	1,660 (100%)	2,199 (133%)	1,930 (116%)	1,950 (117%)
	Breakwater to Satisfy Harbour Calmness	Not necessary	Not necessary	Necessary Approx. 386 [3]	Necessary Approx. 390 [4]
	Equipment	451 (100%)	451 (100%)	451 (100%)	490 (109%)
	Total	2,111 (100%)	2,650 (126%)	2,767 (131%)	2,830 (134%)
Remarks		Cost for yard expansion is included.		Cost for breakwater is included.	Cost for break water is included.

3 As the sea is very calm and seabed elevation is not too deep, 20 % of the above civil work cost is assumed as the cost of breakwater.
4 Ditto

Preferred Alternative

So far as the results of both the EIA study and feasibility study are concerned, the execution of the original port expansion plan is the most recommendable from the following viewpoints:

• It is financially and economically viable. Its project cost is less than those of the contingent alternatives.

• It will not cause serious environmental impacts to both the lagoon and the bay.
• It needs a shorter period of time to complete than the alternatives.

Should the original port expansion plan be aborted to preserve the lagoon environments in compliance with Ramsar Convention or for other reasons, the most probable alternative port expansion would be Alternative A. The reasons for this are that:
• Impact to the lagoon is considered less than the original port expansion plan.
• Alternative A has sufficient harbour calmness.
• Alternatives B and C will be more expensive than Alternative A when the breakwater is taken into account to satisfy the harbour calmness.
• Maintenance of the approach channel and port basin of Alternative A is less costly than that of the Contingent Alternatives B and C.

In the case of Contingent Alternative A, safe navigation will be ensured by employing sufficiently powerful tugboats, the necessary capacity of which can be determined by ship manoeuvring simulations. The second phase construction of Contingent Alternative A will be made in between Phase 1 reclamation and the causeway. This construction may need a shorter period to complete than Phase 2, as the construction site is sheltered from the invading waves and the working conditions will be much more favourable for marine works.

The main comparative aspects among the original plan and contingent alternative plans are summarised below:

	Alternative A	**Alternative B**	**Alternative C**
Impacts on Natural Environments	Acceptable	Acceptable	Acceptable
Impacts on Social Environments	Acceptable	Serious to City Planning	Serious to City Planning
Project Cost	**126%**	**131%**	**134%**
Operation	Similar to the Original	Similar to the Original	More costly

7. POTENTIAL IMPACTS AND MITIGATION/ENHANCEMENT MEASURES

Impact Assessment
The assessment of impacts was determined by specialist studies that dealt with the impact of the project on the residents of Walvis Bay, and on the environmental processes in the bay and the lagoon. These studies were impacts on environmental processes; hydrodynamics; marine ecology and lagoon birdlife; impacts on the town and the residents; noise; traffic and the socio-economics studies.

Hydrodynamic modelling
The construction and operation of the proposed container terminal will cause changes in the hydrodynamic and ecological system of the bay and the lagoon. The new container terminal will cause a shift to the north of the large scale eddy. Water exchange rates in the lagoon will be reduced by about 10-15%, independently of the development Phase, and most distinctly near the lagoon entrance. Effluent from the fish factories will be more confined by the new reclamation, especially in the area near Berth 8 and near the south part of the fishing port and factories, and flow northward once Phase 3 is completed.

Positive benefits of this change in flow patterns are that effluents from the fishing harbour and oil spills will not flow towards the lagoon. Water flow from the lagoon and the future port basin will not reach the intake for the salt-works in measurable volumes, where the water is constantly refreshed by the large scale eddy in the bay.

Sediment transport only changes to a minor extent. Local adjustment to the changed flow conditions will occur, which is normal in dynamic coastal systems. No significant erosion or accretion patterns are predicted. Impacts related to the re-suspension of sediments from dredge operations will generally be of low significance. Precautionary monitoring of the suspended sediment concentrations during dredging and reclamation will ensure the effective implementation of mitigation measures.

