transport, safety & liaison

Department:
Transport, Safety & Liaison
NORTHERN CAPE

Boegoebaai Port
Business Case

Province of the
Northern Cape
REPUBLIC OF SOUTH AFRICA

Transactional Advisors

TM CONSULTING
Transaction Advisory
Project Structuring and Funding

NELUTHA Consulting

Supported by the following specialist Service Providers

PRDW
Consulting Port and Coastal Engineers

NAKO ILISO

CNR Logistics

FASKEN

PSP logistics

Date of Submission:

May 2020

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ABBREVIATIONS

Abbreviations

ADT	:	Average Daily Traffic
ADTT	:	Average Daily Truck Traffic
BMDS	:	Baseline Market Demand Study
BOT	:	Build, Operate, Transfer
BOOT	:	Build, Operate, Own, Transfer
CAGR	:	Compound Annual Growth Rate
CAPEX	:	Capital Expenditure
CBA	:	Cost Benefit Analysis
CIR	:	Cold in-situ Recycling
DMTU	:	Dry Metric Ton Unit
CPA	:	The Richtersveld Sida !Hub Communal Property Association
DBFO	:	Design, Build, Finance, Operate
DPE	:	Department of Public Enterprises
DOT	:	Department of Transport
DTSL	:	Department of Transport, Safety and Liaison
DR&PW	:	Department of Roads and Public Works
DWT	:	Deadweight Tonnage
EBCR	:	Economic Benefit Cost Ratio
EBITDA	:	Earnings before Interest, Tax, Depreciation and Amortization
EIA	:	Environmental Impact Assessment
EIRR	:	Economic Internal Rate of Return
ENPV	:	Economic Net Present Value
ECSA	:	Engineering Council of South Africa
EMP	:	Environmental Management Plan
EPC	:	Engineering, Procurement and Construction
FEL2	:	Front-end Loading Stage 2
GDP	:	Gross Domestic Product
GT	:	Gross Tonnes
HDPE	:	High-density Polyethylene
Hr	:	Hour
HV	:	Heavy Vehicles
ICT	:	Internet and Communication Technology Services
IDP	:	Integrated Development Plan
IRR	:	Internal Rate of Return
Km	:	Kilometre
KL	:	Kilolitre
kVA	:	kilovolt-ampere
LAN	:	Local Area Network
LTPF	:	Long Term Planning Framework

M	:	Meter
Mil	:	Million
MCA	:	Multi-Criteria Assessment
Mn	:	Manganese
MPT	:	Multi-Purpose Terminal
MSL	:	Mean Sea Level
MTEF	:	Medium-Term Expenditure Framework
MTPA	:	Million Tonnes per Annum
MVA	:	Mega Volt Amp
NEMA	:	National Environmental Management Act
NCDTSL	:	Northern Cape Department of Transport, Safety and Liaison
NCEDA	:	Northern Cape Economic Development, Trade and Investment Agency
NCPG	:	Northern Cape Provincial Government
NPV	:	Net Present Value
NWA	:	National Water Act
OPEX	:	Operational Expenditure
P&G	:	Preliminary and General
PFMA	:	Public Finance Management Act
PMO	:	Project Management Office
PPP	:	Public Private Partnership
PSJV	:	Pooling and Sharing Joint Venture
RAMP	:	Road Asset Management Plan
RFP	:	Request for Proposal
RFQ	:	Request for Quotation
ROI	:	Return on Investment
SANRAL	:	South African National Roads Authority
SANS	:	South African National Standards
SEZ	:	Special Economic Zone
SOE / C	:	State Owned Entity / Company
T	:	Tonnes
TA	:	Transaction Advisors
TEU	:	Twenty Foot Equivalent Unit
TNPA	:	Transnet National Ports Authority
TRH	:	Technical Recommendations for Highways
USGS	:	Unites States Geological Survey
VAT	:	Value Added Tax
VMS	:	Vast Mineral Sands
WACC	:	Weighted Average Cost of Capital
WWTP	:	Wastewater Treatment Plant

EXECUTIVE **SUMMARY**

1. Executive Summary

Introduction

A team of specialist advisors, spearheaded by the TM/Nelutha Consulting Joint Venture (the "**Transaction Advisor**"), has been appointed by the Northern Cape Department of Transport, Safety and Liaison (the "**NCDTSL**") to embark on certain transactional advisory services. These transactional advisory services include the determination of the feasibility of the development, construction and operation of a port with warehousing facilities in Boegoebaai Northern Cape (the "**Proposed Project**"). The Transaction Advisors have pursuant to such appointment conducted and compiled this feasibility study, which addresses the technical, legal, financial, environmental, and socio-economic aspects of the Proposed Project.

The Need for the Proposed Project in the Northern Cape Province

The Proposed Project is the first development of this magnitude to be undertaken in the last 26 years. It is therefore a meaningful infrastructure investment and a catalyst for economic growth in the Northern Cape Province and South Africa at large. While the Northern Cape Province is rich in mineral resources such as iron ore, zinc, manganese, lead and copper, all current commodities mined in the Northern Cape are transported out of the province by road and/or rail for export through distant ports. The existing export routes (supply chains) are constrained and expensive for the mines and therefore the Proposed Project establishes new export capacity in the Northern Cape for the benefit of the province and the entire country. The Proposed Project is an opportunity for the Northern Cape Province to grow its economy and benefit from its available mineral resources.

The Proposed Project is intended to be undertaken using the public private partnership ("**PPP**") model in terms of Treasury Regulation 16 issued to the Public Finance Management Act No 1 of 1999 (the "**Regulations**"). Furthermore, the Proposed Project has been registered as a potential PPP in terms of a letter from the Government Technical Advisory Centre to the Head of Department of the NCDTSL.

The Proposed Project, when viewed holistically and from end-to-end, is a profitable business that will alleviate, amongst others, the high logistical costs associated with long distance transporting of commodities to ports and capacity constraints relating to existing export supply chains which limit exporters' capacity to service the full extent of the market demand. A Greenfield port has been earmarked as a potential site in alleviating these challenges. The key project drivers as to '*why Boegoebaai should become a Provincial and National priority and catalytic project*', therefore, revolve around the Proposed Project's ability to: (i) reduce the economic cost of moving cargo within the Northern Cape hinterland; (ii) unlock greater export logistics capacity for minerals from the Northern Cape; (iii) optimize the cargo distribution within the South African port system; (iv) stimulate regional and provincial socio-economic development; (v) secure a competitive advantage regionally for South African ports; and (vi) offer, in addition to Saldanha Bay, a means for exporting additional volumes of minerals from Northern Cape.

From a commodity perspective, the Base Case portrayed in this business case is designed to export and import the following commodities through the port:

Table 1-1: Commodity Demand

Cargo Type - Commodity	Volume (Mtpa) 2019	Volume (Mtpa) 2025	Volume (Mtpa) 2050
Dry bulk – Iron Ore	0	0	0
Dry bulk – Manganese	4.5	6.0	9.0
Break bulk – Lead/Zinc	0.7	0.7	0.7
Break bulk – Magnetite	0.3	0.3	0.3
Break bulk – Ilmenite	0.1	0.1	0.5
Liquid bulk – Diesel Oil	1.3	1.37	1.7
Containers – Agricultural Products	0.15	0.21	0.42
Containers – Salt	0.03	0.03	0.03
Containers – General Cargo	0.75	0.9	1.28
Total Demand	**7.83**	**9.61**	**13.93**

Employment Opportunities

The Proposed Project will unlock the economic potential of the Northern Cape Province by, amongst others, the creation of job opportunities. Phase 1A of the Proposed Project, which encompasses the dry bulk, liquid bulk and multi-purpose terminals, with capital costs of R13.801 billion, could over time create a total of 13 770 indirect and induced jobs in the region for the operation of the port. This includes 2 300 indirect jobs for truck drivers and assistants. Further to this, 400 permanent jobs will be created for the operation of the port once the construction is complete.

During the construction phase, it is estimated that 2 971 direct jobs and 13 819 indirect and induced jobs will be created. The construction phase period is estimated to be 44 months, therefore providing employment security for a period of 3-4 years for more than 13 000 individuals.

Marine Engineering

The site identified for the Proposed Project, located 20 km south of Alexander Bay and 60 km north of Port Nolloth, is characterized by a prominent headland on a rocky coastline. Offshore, the seafloor drops steeply into relatively deep water making the site favorable for the development of a deep-water port. Onshore, the land area is owned by the Richtersveld Sida !Hub Communal Property Association (the "**Richtersveld CPA**"). The land is currently occupied by Alexkor, a public entity, and is used for diamond exploration purposes in a pooling and sharing joint venture with the Richtersveld Mining Company.

The Proposed Project's long term masterplan has been developed to be able to accommodate any commodity mix and operational changes that may take place in the future. A large area has been provided for in the masterplan, with a wide selection of cargo terminals including ship repair, a dedicated multi-purpose terminal, container terminal, dry bulk and liquid bulk berths together with their corresponding landside requirements. The vessel distribution for the Proposed Project's master plan layout includes a 400,000 DWT Chinamax dry bulk carrier as the upper-limit design vessel to

maximize the long-term expansion potential of the Proposed Project. The potential masterplan layout is presented below:

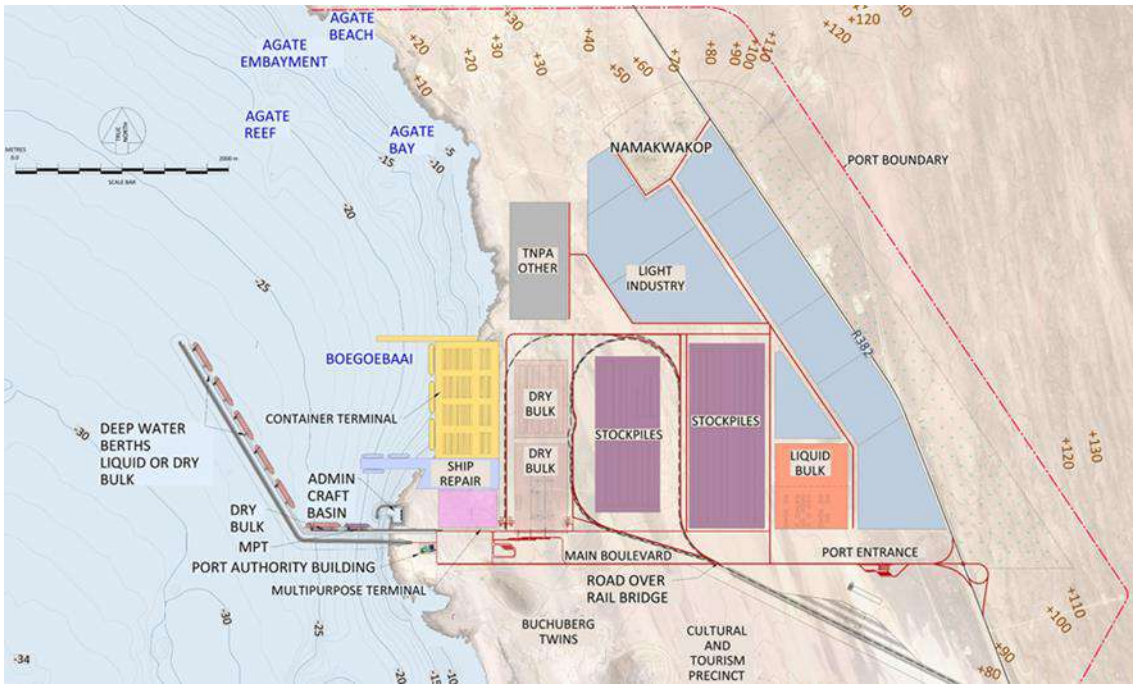


Figure 1-1: Potential Masterplan

The Phase 1 port layout, which represents the initial elements of the port masterplan, provides for Phase 1A and Phase 1B. Phase 1A (the Proposed Project) is the maximum development phase considered in this submission and consists of a jetty, connected to the land via an access trestle, and sheltered from wave energy by a rubble mound breakwater. Two berths are provided on the jetty, one dedicated to dry and liquid bulk cargo and one designated as a conventional multi-purpose berth. All operations in Phase 1A will be serviced by road transportation only. It is envisaged that Phase 1B, that includes the addition of rail facilities, will follow at a later stage when the market demand has reached the required volumes to make it viable. See the Phase 1 layout below:

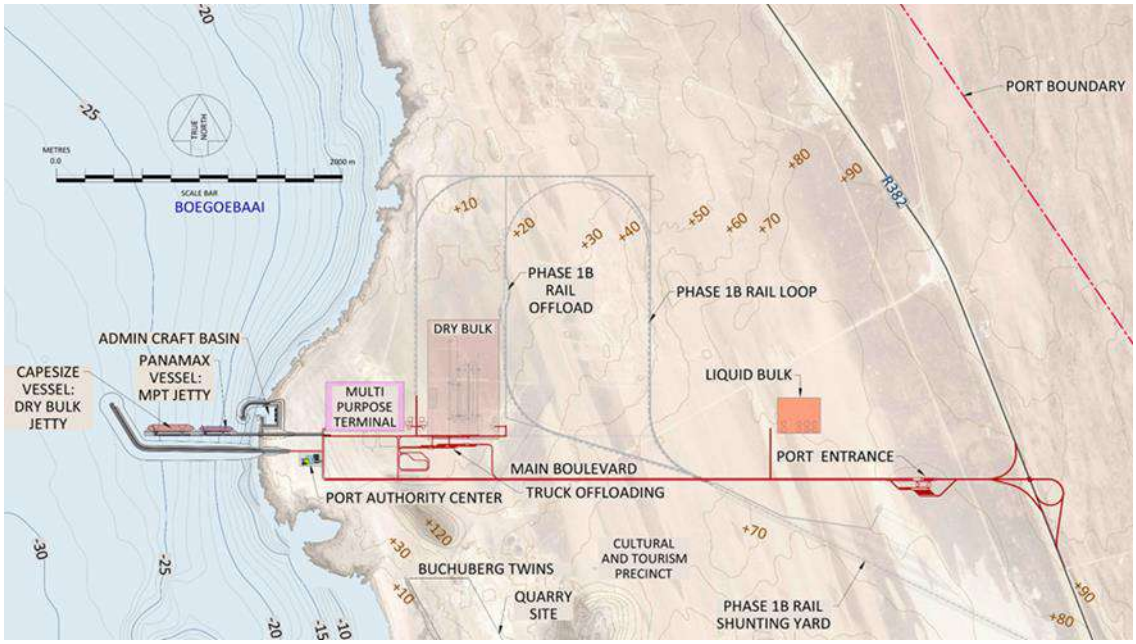


Figure 1-2: Phase 1 Port Layout

It is envisaged that the area surrounding the Proposed Project site may be developed through the declaration of a Special Economic Zone ("SEZ"). In addition to attracting local and foreign investments, declaring the area a SEZ will enable the Northern Cape Province to be competitive in both local and foreign export markets, potentially increasing investments in other infrastructure in the Northern Cape Province, enhancing foreign exchange earnings and contributing to the Proposed Project's efforts to unlock the Northern Cape Province's economic potential by, inter alia, increasing job creation and skills development. A SEZ declaration, therefore, will operate as a significant tool for socio-economic development, which is one of the many aspects the Proposed Project intends on improving and expanding.

Phase 1A of the Proposed Project has been developed up to a feasibility or FEL2 level with a target costing accuracy range of -20% to +30%. Various site investigations were undertaken to inform the engineering development, including a bathymetric and geophysical survey, marine geotechnical site investigation, metocean data collection, landside boreholes and quarry assessment. The estimated construction period for the Phase 1A marine works is 44 months from mobilization. It is estimated that the first vessel may be accommodated after 36 months of construction. The critical path is construction of the main breakwater, specifically the pre-casting and placement of the concrete armour units on the main breakwater.

Landside Engineering

The landside port infrastructure is aligned with the proposed terminal and marine operation requirements. The required infrastructure was engineered to respond to the physical and environmental opportunities and constraints of the site. The associated civil services include earthworks, water, sewer and storm water works and have been engineered to align with the proposed Phase 1A port development.

A 1 megaliter per day (ML/D) desalination plant is provided to treat the water required for the domestic and non-domestic demand of the Proposed Project. A 2 ML ground reservoir is required to store the necessary water volumes for the site and will be fed directly from the desalination plant. Furthermore, a 500 KL elevated reservoir is required to service the induction centre, wash bay, gateway, weighbridge offices and fire water requirements. Another 500 KL reservoir is required to service the port authority building, the recreational building, the emergency services building, the satellite ablution building, dust suppression systems and fire water requirements. The elevated reservoirs will also provide sufficient head to meet the required pressures for fire suppression discharge.

A proposed port access gateway, induction centre, administrative building, and emergency services building has been designed, taking into consideration the local climatic conditions. The terminal buildings, including workshops and sheds have been designed to cater for the required structural loads.

The internal port roads will consist of a boulevard, a dual carriageway leading from the port access control to the port administration buildings. The internal circulation, predominantly for Phase 1A will consist mainly of access to the multi-purpose-, dry bulk- and liquid bulk terminals. The external roads leading to the port from the Northern Cape mining areas and hinterland will require upgrading and rehabilitation over the next 5 to 10 years.

Environmental Consents

An environmental screening study was conducted to determine amongst others, whether the environment surrounding the area where the Proposed Project will be implemented contains any features that could prevent the Proposed Project from proceeding or require excessive mitigation in order to be acceptable. The environmental screening did not reveal any legal restrictions or any insurmountable challenges preventing the Proposed Project from proceeding at this point. An environmental impact assessment will in due course be conducted to determine the extent of the environment related approvals and contents to be obtained as well as the timing for obtaining the relevant consents. Environmental approvals and consents required for the Proposed Project can be obtained during the ordinary course of the design of the Proposed Project as determined by the environmental impact assessment.

The Proposed Project is a strategic development and will provide significant economic and social benefits and will in due course be registered as a priority project with the Presidential Infrastructure Coordinating Commission to expedite the granting of approvals and/or permits. The feasibility study will accordingly be revised as and when it is necessary, each time ensuring that any action that needs to be taken or consent that is needed is obtained well in advance.

Financial Projections

The estimated cost of Phase 1A of the Proposed Project is R13.801 billion. The amount comprises R9.4 billion for the port authority infrastructure, R2.2 billion for the dry bulk terminal, R0.3 billion for the multi-purpose terminal and R0.3 billion for the liquid bulk terminal. Allowances for debt, maintenance reserves and capitalized interest add up to R1.6 billion. The most significant cost

element is the construction of the breakwater which is R3.8 billion and is included in the R9.4 billion mentioned above.

As a result of the base case, the advisory team believes that the different terminals and the port are viable and contribute positively to the overall total Net Present Value ("**NPV**"). Payback for the total project occurs around 11 years after commencement of construction. The financial projections reveal a constant increase in the revenue of the Proposed Project between 2024 and 2046, which at all times will be positive as against Opex and EBITDA. Apart from a positive financial outlook, a project of this magnitude could unlock various benefits, financially, economically and socially as illustrated graphically below.

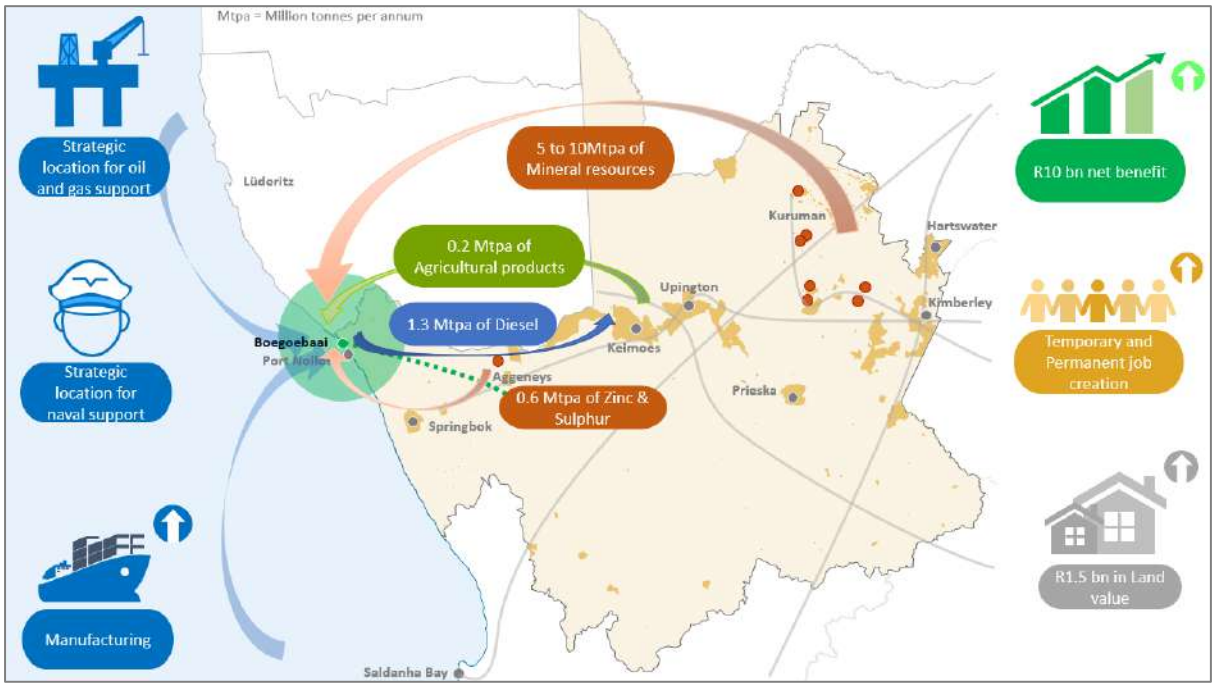


Figure 1-3: Potential Benefits of the Proposed Project

When analysing the project sensitivity to changed assumptions, it is clear that the project and its broader economic benefits are not overly reliant on one specific element working properly. This will mean that the risks to an investor and the country of undertaking the Proposed Project are spread across many elements. This is because there are a number of different commodities wanting to make use of the Proposed Project. There is an underlying demand for high-volume mineral exports which is not currently met cost effectively by existing supply chains, a number of diverse terminals operate within the port and the Proposed Project has a broad number of revenue streams which limits the risk of being reliant on one or two revenue sources.

Public Private Partnership versus Public Sector Comparator

A Public Sector Comparator ("**PSC**") model operates on the basis that the NCDTSL itself or through its agent, will be responsible for the development and operation of the Proposed Project and most importantly will fund the Proposed Project from its budget. The PPP on the other hand, operates on the basis that the NCDTSL will enter into a contract with a private party, by means of a special purpose vehicle("**SPV**"), that will be responsible for the development and operation of the Proposed

Project (the "**Concession Agreement**"). The highest distinguisher between the two models is the risk transfer associated with each model. For instance, in a PPP, the private party will ease the NCDTSL's burden, by taking the risks for project loans and guarantees.

Currently there is no allocation in the provincial budget for the Proposed Project and as a result, the Northern Cape Provincial Government does not have a budget to fund the Proposed Project. The PSC option requires an initial R13.306 billion investment from the fiscus. On this basis, the Proposed Project cannot fulfil the capital requirement affordability and cannot be practically funded utilizing the PSC model. It is observed that over the entire operational period of the PSC option, the projected rental revenue collected is sufficient to cover the operating cost. The PPP on the other hand, does not require a substantive budget allocation from the fiscus with the exception of the unitary fee, and this presents an opportunity to get varying proposals with different business options that can work within the parameters of the PPP framework.

For the reasons stated above, it is recommended that the NCDTSL uses the PPP option as it is more viable to carry out the Proposed Project. Presumably, a PPP standardization manual will be used, which will cover any residual fee payable as well as the options for extending the PPP.

Value for Money

Value for money is determined by comparing the Net Present Value ("NPV") of the funding options under consideration. A proposed PPP project may provide value for money but could be unaffordable if the specifications are too high. Value for money is a necessary condition for PPP procurement, but may not be enough. If a project is unaffordable it undermines the institution's ability to deliver other services and it should not be pursued.

The applicable rule is that the option with the highest relative NPV creates the highest value for money for the Government and economy of South Africa. The table below is a value for money comparison of the various options:

Table 1-2: Value for money comparison

Value for money comparison	PSC	PPP
Items		
Financial model	Done	Done
Impacts on Options	Done	Done
Date of First Ship at Berth	Mid 2028	Mid 2025
Capex	R 13 306 million	R13 801 million
Opex	R 74 669 million	R79 249 million
Discount Rate	13.2%	9.7%
Funding Options	Equity	Equity & Debt
Government Contribution	100%	0%
Net Present Value	(R 1 295 million)	R 4 406 million
Defined Risk Adjustment to costs	(R 166 million)	R 0
Net Present Value including risk	(R 1 325 million	R 4 406 million
Project IRR after risk adjustment	11.74%	13.3%

The PPP model has a slightly higher capital cost due to debt service ("**DSRA**") and maintenance reserve ("**MMRA**") allowances needing to be included as well as needing to provide for capitalized interest during construction. Operating costs for the PPP model are slightly higher due to needing to provide for interest. Notwithstanding this, the PPP model still indicates a better NPV because the PSC design and development costs and duration are higher due tothe project taking 3 years longer to start-up and that the PSC is funded solely by means of equity. The results presented in the table above therefore indicate that the PSC option results in a lower NPV compared to the Concession Agreement and therefore the PPP option does represent value for money compared to the PSC option.

Procurement

While the PPP model alleviates the NCDTSL's burden as far as risk and loan guarantees for the Proposed Project are concerned, the legal due diligence has identified a number of potential challenges relating to the procurement of land, engagement with stakeholders and obtaining consents and approvals. The Richtersveld CPA is the owner of a majority of the proposed project site and is a communal property association in terms of the Communal Property Associations Act No 28 of 1996 ("**CPA Act**"). The NCDTSL will therefore, be required to engage and negotiate with the Richtersveld Community through the Richtersveld CPA in terms of its constitution and in accordance with the CPA Act regarding the sale and/or lease of the proposed project site. The Richtersveld CPA has been placed under administration in terms of an order of court and as a result, any negotiations intended for it, will have to be directed to the administrator appointed to manage the affairs of the Richtersveld CPA, being the Acting Director General for the Department of Agriculture, Rural Development and Land Reform.

Given the sensitive nature of engagements with communities, it is intended that the NCDTSL engages the Richtersveld CPA or community, as applicable, as soon as possible after Treasury I approval is obtained, in order to: (i) understand and address the community's demands (if any) timeously; and (ii) control the information relayed to the community regarding the Proposed Project and to ensure that the community is meaningfully engaged regarding the Proposed Project, thereby developing a meaningful relationship with the community.

The legal due diligence has revealed that there are mining rights and prospecting rights granted over the proposed project site and that Alexkor is one of the mining right holders. This then means that the NCDTSL will further have to engage Alexkor and other prospecting and mining right holders in respect of the proposed project site regarding abandoning their mining and prospecting operations. Since the intended use of the land earmarked for the Proposed Project 'may' be contrary to any object of the Mineral and Petroleum Resources Development Act No 28 of 2002 (the "**MPRDA**") and/or such use will 'likely' impede any such object, the NCDTSL will also be required to obtain an approval from the Minister for the Department of Mineral Resources and Energy in order to implement the Proposed Project on the land earmarked for the Proposed Project. It is anticipated

that engagements with the various stakeholders will commence as soon as possible after Treasury I approval is obtained.

Implementation Readiness

The Proposed Project will be implemented by way of a PPP model and the Treasury PPP procurement process will be followed. Engagements with the relevant stakeholders will take place in light of their identified roles and all consents and approvals required at different levels will be obtained as and when necessary. While a number of challenges have been identified, workarounds have been provided for same and contingency plans relating to development funding budget, time related deviations and unforeseen technical conditions have also been considered to deal with any time and budget related deviations. The Implementation Readiness is a living document and will be revised at the appropriate intervals.

PROJECT **BACKGROUND**

2. Project Background

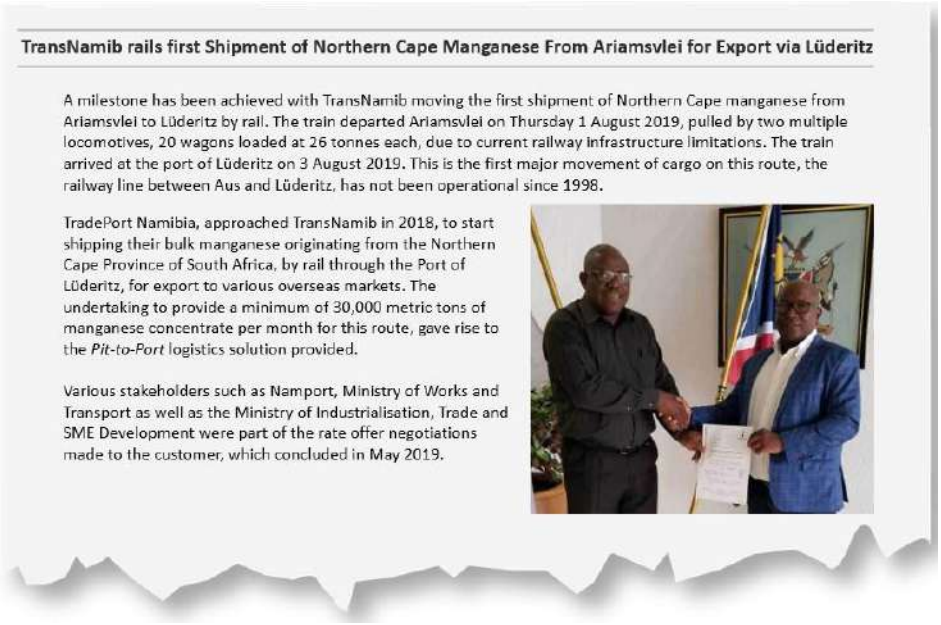
2.1 The Need for a Port in the Northern Cape

The Northern Cape Province is replete with iron ore, manganese, zinc, lead, copper and other commodities of which the Province owns 24% of the available global manganese deposits. Having stated the abundance of mineral resources abounding from the Northern Cape, all commodities are currently transported via road or rail for exports through suitable ports in other provinces, effectively making the Northern Cape Province economically landlocked, albeit having access to 338 kilometers (km) of Atlantic coastline. Despite a 70% Gross Domestic Product (GDP) growth in the Transport Sector between 2010 and 2016, save for Port Nolloth, the Northern Cape does not experience the GDP growth as a result of seaport activities.