Impacts on marine ecology and lagoon avifauna

It is considered extremely unlikely that any sediment suspended during dredging that might be deposited in the lagoon will be detectable and the significance of this impact will be low to very low. Every reasonable effort will be made to limit the amount of suspended material mobilised by dredging, and the impact on fisheries and cetaceans in the bay is deemed therefore to be low to very low. International research shows that the impact of dredging is limited to the dredged area. No suppression of benthic community structure has been recorded beyond 100 m from dredge sites. If one applies these findings to Walvis Bay, the overall impact will therefore be low since the organisms have the ability to regenerate rapidly.

Elutriation (leachate) tests were performed on samples of sediment with high concentrations of cadmium to determine whether the cadmium would be mobilized, that is, become available for assimilation by marine organisms. It was found that the cadmium did not leach into the water. The impact of pollutants on the Walvis Bay and lagoon ecosystem is deemed, therefore, to be low to very low. Cetaceans, particularly the large baleen whales, become habituated to the existing pattern of controlled movement of ships, and keep clear of ships. Smaller craft not requiring the use of the dredged approach channel behave more randomly and are thus more likely to have encounters with cetaceans. Dolphins, which are rapid swimmers, are easily able to avoid vessels and generally can co-exist comfortably with both ships and smaller craft. Nevertheless careless and reckless handling of high-speed craft in the presence of dolphins could result in injury through propeller-strikes.

Since almost all of the large vessels entering Walvis Bay will do so at reduced speed the increased noise resulting from increased traffic is extremely unlikely to reach physically harmful levels although should the noise cause discomfort the whales will move to areas where the noise levels are lower. The increases in shipping traffic will be gradual thus the whales are likely to acclimate to it. The concept of trophic levels and the generally accepted 10 % energy cascade between one trophic level and the next was used to assess the impact on the lagoon fauna of the predicted reduction in the refreshment rate of the lagoon. The impact is not easily measurable against the fluctuating numbers of birds and fishes feeding there and the natural variation in the input of particulate organic carbon. Since this masks the scale of any potential change, the impact will therefore not be significant. However, to assess the potential long-term effects of cumulative changes, an easily counted, top intertidal predator is a suitable indicator species. The Grey Plover could be one of these indicator species. Since no direct impacts of high significance as a consequence of the proposed terminal expansion were identified, environmental

management goals shall be achieved without requiring significant changes to the existing project design. Monitoring of bird indicator species has been recommended, to alert stakeholders to changes that result from both urban and port development.

Impact of Noise

The impact of noise from the site during the construction and operational phase will largely depend on the climatic conditions at the site. The prevailing wind is a south westerly wind, which will direct noise away from the sensitive areas. Under very stable atmospheric conditions, a temperature inversion or a light wind from the north, the noise will not be readily dissipated.

Impact of Construction Noise

A variety of noise sources will be present during construction. The one factor that they will have in common is that they will not be individually constant, that is, they will rise and fall according to the particular activity being conducted. There will be an impact on the immediate surrounding environment from the construction activities, especially the pile driving (if non-auger methods are used such as impact pile driving). The area surrounding the construction site will be affected for approximately 640 m in all directions, should a number of main pieces of equipment be used simultaneously. The existing ambient noise exceeds the recommended rating values in SANS 10103 due to the number of vehicles that currently pass residential areas. The number of construction vehicles that will convey rock to the construction site will add to these existing ambient levels, and will most likely cause a disturbing noise, particularly the stop-start operation of trucks at intersections close to residential areas. Both traffic scheduling and an alternative route, which would not pass through residential areas, would eliminate the issues of start-stop related noise – both during construction of the terminal expansion and its operational phase.

Impact of Terminal Operational Noise

Activities that are typical of operations in the container terminal include the loading and unloading of containers on and from ships, and the handling of containers by vehicles on the terminal platform. This noise continues, whether or not the proposed project goes ahead. At the new terminal, the noise from container cranes will essentially remain as at present. Quay side activities may impact on residential areas if a wind from the north is blowing; ambient noise levels during the night will then most likely be exceeded. No impact with a southerly wind is expected. With proper training of crane operators, the impact of percussive noise from container handling on existing ambient noise levels can be reduced. Impacts of medium-high significance were identified, as a consequence of construction activities. Mitigation measures have been recommended for these. Apart from these impacts, which will occur mainly in the first six months of the project, the environmental management goals shall be achieved without significant changes being required of the existing project design.