The National Freight Flow Model (2017) that informs the economic baseline for the Northern Cape Province encapsulates:

- 108,569,803 (108.6m) tonnes of freight representing;
- 86,702,856,225 (86.7bn) tonne.km of value-added transport work; and
- hauled over an average transport distance of 799 kilometre (km).

Having stated these vast volumes of commodities transported through the province, few deep-water ports exist along the West Coast whilst the Northern Cape Province finds itself burdened by long distances to ports – causing relatively high logistical costs for exports of its goods when compared with its major trading competitors. Apart from this, there are also capacity constraints over the export supply chains which are limiting existing and new exporters access to take full advantage of market demand. As an example, Namibia's GDP currently benefits from exports of Northern Cape Manganese, as detailed below.



TransNamib rails first Shipment of Northern Cape Manganese From Ariamsvlei for Export via Lüderitz

A milestone has been achieved with TransNamib moving the first shipment of Northern Cape manganese from Ariamsvlei to Lüderitz by rail. The train departed Ariamsvlei on Thursday 1 August 2019, pulled by two multiple locomotives, 20 wagons loaded at 26 tonnes each, due to current railway infrastructure limitations. The train arrived at the port of Lüderitz on 3 August 2019. This is the first major movement of cargo on this route, the railway line between Aus and Lüderitz, has not been operational since 1998.

TradePort Namibia, approached TransNamib in 2018, to start shipping their bulk manganese originating from the Northern Cape Province of South Africa, by rail through the Port of Lüderitz, for export to various overseas markets. The undertaking to provide a minimum of 30,000 metric tons of manganese concentrate per month for this route, gave rise to the *Pit-to-Port* logistics solution provided.

Various stakeholders such as Namport, Ministry of Works and Transport as well as the Ministry of Industrialisation, Trade and SME Development were part of the rate offer negotiations made to the customer, which concluded in May 2019.

Figure 2-1: Northern Cape Manganese railed by TransNamib – exported via the Port of Lüderitz [1]

[1] https://www.railwaysafrica.com/news/transnamib-rails-first-shipment-of-northern-cape-manganese-from-ariamsvlei-to-l%C3%BCderitz

Based on the aforementioned, the key project drivers of why Boegoebaai should become a Provincial and a National priority are to:

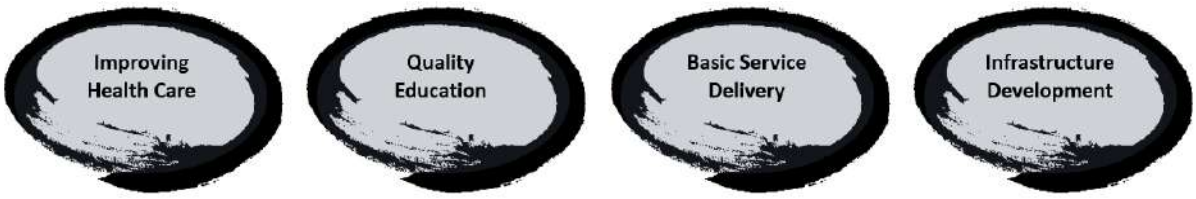
- Reducing the economic cost of moving cargo within the Northern Cape hinterland;
- Unlocking greater export logistics capacity for minerals from the Norther Cape;
- Optimising the cargo distribution within the South African port system;
- Stimulating regional and provincial socio-economic development;
- Securing a competitive advantage regionally for South African ports; and
- Offering an alternative to Saldanha Bay for exporting surplus volumes of minerals as Saldanha communities are resistant to additional exports

Further to the above, a new port at Boegoebaai could represent a significant direct investment in a sub-region of the Northern Cape which is currently economically depressed – whilst the provision of a port and supporting infrastructure could create temporary construction jobs, demand for raw materials, accommodation and support services, to name but a few. A range of new permanent jobs in the state, semi-state and private sectors will follow, all of which could result in significant long term economic growth in the Northern Cape.

2.2 Mandate from the Northern Cape Provincial Government

The slogan of the Northern Cape Provincial Government is profound in stating that their aim is to create a **Modern, Growing and Successful Province**. To achieve this aim, diligent and futuristic planning is ongoing whilst Boegoebaai is earmarked as a key infrastructure project to serve the people and the business communities of the province.

It was further asserted in the State of the Province Address delivered in March 2019, whereby a People Oriented Budget was shared that focuses on critical human development indicators such as:



The latter therefore includes the proposed Boegoebaai Deep Water Port – which is currently in Feasibility stage.

The Boegoebaai Deep Water Port seeks to activate the following strategic objectives which are in line with the mandate, vision and goals of the Northern Cape Provincial Government, so as to:

- Ensure sustainable growth in Regional and National GDP.
- Create employment opportunities for people in the Richtersveld Local Municipality, the Namakwa District Municipality and the Province at large.
- Develop and influence local economic development in the Namakwa District, specifically in the case where a town like Alexander Bay is on the verge of becoming extinct.
- Create an opportunity for sustainable business relationships with key markets, suppliers, State Owned Enterprises (SOEs), producers and business-related service providers.

- Forge strategic alliances within supply chains to ensure quicker and more cost-effective export solutions.
- Build capacity (skills) within the Northern Cape Province.

2.3 The Transactional Advisory Team

TM Consulting / Nelutha Consulting Joint Venture was appointed by the Northern Cape Department of Transport, Safety and Liaison (NCDTSL) to embark on Transactional Advisory Services to assist with project structuring, technical feasibility, financial viability and potential funding mechanisms to realise the dream of a Northern Cape Deep Water Port which is strategically poised to support producers with exports and to attract potential investors.

The Transactional Advisory Team has been appointed and is accordingly supported by the following specialist advisors:

Table 2-1: Specialist Project Advisors

Specialist Advisors	High-Level Scope
PRDW Consulting Port and Coastal Engineers	Marine Engineering inclusive of: • Bathymetric and Seismic Surveys. • Marine Geotechnical Investigations. • Metocean Data Collection. • Port Master Plan Design. • Preliminary Marine Engineering and Drawings. • Materials Handling Equipment Identification. • Provided inputs into other work streams such as landside engineering, commodity mix, financial modelling, economic analysis, legal due diligence etc.
NAKO ILISO	Landside Engineering inclusive of: • Environmental Screening Report. • Landside geotechnical and topographic surveys. • Bulk services including water, sewerage, stormwater and electricity. • Internal port roads / bridges and external roads. • Buildings and supporting infrastructure. • Future rail considerations.
CNR Logistics	• Financial Modelling. • Socio and Economic Analysis. • Sensitivity and Risk Analysis.
FASKEN	• High-Level Legal Due Diligence. • Provide legal advice in respect of the project.

Specialist Advisors	High-Level Scope
PSP logistics	• Commodity Mix Report.

2.4 Location

The Boegoebaai study site is located 20 km south of Alexander Bay and 60 km north of Port Nolloth. The site is characterised by a rounded headland on a rocky coastline.

A unique feature of the site is the short distance between the coastline and relatively deep water (−15 m MSL) which presents an opportunity to reduce capital costs by limiting the length of the primary marine structures such as the breakwater and access trestle.

It is to be noted that the envisaged Boegoebaai deep water port will be a greenfield development.

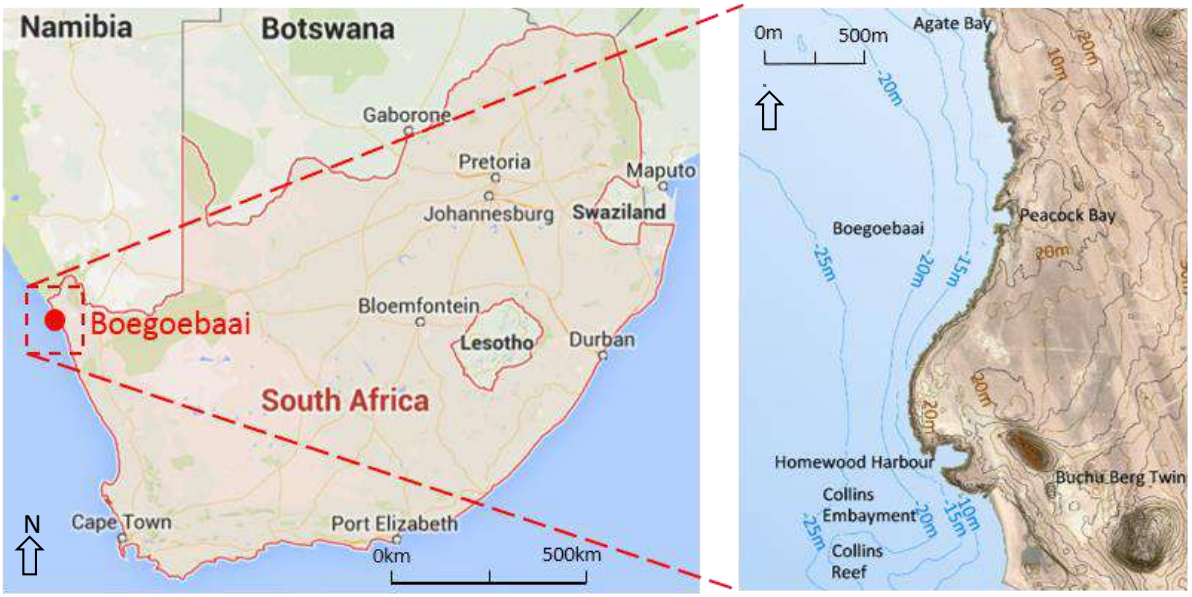


Figure 2-2: Boegoebaai site location

2.5 Land Ownership

The Richtersveld Sida !Hub Communal Property Association (CPA) owns the land in the vicinity of Boegoebaai following a successful land claim.

The land is currently used by Alexkor for diamond exploration purposes in a pooling and sharing joint venture (PSJV) with the Richtersveld Mining Company.

Figure 2-3 shows the erven owned by the CPA.

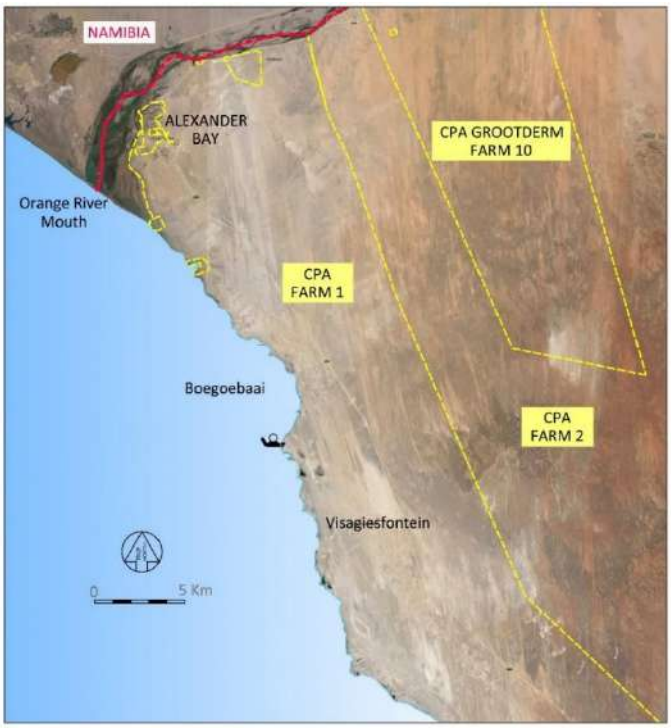


Figure 2-3: Land owned by CPA

2.6 Greenfield Port Typology

There are various types of greenfield port developments. Many greenfield ports act as a replacement of an existing port – occasionally greenfield ports are built as part of new transport solutions, whilst a limited number of greenfield ports are created as a solution to induce economic growth by developing transport infrastructure in under-developed regions. An outline of greenfield port types is shown in Figure 2-4.

Figure 2-4: Greenfield Port Typology

From a market and supply-driven perspective, the port of Boegoebaai could be developed as a Type II port to improve supply chains or as a Type III port being the catalyst for economic growth by providing the necessary port and related infrastructure first.

The potential for a complementary supply-side driven strategy to further develop the Port of Boegoebaai as a basis to attract economic development to the Province needs to be carefully analysed taking cognisance of the potential balance between demand and supply, the availability of funding and potential risk allocation through strategic partnerships.

Some greenfield port challenges identified and addressed within this report follow:

Right Location: The primary strength of a port is its location supplemented by its centrality and access towards markets complemented by favorable physical-technical conditions to develop the

port, typically such as natural deep water. The location decision of the port cannot be reversed and makes the port unique being the prime source of competitive advantage.

Financial Resources: Ports aiming to expand their capacity to ensure growth find it difficult to attract the requisite investment as Governments generally have limited public funding available.

Port infrastructure development requires substantial investment in basic public infrastructure ranging from breakwaters, dredging, roads, rail infrastructure and taking due cognisance of the environment. Greenfield port developments, in particular, require major spending in basic public infrastructure on the land side as well as the marine side. The private sector is not always keen to finance such public / non-commercial infrastructure projects unless the State provides the necessary guarantees.

Anchor Commodities: Less State funding implies that more risk needs to be absorbed through private participation. Private investors require a return on their investment (ROI) in line with the risk they need to bear. In an attempt to control market risk, many ports are built only after an anchor commodity has been secured that offers lucrative volumes on a sustainable basis. The business case for the anchor commodity becomes an integral part of the overall feasibility to construct a greenfields port.

Environmental / Social Sensitivities: Stakeholder management is key in defining the parameters of a greenfields port. Ports have to take cognisance of increasing environmental and social pressures. Greenfield ports and port expansions need to offer a sustainable port master plan, ensuring that they are not only profitable, but are also beneficial to the district and the people and that they are cognisant of the environmental and social impact of such ports and incorporate measures to curb the adverse environmental impacts. Any delay or capacity constraint experienced due to environmental issues could impact on the economic return to investors. Port operations are also subject to innovation to improve their environmental footprint.

Surrounding Infrastructure: Greenfield ports in remote areas are very dependent on the availability of the requisite infrastructure necessary during the construction phase as well as when operational. Without connecting transport infrastructure the port cannot be accessed which inhibits movement of freight and people. Utility requirements and connections need to be well-aligned with the requirements of the port development plan.

Government Buy-in: Globally, the number of private greenfield ports without any public investment is rare. Government involvement is pivotal in projects of this nature, specifically related to investments, in offering public services and to ensure a conducive regulatory framework for trade.

Notwithstanding the challenges, there is sufficient evidence that the construction of the Boegoebaai Deep Water Port is necessary and as part of the construction of the port, various measures will be implemented to address the challenges outlined above.

2.7 Engineering Analysis Status

From an engineering perspective, the technical study has been developed up to a feasibility or FEL2 level with a target costing accuracy range of -20% to +30%. Previous stages of the project performed

by PRDW and other service providers included a concept study (PRDW, 2013), comprising a port development framework and marine works concept study, and Phase 1 of the pre-feasibility study (PRDW, 2015).

2.8 Structure of this Report

This report represents the Technical, Commercial, Financial, Economic and Legal Options for the Boegoebaai Deep Water Port project. The report is fully aligned with guidelines detailed in the Public Private Partnership (PPP) Manual authored by National Treasury as well as the Capital Planning Guidelines.

The ensuing sections cater for content related to the following topics:

III. Needs and Demand Analysis
IV. Options Analysis
V. Technical Engineering Analysis
VI. Environmental Screening
VII. Legal Due Diligence
VIII. Value Assessment
IX. Socio Economic Profile and Cost Benefit Analysis
X. Implementation Readiness.

NEEDS AND DEMAND **ANALYSIS**

3. Needs and Demand Analysis

3.1 Services to be Delivered

The Northern Cape Department of Transport, Safety and Liaison (NCDTSL) in conjunction with the Office of the Premier are investigating the feasibility of developing at Port of Boegoebaai, a port and marine terminals and in general promote economic growth in all sectors of the local economy, especially regarding manufacturing, transport warehousing, tourism and job creation.

3.2 Strategic Alignment

One of the main objectives of the NCDTSL as it relates to transport, is to ensure efficient logistics links and an integrated transport system and networks. At a national level, strategic infrastructure projects ("SIPs") have been identified by the Government to improve social and economic infrastructure of the country, and improve economic development and growth, critical to improving transport infrastructure in South Africa to promote reliability, integrated transport systems, as well as to promote trade and investment.

Due to historical challenges of freight transport, many mining companies resorted to export from ports outside of the province to send cargo to their clients. This means that the province and its citizens do not share in the logistics activity and job creation from minerals sourced from within the province.

The construction of the Boegoebaai Port would therefore bring about the following benefits:

- Support Government's policy of decongesting mineral supply chains;
- Reduce the pressure on current ports in South Africa and unlock capacity for further volume exports;
- Improve efficiencies in freight transport for Northern Cape trade flows; and
- Potentially attract increased freight traffic and industrial development from improved systems and capacity of freight corridors.

The NCDTSL's current budget allocation for road maintenance and other transport infrastructure is R3.5 billion for the MTEF 2018/19 to 2019/20 financial year. Although not yet quantified at this stage, there is a potential increase in trade flows from the mining industry due to the current constraints in port and rail capacity in South Africa at the moment, which would provide South Africa with added foreign exchange due to the ability to increase volumes of manganese, iron ore and other base minerals. The feasibility study will outline any budget allocations required from the province for this project.

The objectives of the port project are to:

- Strengthen the logistics and transport corridor for trade flows into the province;
- Improve access to mineral exporters, especially manganese, lead and zinc;
- Raise efficiency for international freight trades; and

- Integrate the currently disconnected mining, industrial and logistics activities that are isolated from the main logistic system.

The function of transport management falls under the ambit of NCDTSL in the Northern Cape Province. The above stated description of Boegoebaai Port and the strategic plans of both provincial and national government confirms the alignment between the objectives of the Project, the Province, as well as those of the National Government. It is hoped that this project will extend Government's policy and implementation capacity.

3.3 Output Specifications

In terms of services to be delivered the NCDTSL in conjunction with the Office of the Premier are investigating the feasibility of developing the Port of Boegoebaai, a port and marine terminals with a view to create jobs and promote economic growth in all sectors of the local economy, and specifically in manufacturing, transport, warehousing and tourism. It is expected that to achieve its goals, the programme of the Boegoebaai Freight Port will therefore incorporate the development of:

- A marine port at Boegoebaai
- A marine container and multi-purpose terminal
- A bulk minerals terminal
- A liquid bulk terminal
- Landside port infrastructure
- Additional residential and urban developments (Not part of scope)
- An improved catchment function, facilitating the movement of freight from the surrounding areas.

3.4 Minimum Requirements

Whereas the NCDTSL seeks to promote economic growth and job creation within the region, pre-feasibility studies have identified the development of a port as the core development within this PPP feasibility study. This then requires that for whatever development proposals put forward by private parties, a viable port and its terminals should be central to the development proposals.

3.5 Meeting the Department's Ongoing Needs

The port has been developed to integrate various individual components in adding logistics value at a facility that acts as an intermediary in the supply chain. This concept works on a "transit storage" principle, where goods are received from various origins by road vehicles or in future by unit or block trains discharged, stored and then loaded onto vessels to be distributed to the destinations by ship. Benefits accrue to all parties by offering consolidation services for both imports and exports, as well as utilising the inter-modal concept, which streamlines the shipping and landside transport significantly.

The port service provider benefits by reduced queuing and in-port time for ships and increased efficiency, while the customer receives much better service levels and can find export supply chain capacity. In addition, cost savings can be passed back to the end user in the form of a contract. Peripheral services at a port and terminal can include the following:

- Handling and Berthing of Ships
- Container loading and offloading;
- Offloading, storage and loading of bulk minerals and liquid fuels;
- Empty container storage;
- In-bond warehousing and mineral storage;
- Specialised warehousing (eg. refrigerated, high security, liquid/bulk handling and storage);
- General warehousing for less-than-container loads (LCLs);
- Road delivery and pickups;
- Shipping line container parks; and
- Specialised services such as export packing.

These value adding logistics services and more are depicted in Figure 3-1 as spherical surfaces extending outward from the core infrastructure. The basic logistics services include freight transfer, loading and unloading to ships and storage while value added logistics services include groupage, stuffing and destuffing of containers, clearing and forwarding insurance and container maintenance and repair. Once these services are available, commercial and financial services follow almost by default since it is required to sustain and serve the value added logistics services.

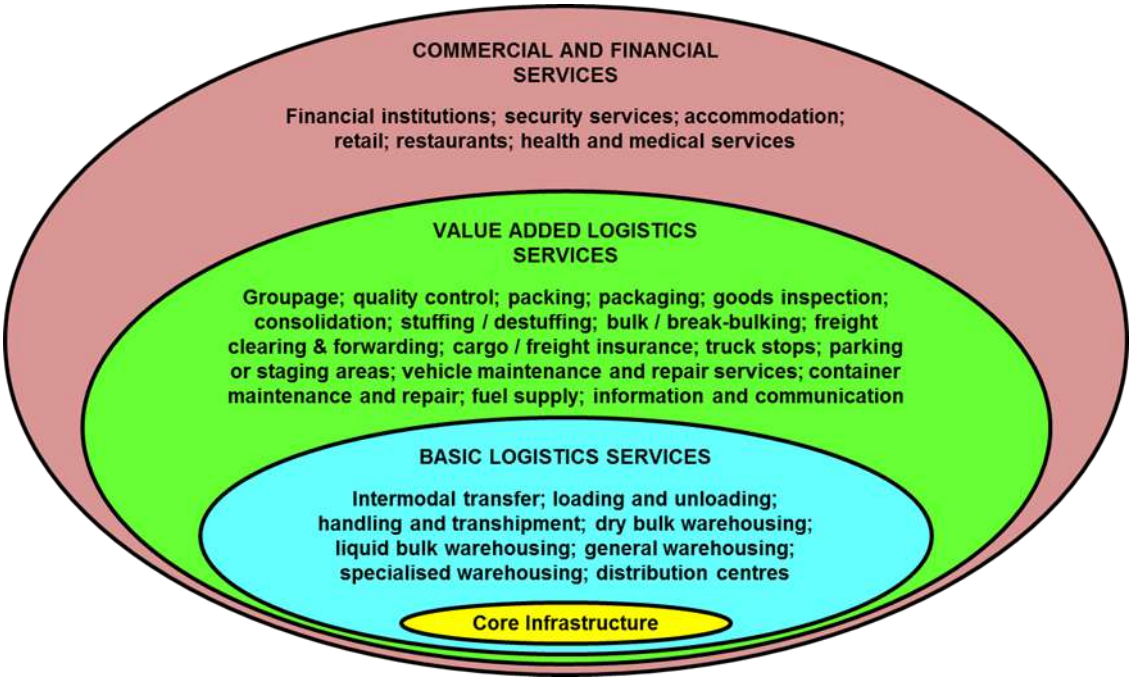


Figure 3-1: Value adding logistics services around the core infrastructure

Benefits to the terminal operation occur because the terminal serves as the central point or hub around which all ship, truck and container movements and operations gravitate within the area. The flow of containers to and from the Northern Cape mineral hinterland area becomes more cost-effective and thus benefits the importer or exporter, making them more competitive in the global markets.

The terminal on its own, without peripheral services, is not profitable, however this does not render the port not profitable as there are indispensable services which are ancillary to the existence of the terminal, which then render the entire project profitable. To this extent the proposed terminal should be a flexible solution that could be expanded and enhanced over time.

Benefits to the main stakeholders include:

- Freight managers:

  The ability to get cost effective and reliable service at affordable rates. This allows for improved freight planning, resulting in reduced need for carrying stock, less carrying costs and reduced demurrage charges. It also facilitates container repair, maintenance and cleaning services to be centralised at the terminal.

- Freight Owners:

  Opening of new logistics supply chains for especially mineral and agricultural exporters and unlocking capacity for South African exporters. The central port allows concentration of bulk and container movements, specifically for receiving exports and preparing them for export movements

- Transport service providers:

The terminal makes it easier for the transport service providers, primarily road, to achieve economies of scale by operating from one central port to a myriad of mines and pack-houses. This reduces unnecessary shunting with significantly improved turnaround times for ships as well as road equipment, as the central hub allows for efficient loading or off-loading of the cargo.

- Terminal facilities:

  Integration of the supply chain from hub to hub is achieved by greater co-operation and pre-planning for consignments.

From the above one can assess that the output specifications of the port can meet the institution's ongoing service needs as defined in the document. The aim of this project will be to improve the economic performance for exporters and importers in the Northern Cape by improving logistics links. This will thus lead to an improved economic growth in the province and lead thereafter to socio-economic development for the province, for this reason the project will be shown to achieve the department's goals.

The design will be done in such a way as to provide a flexible solution that can be expanded or enhanced over time yet remain economically viable to the institution.

3.5.1 Potential Revenue Stream of the Port Project

The terminals and port need the core infrastructure of a shipping berths and port handling terminals where bulk cargo and containers could be transferred from one mode to another. This in itself is usually not highly profitable but the peripheral value added service linked to the terminal can create significant return on investment.

Potential revenue linked to the core functions of the terminal can include:

- Primary lift on and lift off from ship
- Primary lift on and lift off from road
- Receiving, storing and loading of dry bulk cargoes
- Receiving, storing and loading of liquid bulk cargoes
- Storage per day: Loaded containers and minerals
- Storage per day: Empty containers
- Storage per day in liquid tanks
- Internal cross-haul of containers
- Handling rate of cargo: Off or onto road
- Administration and documentation fee

Potential revenue linked to basic logistics services can include:

- Weighbridge

- Destuffing of containers
- Stuffing of containers
- General warehousing
- Office rental (agencies and other service providers)

Potential revenue linked to peripheral activities (value added logistics services) can include:

- Groupage
- Quality control
- Packing and packaging
- Goods inspection
- Consolidation
- Clearing and forwarding
- Freight insurance
- Distribution centres
- Truck stops
- Parking and/or staging areas
- Vehicle maintenance and repair services
- Container maintenance and repair
- Fuel supply
- Information and communication

Potential revenue linked to related activities (commercial and financial services) can include:

- Financial institutions
- Security service
- Accommodation
- Retail
- Restaurants and food outlets
- Health and medical services

As indicated above the other sections of the economy providing other services can interface comfortably with the port. This could include services such as roads and truck stops and other logistics facilities, to better allow for exports and imports to move in and out of the province, thus adding value to the economy.

3.6 Mineral Resources in the Northern Cape

As detailed in the Section 2, the Northern Cape Province has substantial mineral resources of which iron ore and manganese are the most prominent. Due to the large tonnages and relatively long transport distances, heavy haul corridors are created to minimise transport costs. A new deep-water port in the Northern Cape Province for the import and export bulk cargo is intended to reduce transport costs, increase iron ore and manganese export capacity, whilst simultaneously boosting economic development in the region.

The aim of this section is to analyse all potential export/import commodities, as identified by PSP and Aurecon, that would benefit from the development of a new port in the Northern Cape. This will also provide a basis for the financial and economic assessments. The Northern Cape contributes 23% (or R66 billion) to South Africa's primary mineral exports (TM Consulting, 2014).

Major mining developments in the Northern Cape are presented in Figure 3-2.

Figure 3-2: Major Mining Developments in the Northern Cape

The only heavy haul rail line that passes through the Province is the iron ore line from Sishen to Saldanha Bay, or well-known as the OREX Line. This line is reaching capacity for the long term and will require major upgrading in order to provide additional capacity.

The major road and rail networks in the region are presented in Figure 3-3**.**

Figure 3-3: The Major Road and Rail Network in the Northern Cape

Currently the only port within the Northern Cape is Port Nolloth which mostly serves offshore mining vessels. The port in its current state is constrained and cannot support large vessel / cargo operations. Most Northern Cape commodities are exported through the ports of Saldanha Bay, Cape Town, Port Elizabeth and Durban.

3.7 Import / Export Commodity Analysis

The commodity analysis is based on desktop research and a literature review of relevant studies undertaken by PSP (2018) and Aurecon (2015). Commodities considered in the analysis can be grouped into two main categories namely mining and import/export goods consisting of agriculture, fuel and petroleum as well as general cargo. Each commodity considered for the port of Boegoebaai is detailed in the section below.

3.7.1 Iron Ore

The global demand for iron ore is strongly linked to the global steel industry and more specifically to the steel manufacturing output in China. South African reserves of iron ore amount to 930 Mt or 9% of the world reserves (Transnet, 2015). The ore is in high demand as a result of its high iron content (65%). The principal deposits are located in the Northern Cape, within the Karoo basin, from where export ore is transported 850 km via the Orex line, a purpose-built rail link to the Port of Saldanha Bay. The Port of Saldanha Bay, the primary dry bulk and liquid bulk port for commodities emanating from the Northern- and Western Cape currently handles dry bulk, liquid bulk and break bulk. The port handles approximately 70 Mtpa of which 86% is the export of iron ore.

There are currently two iron ore berths in the Port of Saldanha Bay. The current installed and theoretical berth capacity is approximately 60 Mtpa.

The development of the iron ore export capacity of the port is directly linked to the Ore Export Line which links the port to the Sishen mines. The current capacity of the ore line is >60 Mtpa with 58 Mtpa for export and 2 Mtpa for the domestic market. The ability to export iron ore is however constrained by the need to export manganese (2 to 4 Mtpa) and Zinc/Lead/Magnetite (0.25 to 0.5 Mpta) which has a negative impact on the mines and reduces potential foreign exchange earnings. It should be noted that based on the annual financial reports of Transnet in 2018, the price charged to iron ore exporters on the OREX line is around 20% of the potential rate that would be charged by equivalent road transport options, due mainly to efficiencies and heavy haul technology and thus, the ability to swing iron ore traffic to Boegoebaai from Saldanha is limited by this cost element. Using Transnet financial result of 2018, it seems that this highly economic rate does not apply to other commodities moving on the OREX line such as lead, manganese and zinc, with the rail and road rate being much closer to one another. This is important in terms of identifying what traffic would be more likely to find Boegoebaai and its supply chains more attractive.

Kumba has two mining operations in the Northern Cape consisting of Sishen Mine located near Kathu which has an estimated life of mine of 10 years with a production capacity of 37 Mtpa and mineral reserves of 535 Mt whilst Kolomela is located near Postmansburg with a 10 Mtpa production capacity, mineral reserves of 188 Mt and an estimated life of mine of 18 years.

The Assmang Iron Ore division consists of two iron ore mines, Khumani and Beeshoek Mine. Both mines are situated in the Northern Cape Province of South Africa, approximately 200 km west of the town of Kimberley. Khumani Iron Ore Mine is situated approximately 30 km south of the town of Kathu and has a production capacity of 13.5 Mtpa and mineral reserves of 555 Mt or 40 years. Beeshoek mine is situated approximately 65 km south of the Khumani mine near the town of Postmansburg and has a production capacity of 4 Mtpa and mineral reserve of 54 Mt or 13 years. Beeshoek is mainly responsible for supplying iron ore to meet the domestic market.

Iron ore from junior miners, creates a catalyst for development of junior miners currently constrained by high transport costs and exclusion from larger logistic solutions on the OREX line.

Saldanha Transnet Port Terminals (TPT) are constructing two additional discharge lines, for junior miners transporting iron ore, that can handle 53 wagons each and will be discharged with the excavator technology.

It was assumed by PSP Logistics (2018) that export iron ore produced by the juniors can contribute between 5 Mtpa and 15 Mtpa of additional export volumes from the Northern Cape for Boegoebaai. For the purposes of this analysis, this is more conservatively estimated at approximately 1 Mtpa of export iron ore. It is anticipated that this volume, although relatively low, would be loaded into dry bulk vessels through a ship loader at the dry bulk berth to provide additional capacity for junior miners. An alternative view is that by shifting current volumes of manganese, lead and zinc to Boegoebaai there is an opportunity to shift this iron ore volume on the more cost-effective OREX line to Saldanha. This alternative strategy would have the greatest economic benefit to the country as it optimises supply chain costs for mineral exports while freeing capacity on the Sishen – Saldanha export logistics chain.

3.7.2 Manganese

The Kalahari Basin in the Northern Cape contains the world's largest manganese reserves, however, only 15% of global production comes from this area, leaving significant scope for development. The demand for manganese is strongly tied to the demand for steel. Manganese is used in steel as an alloying agent to achieve specific metallurgical properties which, as a commodity, has no viable substitute. Demand for manganese ore is driven by the strong growth in carbon and stainless steel (China), and manganese alloy production in China, India and other Asian countries. Asia accounts for 76% of the global manganese demand.

South Africa currently accounts for about 74% of the world's identified manganese resources. These mostly occur near Hotazel in the Northern Cape Province. According to the United States Geological Survey (USGS), reserves were estimated at 15 billion tons in 2011. Currently, manganese is mainly exported via Port Elizabeth, Saldanha Bay and Durban.

Samancor Manganese, owned 60% by BHP Billiton and 40% by Anglo American, owns manganese mines, Wessels and Mamatwan, and associated prospecting rights in the Hotazel area in the Northern Cape. Mamatwan mine produces approximately 5 Mtpa with estimated reserves (exploited and discovered) of 433 Mt whilst Wessels mine produces approximately 2 Mtpa with estimated reserves of 190 Mt (exploited and discovered). Both mines transport their product via rail to the port of Port Elizabeth for export to markets in the east.

Assmang Manganese operates from the Black Rock area of the Kalahari, situated approximately 80 km north-west of the town of Kuruman and includes three underground mining complexes namely Gloria which produces medium grade ore and Nchwaning 2 and Nchwaning 3 which both produce high grade ore. Current mining operations produce approximately 3.2 Mtpa. In February 2014 the Black Rock Expansion Project was commissioned to increase the output of high-grade manganese ore products and will lead to an increased output of 4.8 Mtpa. The majority of the production is intended for export, but a portion is supplied for domestic use to two smelters: Cato Ridge Works in KwaZulu-Natal and Machadodorp in Mpumalanga.

Ore is transported by rail to Saldanha and Port Elizabeth and via road and rail to Durban for export; and to Kwazulu Natal for domestic use. Kudumane Manganese Resources is located in the Northern Cape Province, near Hotazel, situated 60 km northwest of Kuruman. They currently have mining rights on two farms namely York, which is currently operational and Telele where mining was estimated to start in 2018. York currently produces approximately 1 Mtpa and the predicted production from Telele will also be around 1 Mtpa. Both mines have an estimated life of mine of approximately 30 years. They currently transport their product via rail and road to Durban and via rail to Port Elizabeth harbours for export to markets in India, China, Russia and other countries.

As mentioned, currently, Transnet is utilising the Ports of Saldanha Bay, Durban and Port Elizabeth for its manganese export operations, with deferred plans to move or consolidate these operations to the Port of Ngqura in the short term (TNPA, 2019). The main bulk export of 6 Mtpa is shipped from Port Elizabeth. Port Elizabeth has a current theoretical and installed capacity of 6 Mtpa limited by the rail line capacity, from Hotazel, which is around 8 Mtpa. The Long term Planning Framework (2017) indicates that in 2025, the capacity requirements will need to meet a demand of 20.7 Mtpa.

In 2013/14, 65% of all manganese exports from South African ports (approximately 9 million tons) were handled by the Port of Port Elizabeth, 33% by the Port of Durban in open-top container trains, and the remainder by the Port of Saldanha Bay. The Port of Saldanha Bay commenced with the export of manganese through the multi-purpose terminal (MPT) in 2013 and will continue to do so until the manganese terminal in the Port of Ngqura is commissioned (TNPA, 2019). The Transnet Long term Planning Framework (LTPF) 2017 considers a demand of 3 Mtpa of manganese to be handled at the MPT berth at the Port of Saldanha Bay and 1.5 Mtpa for the Port of Durban.

The Port of Lüderitz in Namibia, which is a small harbour dependent on tourism, fishing and mining activities, is looking at alternative projects to expand its development potential. TradePort Namibia cc (TradePort), and Pektranam Logistics started transporting 30 000 t consignments of manganese monthly from South Africa to China via the Port of Lüderitz since 30 December 2018. However, divergent views have emerged out of the port town of Lüderitz on whether it was environmentally safe to use it as a transit for manganese ore. The Ministry of Environment and Tourism have issued TradePort with an environmental clearance certificate to undertake road and rail manganese import and export operations by utilising the Trans-Oranje Corridor, linking the Port of Lüderitz with the Northern Cape Province of South Africa. TransNamib transported the first shipment of Northern Cape manganese from Ariamsvlei to Lüderitz by rail on 01 August 2019. The 26 t x 20 wagon train departed Ariamsvlei pulled by two multiple locomotives arriving at the Port of Lüderitz on 03 August 2019 (Railways Africa, 2019). The intention is to ramp up the monthly 30 000 t consignments to 80 000 t (i.e. approximately 1 Mtpa) consignments (TC, 2019).

As part of Transnet's manganese expansion programme, Transnet has been able to increase the national manganese capacity from 5 Mtpa in 2012 to just over 13 Mtpa currently. Through its capacity creation initiatives, the new projects which have come on line, include minor manganese exports through the Port of Richards Bay and the Port of Cape Town, thus creating bridging capacity. United Manganese of Kalahari (UMK) is amongst manganese players who have been instrumental in piloting new export channels that Transnet has successfully operationalised.

Boegoebaai and the country could benefit from consolidating all minor flows, including all the off-route manganese such as the 3 Mtpa of manganese flows to Saldanha on the OREX rail line, the 1.5 Mtpa manganese flows by road and rail to Durban and the 1 Mtpa originating from the Northern Cape and presently destined for the Port of Lüderitz. As stated, the surface transport pricing of manganese to these ports is of such a nature as to make Boegoebaai a more competitive alternative and thus allowing for manganese to be diverted through Boegoebaai.

According to Transnet's LTPF, by the year 2050, the total demand for manganese is projected to be 34 Mtpa. It is projected that Boegoebaai would have reached export capacity at 9 Mtpa by then. The balance would be routed via Port Elizabeth that is planned to be extended by 2032.

3.7.3 Cement and Lime

The only cement plant in the Northern Cape is Afrisam, located at Ulco, and its output has been growing due to the ever-increasing demand for cement in South Africa and neighbouring countries such as Lesotho and Namibia.

The output of the Ulco plant produces nearly 1 million tons of cement a year but the Northern Cape only consumes some 150,000 tons of cement a year. Of the balance nearly 400,000 tons per annum is thought to be exported and the balance sent to other parts of South Africa, though mainly in the Free State and Eastern Cape (Aurecon, 2015).

This export is assumed to be inland and not via Cape Town as the Transnet LTPF 2017 considers a demand for import only (of approximately 0.3 Mtpa) and no export cement via any of the ports in the South African port system is evident. Coastal shipping of the identified 0.6 Mtpa of cement could be considered for the Port of Boegoebaai, in the short term, but will not be further considered as part of this analysis.

3.7.4 Zinc, Lead and Sulphuric Acid

The Northern Cape supplies 13% of the country's zinc and lead exports but as with manganese and iron ore, both zinc and lead are transported out of the province. Lead and zinc from the Northern Cape Province are primarily exported through the Port of Saldanha Bay (Aurecon, 2015).

The Vedanta Group comprises three mines namely Black Mountain Mine, the Gamsberg Project and Skorpion Zinc Mine. Black Mountain Mine and the Gamsberg Project are both located in the Northern Cape whilst Skorpion Zinc Mine is located near the southern town of Rosh Pinah in Namibia, approximately 120 km from Boegoebaai. Lead and zinc from Gamsberg and Skorpion mines should benefit immediately from a shorter logistics chain and could potentially be the first minerals to use the port facility at Boegoebaai by 2025.

The Gamsberg ore contains sulphur which allows the production of sulphuric acid as a by-product. Stakeholder consultation indicated that 0.25 Mtpa of lead or zinc and 0.35 Mtpa of sulphuric acid will be available for export via the port of Boegoebaai. The distance between the mine and the Port of Boegoebaai will be significantly less than the distance between the mine and the Port of Saldanha Bay or Walvis Bay which will result in reduced cost and greater profit to the mine (Vedanta, 2019). It is envisaged that Phase 2 of the Gamsberg Project considers zinc concentrate export of 0.45 Mtpa and 0.6 Mtpa by 2025. South Africa exports sulphuric acid mainly to the Democratic Republic of Congo (65%), Zimbabwe (17%) and Zambia (14%) (OEC, 2017) and for downstream industry use (Vedanta, 2019) and will therefore not be considered further in this analysis.

Zinc and lead are currently exported by road and rail via the OREX line using an intermodal solution. Diverting this traffic to Boegoebaai will release additional capacity for the export of iron ore through Saldanha Bay.

3.7.5 Magnetite

Black Mountain Mining, a subsidiary of Vedanta Resources, officially opened the Swartberg Mine related to the Magnetite Project in 2014. The Swartberg Mine is developed as an open pit operation that will evolve into an underground operation. It is expected to produce 300,000 t of ore per annum and production will ramp up to 2.4 Mtpa when it reaches full underground capacity after six years which will extend the life of mine at Black Mountain by 15 years (Aurecon, 2015). It is noteworthy to mention that the latter volume was not verified by Vedanta (2019). It is therefore assumed that only

0.3 Mtpa of Magnetite will be available for export from the Port of Boegoebaai following a similar transport solution as for the Zinc/Lead exports.

3.7.6 Ilmenite (Titanium Ore)

The Tronox Namakwa Sands Mine is the only remaining ilmenite mine and is situated at Brand-se-Baai, 385 km north of Cape Town in the Northern Cape Province. The ore is mined and processed at primary concentration plants to produce a mineral concentrate. It undergoes further processing at the secondary concentration plant to yield a magnetic and non-magnetic stream. These concentrates are then put through a mineral separation plant at Koekenaap where the minerals in the streams are separated to produce zircon, rutile and ilmenite. The mine has a reported production rate of 550,000 tonnes per annum, all of which is exported through the Port of Saldanha Bay where there is also a processing plant and a rail system in place (Aurecon, 2015).

Boegoebaai could serve as an alternative to the Port of Saldanha Bay which will lead to reduced transport costs. The Transnet Long Term Planning Framework (LTPF) 2017 considers a demand of 0.06 Mtpa of zircon and rutile, and 0.3 Mtpa of ilmenite, to be handled at the Multi-Purpose Terminal (MPT) berth at the Port of Saldanha Bay.

Based on stakeholder engagement with Vast Mineral Sands (VMS), it is estimated that 100,000 tonnes would be available for export through Boegoebaai from VMS in year one increasing to 0.25 Mtpa in year two, and then increasing to 0.5 Mtpa thereafter. This is new demand arising from the reworking of Alexkor tailings. This would also have the effect of freeing capacity through Saldanha port allowing more junior iron ore miners to utilise the highly cost-effective OREX solution.

3.7.7 Bulk Fuels

South Africa is a majority importer of fuel and petroleum products with the three biggest receiving ports being Durban, Richards Bay and Cape Town. Currently, 3.47 Mtpa fuel and petroleum products are being imported through the Western Cape Province for use in both the Western Cape and Northern Cape (Aurecon, 2015).

As a result of Boegoebaai's location in relation to the mines, a large portion of the volume for the Northern Cape could be considered to be processed through a liquid bulk terminal established at the Port of Boegoebaai. There is thus a strong case for inward transportation of bulk fuels (tanktainers and conventional road tankers) to economic clusters in Upington, Sishen, Postmasburg, Hotazel and Kuruman depending on a favourable Boegoebaai diesel price (compared to other existing ports).

The Northern Cape Province will use an estimated 70% of the diesel due to the large mining industry within the region. Diesel volumes for the long term are taken as 1.3 Mtpa, with the remaining diesel volumes and petrol imports assumed to be continuing via road tankers. It is assumed that the diesel imports will be via liquid bulk vessels (i.e. tankers) in 50,000 tonnes parcel sizes, i.e. 26 vessel calls per annum.

The above assumption is based on the reduced travel distance from a dedicated importing bulk fuel terminal at the Port of Boegoebaai to the consumer resulting in a lower transport / logistics cost for the commodity.

3.7.8 Agricultural Products

The Orange River is the most important geographical feature of the Northern Cape – providing irrigation to support a thriving grape, sultana and wine industry. The agricultural complex in and around Upington requires refrigerated container transport (i.e. reefer containers) for the export of fresh produce. Produce ranges from grapes, lucerne, cotton, wheat, corn, carrots, potatoes, ground nuts and soya beans. Presently the dominant export terminal is in Cape Town, 837 km by road and approximately 1,300 km by rail.

The road and rail distance to Boegoebaai is only 600 km. Boegoebaai could be established as a fresh produce container terminal. Aurecon (2015) assigned 1.5 Mtpa of agriculture exports to Boegoebaai depending on the condition of a rail link or associated road infrastructure. Currently most of these commodities are exported to markets in other provinces and as a result valuable revenue is lost for the province. In the short term, only farmers located close to the port will make use of it, i.e. approximately 0.15 Mtpa (Aurecon, 2015). Based on a nominal TEU container weight of 14 tonnes per TEU, 150,000 tonnes will equate to approximately 10,715 TEU per annum. In the long term, once all port and rail infrastructure has been established, this opportunity may be expected to grow.

3.7.9 Salt

Saltcor is one of South Africa's largest privately-owned salt producers with establishments in the Brandvlei and Upington regions and produces over 140,000 tons of product per annum. Approximately 28,000 tonnes is exported via the Port of Walvis Bay and the balance is transported for domestic use by rail to various destinations in South Africa (Aurecon, 2015). The towns of Upington and Brandvlei in the Northern Cape are situated in a geographic region where climatic conditions for producing salt are ideal. The underground saline water supply in this region yields salt of exceptionally high quality.

Indications are that the production of salt in the Northern Cape province is currently greater than the capacity allocated to it for export. With on-going port expansion projects in the Port of Walvis Bay, there may be export capacity opportunities.

Boegoebaai could serve as an alternative for the 28,000 tonnes of salt export in containers, as it is geographically better located to Saltcor which will lead to reduced transport costs. Based on a nominal TEU container weight of 14 tonnes per TEU, 28,000 tonnes will equate to 2,000 TEU per annum.

3.7.10 General Cargo

Aurecon (2015) assigns 0.75 Mtpa up to 1.6 Mtpa of general cargo to Boegoebaai on grounds that 30% of anticipated cargo flows could be redirected.

With continued growth in the container market, information obtained from the LTPF 2017 indicates a significant growth of containerised transportation in the near term. Boegoebaai's location in relation to the mines in the Northern Cape and specifically the offshore diamond mining industry, makes it an obvious choice for the import of equipment and project related cargoes. In the short

term, 0.75 Mtpa of general cargo (Aurecon, 2015) in the form of containers (i.e. approximately 54,000 TEU per annum) is considered. In the long term, once all port and rail infrastructure has been established, this opportunity is expected to grow.

3.7.11 Potential New Commodities

Other Northern Cape resources include copper, gypsum, granite, fluorspar and semi-precious stones (Sugilite) as well as marble. The Northern Cape has the potential for a mining boom in new-tech minerals: zinc, nickel, lead, copper and cobalt. These are key elements in the manufacturing of smartphones, electric vehicles and renewable power systems.

Orion Minerals is developing a flagship zinc copper project at Copperton, an Anglovaal mine that produced 1 Mt of zinc and 430,000 tons of copper before it closed in 1991. Historically, the concentrates were sent to either O'kiep or Zincor for smelting or Saldanha Bay for export. The R4 billion project will be established on Copperton's footprint and tap into one of the world's most significant volcanogenic massive sulphide deposits, a rich source of metals including copper, lead, and zinc.

Orion Minerals have just completed a bankable feasibility study on a modern 2.4 Mtpa underground and open pit mining operation in Prieska for export. The 10-year 'Foundation Phase' delivering payable metal production of 189,000 tonnes of Copper (USD $ 6,834/t) and 580,000 tonnes of Zinc (USD $ 2,756/t) in differentiated concentrates (Orion Minerals, 2019). Orion Minerals would like to be in a position to commence construction by late 2019 or early 2020.

3.7.12 Other Port Users

Port Nolloth comprises a shallow water harbour that can only accommodate vessels with a draught of up to 4 meters. This accommodates fishing vessels with a length of up to 22 meters and a maximum capacity of approximately 1,000 DWT. The port primarily accommodates small mining vessels (approximately 13) operated by subcontractors to Alexkor Mining.

The port has a slipway for small boat repair and launching area which has been in a state of disrepair for many years. Although a R39 million infrastructure rehabilitation project was completed in 2017 to the quay, fender system and revetment (Engineering News, 2017), the port remains draft restricted and only able to service small vessels with limited berths. It is envisaged that Boegoebaai would be able to more suitably provide services to vessels engaged in fishing as well as offshore diamond mining activities along the west coast of South Africa. In addition to this, Boegoebaai could also exploit the emerging opportunities in the offshore oil and gas industry offering less draft restriction than current experienced in Port Nolloth.

South Africa's maritime border extends from the Orange River (approximately 17 km from Boegoebaai) in the West to Punta do Ouro in the East – a coastline of about 3,000 km along which its marine resources are spread. Boegoebaai strategically provides a port from which the SA Navy could efficiently carry out its main activities. This includes application of maritime presence in maritime trade and defensive operations to protect own forces, territory, marine resources and maritime trade.

In summary, the Richtersveld Municipality, which is the municipality where Alexander Bay/the port will be located, describes the key challenges, in its Integrated Development Plan (IDP), within the following spheres:

- Economic;
- Spatial and housing;
- Infrastructural; and
- Socio-economic.

Meaningful interventions under the spheres listed above are intended to create job opportunities and to encourage economic growth and development within the Northern Cape. According to the IDP, these objectives would be achieved by growing the following industries within the Northern Cape:

- Mining and mineral processing;
- Agriculture and Agri-processing; and
- Renewable energy.

The development of port infrastructure within the Richtersveld Municipality would support the above industries by lowering production and transportation costs.

In addition, the development of port infrastructure would align with the New Growth Plan which places emphasis on efficient transport systems. It is well known that the transport sector plays a key role within the growing economies of provinces, countries and regional networks. An efficient transport system therefore encourages industry development, job creation and spatial/housing patterns through the movement of freight and services. Based on this reasoning, a proposed port development within the Northern Cape would need to align with the following IDP development guidelines:

- Support the proposed renewable energy developments;
- Take advantage of the close proximity to the R382 which is near the N7;
- Optimise opportunities presented by the Richtersveld corridor development; and
- Attract economic and investment opportunities to the urban areas.

3.8 Commodity Demand

For the first development phase of Boegoebaai, it has been assumed that the Northern Cape mining region will serve as the hinterland. In addition, because of the relatively small nature of the port, it has been assumed that a dedicated rail link will not be financially feasible (PRDW, 2015) at this point in time. Hence all the landside logistics will be based on the use of road vehicles for the Phase 1A development. This benefit is likely to lead to re-routing of some commodities from the distant ports of Saldanha, Cape Town, Durban and Port Elizabeth. The motivation for allocating commodities to the new port at Boegoebaai are firstly to reduce the overall transport costs and secondly to increase the capacity of the Northern Cape Province to export iron ore and manganese.

As a result of the commodities described above and for the purposes of this business case, an analysis of all potential export / import commodities that could benefit from the development of a new port in the Northern Cape was done.

Two commodity demand scenarios were considered namely a conservative low case scenario and a long-term high case scenario. From these two scenarios a realistic base case commodity demand was selected for the project evaluation. A more detailed explanation of these scenarios is detailed below.

3.8.1 Low Case Commodity Demand: Boegoebaai

The low case commodity demand only assumes that manganese volumes currently moving through the Port of Durban and Saldanha Bay will be rerouted to Boegoebaai to reduce transport costs and create capacity on the OREX line respectively. For the remaining commodities, the most conservative view has been considered in each case. Additionally, the low case considers that in the future 30-year horizon (i.e. 2050) a rail link will not be financially feasible. The low case commodity demand for Boegoebaai in 2019, 2025 and 2050 is presented below.

Table 3-1: Low Case Commodity Demand - Boegoebaai

Cargo Type - Commodity	Volume (Mtpa) 2019	Volume (Mtpa) 2025	Volume (Mtpa) 2050
Dry bulk – Iron Ore	1.0	1.13	1.85
Dry bulk – Manganese	4.5	4.5	4.5
Break bulk – Lead/Zinc	0.25	0.60	0.60
Break bulk – Magnetite	0.3	0.3	0.3
Break bulk – Ilmenite	0.1	0.25	0.50
Liquid bulk – Diesel Oil	1.3	1.38	1.77
Containers – Agricultural Products	0.15	0.16	0.20
Containers – Salt	0.03	0.03	0.03
Containers – General Cargo	0.75	0.80	1.02
Total Demand	**8.38**	**9.15**	**10.77**

The low case demand presented in Table 3-1 shows the current demand in 2019 and the demand for the proposed port commissioning date assumed for the study (i.e. 2025). The low case commodity demand split for 2050 is presented in Figure 3-4.

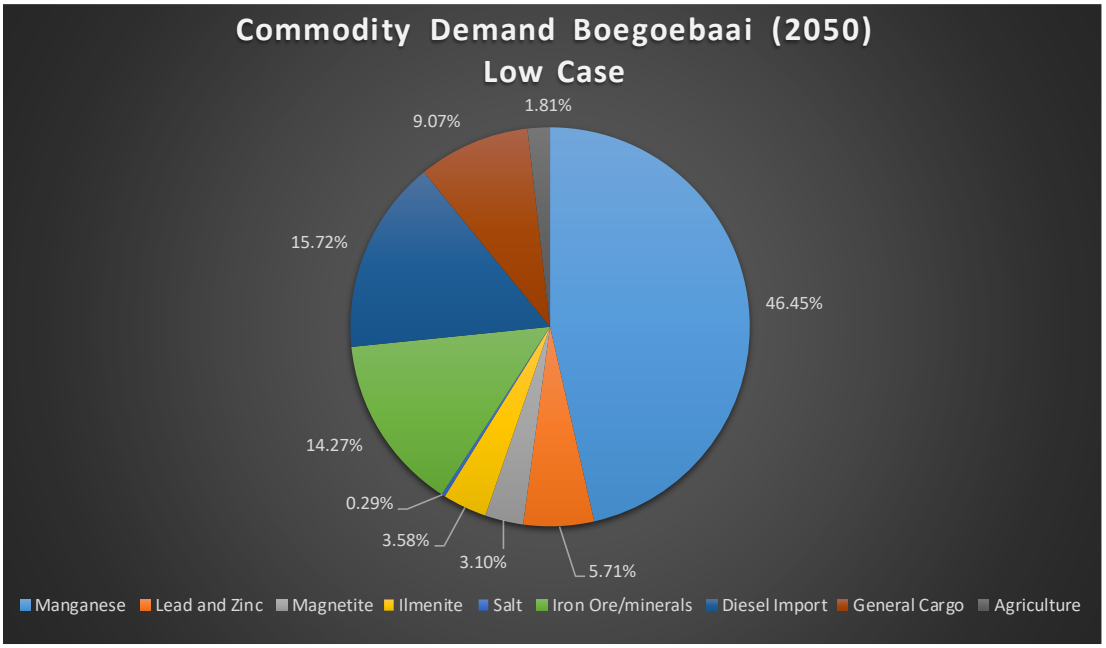


Figure 3-4: Boegoebaai Low Case Commodity Demand Split (2050)

The low case cargo type split for Boegoebaai for 2050 is presented in Figure 3-5. The cargo type split considers the demand for 2050 in terms of containers, breakbulk/MPT, dry bulk, minor bulk and liquid bulk. As illustrated below, it is envisaged that the Port of Boegoebaai will predominantly be a dry bulk commodity port.

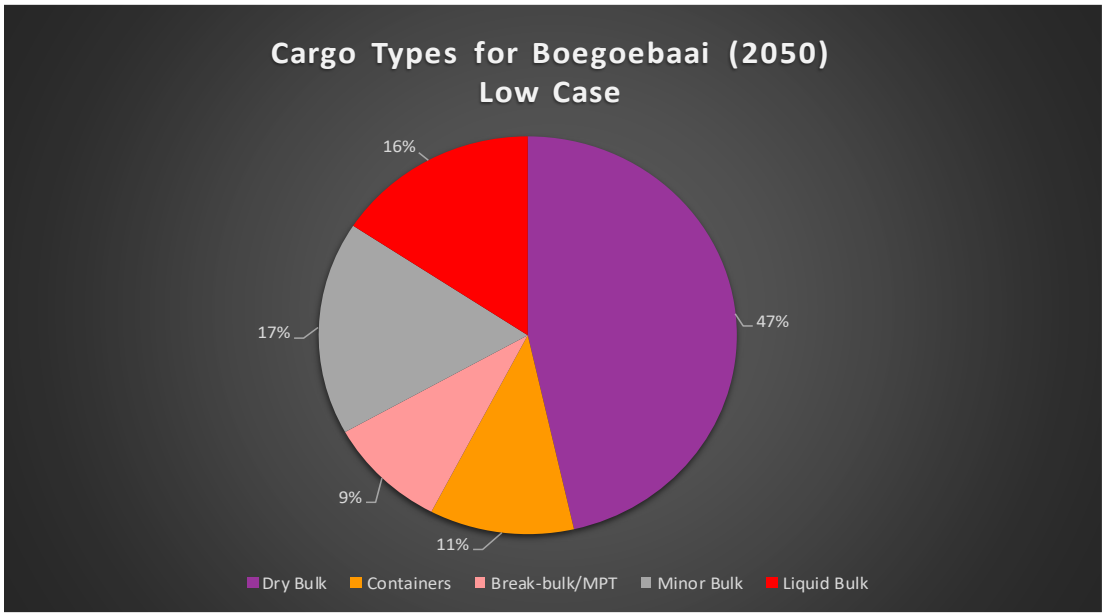


Figure 3-5: Boegoebaai Low Case Cargo Type Split (2050)

3.8.2 High Case Commodity Demand: Boegoebaai

The high case commodity demand assumes manganese volumes currently moving through the Ports of Durban, Saldanha Bay, Richards Bay, Cape Town and the Port of Lüderitz. Additionally, it includes the LTPF capacity gap in the port of Port Elizabeth to be rerouted to Boegoebaai in the long term.

For the remaining commodities, a less conservative view has been considered in each case. The high case commodity demand for Boegoebaai is presented below.

Table 3-2: High Case Commodity Demand - Boegoebaai

Cargo Type - Commodity	Volume (Mtpa) 2019	Volume (Mtpa) 2025	Volume (Mtpa) 2050
Dry bulk – Iron Ore	1.0	1.13	1.85
Dry bulk – Manganese	6.5	8.5	16.5
Break bulk – Lead/Zinc	0.7	0.7	0.7
Break bulk – Magnetite	0.3	0.3	0.3
Break bulk – Ilmenite	0.1	0.25	0.50
Liquid bulk – Diesel Oil	1.3	1.38	1.77
Containers – Agricultural Products	0.15	0.27	2.88
Containers – Salt	0.03	0.03	0.03
Containers – General Cargo	0.75	0.95	2.53
Total Demand	**10.83**	**13.51**	**27.1**

The high case demand presented in Table 3-2 shows the current demand in 2019 and the demand for the proposed port commissioning date assumed for the study (i.e. 2025). Additionally, the high case considers that a rail link may be financially feasible in the future (2050). This would potentially allow the rerouting of all the manganese exports via rail through Boegoebaai instead of Port Elizabeth in the future (2050). The high case commodity demand split for Boegoebaai is presented below.