Impact on Roads and Traffic

During construction, traffic will impact on:

Road sections. The volume/capacity ratio along Third Street east of 13th Road will increase from 0.28 in 2009 to 0.32 in 2018 and the significance of this negative impact is therefore low.

Intersections. The Third Street/13th Road 4-way stop will experience an increase in peak hour traffic 23%, while traffic volumes through the traffic circle at the B2/C14 intersection will increase by 10% from 2009 to 2018. The significance of the negative impacts is medium at the Third Street/13th Road 4-way stop and low at the B2/C14 traffic circle.

Impact on traffic safety. About 6 million additional vehicle kilometres shall be travelled on the road network by vehicles conveying staff and construction materials during the construction periods for Phases 1, 2 and 3 added together. It is estimated that the construction traffic is likely to cause 6 casualties and a 40% chance of one fatality during the three construction periods altogether. The significance of the negative impact on road safety during the construction phases is therefore assessed to be low.

Road pavement infrastructure. Additional heavy traffic is expected to increase by about 12% along 3rd Road/5th Street, about 11.5% along 18th Road, and about 15.5% along the C14. The significance of the negative impact on the structural capacity of the road infrastructure is assessed to be low.

Road sections. Current morning peak hour traffic volume at the Third Street/13th Road intersection will increase by 4%. The significance of this negative impact is therefore **low**. The afternoon shift change at the container terminal at 14:00 will have **no** impact on the afternoon peak hour traffic.

During operation, traffic will impact on:

Impact on intersections. The net increase from 2009 to 2023 is small and will not cause a noticeable impact on the peak hour traffic level of service at the intersections. The significance of the negative impact for the container terminal operation in 2025 is therefore assessed to be low.

Impact on traffic safety. It is estimated that there will be an additional 12 million vehicle kilometres per year travelled on the road network when the container terminal becomes operational in 2013. This is likely to cause an additional 12 casualties per year and one fatality per year at the start of the operational phase and increase at about 10% per annum as the additional container truck traffic volume will increase at this rate. The significance of the negative impact of new container operations traffic on road safety is therefore assessed to be medium. As the container volumes increase annually, the accident rate will also increase proportionately.

Impact on road pavement infrastructure. Additional heavy traffic is expected to increase by about 9% along 3rd Road/5th Street, about 8% along 13th Road, and about 19% along the B2. The significance of the negative impact on the structural capacity of the road infrastructure is assessed to be low, except on the B2 where it is assessed to be medium. Since no impacts of high significance as a consequence of the proposed terminal expansion were identified, no significant changes are required to be made to the existing project design.

Socio-economic Issues

Employment in the port in future will increase with expansion of the port's activities. In addition to the proposed expansion of the container terminal, there are other activities

likely to increase in scope, for example, the cruise liner tourism sector, ship repair and other activities. Also, there are an increasing number of oil rigs and ships that use the port for repairs and refurbishment. The expected surge in employment opportunities will be direct and indirect in nature and focus on providing goods and services in other domains that are part of Walvis Bay's economic life.

Potential positive impacts can be summarised as follows:

- Employment creation for Namibians, both during construction and operations;
- Skills development and transfer and educational opportunities;
- Visual barrier caused by the current container terminal will be reduced;
- Increase in economic activities of companies related to the construction industry during the construction phase;
- Increase in economic activities of companies related to the transport industry during the operational phase;
- Increase in economic activities of companies providing other services linked to the project activities during the construction and operational phase;
- The growth in new small enterprises and medium size enterprises being established;
- Increased scope for a marina development;
- Increase in the number of business men to the area, benefiting the hospitality industry and tourism more broadly.

Potential negative impacts on the community and economy

- Influx of workers which in turn places increased pressure on available resources and infrastructure;
- An influx of workers from other regions of Namibia and from neighbouring countries;
- Increased risk for the spreading of communicable diseases such as HIV/AIDS, especially with the associated increase in the number of truckers and sailors;
- Behavioural changes promoting greater theft, prostitution and alcoholism;
- Liberation of bad odours during dredging;
- Increase in traffic in Walvis Bay as well as through the Erongo Region, along with associated safety risks;
- Inability of local businesses, which are currently leasing the area being targeted for the marina development, to realize the full value of the investments they recently made given the one year notice they have been given to vacate the area; and
- Increase in noise levels, impacting residents near the harbour as well as those residing on routes used by heavy vehicles.