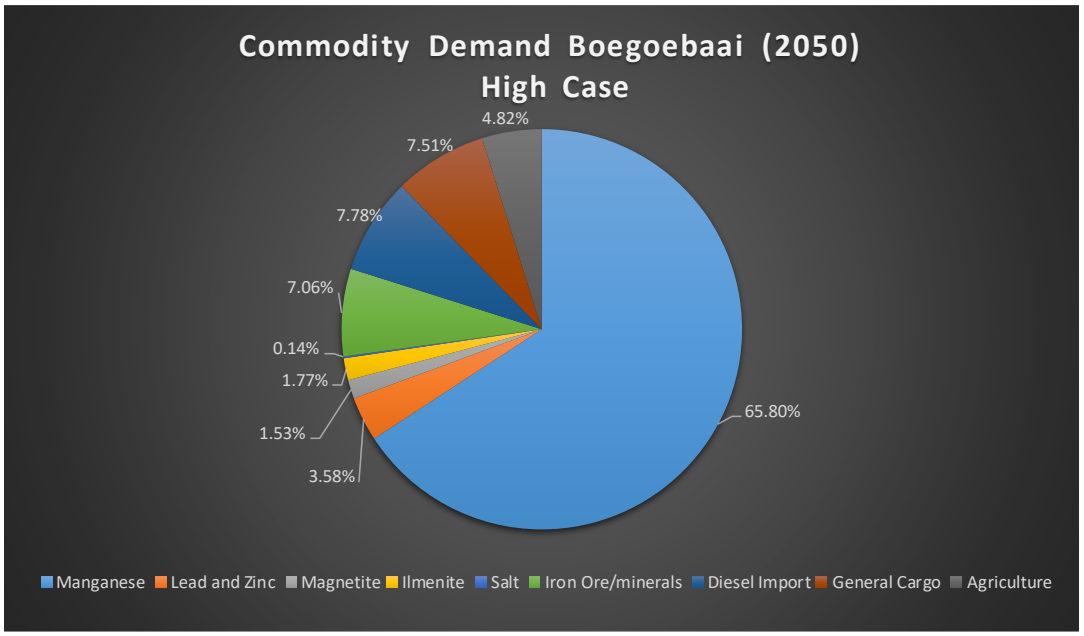


Figure 3-6: Boegoebaai High Case Commodity Demand Split (2050)

The high case cargo type split for Boegoebaai for 2050 is presented in Figure 3-7. The cargo type split considers the demand for 2050 in terms of containers, breakbulk/MPT, dry bulk, minor bulk and liquid bulk for the Port of Boegoebaai. As illustrated below, the Port of Boegoebaai will

predominantly be a dry bulk and minor bulk commodity port with only 12% of the cargo demand likely to utilise containers.

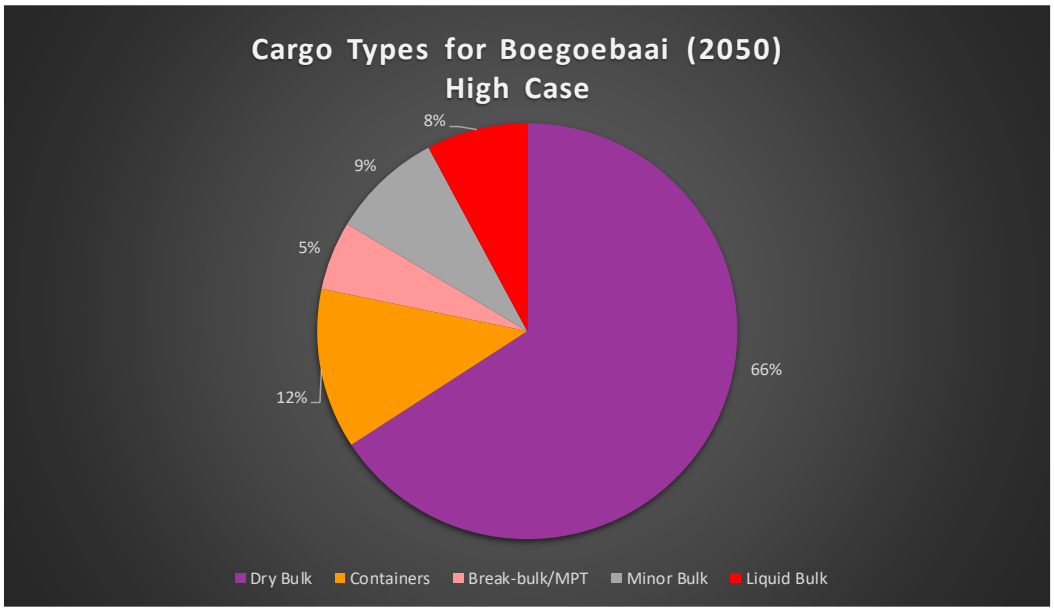


Figure 3-7: Boegoebaai High Case Cargo Type Split (2050)

3.8.3 Base Case Commodity Demand: Boegoebaai

When analysing the different scenarios, the advisors looked not only at demand patterns but also the influence of logistics on the utilisation of the port. For this reason, the following commodities were chosen as most likely anchor commodities for the port:

- The base case commodity demand, used in the project evaluation, assumes that manganese volumes currently moving through the Port of Durban, Saldanha Bay and Lüderitz will be rerouted to Boegoebaai due to similar overall export logistics costs and the ability to create capacity on the OREX line respectively. Additionally, it includes the LTPF capacity gaps in the port of Port Elizabeth to be rerouted to Boegoebaai in the longer term up to a maximum of 9 Mtpa due to port capacity. Thus, no current Port Elizabeth volume would re-route via Boegoebaai;
- In terms of iron ore, the view is that potential volumes would rather fill the gap caused by freeing rail/port capacity on the OREX and Saldanha networks and due to the very low rate applied to railing iron ore on OREX, no iron ore would move through Boegoebaai;
- Other minerals such as zinc, lead, Ilmenite and magnetite would route through the lowest cost solution via Boegoebaai due to distance advantages as well as the ability to not have to go through inland terminals;
- Diesel volumes are linked to general economic activities and are set at a similar level to that of the two scenarios; and
- For the remaining commodities, a less conservative view has been considered in each case although the agricultural and general cargo numbers have also been capped due to port capacity. Additional capital expenditure would be required to increase the port capacity to accommodate the high case commodity demand.

The base case commodity demand for Boegoebaai is presented below.

Table 3-3: Base Case Commodity Demand - Boegoebaai

Cargo Type - Commodity	Volume (Mtpa) 2019	Volume (Mtpa) 2025	Volume (Mtpa) 2050
Dry bulk – Iron Ore	0	0	0
Dry bulk – Manganese	4.5	6.0	9.0
Break bulk – Lead/Zinc	0.7	0.7	0.7
Break bulk – Magnetite	0.3	0.3	0.3
Break bulk – Ilmenite	0.1	0.1	0.50
Liquid bulk – Diesel Oil	1.3	1.37	1.70
Containers – Agricultural Products	0.15	0.21	0.42
Containers – Salt	0.03	0.03	0.03
Containers – General Cargo	0.75	0.90	1.28
Total Demand	**7.83**	**9.61**	**13.93**

The base case demand presented in Table 3-3 shows the current demand in 2019 and the demand for the proposed port commissioning date assumed for the study (i.e. 2025). The base case does not consider the installation of a rail link during the investment period. Initial studies have indicated that the existing road infrastructure can accommodate the projected volume capacity as presented in the base case. The base case commodity demand split for Boegoebaai is presented below.

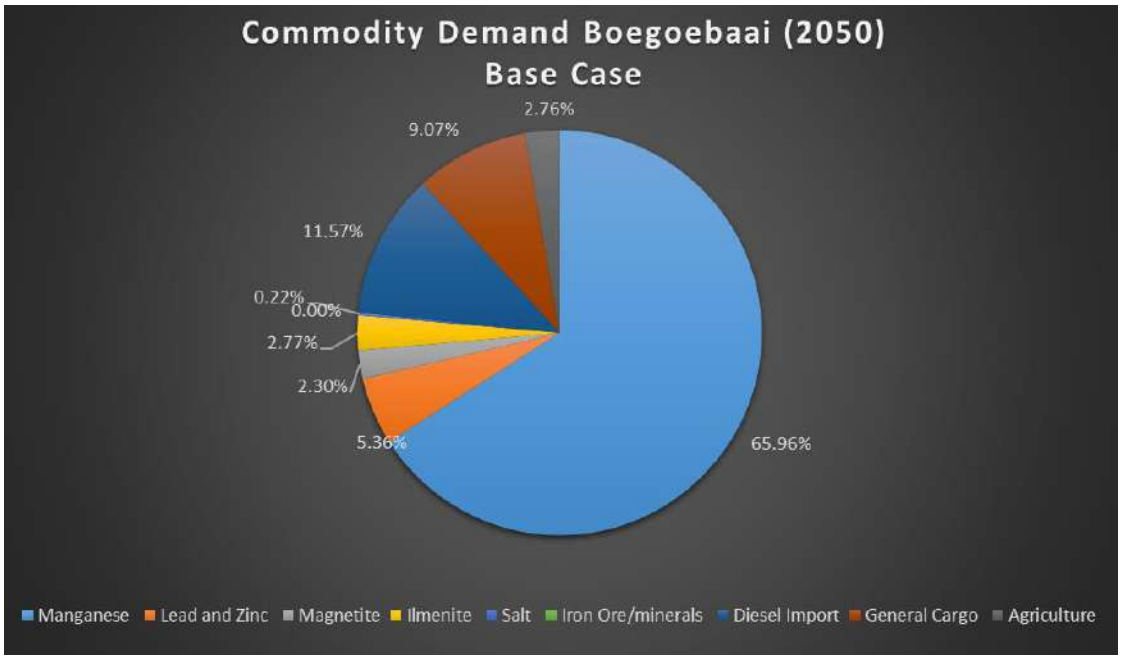


Figure 3-8 Boegoebaai Base Case Commodity Demand Split (2050)

The base case cargo type split for Boegoebaai for 2050 is presented in Figure 3-9. The cargo type split considers the demand for 2050 in terms of containers, breakbulk/MPT, dry bulk, minor bulk and liquid bulk for the Port of Boegoebaai with the limitations as imposed due to port capacity. As illustrated below, for the base case, the Port of Boegoebaai will predominantly be a dry bulk port

with about 12% of the cargo demand likely to utilise containers and 12% consisting of liquid bulk. About 10% of the cargo will consist of minor bulk and break bulk.

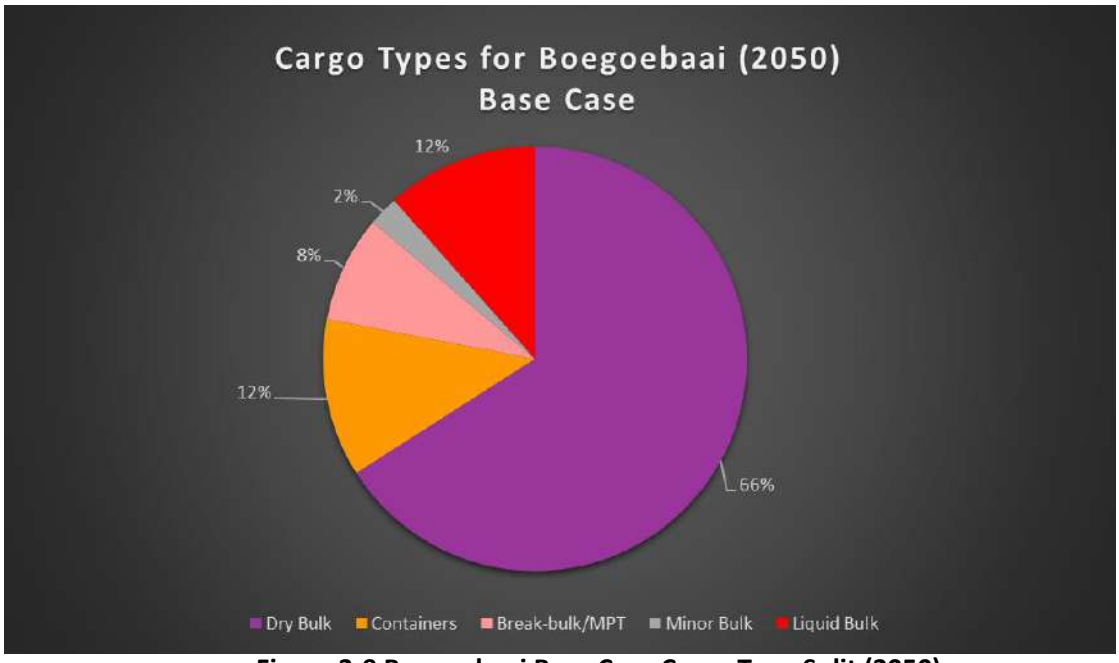


Figure 3-9 Boegoebaai Base Case Cargo Type Split (2050)

The base case market volume commodity mix was fed into the financial and economic models as the most likely scenario considering the general market needs as well as transport economics principles.

OPTIONS **ANALYSIS**

4. Option Analysis

4.1 Purpose of the Analysis

The aim of this options analysis is to evaluate potential port options that would allow the development of the Northern Cape and unlock the potential of this region. This section represents the Technical Options Analysis for the Boegoebaai Port project. The analysis is fully aligned with guidelines of the PPP Manual of National Treasury and forms the second part (after the Needs Analysis) of the PPP Feasibility study for this project. The purpose of this is as follows:

- Identify the possibly technical solution options for the anchor commodities identified in the commodity mix analysis that will satisfy the basic requirements in terms of space and equipment requirements.
- Evaluate each of the technical options in terms of the evaluation criteria proposed by the PPP guidelines
- Conclude on the preferred technical solution option

4.2 Port Logistics Solution Options

The possible port logistics solution options based on the commodity demand profile of the Northern Cape include the following type of ports that would need to be developed:

- Bulk Mineral Port.
- Container focused Port.
- Port serving the offshore oil and gas industry.
- Fishing Port.
- General Purpose Port being able to handle mainly bulk minerals, containers and some breakbulk cargo.

It is clear from the particular situation and requirements of the Northern Cape, a new port would need to handle a broad configuration of cargoes including export minerals, agricultural cargoes in containers, general cargo and fuel imports. There are significant benefits to be realised from port flexibility and ability to handle a wide range of cargoes and thus the port would aim to become a general-purpose port with a number of different terminals. As fishing ports are already available up and down the Northern Cape coast any new development would have less economic value to the region. Finally, the development of a dedicated port focused solely on the Oil and Gas sector would not have a broad enough revenue base to cover the full capital cost.

This very brief qualitative assessment suggests that the best practical port logistics solution should be the development of a General-Purpose port able to handle mainly bulk minerals, containers and some breakbulk cargo on the Northern cape coast.

4.3 Multi Criteria Decision Analysis

The Northern Cape does not currently have any similar port facilities and the different port logistics solution options were detailed above. It is clear that the best practical solution should be the

development of a general-purpose port and associated terminals focussed on supporting the trade supply chain flows of Northern Cape traffic. However, in order to proceed with the suggested analysis framework according to the PPP Guidelines, it is important to select the most suitable supply chains and ports to handle the needs of Northern Cape trade flows. It was found in the literature review that previous studies investigated different locations for the definition of supply chains and associated ports to move trade, the options included existing Ports in the surrounding areas of the province and a greenfield site. The possible locations are best provided below:

- Option 1: Port Nolloth – Brownfield Development
- Option 2: Boegoebaai – Greenfield Development
- Option 3: 'Do Nothing' Option
- Option 4: Port of Saldanha Bay
- Options 5: Port of Ngqura
- Option 6: Port of Durban
- Option 7: Namibian Ports (Lüderitz and Walvis Bay).

4.4 High-Level Assessment of Options

This section provides a high-level assessment of the potential development options. The high-level assessment includes a qualitative description of each option.

4.4.1 Option 1: Port Nolloth: Brownfield Development

Port Nolloth is located along the west coast 550 km north of the Port of Saldanha. Currently, Port Nolloth provides the only port facilities over a 700 km length of coastline from Lamberts Bay in the south, to Lüderitz in Namibia in the north. Although Port Nolloth is ideally located to service the Northern Cape, the port facilities are significantly constrained. The port limits comprise a 3,060 hectares of maritime and 1.6 hectares land area extent.

A brownfield port expansion of Port Nolloth could provide the development potential required while servicing the transport needs of the Northern Cape, surrounding provinces and neighbouring countries such as Namibia, Botswana and the rest of Africa.

The port comprises a shallow water harbour that can only accommodate vessels with a draught of up to 4 m which accommodates fishing vessels with a length of up to 22 m and a maximum capacity of approximately 1,000 DWT. The facilities comprise a 67 m long L-shaped jetty protected by shoal (i.e. Robbe Island). The port primarily accommodates small mining vessels (approximately 13) operated by subcontractors to Alexkor and DebMarine. The port has a slipway for small boat repair and launching.

The following opportunities exist for a potential port development in Port Nolloth:

- Port Nolloth has good existing road connections (capacity not confirmed);
- Port Nolloth has existing services and utilities such as water, electricity and sewerage connections (capacity not confirmed);

- Local labour is immediately available; and
- The port is the closest port to the mineral mines in the Northern Cape, currently utilising the Port of Saldanha as an export port.

The PMU (2013) investigated the design constraints of a proposed upgrade of Port Nolloth. It was established that the development would be technically challenging based on the following issues:

- A breakwater south of the current jetty would interrupt the natural littoral drift necessary for maintaining the beach at Mc Dougalls Bay;
- Dry bulk stockpiles south of the town of Port Nolloth would be environmentally unacceptable due to strong winds, restricting future development;
- Port development is constrained behind Robbe Island offering the only protection to the port;
- The absence of a breakwater results in the port being exposed to strong currents and swells during winter months, with access to the harbour severely limited;
- The port has been constructed on a rocky reef where the -10 m CD contour is only reached approximately 1,000 m from the shoreline. Shallow nearshore bathymetry implies moving relatively far offshore to provide the required mooring depth for modern cargo handling vessels;
- Rocky seabed which makes the capital dredging required by port expansion capital intensive;
- Offshore wave climate varies between and H_s of 6.5 m and 8.5 m;
- A breakwater will be required to provide necessary protection against wave action if larger vessels are to be considered;
- No rail access to the port. Rail access to the hinterland will be an important requirement to ensure relatively low transport costs for large volume bulk cargo;
- No existing marine services (i.e. tugs, pilots) available in the port; and
- Town development has left minimal land available for port development.

4.4.2 Option 2: Boegoebaai: Greenfield Development

The Boegoebaai site is located 20 km south of the border between South Africa and Namibia, and 60 km north of Port Nolloth.

The site is characterised by a rounded headland on a barren rocky coastline. A small natural bay, Humewood Harbour, is situated on the southern side of the headland. Offshore, the seafloor drops off steeply from the coastline to relatively deep water making this site unique in this region for the development of a deep-water port. In addition to this advantage, no human settlement developments exist near Boegoebaai, meaning future expansion would be less restricted.

Boegoebaai possesses many attributes that would be suitable for a deep-water port, key of which include (PMU, 2013):

- The site is unique along the South African coastline as the seafloor drops off steeply from the coastline to relatively deep water making this site ideal for the development of a deep-water port;

- A feature of the site is the short distance between the coastline and relatively deep water (−15 m MSL). This presents an opportunity to reduce initial capital cost by limiting the length of the primary marine structures, i.e. breakwater and access trestle;
- Access to naturally deep water within 250m from the coastline limits the need for any capital dredging into rock;
- Partial wave energy reduction due to the offshore reefs north and south of the site;
- Stable shorelines both south and north of the proposed site which will not be disturbed or interrupt and littoral processes as a result of the harbour development.
- Excellent foundation conditions for marine structures; and
- Rock source nearby for breakwater construction to limit capital costs.

The following constraints exist for a potential greenfield port development in Boegoebaai:

- Presently no direct rail access; and
- No existing provision of bulk services. Currently there is no potable water, power or sewage facilities provided to the site. A more detailed study will need to be undertaken to identify the most suitable options for provision of these services.

Boegoebaai has been identified as a potential site for a deep-water port and can meet the requirements as detailed in the IDP to enable both social and economic development to the region.

4.4.3 Option 3: 'Do Nothing' Option

The 'Do-Nothing' approach considers the status quo continuing into the future with competing ports such as Saldanha Bay, Ngqura, Durban, Cape Town and Lüderitz/Walvis Bay in Namibia providing the required capacity to meet the demand. The 'Do-Nothing' approach will be the least capital-intensive option in the short term but may not fully unlock the development potential of the region or the province.

4.4.4 Option 4: Port of Saldanha Bay

The Port of Saldanha Bay is South Africa's deepest draft port at -23 m CD, handling around 67 million tonnes of cargo per year, with the 30-year forecast predicting around 108 million tonnes of cargo per year. The iron ore export jetty provides berthing for two Very Large Bulk Carriers, as well as one liquid bulk berth for Very Large Crude Carriers for the import of crude oil. The port also contains iron ore stockpiles on reclaimed land, a multi-purpose terminal with four berths, and ship repair facilities for offshore rig servicing and fabrication.

The port was initially conceived as an iron ore export facility in order to exploit the discovery of high-grade ore at Sishen in the Northern Cape, 860 km to the north east of Saldanha Bay. The port is currently developing an offshore supply base and an oil and gas Industrial Development Zone which is in line with South Africa's oil and gas resources and future gas to power energy requirements. The expansion of bulk export commodities (iron ore and manganese) from Saldanha Bay is constrained by environmental permitting approvals which is expected to prevent increasing capacity.

In the long term, a port within the Northern Cape would be able to supplement iron and manganese ore capacity from Saldanha. This would be achieved when the port or the Sishen rail line reaches capacity where any additional throughput could be routed through a Northern Cape port. Northern Cape break bulk commodities are currently exported to Saldanha by rail or road haulage. This method would be 57% more expensive compared to exporting through a Northern Cape Port (PMU, 2013).

4.4.5 Option 5: Port of Ngqura

The Port of Ngqura is sited in Algoa Bay, some 20 km north of Port Elizabeth and 980 km south east of Port Nolloth. It is the newest port in the South African port system becoming operational in 2009. The port is intended to provide complementary services to the central ports of Port Elizabeth and East London. The port currently handles around 2 million tonnes of cargo per year, with the 30-year forecast predicting around 60 million tonnes of cargo per year.

Port Elizabeth currently handles the bulk of South Africa's manganese throughput at 5.5 million tonnes. A large stake of this throughput derived from mines in the Northern Cape. Currently, Port Elizabeth experiences over utilisation of its manganese terminal with plans to expand capacity to 16Mtpa in 2021/2022 by routing manganese throughput to Ngqura instead (LTPF, 2015). A port within the Northern Cape would provide additional manganese capacity while providing junior miners with small tonnages with a more cost- effective alternative for exporting manganese.

4.4.6 Option 6: Port of Durban

The Port of Durban is South Africa's premier container port and is the principal port serving the KwaZulu-Natal province, Gauteng region, and the Southern African hinterland. The port typically handles 4,000 vessel calls per year, which is the highest number in South Africa, equating to around 61 million tonnes of cargo per year. The 30-year forecast predicts around 147 million tonnes of cargo annually.

Currently, excess manganese throughput which cannot be accommodated at Port Elizabeth is handled by the Port of Durban. This trend is likely to continue until rail infrastructure, linking the Port of Ngqura and the Northern Cape, is developed which would be able to accommodate this excess throughput at a dedicated manganese terminal at Ngqura. In its current state, Durban exhibits high congestion at some of its dry bulk terminals which, coupled with its long-haul distance from the Northern Cape, would provide junior miners with a costly method of transport. A port within the Northern Cape would therefore supplement any future manganese throughput from the Northern Cape while maintaining cost effective transport.

4.4.7 Option 7: Namibian Ports (Lüderitz and Walvis Bay)

The national ports of Namibia, Lüderitz and Walvis Bay, were expanded to accommodate coal exports from Botswana. A Trans-Kalahari rail system has been proposed that would transport coal directly from mines in Botswana to either Lüderitz or Walvis Bay. These ports would need to be developed into deep water ports to accommodate the drafts of large bulk carriers. The Port of Walvis Bay would require extensive dredging to accommodate these vessels while the Port of

Lüderitz would need to be developed from a fishing port into a commercial port. Namport, Namibia's Port Authority, has stated that it aims to develop at least five coal berths in Walvis Bay to allow for 65 Mtpa of Botswana coal beyond the year 2020. A port located in the Northern Cape would perform a similar function to the Trans-Kalahari rail haul if developed in tandem with a rail link to Botswana's coal fields.

4.4.8 Technical Options Analysis

As per the PPP guidelines, the seven possible logistics options have been evaluated in line with the following considerations:

1. Option description
2. Financial impact
3. Funding and affordability
4. Risk
5. BEE and other socio-economic aspects
6. Service delivery arrangements
7. Transitional management issues
8. Technical analysis
9. Site issues
10. Legislation and regulation
11. Human resources
12. Market capability and appetite
13. Qualitative factors.

The findings in terms of considerations 1, 8, and 9 were presented in the previous section. The other considerations are discussed below and then incorporated into a multi-criteria analysis to determine the optimum layout position.

4.4.9 Comparison of Options in terms of Non-Technical Considerations

Consideration 2: Financial Impact

As the choice of option is not limited solely to comparing one facility against another, but rather about comparing supply chains (transport, warehousing, port facilities and shipping) the advisory team considered the overall high-level relative supply chain's CAPEX and OPEX costs of the different options as indicated in the table below (1 being the lowest relative supply chain CAPEX or OPEX cost and 7 being the highest).

Table 4-1: Financial Impact Comparison

Cost component	Port Nolloth	Boegoe-baai	Do Nothing	Saldanha	Ngqura	Durban	Namibia
CAPEX	**7**	**3**	**1**	**2**	**4**	**6**	**5**
OPEX (20 YEAR)	**3**	**1**	**5**	**4**	**2**	**7**	**6**

Consideration 3: Funding and Affordability

The exact requirements in terms of funding and affordability have not been determined to date and will only be evaluated during the Full Value Assessment part of this feasibility study. However, for purposes of the technical options analysis, the following aspects should be noted:

- The site options will not be able to accommodate similar demand volumes, and therefore the revenue potential of all options will vary. This is especially true for the option 6 and 7 as they are already surrounded by residential developments which will impact logistics handling, thus port expansion.
- It is anticipated that revenue for the project will be generated solely from private customers of the logistics facility. The details of the service delivery mechanism are discussed in more detail below.
- Initial discussions with the NCDTSL have revealed that they do not have any available budget to support the port from a financial perspective.

From the above it is clear that Funding and Affordability from Public Sector perspective will not materially affect the choice of technical options.

Consideration 4: Risk

A comprehensive risk assessment will be undertaken as part of the Project Due Diligence and Value Assessment. However, for the purpose of the technical options analysis, the following site specific risks have been identified as material:

- Property ownership of Option 2 is a risk as the transfer agreement may take time to complete, however, can be mitigated.
- Port Nolloth and other ports are located near towns implicating that port expansion would be constrained. The proposed port of Boegoebaai layout overcomes these constraints by being located far from beaches and human settlements.
- The transport issues for movement of cargo to ports on the East Coast of South Africa would add to the congestion to ports on key routes such as N3 and N12.
- Due to the greater demand for export logistics capacity for mineral exports through a number of established South African ports, exporters may be limited in their capability to take advantage of greater mineral demand from importers in Asia and elsewhere in the world.

From the above, options 2 and 6 are preferred from a risk point of view.

Consideration 5: Black Economic Empowerment and other Socio-Economic Aspects

The South African democratic government has adopted a policy of black economic empowerment (BEE). BEE is a broad-based, inclusive core component of the country's overall growth strategy and infrastructure development is a suitable vehicle to achieve this objective. The entire process, from

appointment of the transaction advisor to the final procurement of the private party, ensures that BEE targets are consistently set and met.

Further to the above the local socio-economic impact on the community will see to substantial creation of jobs. The employment impacts will include direct and indirect labour opportunities emanating during construction to operations.

Socio-economic impacts can be seen in the areas of improving the economic performance of the export industry in South Africa with specific focus on the Northern Cape mineral and agricultural sectors and in this case the opportunities unlocked by Options 1 and 2 can be seen as most advantageous in comparing options.

It is also evident with the creation of job prospects in the Northern Cape labour market and in opportunities to upskill the workforce within the province, which will yield superior returns to the client. Furthermore the opportunity to improve land values in the western portions of the Northern Cape are unlocked by the application of Options 1 and 2 which supports the implementation of Option 2 especially to be the most favourable option.

Consideration 6: Service Delivery Arrangements

The project under consideration does not entail the delivery of a publicly mandated service. No comparable public facility exists in the Northern Cape.

The proposed project will entail the following aspects:

1. Most broadly, it will entail the development, operation and financing of a port under a PPP arrangement.
2. At this stage it is unclear whether the project will need to be supported from public subsidy, although initial indications suggest that this would not be affordable to the Northern Cape Government.
3. As the project would help to unlock the potential for greater mineral exports, there is a possibility that exporters could support the project financially due to the improvement of export opportunities into the future, specifically related to cost and time benefits.
4. The project will be developed on public property (partially). The details regarding future land lease and own agreements are still to be finalized as the land is currently held by the Richtersveld CPA.

The procurement choice will be investigated further in the value assessment to determine whether a PPP will be a viable option for the delivery of the proposed project. For purposes of this options analysis, the service delivery arrangement will not influence the choice of option.

Consideration 7: Transitional Management Issues

The high-level analysis of the options indicate that this project is for the consideration of a new greenfield facility, transitional management issues are therefore not applicable.

Consideration 8: Site Issues

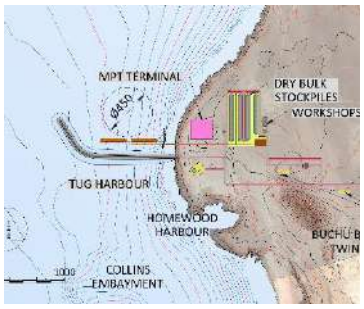
A detailed assessment of each of the chosen sites were presented in the previous section. From that assessment there are a number of advantages and disadvantages in terms of operational service delivery that distinguish the four possible options. These are summarised in the Table 4-2 below.

Table 4-2: Comparison of Delivery Implications of Various Sites

Option	Advantages	Disadvantages
Option 1	Cheaper land, lesser development	Town already established
Option 2	Greenfield site, no development	Different owners of land
Option 3	Some established services available	Congestion, no development
Option 4	Port with services	Environmental issues and residential areas
Option 5	Newly established port with space	Minimal benefit for Northern Cape
Option 6	Established port, variety of services	Congested port, no back of port space
Option 7	Minimal impact on South Africa environment	Congested port, no back of port space, not within SA sovereignty

A high-level options assessment was done to evaluate the positioning of the proposed port at Port Nolloth (Brownfield) or Boegoebaai (Greenfield). The Table 4-3 below clearly indicated the advantages of the new port location.

Table 4-3: Summary of High-Level Options Assessment

Criteria	Port Nolloth	Boegoebaai
		
Technical Analysis	A dredged approach channel is required. Existing port infrastructure and lack of back of port space for future expansion. However, would provide a shorter implementation schedule	Deepwater port therefore no dredging is required Greenfield site with sufficient area for future development. However, would have a longer implementation schedule
Socio-economic Impact	Future mining and subsistence operations may be impacted as a result of port upgrading and expansion	Would not impact on current and future mining and subsistence operations in Port Nolloth
Environmental Constraints	Close proximity to human settlements, upgrading involves possible beach erosion	Located far from human settlements and beaches
Legislative Process	Existing port in TNPA national ports system	Would require legal induction into TNPA national ports system

Consideration 10: Legislation and Regulation

There are no legislative constraints to the development and operation of a Port facility as contemplated under this study. The operation will have an interface with the national ports authority.

The only possible aspect for consideration here will be the transfer of development rights on the property.

Consideration 11: Human Resources

It is expected that a port of this nature will need about 400 directly employed staff to support port operations. The skills to operate such a port can be found within South Africa and it is not expected that the location of the option of a port will impact on this consideration.

Consideration 12: Market Capability and Appetite

The project scope being contemplated entails the financing, development and operation of a deep water port in Boegoebaai. Significant market capability already exists for this type of facility in South

Africa. Moreover, a number of private parties have previously informally expressed interest in this project.

Regardless of the above, to some extent many of the options will entail similar scope. Only the "do nothing" option does not fall under this consideration, regarding market capability and appetite. Thus, it is not expected that this consideration will influence the choice of the technical option.

4.4.10 Why Boegoebaai is the Preferred Option

In support of the above analysis, the preferred option was further assessed based on the following analysis:

- Economic Analysis
- Technical Engineering Analysis;
- Environmental Analysis;
- Safety and Well-being Analysis; and
- Integration into the regional and national social fabric.

The option evaluation of the Multi-Criteria Decision Analysis process includes a mixture of qualitative and quantitative analyses in a Strategic Option Evaluation Framework that is used to evaluate and prioritise the supply chain and port location options. The purpose of the appraisal framework is to help prioritise a large number of options or interventions, to reduce the number of options and to package them where possible.

The first step was to define suitable criteria for the assessment and the list is presented below.

Table 4-4: Appraisal and Measurement Criteria

High Level Appraisal Criteria	Appraisal Criteria Description	Measurement Criteria
Economic	Connectivity	Availability of Supply Chain capacity
		Supply Chain Cost
		Supply Chain Time
	Capital Cost	Supply Chain Infrastructure Cost
		Land Cost
		Equipment Cost
	Wider Economic impact	SA Job Creation Opportunities
		Unlocking Mineral Logistics Capacity
		Provincial Industrial Development
Technical	Ship Accessibility	Draft at Quays
		Channel Geometry
	Availability of land	Availability of Land for cargo servicing
		Scalability for future phases
	Bulk Services	Access to electricity
		Access to water
	Road/rail access	Current Rail links
		Current Road links
	Labour	Available Local Labour
		Deployment of Technical Skills

High Level Appraisal Criteria	Appraisal Criteria Description	Measurement Criteria
	Constructability	Impact on current operations
		Geotechnical Conditions
Environmental	Air Quality	Local Air Quality
		Dust Pollution
	Noise	Proximity to residential areas
	Landscape/biodiversity	Change in Flora Environment
		Change in Fauna Environment
Safety/Wellbeing	Reduction in accidents	Heavy Vehicle Accidents
		Road and Rail Congestion
	Housing, schools, health	Staff Housing
		Schools for staff children
		Health services/clinics
Integration	Land use	Community Commercial Development
		Availability of land around port
	Settlement severance	Relocation required
	Legal	Promulgated Port
	Social Services	Expansion of Regional Health Services
		Expansion of Regional Training Services

The appraisal criteria were matched with measurement criteria and a seed value for the respective weights entered for use by the excel modelling software. Individual options were then scored, of which the findings are presented below.

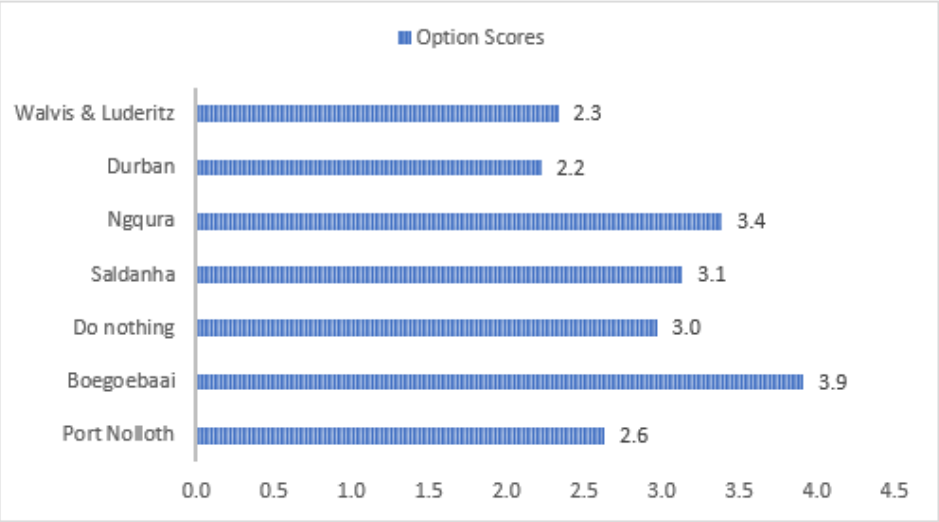


Figure 4-1: Option Scores

An overview of the development options for the Northern Cape presented the status quo of the region with regard to a summary of the site description, needs analysis and demand analysis. The Multi-Criteria Assessment of options considered seven options, namely: the other TNPA and NAMPORT facilities, Boegoebaai and "Do Nothing" options. Port Nolloth, the brownfield option, considered the upgrading of existing port infrastructure to meet the standards of a commercial port. Boegoebaai, the greenfield option, considered the development of a deep water port, 60 km north of Port Nolloth. The "Do Nothing" option was added to evaluate the status quo continuing into the

future with competing ports such as Saldanha Bay, Ngqura, Durban and Lüderitz and Walvis Bay in Namibia or upgrading them individually to handle the expected volumes. The Boegoebaai option was found to be a capital-intensive option in the short term but would unlock the development potential of the region or the province.

The options analysis results provide a qualitative high-level assessment of Port Nolloth and Boegoebaai which describes the benefits of developing a greenfield site (Boegoebaai) instead of an existing port site. The Boegoebaai site has the potential to be developed as a deep-water port with limited impacts to existing marine environments and human developments while maintaining a comparatively low capital cost due to the natural geometry of the coastline.

The analysis indicates a clear and significant difference in the respective scores and suggests, with acceptable confidence, that Boegoebaai and supply chains is the best supply chain solution for the proposed port. The result is indeed based on the respective weighting of each criteria and scoring of the respective options, but the high number of criteria provides for a relative insensitive result.

Boegoebaai is on balance the preferred option relative to the others by a clear margin, as:

- Ngqura needs significant investment in rail.
- Saldanha Bay is constrained by environmental permitting.
- Do nothing retains an inefficient and constrained supply chain.
- Port Nolloth has all of the above.

Given the detailed assessment embarked on, the preferred business model devised for the port of Boegoebaai complemented by the key financial and business ratios are therefore graphically portrayed below.

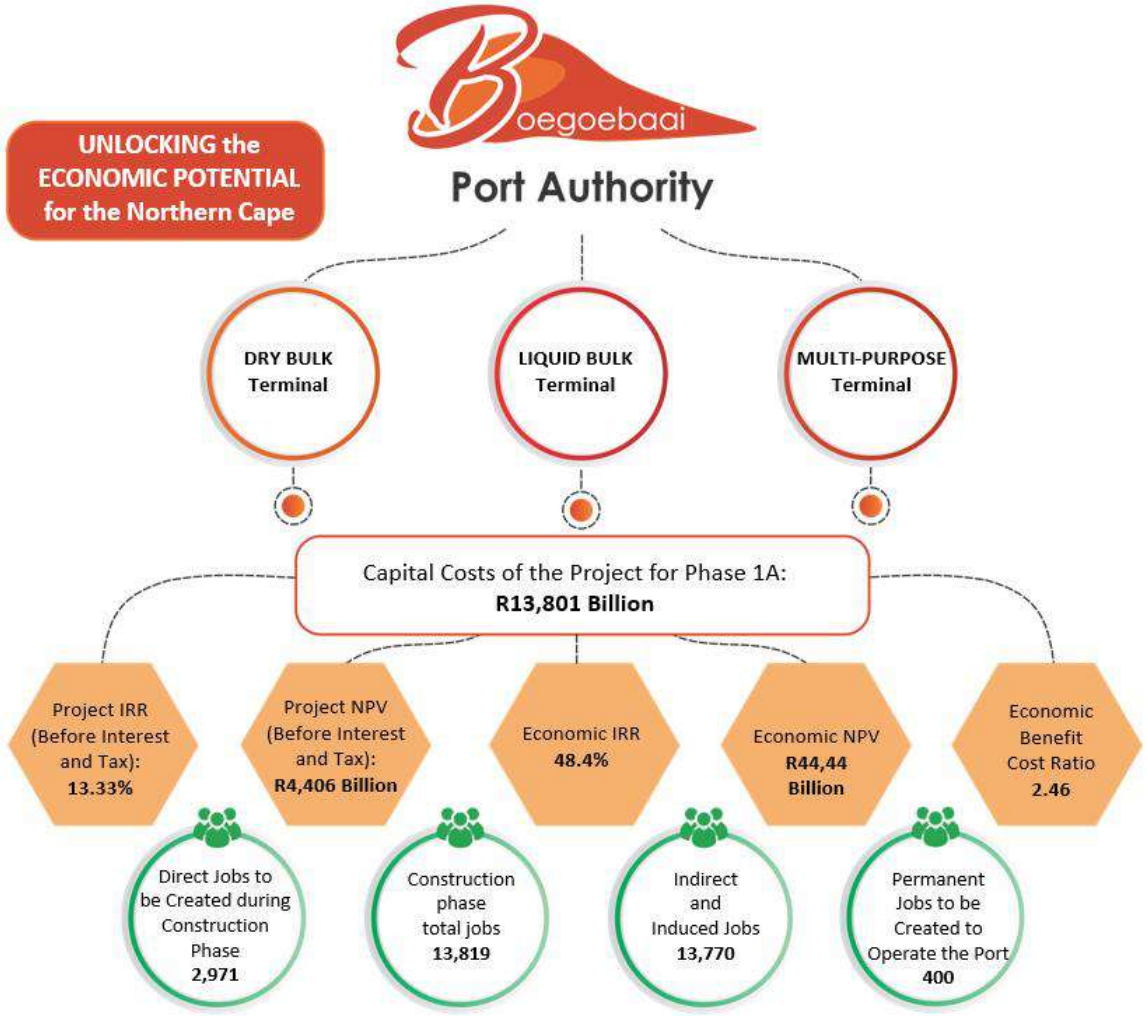
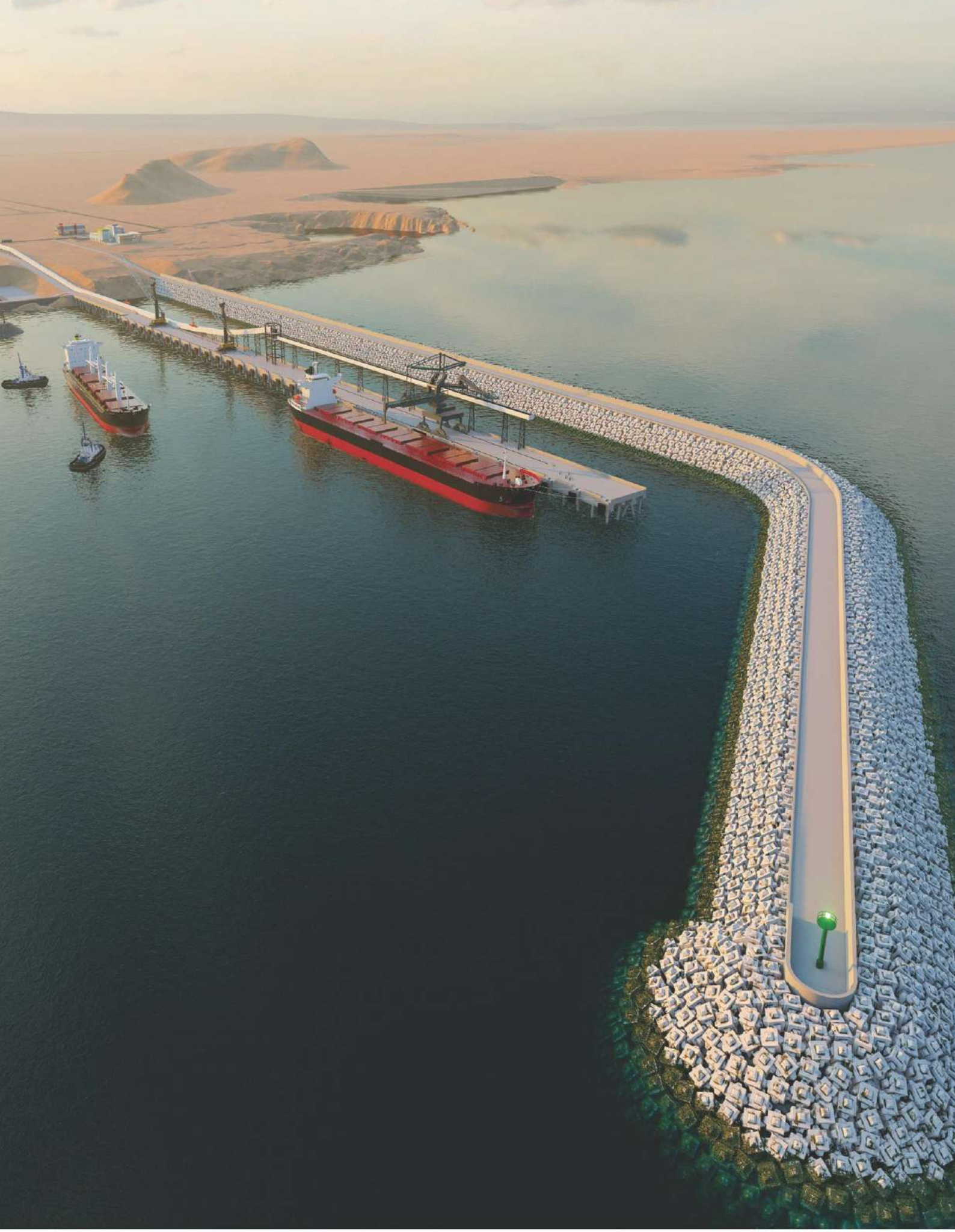


Figure 4-2: Boegoebaai Business Model, Capital Costs, KPI's and Jobs

As stated in Phase 1A, the deep water port will consist of a jetty, connected to the land via an access trestle, and sheltered from wave energy by a concrete armoured breakwater. Two berths are provided on the jetty, one dedicated to dry and liquid bulk cargo and one dedicated as a conventional multi-purpose berth. To cater for the maximum development phase considered in this submission, the port will be serviced by road transportation only while Phase 1B considers the future potential of the port to accommodate rail facilities.

Phase 1 of the proposed port development can accommodate a 200,000 DWT Capesize vessel and an 80,000 DWT Panamax vessel as the upper-limit design vessels for the dedicated bulk berth and the MPT berth respectively. The design vessel selection is based on an assessment of the most likely vessel distribution for the forecasted throughput and on considerations for future flexibility. The port will be serviced and will have all auxiliary infrastructure such as water, electricity, roads etc.



TECHNICAL ENGINEERING **ANALYSIS**

5. Technical Engineering Analysis

5.1 Key Design Parameters

The key design parameters which form the basis of the technical work for this feasibility section are presented in the following sections.

5.1.1 Demand Forecast

The Phase 1 port development has been designed to accommodate the design forecast as presented in Section 3 of this business case. The port masterplan has been developed to allow for the future expansion of the port whilst also providing suitable flexibility to any commodity mix, operational and planning changes that may take place in the future.

5.1.2 Design Vessels

The Phase 1 upper-limit design vessel for the dedicated bulk berth has been selected as a 200,000 DWT Capesize vessel whilst an 80,000 DWT Panamax vessel was selected for the multi-purpose terminal (MPT) berth. The vessel selection considered future flexibility and an assessment of the most likely vessel distribution for the forecasted throughput.

Although the bulk berth is expected to predominantly service smaller Panamax class vessels, carrying high value ores, the ability to also accommodate much larger Capesize vessels allows for economies of scale for shipping.

This makes the berth a viable iron ore export facility, if required in the future. As the site is of sufficient depth to avoid costly dredging the increased flexibility of a Capesize berth comes at a relatively negligible CAPEX increase.

The Panamax design vessel for the MPT berth allows for suitable flexibility as the berth is forecasted to handle a relatively large portion of dry bulk concentrates, containers and some manganese.

The vessel distribution for the long-term port masterplan layout includes a 400,000 DWT Chinamax dry bulk carrier as the upper-limit design vessel to maximise the long-term expansion potential of the port.

The design vessel parameters for Phase 1 and the long-term port masterplan are presented inTable 5-1 and Table 5-2 respectively.

Table 5-1: Phase 1 design vessel parameters

Parameters	Capesize	Panamax	Ultramax	Tanker	Multipurpose Vessel
Terminal	Dry Bulk	Dry Bulk and Multipurpose	Multipurpose	Liquid Bulk	Multipurpose
Commodity	Various	Manganese	Zinc, lead, Mn breakbulk	Diesel	Breakbulk
Deadweight [t]	200,000	80,000	63,300	60,000	30,000
Displacement [t]	236,000	93,500	75,200	78,000	39,100
Length overall [m]	315	229	200	217	188
Length Between Perpendiculars [m]	300	222	195.5	206	179
Beam [m]	48.5	32.2	32.2	36.0	27.7
Laden Draft [m]	19.0	14.3	13.3	13.0	11.3

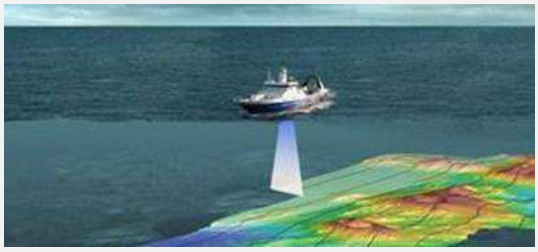
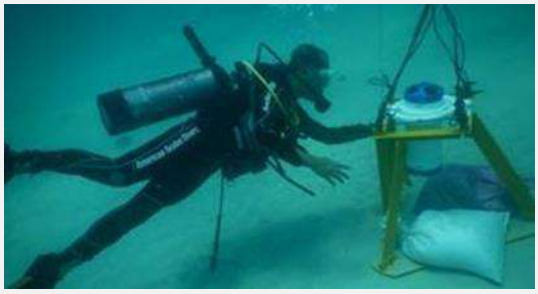
Table 5-2: Masterplan design vessel parameters

Parameters	Multipurpose Vessel	Very Large Ore Carrier	Chinamax	Very Large Post Panamax	Tanker
Terminal	Multipurpose	Dry Bulk	Dry Bulk	Container	Liquid Bulk
Deadweight [t]	63,300	200,000	400,000	120,000	60,000
Displacement [t]	75,200	236,000	440,000	158,000	78,000
Length overall [m]	200	324	362	352	217
Length Between Perpendiculars [m]	195.5	353	353	335	206
Beam [m]	32.2	51.1	65.0	45.6	36.0
Laden Draft [m]	13.3	19.4	23.0	14.8	13.0

5.1.3 Site Investigations

The engineering development, at this FEL2 level of study, was informed by the following site investigations which were completed as part of this study:

Table 5-3: Site investigations

• **Bathymetric and geophysical survey** *Offshore surveys to determine the water depths across the area of interest and to provide a better understanding of subsurface geophysical conditions in terms of bedrock level, soil horizons, variability, etc.*	
• **Marine geotechnical site investigations** *Offshore jet probes and vibrocores to calibrate the results of the geophysical survey. The jet probes aim to verify the seabed sediment thickness while the vibrocores allow for the collection of core samples.*	 
• **Metocean data collection** *Deployment of an instrument, located on the seabed, to measure wave height, wave direction and wave period as well as current speed and direction. The measurements were used to calibrate numerical models of the coastal processes which provided design parameters of the marine infrastructure.*	
• **Landside boreholes and quarry investigation** *Landside site investigations to determine the onshore geotechnical conditions and to identify possible locations near the site for the development of a dedicated quarry to supply rock for the breakwater construction.*	

5.1.4 Support Vessels

Tugs with the characteristics and bollard pull as shown in Table 5-4 below are recommended based on the convention of similar ports in the South African port system. The number of tugs (three) and the tug power requirements seen below were confirmed as part of the desktop ship simulation study.

Table 5-4: Tug characteristics

Characteristics	Tug
Length Overall [m]	35
Beam [m]	12.9
Draft [m]	5.45
Bollard Pull [t]	70 – 80

5.2 Port Layout Development

At the beginning of the port layout development process, the main site opportunities and constraints were identified. The primary opportunity of the site is the short distance between the coastline and relatively deep water (−15 m MSL).

Various port master plan layouts, and their associated first phase developments, is portrayed below. Each option shows a first phase development and masterplan layout potential.

Figure 5-1: Port layout development options assessed in a MCA

The port layout options were assessed using a multi-criteria assessment (MCA) to identify the preferred port layout development. The MCA considered key development criteria such as capital cost, future expansion and developmental potential, operability, and construction duration.

A hybrid layout of the 'North' and 'Middle' layout options were selected as the preferred port layout.

The potential regional development framework, as well as the long term port master plan and the associated Phase 1 layout are presented in the following sections.

5.3 Regional Development Framework

A layout for the development of complementary industries within the area surrounding the proposed port precinct is illustrated overleaf.

It is envisaged that this area may be developed through the declaration of a Special Economic Zone (SEZ) to attract local and foreign investment.

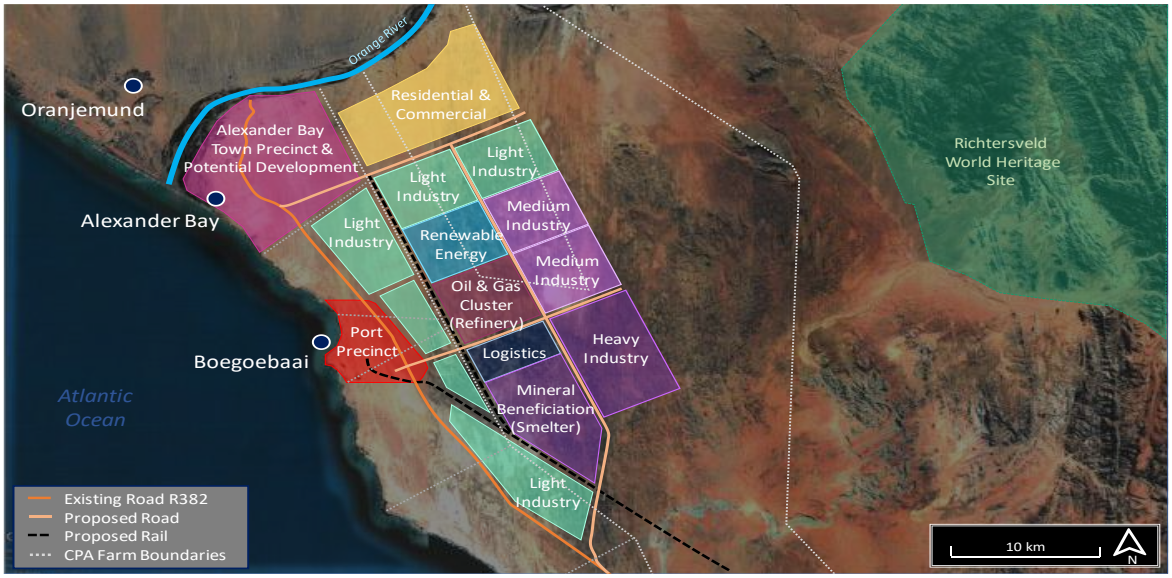


Figure 5-2: Regional development framework

5.4 Port Masterplan

The masterplan has been developed to remain flexible and agile to any commodity mix, operational and planning changes that may take place in the future. Sufficient space has been provided, with a wide selection of designated cargo terminals including ship repair, a dedicated multi-purpose terminal, container terminal, dry bulk and liquid bulk berths together with their corresponding landside requirements.

The port masterplan is presented in Figure 5-3 below.

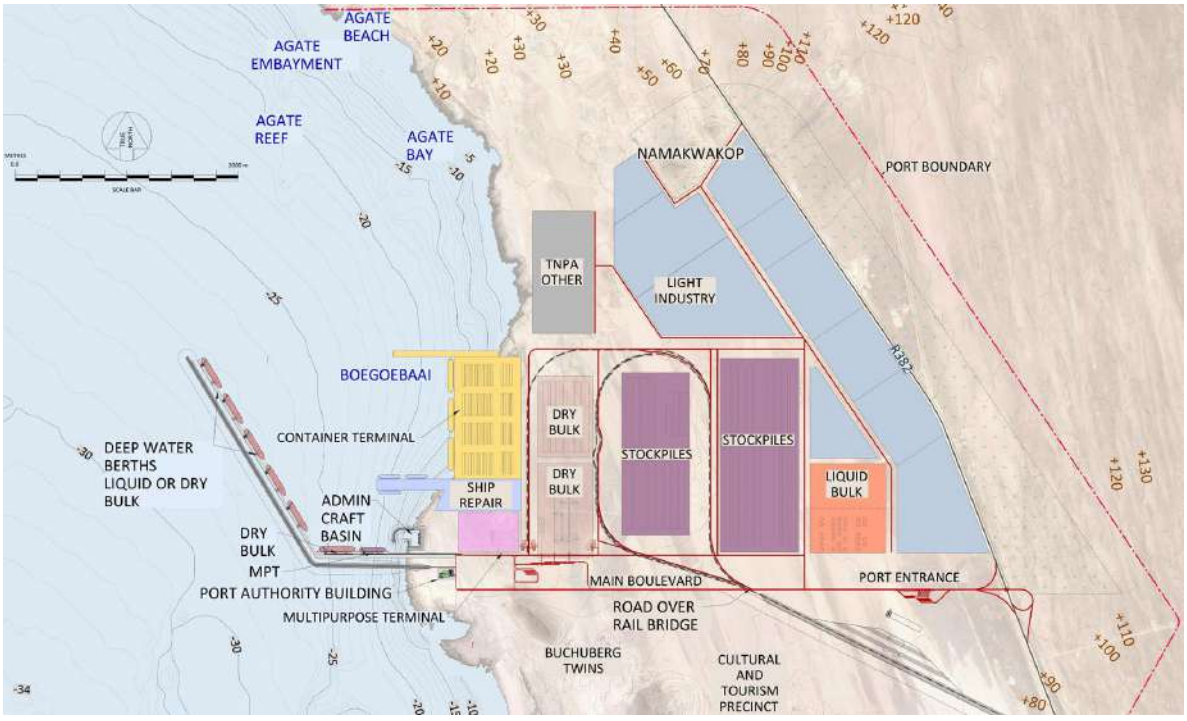


Figure 5-3: Potential masterplan layout

5.5 Port Layout Phase 1

The Phase 1 port layout, which represents the initial elements of the port masterplan, is shown in Figure 5-4.

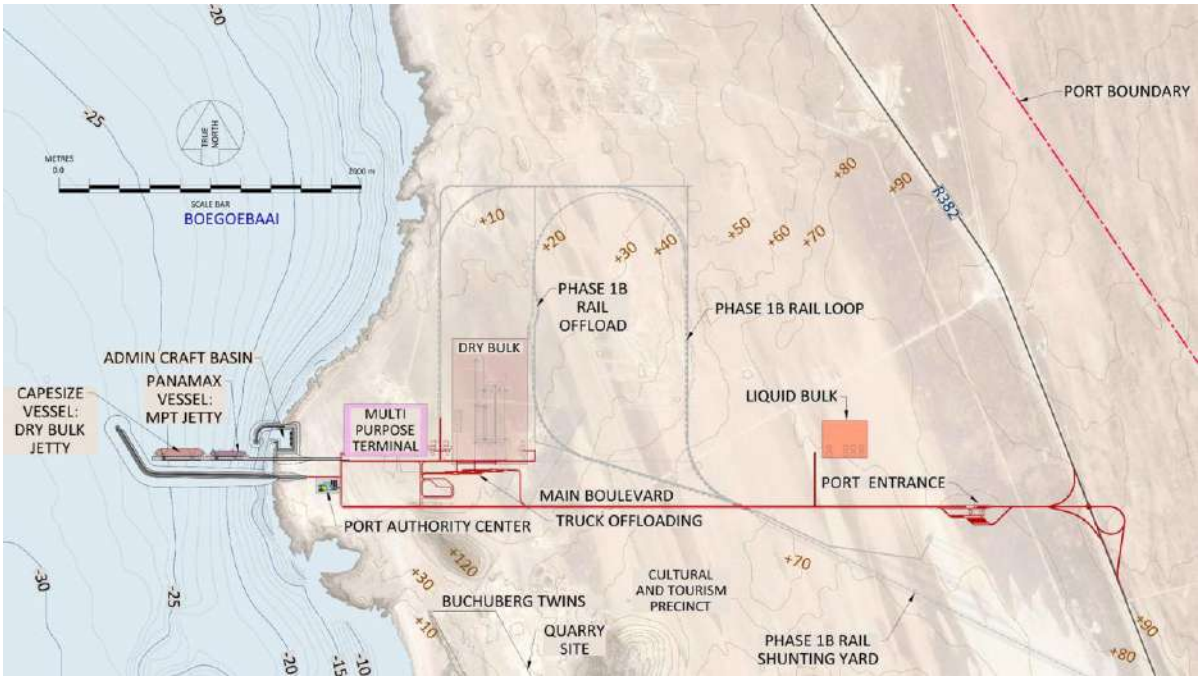


Figure 5-4: Phase 1 port layout

Phase 1A is the maximum development phase considered in this submission. Phase 1B shows the future potential of the port to accommodate rail facilities.