8. ENVIRONMENTAL HAZARD MANAGEMENT

Considerations for ensuring effective environmental hazard management will be explored and integrated into the comprehensive Environmental and Social Management Plan (ESMP) which will be elaborated upon. Environmental hazards that must be factored include the handling of hazardous materials and hydrogen sulphide gas eruptions. Namport will also be required to develop an Emergency Response Plan.

9. MONITORING PROGRAM

The monitoring of environmental and social impacts for the project will be guided by the development of a comprehensive ESMP. Namport has already developed an Environmental Management Plan (EMP) that will be updated prior to loan effectiveness to take into account additional recommendations which were made by the Bank.

Responsibilities under the EMP have been currently allocated between Namport, its contractors and certain units with the Walvis Bay municipality. Namport intends to augment its internal staffing capacity in order to meet the environmental and social obligations that will be required of it for the purposes of this project. Monitoring activities will consist of baseline monitoring, site inspections, monthly reporting and internal audits. Namport will have an Environmental Manager and an Environmental Officer dedicated to this project. The contractor will also appoint his own Environmental Officer, Health and Safety Officer, Fire Officer and a Waste Management Officer.

Mitigation Recommendation	Monitoring Responsibility	Action Required	Monitoring Method	Frequency
Socio-economic impacts				
During both construction and operations a 'Locals first' policy has to be adopted whereby Namibian Contractors and employees are used as far as possible.	Namport Project Manager and HR Manager.	Where appropriate, practicable and reasonable, preference shall be given during recruitment firstly to Walvis Bay residents, then Namibians followed by International contractors and employees as far as possible.	Review of employee records.	During recruitment.
Foster collaboration with the Municipality with regard to available resources such as water and electricity and increased housing needs.	Namport Project Manager and HR Manager.	Establish forums to facilitate discussion.	Review of minutes.	Quarterly, on-going process
Adopt a 'reduce-at source' policy.	HR Manager.	Put policy in place while raising awareness amongst employees.	Water and electricity records. Spot checks.	Regular basis.
Managing the transferring of skills programmes.	HR Manager.	Establish skills transferring programmes. Manage individual development plans.	Review employee records.	Quarterly and as need for new skills arises
Continue DOTS programme for TB along with HIV/AIDS programme, link up with NGO's for awareness raising on HIV/AIDS.	HR Department/ Health and Safety Officers.	Continue the availability of the DOTS programme along with HIV/AIDS awareness raising through pamphlets, posters, workshops and campaigns.	Review the implementation of programmes and policies.	Continuously
Keep Public informed through the media on when dredging will occur, increasing the possibility for the emission of bad odours.	Environmental Manager in collaboration with municipality.	Place notices in newspapers and Bay News.	Align notices with the project schedule. Review the notices placed in newspapers.	Before dredging occurs.
Direct flood lighting away from the town.	Environmental Manager, Contractors.	Direct flood lighting away from the town.	Visually observe direction light form flood lights.	Continuously during Construction
Traffic Impacts				
Heavy vehicles, including construction vehicles, shall avoid routes running through the town, especially residential areas.	Environmental Manager and Walvis Bay Traffic Department.	Namport and the Walvis Bay traffic department identify routes to be used by heavy vehicles.	Spot Checks..	Continuously
Namport and Walvis Bay Traffic Department shall investigate the restrictions of movement for heavy vehicles to certain times of the day. .	Namport and Walvis Bay Traffic Department.	Investigate safety risks on road between Swakopmund and Walvis Bay. Determine the number of road users on the road under discussion as well as peaks.	Review minutes of discussions and studies conducted.	Continuously, especially before operational phase of the project is commissioned
Provision of reliable passenger transport service during construction and	Namport	Namport shall check that the staff bus service is provided as per	Appointed inspectors shall	Once a week on a randomly selected

Mitigation Recommendation	Monitoring Responsibility	Action Required	Monitoring Method	Frequency
operation to encourage high use of buses by workers		agreement, with the operator	record buses arrival and departure times at designated pick-up points and count passengers on buses	day each week
An alternative to the installation of traffic signals at the Third Street/ Thirteenth Road intersection is to ban construction trucks from using this intersection during peak traffic periods (07:00 – 08:30 and 16:00 – 17:30)	Walvis Bay Traffic Department	Traffic signs on the approaches to the Third Street/ Thirteenth Road intersection indicating that no construction trucks are allowed on these roads during the specified time periods	Traffic law enforcement during specified time periods	Daily
Heavy vehicle safety and overloading checks	Walvis Bay Traffic Department	Traffic enforcement officials to weigh and inspect selected vehicles entering the Port	Municipality to organize use of vehicle weighing equipment at Port gateway	All heavy vehicles passing over weight detector. Selected vehicles to undergo safety inspection daily.
A greater proportion of containers to be transported by rail instead of road	TransNamib and Namport	TransNamib to investigate using more wagons for conveying containers	Namport to record supply of wagons by TransNamib and delivery time between origin and destination of selected container trains	Monitor trains on a daily basis and discuss progress with TransNamib on a monthly basis
Noise Impacts				
If noise from piling exceeds accepted levels, it shall be restricted to specific times, e.g. not at night between 22h00 and 06h00.	Contractor	Construction schedule shall be designed in such a way that noise from piling is restricted.	Review construction schedule and monitor piling actions. Install noise level meters.	Continuously.
Noise barrier shall be constructed, subject to architectural design and landscaping limit visual impact. .	Namport and architects	Consider design.	Review designs.	Before construction of barrier
Crane operators receive training so that the noise from connecting on to the spreaders and dropping empty containers is minimised.	Namport	Establish skills development programme. Manage individual staff development plans.	Performance management and review of staff.	Quarterly and as a response to the EMC dealing with complaints about noise from container operations.
Ensure that trucks pass through the industrial areas as much as possible, ensure level crossings are upgraded, investigate rubber mixture road surface.	Contractor	Namport and the Walvis Bay traffic department identify routes to be used by heavy vehicles. Investigate measures to reduce container bounce on level crossings and tyre/road noise of heavy vehicles.	Spot checks Measurement of noise levels at identified locations.	Continuously Semi-annually, and as a response to the EMC dealing with complaints about noise from container haulage
Turbidity Levels at Environmentally Sensitive Receptor Sites				
Sensitive areas, that is, salt works intake and aquaculture farms, lagoon entrance and intakes to fish factories, are protected by systems that provide real-time measurements of turbidity. If turbidity due to sediment particulates exceeds critical levels, corrective action shall be taken by the dredging operator. A reference site must be chosen, so that its measurements of elevated turbid levels due to natural causes can be separated from those caused by dredging.	Independent consultant	Deployment of optical backscatter sensor to measure total suspended solids at the reference site and sensitive sites. Measurements at the reference site will show turbidity levels due to natural variations in the environment.	Real-time measurements of turbidity monitored by independent observer	Real-time, continuously during dredging.
Hydrogen Sulphide Levels				

Mitigation Recommendation	Monitoring Responsibility	Action Required	Monitoring Method	Frequency
Release of hydrogen sulphide from dredged sediments, and bad odours.	Contractor	Deployment of on-board air quality instruments.	Measurements of on-board air quality. .	Continuously during operations
Changes in migration and breeding patterns of birds, particularly Red Data species				
Quantify long-term effects of reduction in rate of tidal refreshment of the lagoon on indicator species of intertidal predator species	Namport	Regular bird counts of selected bird species, e.g., Grey Plover	Population size of indicator bird species	Summer and winter every year
Characteristics of dredged material				
Minimise any negative environmental impacts due to dredge operations.	Namport	Take water, mussel and oyster samples at locations designated in the EMP for the disposal site, and bed sediment at dredge locations.	Chemical analysis of samples as required in the EMP approved by DEA_MET for capital dredging.	Before spoil disposal starts, and at regular intervals during dredging, in consultation with MFMR in Walvis Bay.