Phase 1 has been divided into Phase 1A, the maximum development phase considered in this submission, and Phase 1B which shows the future potential of the port to accommodate rail facilities. All operations in Phase 1A will be serviced by road transportation only.

Phase 1A infrastructure includes a two-berth jetty connected to the land via an access trestle. The berths are sheltered from wave energy by a concrete armoured breakwater. The sea-side berth is dedicated to dry- and liquid bulk cargo whilst the land-side berth is a conventional multi-purpose berth. The bulk berth is fitted with a ship loader and conveyor system connected to landside stockpiles. The bulk berth is also capable of liquid bulk import and is fitted with a pipeline connected to diesel storage tanks.

The multi-purpose berth will handle containerised cargo and break bulk using two mobile cranes. MPT cargo will be stored in a dedicated MPT terminal.

The admin craft harbour takes the form of a dig-out basin inside the main breakwater, protected by a secondary breakwater.

5.6 Marine Infrastructure Components

The marine structures for the proposed port development can be split into three main elements, namely the main jetty and access trestle; the admin craft basin; and the breakwaters and revetments. The preferred structural solutions, which have been engineered to the required level of detail for the target costing accuracy range of -20% to +30%, are summarised in the following sections.

5.6.1 Main Jetty and Access Trestle

A quay structure trade-off study was completed in order to determine the structural solution for the main jetty and access trestle. An initial qualitative options assessment was carried out on all the identified possible structures with the aim of eliminating practically or fatally flawed options and identifying preferred options to be investigated further. Three potential structural options were identified from which a deck on pile jetty structure was selected as the preferred option through a structured multi-criteria analysis decision making process.

The main jetty consists of two berths, namely a 295m long MPT berth and 350m long bulk berth. Both berths are designed to handle dry bulk and multi-purpose cargos, however, the seaside (western) berth can accommodate a Capesize design vessel which makes it suited to a larger throughput dry bulk handling operation. The MPT berth has been designed to accommodate a Panamax design vessel. The main jetty is connected to the shoreline via a 160m long access trestle.

Typical cross sections of the main jetty and access trestle can be seen in Figure 5-5 and Figure 5-6 respectively.

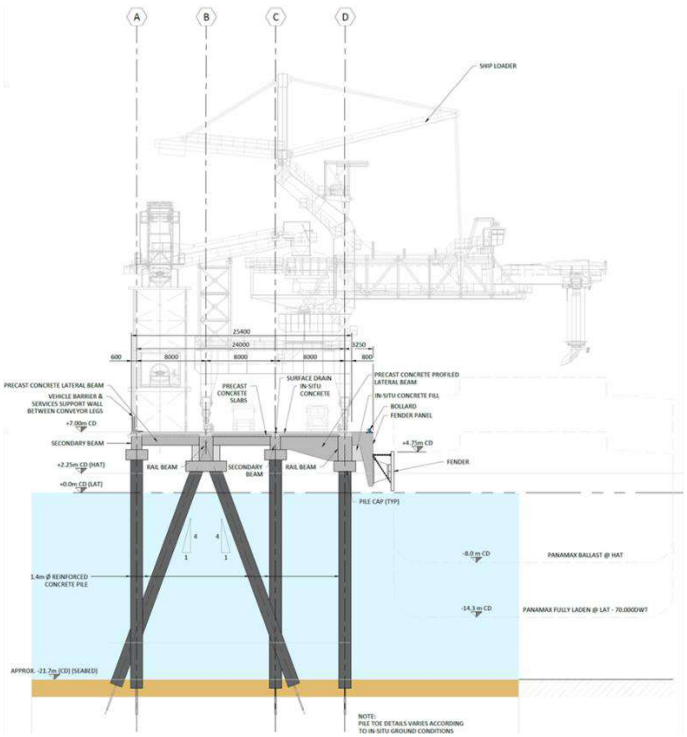


Figure 5-5: Cross section dry bulk jetty

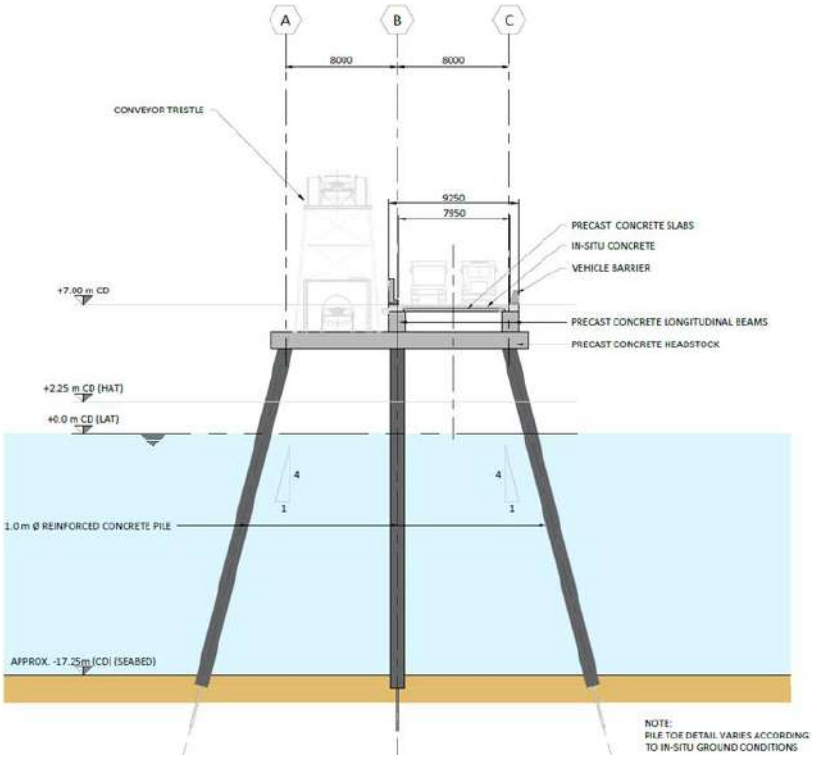


Figure 5-6: Cross section access trestle

The main jetty platform and the access trestle is founded on circular reinforced concrete piles with a sacrificial steel tubular casing. Both the main jetty and access trestle's superstructure is made up of reinforced concrete precast beams and slabs with in-situ concrete casts and topping to stitch the structure together.

The main jetty supports a ship loader, conveyor and mobile cranes which service the bulk and MPT berths respectively. Vehicular access is provided via a single carriageway located beneath the ship loaders with turning circles provided at the ends of both the dry bulk and MPT jetty.

The access trestle comprises of a single carriageway for vehicular access with the conveyor and ancillary services running adjacent.

5.6.2 Admin Craft Basin

The layout and structural arrangement for the admin craft basin was informed by the outcomes of the coastal processes study (PRDW, 2018a) in which it deemed the prevailing wave conditions in the port to be unsuitable for admin craft to be safely moored at a conventional jetty structure.

A dig out admin craft basin providing additional wave protection inside the main breakwater is therefore required.

A typical cross section of the berth structure for the admin craft basin is presented in Figure 5-7 overleaf.

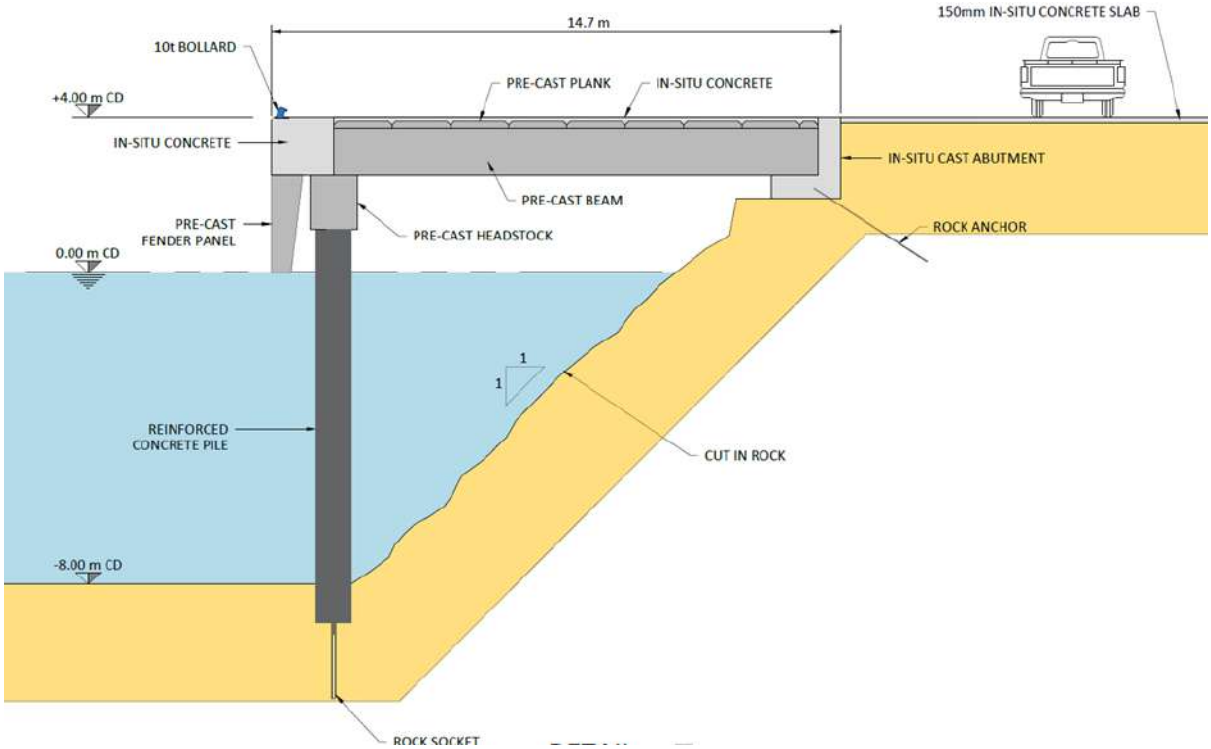


Figure 5-7: Cross section of the small craft harbour deck on pile structure

The structure comprises a concrete deck supported on vertical concrete piles cast into steel casings. The transverse beam is supported on the land side by an anchored concrete abutment.

5.6.3 Breakwater and Revetments

A trade-off study was completed for the proposed main breakwater in order to determine the preferred type of the breakwater structure and the preferred type of the primary armour protection.

Due to the unsuitable wave climate at Boegoebaai and the resulting excessive downtime for caisson placement, a rubble mound structure was selected as the preferred structural type for the breakwater.

Site investigations have indicated that sufficient rock quantities are available to serve as core and underlayer material (SRK Consulting, 2018) for a rubble mound breakwater.

A quantitative assessment considering factors such as armour unit royalty; high-level concrete supply cost; high-level unit placement cost; armour unit size; and design wave height was completed for both Cubipods and Antifer Blocks as potential units for the primary armour.

Examples where Cubipods and Antifer Blocks are used as primary armour units are depicted in Figure 5-8.

Figure 5-8: Example of Cubipod (left) and Antifer Block (right) armouring systems (Medina & Gomez-Martin, 2016), (Frens, 2007)

The quantitative assessment indicated significant difference in cost between Cubipods and Antifer Blocks at Boegoebaai, with Antifer blocks estimated to cost 17% more when compared to Cubipods for the design wave height.

This cost consideration together with Cubipods' good structural stability and improved performance in dynamic sea conditions, resulted in Cubipods being selected as the preferred primary armour protection.

The layout of the primary (main) and secondary (small craft harbour) breakwaters is illustrated in Figure 5-9 while typical sections through the trunk of the breakwaters is provided in Figure 5-10.

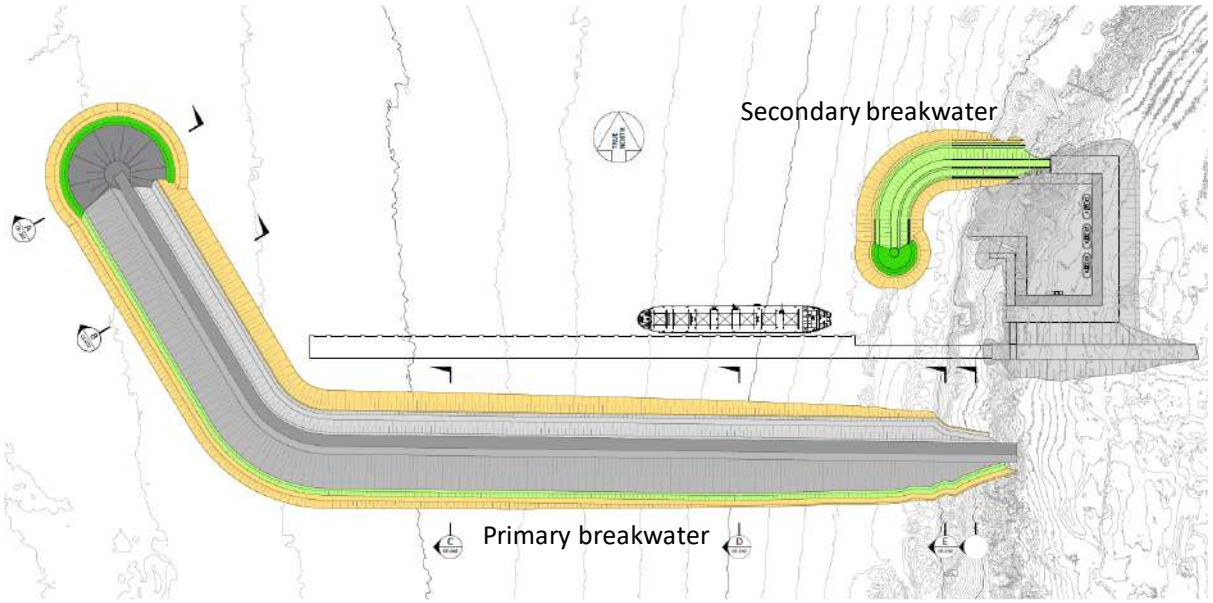


Figure 5-9: Breakwater general arrangement plan view

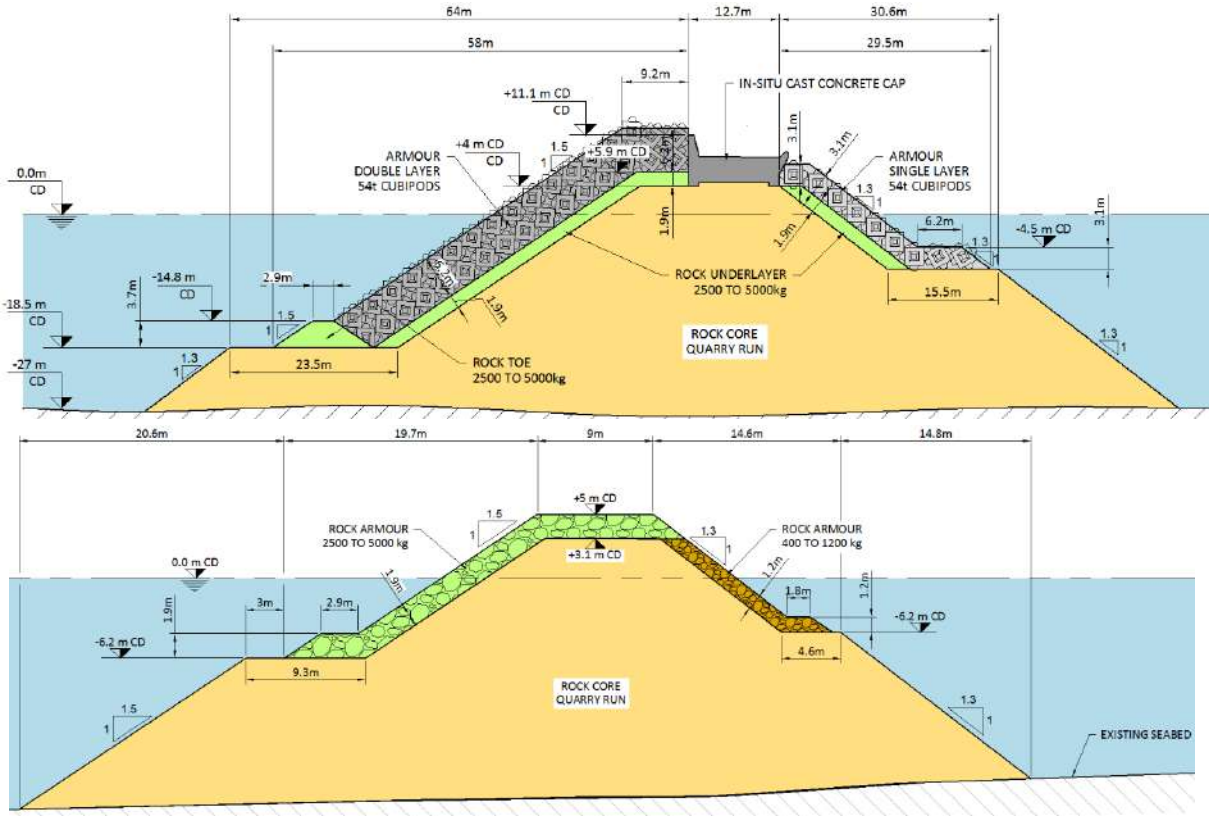


Figure 5-10: Typical cross-section of trunk of the main breakwater (top) and the secondary breakwater (bottom)

It is estimated that 2,785 million m^3 of rock, 63,150 m^3 of reinforced concrete and 13,150 Cubipod units will be required during construction of the breakwaters.

5.7 Materials Handling

This section presents the preliminary design of the material handling equipment which has been engineered to the required level of detail for the target costing accuracy range of -20% to +30%. It is however noted that the materials handling equipment will be defined by the eventual terminal operator based on their operational requirements and the contracted volumes for the facility. The focus was thus on identifying the most likely materials handling solution while also retaining sufficient flexibility within the design of the facility to accommodate a range of potential solutions as may be required by the terminal operator.

5.7.1 Material Handling Overview

The material handling equipment required per berth and the allocation of the forecast cargo type is detailed in Table 5-5.

The material handling solutions have been tailored to ensure low berth congestion (targeting a berth occupancy below 60%). To limit congestion the relatively high volumes of dry bulk are handled using a traveling shiploader, conveyor system and stacker/reclaimers. A more detailed description of the dry bulk material handling system is described in the following sections. Liquid bulk will be piped to

storage tanks and transported by road to the hinterland. The MPT berth will be serviced by two mobile cranes ensuring flexibility to handle both containers and break-bulk.

Table 5-5: Material handling overview

Berth	Cargo type	Material handling equipment
Bulk berth	Manganese, lead and liquid bulk	Dry bulk: Travelling shiploader, conveyors and stacker/reclaimers. Liquid bulk: Pipeline and storage tanks.
MPT berth	Break bulk and containers	Mobile cranes, trucks and front-end loaders.

5.7.2 Dry Bulk Material Handling Overview

5.7.2.1 Stockpiles

Open stockpiles have been designed to store manganese whilst lead and zinc need to be stored in enclosed warehouses. Dust suppression systems, which include spraying the stockpiles and conveyor cargo with water, are specified for the manganese stockpiles.

To handle manganese in the stockpiles, a mobile stacker has been selected for the stacking operation, and a mobile bucket wheel for the reclaiming of materials from the stockpiles. Both stacker and bucket wheel equipment provide operational versatility because they can operate on both sides of their travel line, working in two stockpiles.

A typical mobile stacker and a bucket wheel reclaimer is shown in Figure 5-11.

Figure 5-11: Typical mobile stacker (left) and bucket reclaimer (right)

5.7.2.2 Quayside Material Handling Equipment

Ship loaders are efficient and effective when large quantities of dry bulk cargo are designed to be handled through the berth. The option of a radial shiploader was discarded as it requires an extended quadrant beam to support the boom of its equipment, increasing infrastructure requirements and subsequent capital costs. Radial ship loaders also need to be provided in pairs to avoid the shifting movements of the vessel. A mobile ship loader was also discounted due to its large size and disruption to traffic on the jetty.

A travelling ship loader was selected as the preferred option. The travelling shiploader can achieve the loading rate to meet the required throughput and its spatial dimensions allow the transit of

trucks take place beneath it. A typical section view of a travelling shiploader is illustrated in Figure 5-5.

5.7.2.3 Conveyor Belts

Conveyor belts handling zinc and lead, and the associated transfer points, need to be fully enclosed while belt conveyors handling manganese have an arched coverage over the belt, where applicable. Provision for an independent coverage structure beneath the conveyor belt systems should also be included at applicable locations to provide protection against material spillage to any persons or vehicles transiting below. Elevated belt conveyors have been designed to include handrailed walkways on both sides of the belt.

5.7.2.4 Dust Control

Dust suppression and collection systems have been incorporated into the design. All material handling equipment shall be designed to avoid accumulation of material in places other than prescribed as part of the dust collection system.

5.8 Landside Engineering

5.8.1 Buildings

The desert environment is subject to fair to high summer temperatures, exposure to moisture and condensation, fog and arid climatic conditions. The following specific considerations have been included in the building design:

- Buildings are to be orientated north where possible or, alternatively, glazing on north facade aspects should be maximised in order to benefit from direct solar gain;
- Shading devices in the form of fixed overhangs above glazed areas eliminate unwanted heat and provide some shade to interiors;
- Courtyard design where buildings are clustered assist with retaining heat and provide shade;
- Ventilation is assisted by means of various devices including whirly birds and louvres; and
- The façade's design considers moisture and condensation through the inclusion of permeable mesh screens over glazed facades which further assists in reducing solar heat gain.

The design of the buildings was based on the building identified in the masterplan produced for the Boegoebaai Port. The buildings identified are as follows:

- A Port Access Gateway and Induction Centre;
- Port Authority Building including a Wellness Centre and an Emergency Services Building; and
- Terminal operator's building including workshops and satellite ablution buildings.

An accommodation schedule was created in order to determine the required building sizes. These areas were based on the required population size and occupancy as per SANS 10400 codes.

The proposed port access gateway is located west of the R382 while the proposed Induction centre is located adjacent to the access gateway. The port access gateway and the indication centre are illustrated in Figure 5-12 and Figure 5-13, respectively.

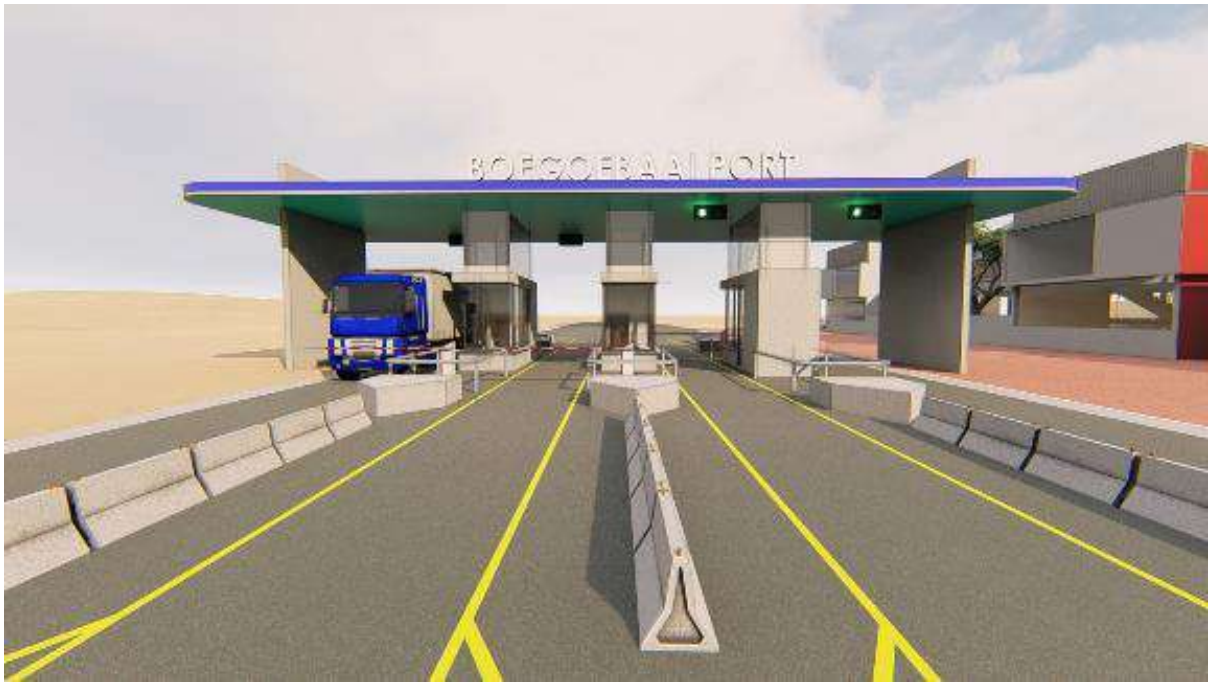


Figure 5-12: Proposed Boegoebaai Port Access Gateway

Figure 5-13: Proposed Induction Centre

The Port Authority Building is proposed to be located at the end of the port boulevard and close to the Atlantic Ocean. The building will consist of a foyer, an admin block, a port control building and a recreational building with provision of parking for visitors and staff. Figure 5-14 and Figure 5-15 show the layout of the port authority buildings.

Figure 5-14: Proposed Port Authority Building

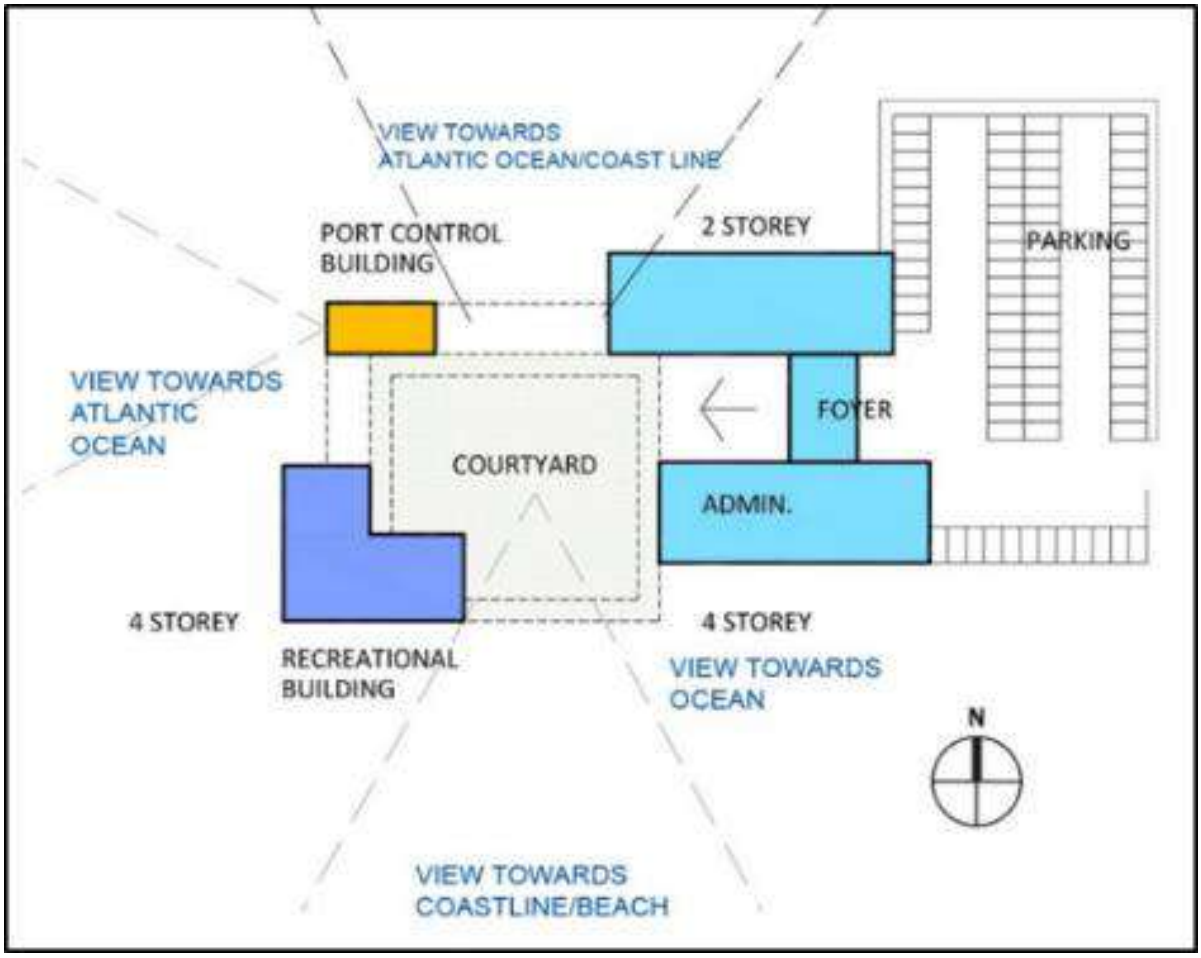


Figure 5-15: Proposed Port Authority Building Layout

5.8.2 Bulk Services

5.8.2.1 Water

There is currently no fresh water supply at the port site. Trial boreholes were tested but no suitable water supply was found. An existing pipeline runs past the site, along the R382, from Alexander Bay to Port Nolloth to supply water to the Port Nolloth area. However, the current pipeline cannot accommodate the water supply over and above the demand of the town. The average daily water demand for Phase 1A of this project is estimated to be 660 KL/day. Two water supply options were therefore considered to meet this demand.

Option 1 requires the construction of a pipeline from Alexander Bay, as well as abstraction systems, a pump station, and a water treatment plant to accommodate the water supply requirements of the port over and above that of the town. Option 2 requires the construction of a desalination plant (on-site) that would cater for the water supply requirements.

Due to this area being a water scarce area, Option 2 is deemed not only the more feasible option but also the more secure option.