10. PUBLIC CONSULTATIONS AND PUBLIC DISCLOSURE

Consultations with local stakeholders took place in 2009 in compliance with the Namibian Environmental Act. Local stakeholders included representatives of civil society, local businesses, local residents and municipal and regional government officials. A public hearing was held in 2009 in order to inform stakeholders about the project and to obtain their perspectives and concerns on the ESIA. Significant concerns were raised and focused on the effect on tidal flow into the lagoon, the impact on the marine ecosystem, noise levels for the surrounding communities and inadequate baseline information related to the lagoon, for example. The project's design and implementation modalities have been shaped by the concerns that were raised.

Public participation was a key part of the ESIA process. Key interested and affected parties (I&AP's) in and around Walvis Bay were identified through reviewing and updating Enviro Dynamics' database for the Walvis Bay area and the Erongo Region, which includes relevant authorities and specific interest groups. There were also newspaper advertisements that requested I&APs to register for the ESIA supplemented this database, which was updated regularly during the EIA process

A public meeting to discuss the findings of the EIR and the Specialist studies was held at the Atlantic Hotel at 18h00 on Tuesday, 24 November 2009. A notice of the meeting was emailed to all registered stakeholders on 10 November, and it was advertised in the Namib Times (local newspaper) and on radio.

Issues raised in the meeting pertained to:

- Impacts of new hard structures such as the proposed causeway and terminal quays on waves and currents in the Bay – and Pelican Point, in particular - and in the lagoon. How this will influence siltation patterns in the lagoon, thereby changing the physical dimensions of the lagoon. Impacts on water quality, on fisheries activities, the yacht club and on migratory bird patterns and ecosystem.
- Impacts of noise, odours
- Impacts of increased port activity on existing services such as health facilities, water etc
- Road safety

The issues were by and large those that are extensively covered in the EIA and for noise and traffic there were even specialist studies conducted. They are further dealt with in the ESMP and as a consequence of these discussions; it was recommended that an Environmental Monitoring Committee be established. Given the substantial time that has passed since the last set of consultations, the Bank has also requested that Namport should establish and undertake a continuous consultation process for the project. This process would facilitate regular communication and interaction with various stakeholders throughout the duration of the project.

11. COMPLEMENTARY INITIATIVES

In complementing the comprehensive ESMP which will be elaborated, Namport has a Social Investment Fund through which it carries out activities in support of local communities, such as in building socio-economic infrastructure and providing donations to fire victims. This fund will continue to operate throughout the realization of the project.

12. CONCLUSION

Evaluation of ESIA, ESMP and the feasibility studies showed that the project is environmentally and socially feasible provided there is compilation of and strict adherence to a more detailed ESMP for both construction and operation stages. The impact of the project on the siltation of the lagoon has been discarded during studies but these were based on desk top analysis. Namport will therefore be requested to embark on a monitoring program as part of the construction to ensure that the project is not in any way accelerating the siltation of the lagoon. In this regards they have already installed turbidity measurement equipment to gather baseline conditions prior to construction.

Evaluation of The ESIA confirms that noise and traffic are serious impacts but there is adequate mitigation in place. For both construction and operational noise, where they exceed accepted standards, they would be mitigated to tolerable levels for residents in Walvis Bay and traffic and road impacts can be managed effectively through scheduling and route changes. Limitations of the ESIA will be made conditions precedent to first disbursements and they are:

- A more detailed analysis of the impacts of the project on services such as water, electricity, health services etc.. For example, Namport has not catered for the HIV/AIDS and other communicable diseases based on the fact that there are existing programs run by the Walvis Bay Municipality.
- Gender analysis and cumulative impacts assessment studies.
- Climate change adaptation plan. This is because climate change studies have shown that there is a chance of 30cm sea level rise in the area. It is well noted that this is not guaranteed however, the updated ESMP shall address some climate change adaptation measures in line with the National climate change action plan.
- Analysis of turbidity data which is currently being gathered to agree on the background values and future monitoring methods with the Municipality and the Ministry of Environment.
- Development and conducting consultation process on a continuous basis to engage stakeholders and include updated measures in the ESMP for better assessing and monitoring the socio-economic impacts of the project.

13. REFERENCES AND CONTACTS

References:

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