A 1ML desalination plant is suitable to treat the water required for the domestic and non-domestic demand of the site. A 2ML ground reservoir is required to contain the necessary water volumes for the site and will be fed directly from the desalination plant. Furthermore, a 500KL elevated reservoir is required to service the supply to the induction centre, wash bay, gateway, weigh bridge offices and fire water requirements. Another 500KL reservoir is required to service the port authority building, the recreational building, the emergency services building, the satellite ablution building, dust suppression systems and fire water requirements. The elevated reservoirs will also provide sufficient pressure to meet the required pressures for fire suppression discharge.

5.8.2.2 Sewer

The site is divided into two separate drainage areas, namely Drainage Area 1 and Drainage Area 2. This is due to the scale of the site and the large distances between areas that require drainage. Each area will require its own isolated reticulation system, as well as on-site treatment and disposal. It is assumed that the sewerage effluent produced is general domestic effluent.

Drainage Area 1 includes the Port Authority building, the Recreational building, the emergency services building, and the satellite ablutions. Included in Drainage Area 2 is the induction building, the gateway, the weigh bridge offices as well as the wash bay. Due to the volumes produced at each drainage area, a sewerage treatment plant (wastewater treatment plant) was selected to treat the effluent of Drainage Area 1, treating 100 m^3 of sewerage per day. A septic tank and soak-away system, treating 15 m^3 per day is suited to treat the sewerage generated at Drainage Area 2.

The sewer reticulation system for each drainage area will be primarily gravity fed, except for at the port admin building. The sewerage generated in Drainage Area 1 is fed to the lowest point of this building and, via a rising main, will be pumped to the wastewater treatment plant (WWTP).

5.8.2.3 Stormwater

Design Basis

The stormwater design was based on the requirements for Phase 1A and Phase 1B of the proposed masterplan for the development. The drainage philosophy adopts principles of clean and dirty water separation as set out in Government Notice 704 "Guideline document for the implementation of regulations on use of water for mining and related activities aimed at the protection of water resources".

Proposed Drainage System

The proposed drainage system, is based on the following principles and includes the following stormwater features:

- Clean water catchments are those not exposed to any contamination.
- Clean water runoff generated from the higher lying catchment upstream of the site is diverted around the proposed development site in unlined open channels.
- Dirty water (high risk) catchments are those directly exposed to contamination from manganese, e.g. Dry Bulk Stacking Areas, Manganese Storage, etc.
- Dirty water (high risk) runoff will flow into concrete-lined open channels.
- Dirty water (low risk) catchments are those exposed to contamination from dirty water generating areas indirectly, together with those areas considered to be low contaminant yielding zones, e.g. Light Industry, General Laydown, etc.
- Bulk stormwater channels to be designed for the 1:50 year return period as follows:
    - The bulk network will consist of an unlined (vegetated) trapezoidal channels that divert runoff from the higher lying catchments around the proposed development site. These are referred to as "Clean Water Channels" and will have shallow side slopes (maximum of 1:2 V:H) to ensure that planting can take place and vegetation can suitably establish.
    - "Dirty water channels – low risk" are also trapezoidal open channels, but rather receive runoff from low risk areas or indirectly from high pollution risk catchments. These channels are lined with blocks. These blocks, together with the vegetation that will grow in them will increase the trapping efficiency of the system, thus mitigating the impact of pollution on the receiving network.
    - "Dirty water channels – high risk" channels will be concrete lined trapezoidal channels in which polluted water from high risk catchments is managed. These systems must be lined to prevent infiltration and contamination of the substrate of the development and groundwater network. Any silt or deposits that collect in this network over time must be removed and disposed of in a safe manner as part of the port's operation and management philosophy.
- Pollution Control Ponds (lined with HDPE) will receive and contain runoff generated from dirty water (high risk) zones. Contaminated water collected in these ponds will be contained and evaporated and the sludge removed and recycled to the manganese process stream. These ponds will be designed for 1:50 year return period.

- Overspill from the pollution control ponds will be collected in dirty water (low risk) channels.
- The total post-development runoff generated for the site will be attenuated to the 1:50 year pre-development condition in unlined detention ponds and discharged to the receiving natural environment (i.e. the ocean).

5.8.2.4 Electrical

Investigations and design basis

The investigations undertaken entailed:

- Liaison with the supply authority (Eskom) to determine the parameters of the existing supply, as well as availability capacity;
- Determine the load requirements from the various services for the proposed development; and
- Liaison with the supply authority to determine the requirements for the supply of electricity to the proposed development.

Preliminary design proposals

Eskom only have 5MVA available from their closest substation and the proposed maximum demand for the port development is estimated as follows:

- Phase 1A – 7.5MVA
- Phase 1B – 5.5MVA.

Eskom will have to upgrade their network to accommodate the demand for the Port and its operational requirements. The internal network within the proposed development will consist of the following:

- An intake substation at 22kV;
- Three primary substations with a capacity of at least 8MVA each;
- Seven secondary substations with a capacity of at least 4MVA;
- Fourteen distribution substations with a capacity of at least 500kVA;
- Street lighting;
- Area lighting; and
- Small power and lighting for the buildings.

5.8.2.5 Electronics

Investigations and design basis

The investigations undertaken were as follows:

- Visit to the proposed site to investigate current infrastructure and supporting services in the area;

- Liaise with the local authority to understand the current network infrastructure in close vicinity of the facility;
- Discussions with management and supporting staff of a local port responsible for the import and export of commodities;
- Meet with head of security of the Cape Town harbour;
- Study the International Ships and Ports Security Code to better understand the requirements and the level of protection required for specific assets and infrastructure in a port facility;
- Apply basic design principles for life safety and security systems as per SANS 10139;
- Apply basic design principles for High Voltage Fencing system; and
- Apply design principles for ICT infrastructure.

Preliminary design proposals

The design proposals for various electronic systems are sub-divided into three categories namely:

- Security systems which includes:
    - Electric fencing for general admin area and the entire premises perimeter fence;
    - CCTV coverage along all perimeter fences, including areas identified as security risk areas as well as all access control points;
    - Access control systems at defined vehicle and pedestrian access points; and
    - Specialized coastal and railway protection systems not included, to be considered in future.

- General electronic systems which includes:
    - Fire Detection and public address and evacuation systems for buildings and external general areas;
    - Building Management System integrating all security and alarms systems back to a centralised security control room;
    - Security Control Room to house all head-end equipment for all security and electronic systems; and
    - Port Control Centre.

- Internet and Communication Technology (ICT) services which includes:
    - Fibre connection from ISP to main fibre distribution frame;
    - Local Area Network (LAN) rooms located in strategic positions for the termination of fibre and distribution of data points;
    - Network equipment required for a fully operational network;
    - Microwave links for a redundant communication link; and
    - Manhole and sleeve infrastructure.

5.8.2.6 Fuel

A liquid bulk storage facility is provided as part of the Phase 1A development. The facility consists of 2 No. 35,000m^3 fuel storage tanks and tanker loading facilities. It is envisaged that the tanker vessels will berth at the MPT berth and discharge into the storage tanks via pipeline.

The liquid bulk storage facility provided in Phase 1A represents the first phase development of the overall liquid bulk terminal envisaged in the port masterplan.

5.9 Internal Port Roads and Bridges

5.9.1 Port Access Interchange

The proposed interchange leading off the R382, 60 km north of Port Nolloth, was designed due to the expected large traffic volumes of heavy vehicles. This ensured that the interchange allowed for a continuous flow of traffic in all directions.

5.9.2 Port Access Control

Separate entrances, an access gateway only, and a combined weighbridge and access gateway, were designed so that multiple trucks can queue whilst they wait to be weighed. This prevents congestion along the Main Boulevard, especially for those vehicles using the route to get to the administration building.

5.9.3 Truck Offloading Area

From the traffic assessment, it was found that three offloading terminals were required. The offloading area was designed so that each terminal would operate independently. This prevents further congestion and allows for the offloading processes to continue even if one of the offloading terminals were to be inoperative.

5.10 External Roads

Boegoebaai is located on the west coast of South Africa, between Alexander Bay and Port Nolloth. The roads leading to Boegoebaai from the Northern Cape mines consist of National and Provincial bituminous surfaced roads. The road network that links Boegoebaai to the interior consists of the connectivity to Namibia via the N7, north of Springbok to Keetmanshoop via B1 as portrayed below.

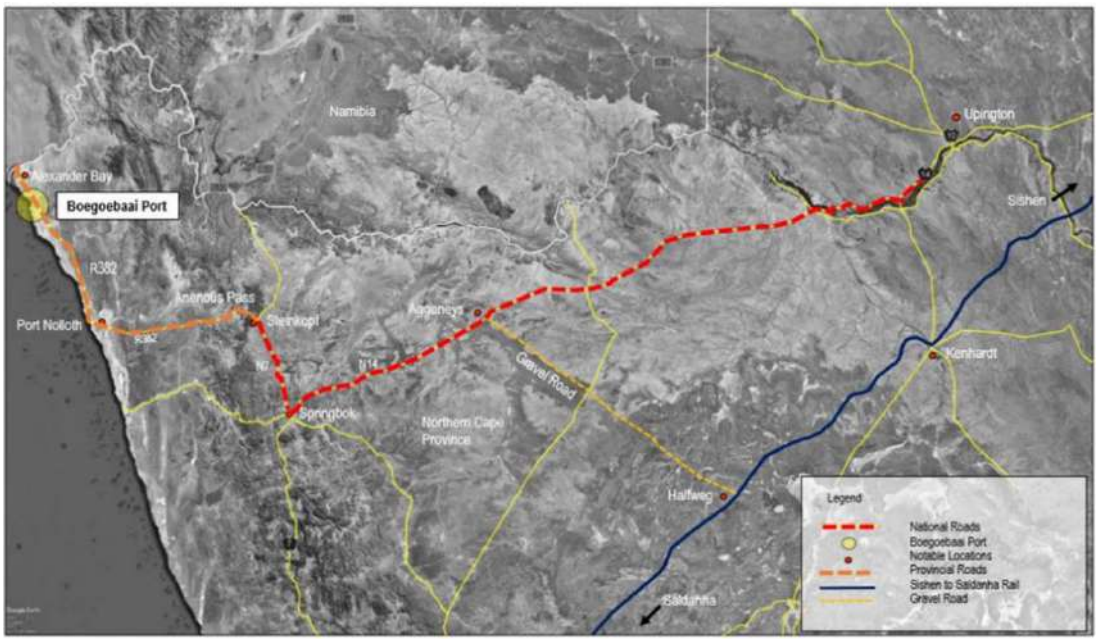


Figure 5-16: Locality Plan showing the external road network

National Road N7, from Cape Town to Namibia, and N14, from Springbok to Upington, in the Northern Cape fall under the South African National Roads Authority (SANRAL).

Provincial road R382 leads off the N7 from Steinkopf (70 km north of Springbok) to Port Nolloth, a length of approximately 90 km of bituminous surfaced road. The road from Port Nolloth to Alexander Bay (R382) is a bituminous surfaced road. Boegoebaai is approximately 60 km north of Port Nolloth.

Table 5-6: Road network between the Northern Cape Mines and Boegoebaai (external to port)

Route	Road	Length	Comments
Sishen to Upington	N14	230 km	National Route, Class 1, surfaced
Upington to Springbok	N14	370 km	National Route, Class 1, surfaced
Springbok to Steinkopf	N7	50 km	National Route, Class 1, surfaced
Subtotal National Routes		***650 km***	
Steinkopf to Port Nolloth	R382	90 km	Provincial Trunk Road, surfaced
Port Nolloth to Boegoebaai	R382	60 km	Provincial Road, surfaced
Subtotal Provincial Roads		***150 km***	
Total length of Road Network		***800 km***	

Based on the commodity demand and the locality of the Northern Cape Mines, it is envisaged that the first phase of the development of the port will attract the mining ore transported via trucks along the road corridor shown in Figure 5-17.

The basis of the design will utilise appropriate standards applicable to the existing conditions, with the provision of suitable localised geological material to rehabilitate the road infrastructure to prolong the residual life of the network.

Provincial road R382 between Steinkopf to Port Nolloth, and from Port Nolloth to Alexander Bay is envisaged to be utilised by the Northern Cape mines as the route to transport the mining commodity via road during the initial phase of the port until the viability of the rail forms part of the future phase development of the port terminal.

Figure 5-17: R382 between Steinkopf and Port Nolloth

The Northern Cape Provincial Department of Roads and Public Works (DR&PW) is the road authority responsible for maintaining an asset of 27,348 km of its road network.

Only 13% (3,500 km) of the Northern Cape Province has been upgraded to bituminous (tarred) surfaced standards. The balance of the roads can be categorised as lower order class 4 gravel roads.

Traffic volumes on the paved network are predominantly low, with 60% of these roads carrying less than 500 vehicles per day, and only 23% carrying more than 1,000 vehicles per day. For unpaved roads, 70% carry less than 50 vehicles per day, and only 3% more than 250.

Figure 5-18: R382 between Port Nolloth and Boegoebaai

According to the Northern Cape Provincial Road Asset Management Plan (RAMP) report (Northern Cape Department of Roads and Public Works, 2018) the overall condition of paved DR&PW roads can be classified as on the border between fair and good.

This analysis determined the impact of the current DR&PW funding levels considering the following interventions: reseal, rehabilitation, re-gravelling and upgrading of unpaved roads to paved standards. The funding level for the DR&PW road network, according to the current DR&PW allocation (2018), is estimated at R740 million annually (Northern Cape Department of Roads and Public Works, 2018).

The RAMP analysis derived at the following outcomes regarding the current MTEF funding:

- The current funding level for the DR&PW roads is not sufficient to maintain the road network, whether paved or unpaved, at current condition, nor increase the performance levels; and
- The paved roads will deteriorate to levels worse than the current condition due to insufficient funding, and the optimal allocation of funds between road types and treatments will also not improve the situation. The paved network already has a high rehabilitation need that will continue to increase, unless specifically addressed through additional funding. The average network condition is expected to deteriorate to the mid fair condition category in 10 years (Northern Cape Department of Roads and Public Works, 2018).

SANRAL and the Northern Cape Provincial DR&PW are the road authorities responsible for the National and Provincial Roads respectively. Annual budgetary allocations are made to the road authorities. The Boegoebaai port development will attract heavy laden mining trucks along the corridor of N14, N7 and R382. The current budgets of the road authority have not taken the port development into consideration. It would be onerous to assume that the damage factor to the road asset resultant of the trucks delivering ore to the port should be paid for by the road authorities. Some funding mechanism needs to be established to rehabilitate the roads to maintainable standards. This funding could be in the form of concessions, tolling or levies.

As it is unlikely that the R382 will last for the duration of the envisaged loading by the mining commodity being transported to Boegoebaai port, it is proposed that the NC Provincial Government include the upgrade of this road in a broader portfolio of enabling projects under the NCDTSL.

Some funding mechanism needs to be established to rehabilitate the roads to maintainable standards. This funding could be in the form of concessions, tolling or levies (royalties) derived from cargo transported to the new port and the OREX railway line.

It is proposed to rehabilitate/reconstruct the R382, with a pavement design life of 25 years, requiring an ES30 pavement design that would be able to carry 30 million E80's over 25 years.

The pavement design, based on the commodity demand study, will be as follows:

- 50mm asphalt wearing course
- 150mm G1 Base, imported graded crushed stone
- 300mm C3 Subbase, in-situ recycling (CIR) the existing base course, stabilized with cement.

In addition to the higher pavement design specification, some climbing lanes would be required on the Anenous Mountain Pass between Steinkopf and Port Nolloth. The estimated costs for the rehabilitation/reconstruction and improvement on the R382 amounts to about R1.85 Billion.

An allowance for the economic impact due to the required road upgrades has been included in the Cost Benefit Analysis but as the road upgrade project is external to the port project it is not included in the capital budget of the port.

5.11 Earthworks

For Phase 1A, the bulk earthworks of the project consist of the construction of four major platforms:

- Platform 1a – Dry Bulk and MTP;
- Platform 2 – Port Administration;
- Platform 3 – Port Entrance; and
- Platform 4 – Liquid Bulk Terminal.

All platforms were designed in such a way to accommodate overland stormwater drainage.

The geotechnical report (SRK Consulting, 2018) classifies the materials for the three trial pits between G7 and G9 quality material (TRH14 Classification). The report further describes the materials as wind deposited Aelolian soils, which are poorly consolidated and are not suitable for founding even lightly loaded structures without treatment of some sort to stabilise and strengthen the material. The report also recommends that further individual geotechnical investigations may be required for heavily loaded structures due to the lateral variability of materials encountered. This may have been influenced by historical mining activities done in the area.

Provided that the material on site is suitable for its intended purpose, the amount of imported material necessary for the Platforms 1a, 2 and 4 is equal to 1,100,000 m^3 of earthworks material.

The extent of the roads constructions covers the construction of the main boulevard, the off-ramps from the R382 (North and South direction), the on-ramps to the R382 (North and South direction), roads to the port authority buildings (on platform 2), truck offload entrance road and truck offload return road.

Provided that the material is suitable for its intended purpose, the amount of excess material to be removed from site is 42,000 m^3. This excess material could be used as fill material for the platforms.

If, during the excavation of materials, boulders of five tons or more are excavated, these boulders will be intended for the construction of the breakwater. In this event, the loss of this potential fill material will need to be compensated for by increasing the amount of imported fill material.

5.12 Future Rail Considerations

The possible route alignment of a future rail line linking the Northern Cape mines to the port of Boegoebaai was investigated. The challenges encountered related predominantly to the terrain and the geometric constraints of descending the mountain range of the Anenous Mountain Pass.

A previous study on the potential of developing a port in Boegoebaai (Shand, 1980) identified the potential rail alignment linking Boegoebaai port to the Sishen Saldanha rail line. Whilst the proposal recognised a similar route linking the Boegoebaai port to the existing OREX line, Figure 5-19 reflects the investigation undertaken during this study in identifying the engineered route alignment.

The route covers 500 km in length and connects the Boegoebaai Port with the Sishen to Saldanha line south of Kenhardt. Possible iterations of route locations covering areas of Oorkruis could be investigated. While the initial phase of the port development (Phase 1A) does not include the provision of a rail linkage, it is noted that significant lead time is required to commission a rail line of this magnitude.

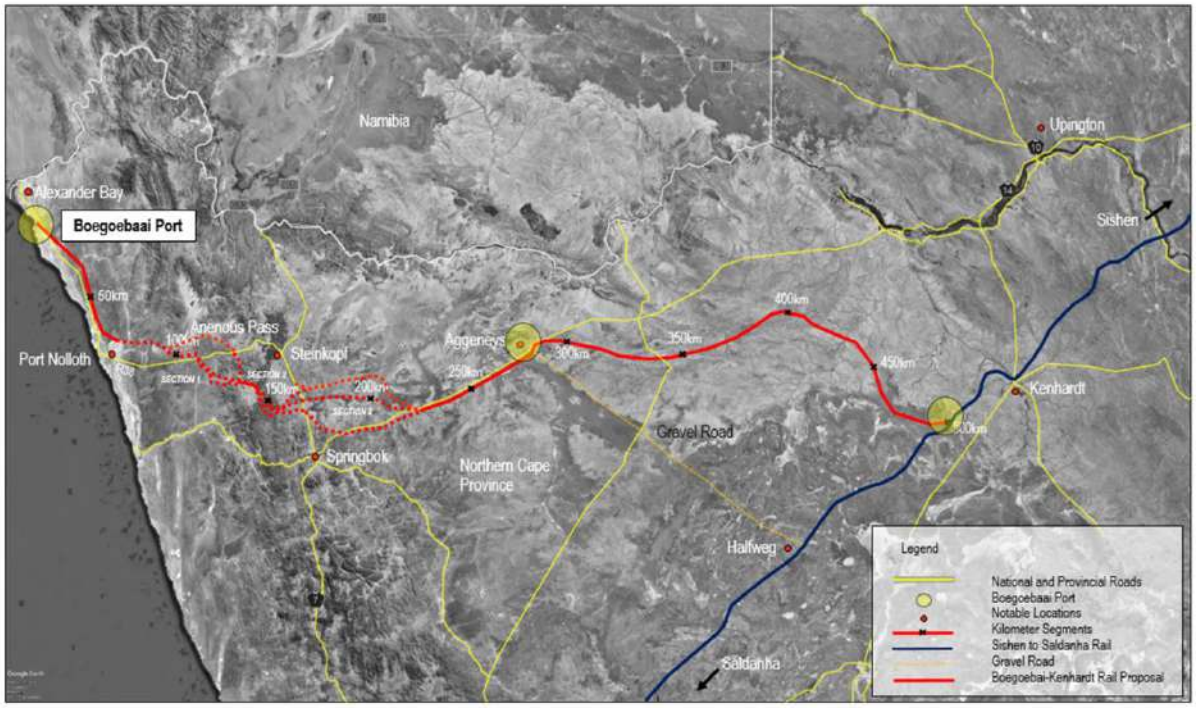


Figure 5-19: Route location investigation of the future possible rail

5.13 Cost Estimate

5.13.1 Capital Cost Estimate: Phase 1A

This FEL 2 (- 20% to + 30% level of accuracy) Phase 1A capital cost estimate was prepared taking into consideration the layouts and basic engineering information presented in the Design Report and supporting drawings for the capital cost elements within the port boundary.

The estimate is derived using a combination of measured preliminary quantities and corresponding current or escalated unit rates largely based upon an internal rates database supported by indicative market related pricing information received from specialist contractors and suppliers. Built-up rates and prices are used where no relevant rates or prices are available.

5.13.2 Scope Exclusions and Assumptions

The capital cost estimate for Phase 1 A does not consider the following:

- Phase 1B Capital Costs (internal and external to the port boundary such as the rail line).
- Provision of bulk services external to the port boundary.
- Provision and maintenance of access roads.
- Relocation or restitution costs as a result of the land purchase.
- Local or other authority approvals.
- Allowance for compensation to third parties.
- Allowance for market adjustment due to local and international demand, availability of skills, resources and materials.
- Rate of exchange adjustment.
- Escalation pre-tender and post contract award.
- Allowance for project wide contingency other than design development and construction related risks contingency.
- Allowance for owner's costs other than provision for Owners Engineer.
- Possible adjustment of costs due to contracting strategy and contractual requirements.
- Value Added Tax or other foreign or South African taxes, royalties and duties.

The estimate is based upon the following assumptions:

- All piling is founded in rock material.
- The rock material required for the Breakwater is available from a new purpose established quarry approximately 3 km from site, operated by the marine contractor.
- Sufficient rock volume of suitable quality is available from the new quarry situated approximately 3 km from the site.
- No dredging will be required.
- Accommodation for local labour, if required, will be provided by others as part of the project wide establishment costs or within the surrounding community.
- The construction contracts will be placed separately for marine civil infrastructure, marine services and materials handling components.
- Bulk water and electricity for construction purposes will be supplied by others and the consumption will not be charged for.

5.13.3 Estimate Base Date and Foreign Currency

The scope of the estimate is subject to the following assumptions:

- Cost base as at October 2018.
- Exchange Rate (Dollar) - $ 1.00: R 14.50.
- Exchange Rate (Euro) - € 1.00: R 16.40.
- Exchange Rate (Pound) - £ 1.00: R 18.70.

No allowance has been included for fluctuations in the rate of exchange used for imported content or for changing market conditions and escalation beyond the base date of the estimate.

5.13.4 Allowances

Preliminary and general (P&G), design development and construction risk, professional fees as well as EPC project management costs and owner's engineers cost allowances have been included in the final cost estimate. In addition to these, a location allowance has been included to account for any costs incurred due to potential limitations and availability of material to the area, additional transportation costs and staff site allowances due to the remoteness of the site. No allowance has been included for fluctuations in the rate of exchange used for imported content or for changing market conditions and escalation beyond the base date of the estimate. A summary of the allowance percentages can be seen below.

- P&G allowances are set at between 10% and 35% of the direct capital cost of each cost element and vary depending on the nature of the work;
- Design development and construction risk allowance, included to cover design, construction and pricing uncertainties due to the level of design information available at this FEL 2 stage of the project is set between 2% and 10%. This is a percentage of the total value of construction work, including P&G allowances, and is included in the direct capital cost estimate;
- A location allowance set between 1% and 5%, depending on the element of work, is included to cover the potential limitations and availability of material in the area, and to cover the staff site allowances and additional transportation costs due to the remoteness of the site. It is included in the base capital cost estimate as a percentage of the total value of construction work, including P&G and design development allowances;
- A professional fee allowance between 1% and 8% has been included in order to cover design fees. The percentage allowance is based on the fee scale principals recommended by the Engineering Council of South Africa (ECSA) as published in Government Gazette No. 38324 on 12 December 2014 which varies depending on the nature and scale of the work. It is included in the direct capital cost estimate as a percentage of the total value of construction work, including P&G, design development allowances and the location factor;
- An EPC project management allowance between 3% and 5% has been included as a percentage of the total direct capital cost has been included to provide for the cost associated with the supervision during the construction phase; and
- An owner's engineer allowance of 1.5% of the total direct capital cost has been included for owner engineering oversight during the construction phase.

5.14 Capital Cost Estimate Summary

The estimated capital costs for the Boegoebaai Phase 1A study for elements within the port boundary is R12.216 billion.

The breakdown of the estimated capital costs for the Port Authority and three Terminal Operators are shown in Table 5-7 to Table 5-10.

Table 5-7: Port Authority Marine Infrastructure Capital Costs

Port Authority Marine Infrastructure Capital Costs	
Description	**Amount (R millions)**
Rubble mound breakwater	3 834
Piled quay structure	865
Piled access trestle	96
Tug harbour	241
Marine Services	693
General Earthworks	133
Services	100
Sub-total	**5 962**
Professional Fees[1]	-
EPC Project Management Costs	297
Owners Engineers Costs	89
Port Authority Marine Infrastructure	**R 6 348**
1. Note the professional fees of R254 mill is added to the PDF	

Table 5-8 : Port Authority Landside Infrastructure Capital Costs

Port Authority Landside Infrastructure Capital Costs	
Description	**Amount (R millions)**
Civil	899
Transportation	231
Electrical	506
Electronic	188
Buildings	446
Terminals	260
Sub-total	**2 530**
Professional Fees[2]	-
EPC Project Management Costs	25
Owners Engineers Costs	21
Port Authority Landside Infrastructure	**R 2 576**
2. Note the professional fees of R 156 million is added to the PDF	

Table 5-9: Dry Bulk Terminal Infrastructure Capital Costs

Dry Bulk Terminal Infrastructure Capital Costs Capital Costs	
Description	**Amount (R millions)**
Equipment	1 014
Conveyors	618
Civils Works	43
Sub-total	**1 675**
Professional Fees[3]	84
EPC Project Management Costs	50
Owners Engineers Costs	25
Dry Bulk Terminal Infrastructure	**R 1 834**
3. Professional fees allocated for Terminal Operator design fees	

Table 5-10: Multi-purpose Terminal Infrastructure Capital Costs

Multi-purpose Terminal Infrastructure Capital Costs	
Description	**Amount (R millions)**
Equipment	171
Sub-total	**171**
Professional Fees[3]	8
EPC Project Management Costs	5
Owners Engineers Costs	3
Multi-purpose Terminal Infrastructure	**R 187**
3. Professional fees allocated for Terminal Operator design fees	

Table 5-11: Liquid Bulk Terminal Infrastructure Capital Costs

Liquid Bulk Terminal Infrastructure Capital Costs	
Description	**Amount (R millions)**
Tanks / Civils	142
Equipment	142
Sub-total	**284**
Professional Fees[3]	16
EPC Project Management Costs	5
Owners Engineers Costs	12
Liquid Bulk Terminal Infrastructure	**R 317**
3. Professional fees allocated for Terminal Operator design fees	

Table 5-12: Phase 1 A Capital Costs Summary

Capital Costs Summary (R millions)				
Description	**Port Authority**	**Dry Bulk Terminal**	**Multi-purpose Terminal**	**Liquid Bulk Terminal**
Marine Infrastructure	6 348			
Landside Infrastructure	2 316	193	87	159
Equipment		1,834	187	159
Total	**R 8 644**	**R 2,027**	**R 274**	**R 317**
Sub-Total				**R 11 262.5**
General Design & Development Cost (PDF)[4]				**R 773**
Success Fee[5]				**R 180.5**
Total Phase 1A Project Capital Cost				**R 12 216**
4. TA1 development cost of R73 mill is included **5. Budget for success fee of 1.5% of Capital provided**				

5.15 Capital Cost: Roads External to the Port Boundary

This FEL 2 Phase 1A capital cost estimate was prepared taking into consideration the layouts and basic engineering information presented in the Design Report.

5.15.1 Scope Exclusions and Assumptions

The estimate exclusions are similar to those stated for the Phase 1A capital costs. The estimate is based upon the following assumptions:

- Budgets are available to procure the services.
- An EIA is excluded from the cost estimate.
- The road works are based on rehabilitation works for the R382, excluding the N7 and N14.
- No deviation routes will be investigated, the road works will be done in half widths.
- No additional lanes will be provided.
- Suitable material is available.

5.15.2 Estimate Base Date and Foreign Currency

The Estimate Base Date and Foreign Currency assumptions are the same as what has been stated under the capital cost estimate section.

5.15.3 Capital Cost Estimate Summary

The estimated capital cost for the roads external to the port boundary for the Boegoebaai study are summarised in Table 5-13 below.

Table 5-13: Roads Capital Costs External to the Port Boundary

Roads Capital Costs External to the Port Boundary	
Description	**Amount (ZAR Million)**
Roads	1 725
Sub-total	**1 725**
Professional Fees	79
EPC Project Management Costs	15
Owners Engineers Costs	31
Roads Capital Costs External to the Port Boundary	**R 1 850**

5.16 Construction Schedule

The estimated construction period for the Phase 1A marine works is 44 months from mobilisation. The schedule's critical path entails the construction of the main breakwater, specifically the precasting and placement of Cubipods on the main breakwater. The construction schedule and critical path is summarised in Figure 5-20.

It is estimated that the first vessel may be accommodated in 2025 (after 36 months) whilst both berths will be operational in 2026.

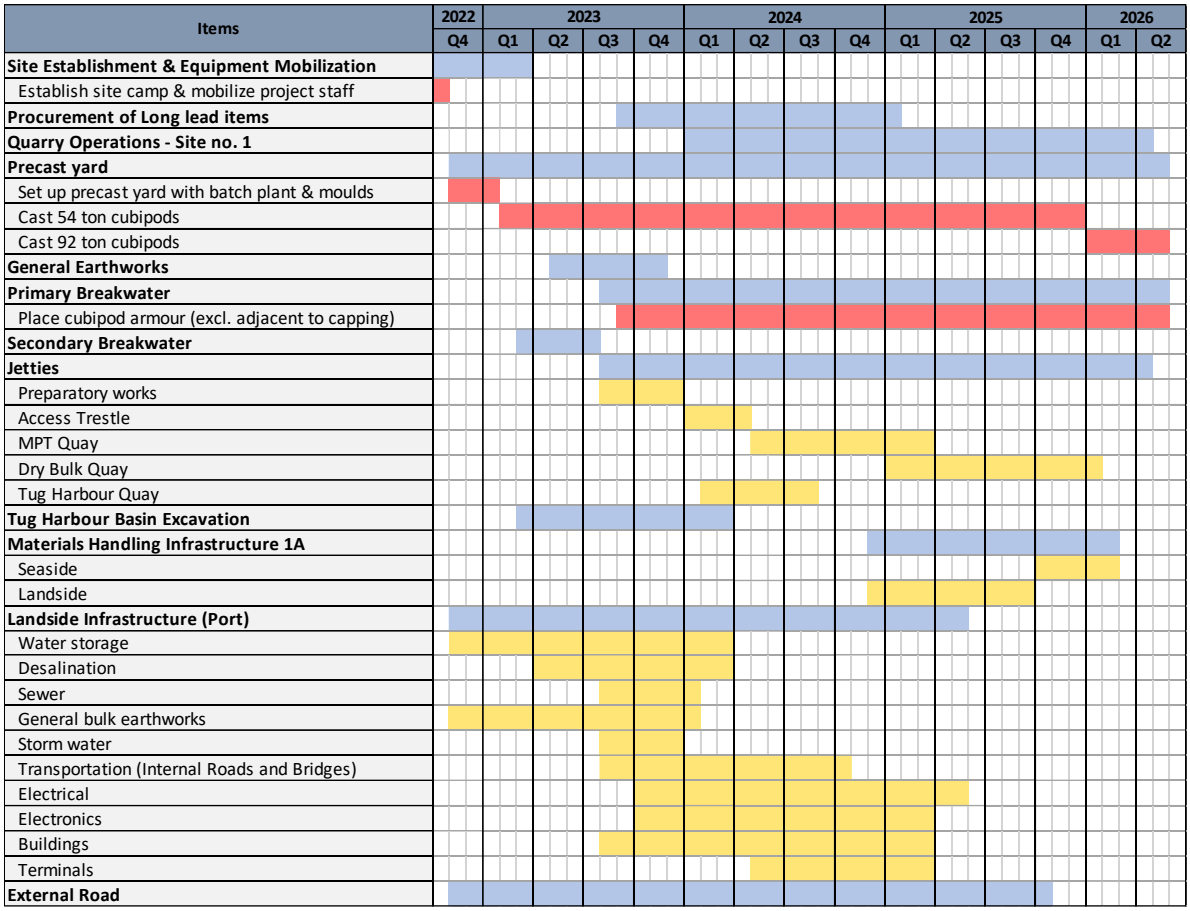


Figure 5-20: Phase 1A construction schedule

It is worth highlighting the following assumptions with regards to the construction schedule durations:

- The contractor will prioritise the excavation of the admin craft basin as the initial source of rock for breakwater construction. This allows the quarry to be established after the main breakwater construction commences, creating float in the programme for temporary haul road construction and quarry preparatory works.
- Construction of the main breakwater's concrete capping can commence prior to completion of the rock and armour unit placement.
- The access trestle construction commences as late as possible to maximise the protection from the main breakwater from wave conditions. Sufficient time risk allowances will be included to ensure that the piling works does not delay the critical path.
- Material handling equipment is constructed and installed as late as possible to mitigate construction congestion on the quays. There will be a short period of time where material handling installations and dry bulk quay construction will run in parallel, however there will be float on these activities.

5.17 Risks

Risk management is a structured process to identify, evaluate and respond to risks with the aim of reducing the uncertainties they have on project objectives. A Risk Management Plan has been prepared by PRDW (2018b) to address and quantify the uncertainties that exist, as far as possible, to enable the mitigation of risks and make an allowance for the possibility of risks materialising. The risk assessment was undertaken based on a probabilistic method of risk analysis.

A risk workshop took place on the 2nd November 2018 to identify and discuss the design and construction risks and to develop mitigation options. A total of 37 risks were identified and allocated to 8 risk categories. Mitigation options were also workshopped. The top 10 risks contributing the most to cost uncertainty are illustrated in Figure 5-21.

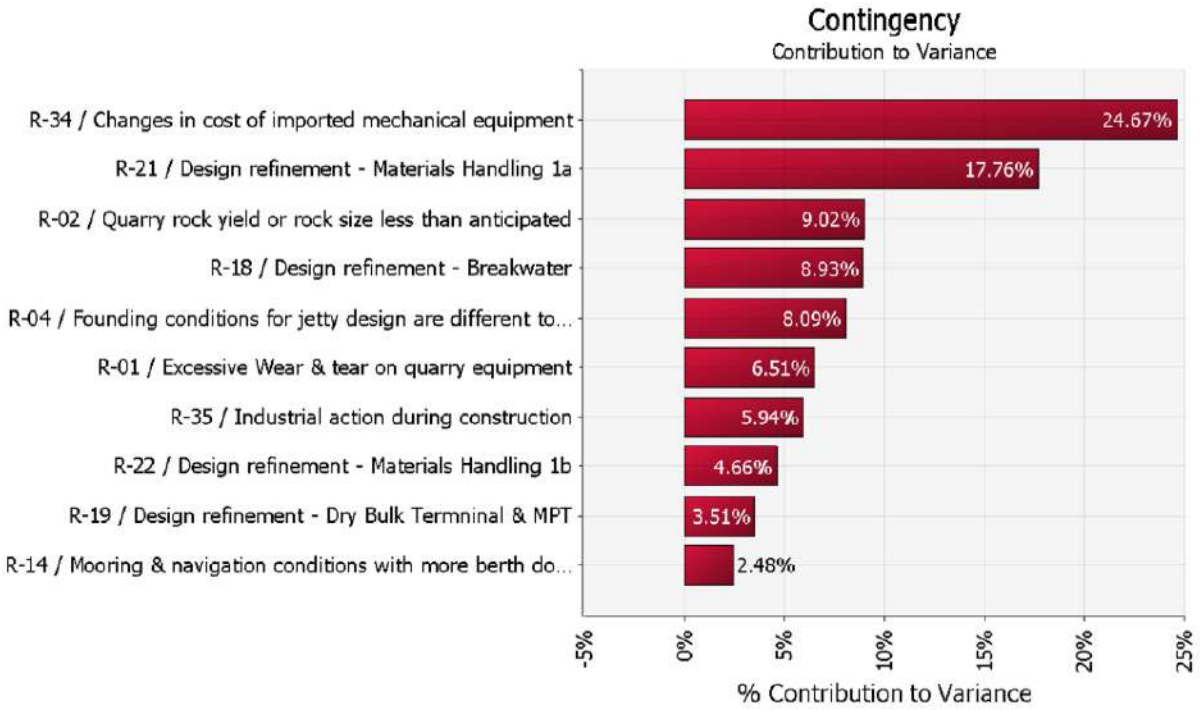


Figure 5-21: Top 10 risks contributing to uncertainty

In terms of reducing uncertainty of design and construction risks in the next phase, it is recommended that mitigation measures are focused on the top five risks identified above. A summary of their mitigation measures is described below:

1. Changes in cost of imported mechanical equipment – The reclaimers, shiploaders and stacker costs have been estimated in US Dollars and this is being affected by exchange rate uncertainty. To reduce cost uncertainty in the next phase, it is recommended that the structures be reviewed to identify suitable local supply items. For the remaining imported items, the client could consider consulting an economist to achieve a greater level confidence in the forecasted range of exchange rates or consider the cost of forward cover. This will reduce the cost uncertainty but comes at a price.

2. Design Refinement – Breakwater: Due to the large CAPEX value of the breakwater structures minor refinements in the design could have large capital cost impacts for the project, creating cost uncertainty. It is recommended this risk is reassessed in the next phase after critical design inputs such as a physical model of the breakwater and geotechnical information are refined. This will increase the confidence level in the breakwater quantities and reduce cost uncertainty.

3. Design Refinement – Materials Handling: Similar to the risk above, the level of design detail of the materials handling infrastructure for Phase 1A and the large capital value means that relatively small refinements in the design detail could result in large cost impacts. It is recommended this risk is reassessed in the next phase after a more detailed design has been developed.

4. Quarry rock yield or rock size less than anticipated: It is recommended that the client considers the cost of establishing a pilot quarry and carry out further testing of rock properties in the next phase. This should include the optimisation of blast design aimed at producing the required yield.

5. Overtopping – Breakwater: The breakwater design is sensitive to small changes in the design wave, which could have large capital cost impacts for the project. It is recommended that the client conducts a physical model study in the next phase to check the numerical model, consider carrying out extensive metocean data collection and consider a peer review of the coastal process modelling.

A P80 value (i.e. a modelled 80% probability of the cost not being exceeded) is considered most appropriate as a cost contingency allowance. This value has been included in the cost estimate to make allowance for design and construction risks.

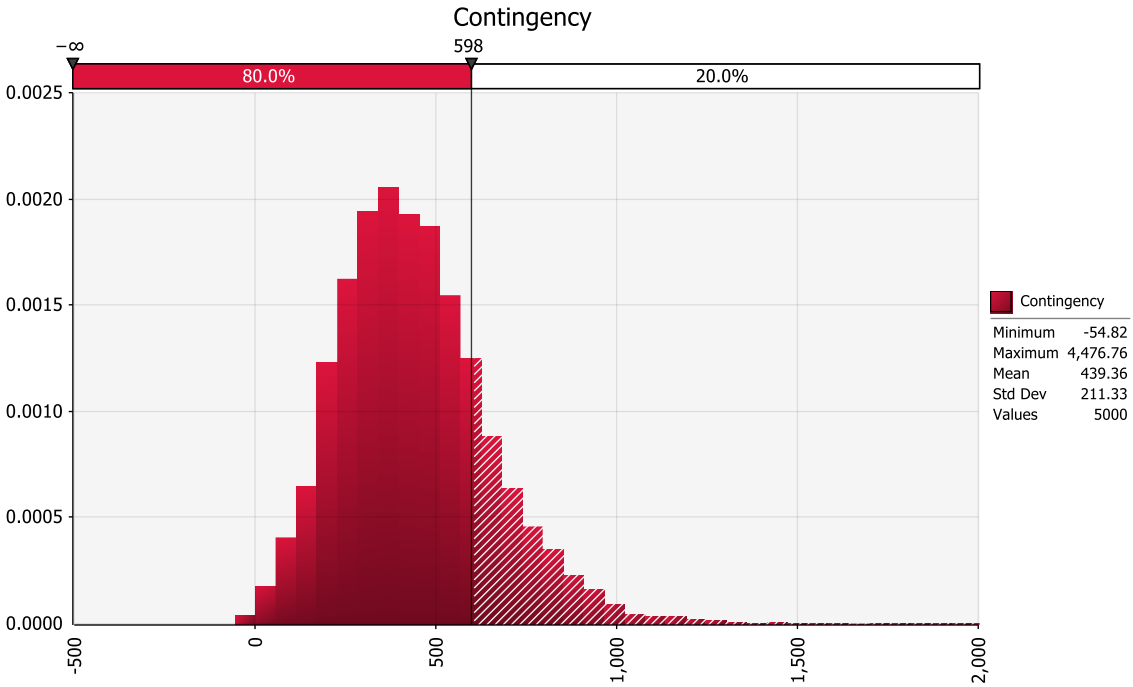


Figure 5-22: P80 value of the modelled contingency distribution

It is important to highlight that the scope of the risk assessment in this phase of the project is limited to design and construction risks only. It is recommended that a quantitative analysis of all risks associated with the project be carried out to develop a comprehensive risk management plan and to identify an appropriate project wide cost contingency. Some of the additional project-wide risks that should be considered are: Eskom's ability to meet the energy demands of the new port; the condition of existing road infrastructure to the port entrance; environmental authorizations and conditions risks; procurement risks; property acquisition risks; economic risks other than exchange rate fluctuations for the construction phase (i.e. tax rates, etc.); and business case risks (funding, revenue, tariffs, OPEX, etc.).

ENVIRONMENTAL **SCREENING**

6. Environmental Screening

6.1 Scope of Environmental Screening

The objectives of the Environmental Screening were embarked on for the Boegoebaai project to:

- Describe the existing environment (social and bio-physical) components of the receiving environment;
- Assess whether the receiving environment contains any features that could prevent the project from proceeding or require excessive mitigation to be acceptable;
- Identify the environmental authorisation (including environmental, water, waste and heritage) that will be required to implement the project;
- Describe the processes and studies required to obtain environmental authorisations; and
- Provide a Terms of Reference and budget estimate for the identified Environmental Studies.

6.2 Assumptions and Limitations

The following assumptions and limitations apply to the environmental screening:

- The Environmental Screening is based on the description of the project provided.
- No electricity will be generated during any phases of the project (except possibly photovoltaic installations of < 10 megawatts).
- Water for pre-construction (investigations) will be obtained from existing licenced service providers.
- Water for construction and operation could be obtained from existing licenced water sources or desalination plants.
- Facilities will include infrastructure for the storage and handling of a dangerous good in a combined capacity of more than 500 cubic meters, where “dangerous goods” means goods containing any of the substances as contemplated in South African National Standard No. 10234, supplement 2008 1.00: designated “List of classification and labelling of chemicals in accordance with the Globally Harmonized Systems (GHS)” published by Standards South Africa, and where the presence of such goods, regardless of quantity, in a blend or mixture, causes such blend or mixture to have one or more of the characteristics listed in the Hazard Statements in section 4.2.3, namely physical hazards, health hazards or environmental hazards.
- There will be no storage of nuclear fuels, nuclear waste, radioactive waste.
- Bulk transportation of a dangerous good (defined above) may be in pipelines (gas or liquid) and by using funiculars or conveyors.
- The development will include a landing strip and helipad.
- Cranes and telecommunication masts may be > 15 m.
- Powerlines for the Transmission and Distribution of electricity with a capacity of > 275 kV and less than 275 kV and associated substations.
- Water Treatment (could be desalination) and Wastewater Treatment Works.
- Liquid waste may be discharged to sea.

6.3 Receiving Environmental

As stated earlier, the majority of the land is owned by the Richtersveld Sida !Hub CPA. The land is currently occupied by Alexkor for diamond exploration purposes in a pooled joint venture with the Richtersveld Mining Company. Alexkor SOC Limited (Alexkor) and the Richtersveld Mining Company (Pty) Ltd (RMC) have formed a Pooling and Sharing Joint Venture (PSJV) in order to oversee all current and future mining activities related to Alexkor's mining rights.

The PSJV thus manages an onshore and four marine mining rights on and off the West Coast of South Africa. These Mining Rights are located roughly between the Orange River in the north and Kleinzee in the south.

The current mining activities are approved and executed under three approved Environmental Management Programmes (EMPrs), as amended. The Boegoebaai Port could potentially impact on the areas under mining rights 550MRC (landside), 554MRC (coastal) and 10025MRC (offshore). The intention is for Alexkor to complete their mining activities in the areas to be affected by the proposed Boegoebaai Port before the commencement of construction. The PSJV outsources the majority of the marine prospecting and mining operations to contractors.

Figure 6-1: Location of Mining Rights

6.4 Climate and Ocean Currents

The West Coast is influenced by the Benguela Current system which is characterised by coastal upwelling of cold nutrient-rich water and is an important centre of plankton production, that supports a global reservoir of biodiversity and biomass of sea life.

Winds, predominantly from the south-east, are one of the main physical drivers of the nearshore Benguela region as portrayed below.

The wave swells coming predominantly from the south-west direction.

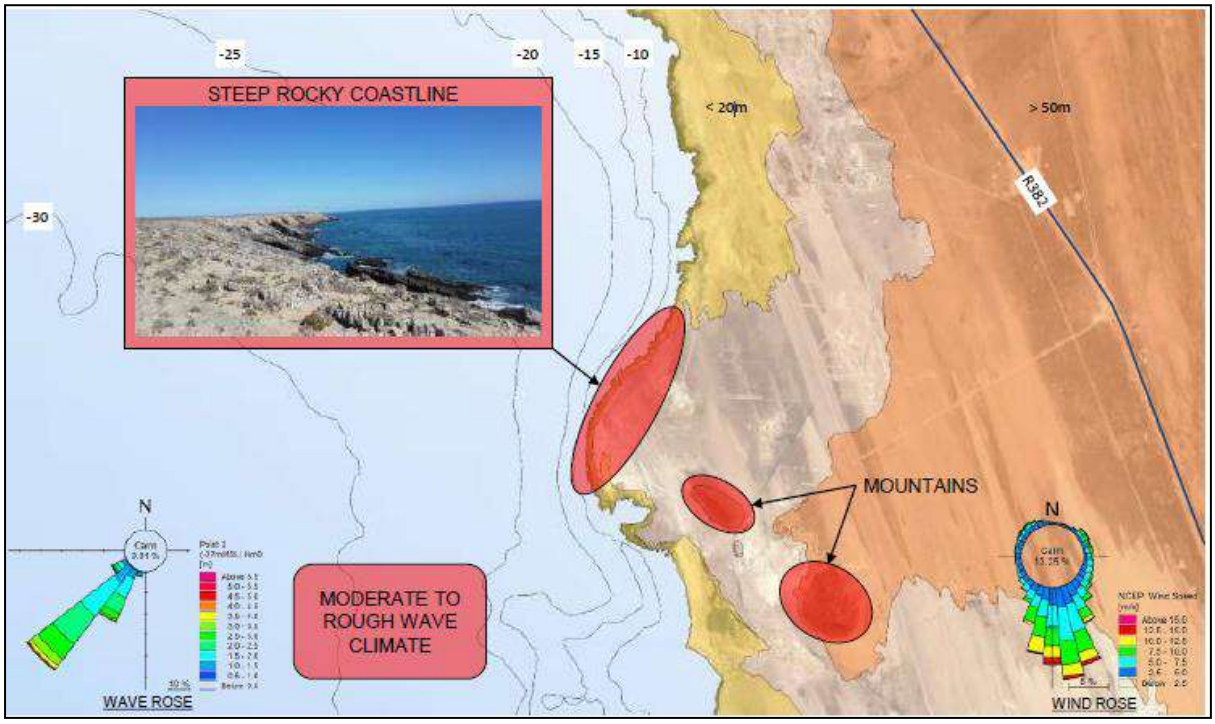


Figure 6-2: Climate and Geomorphology

(Source PRDW, 2015)

6.5 Geophysical Characteristics

The site for the proposed Boegoebaai Port is on rugged rocky section of the coastline that sloped steeply seawards before reaching the shelf break at a depth of 300 m.

The bedrock along the coastal section of the site is white quartzite, as depicted below.

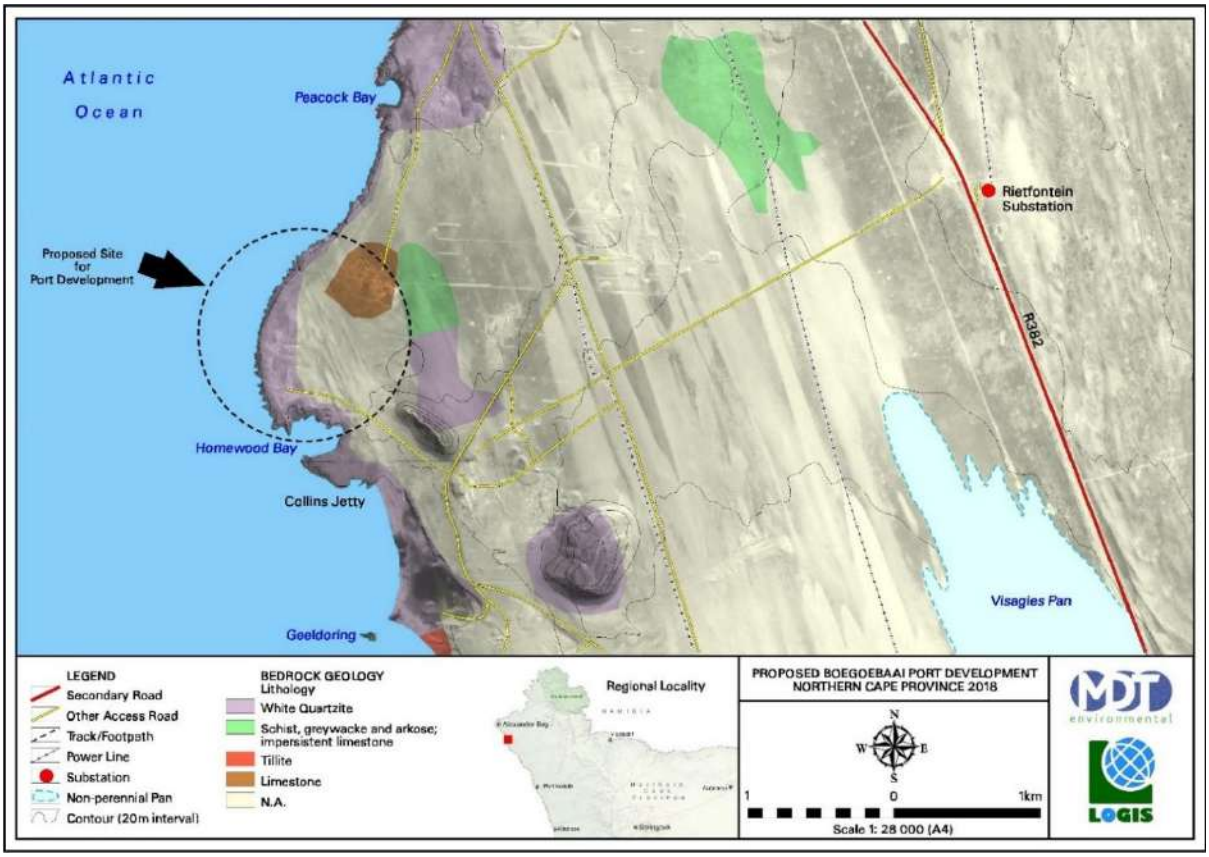


Figure 6-3: Bedrock Geology

6.6 Biological Characteristics

6.6.1 Bioregion

The study area falls within the cold temperate Namaqua Bioregion. The Benguela system is characterised by the presence of cold surface water, high biological productivity, and highly variable physical, chemical and biological conditions.

6.6.2 Vegetation

The site impacts on Namib Seashore and the Richtersveld's Coastal Duneland vegetation. Part of the Namib Seashore vegetation south of the port site is classified as 'Endangered' and any impact on it should be avoided.

6.6.3 Habitats

Four 'critically endangered' **habitats** (Namaqua Inshore Hard Grounds, Namaqua Inshore Reef, Namaqua Sandy Inshore and Namaqua Sheltered Rocky Coast) and one 'endangered' habitat (Namaqua Mixed Shore) fall within the four Alexkor marine mining right areas.

The proposed Boegoebaai Port may impact on the Namaqua Sandy Inshore habitat.

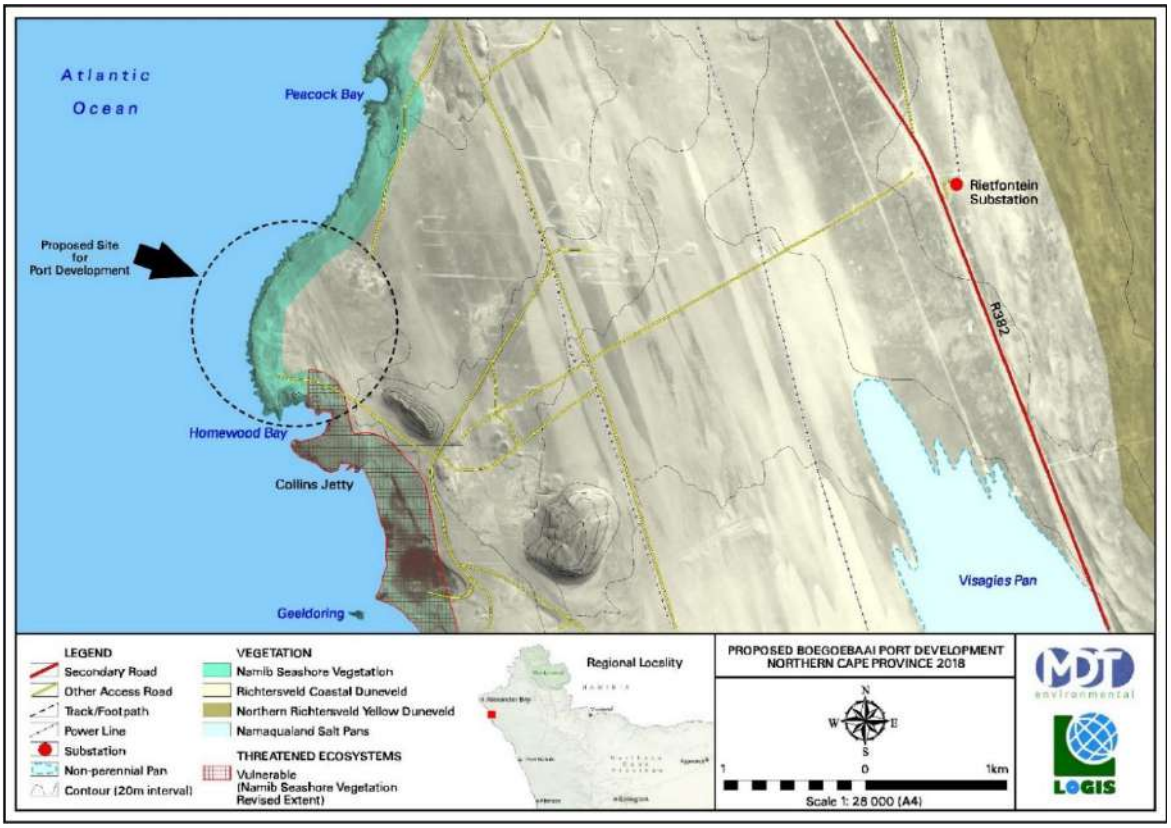


Figure 6-4: Vegetation

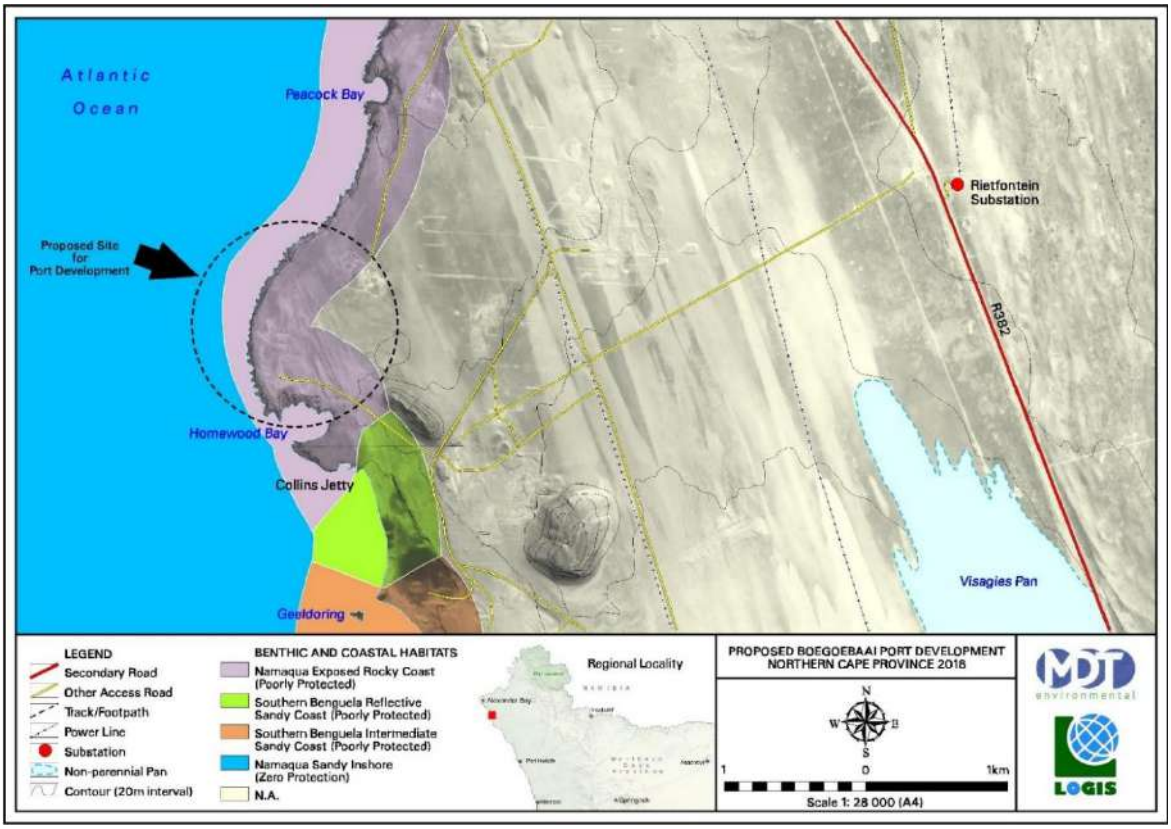


Figure 6-5: Benthic and Coastal Habitats

Rocky shore habitats are generally not particularly sensitive to disturbance with natural recovery occurring within 2 to 5 years (PSJV, 2017). Much of the coastline has also been subjected to decades of disturbance by shore-based diamond mining operations as detailed below. These cumulative impacts and the lack of biodiversity protection have resulted in some of the coastal habitat types in Namaqualand being assigned a threat status.

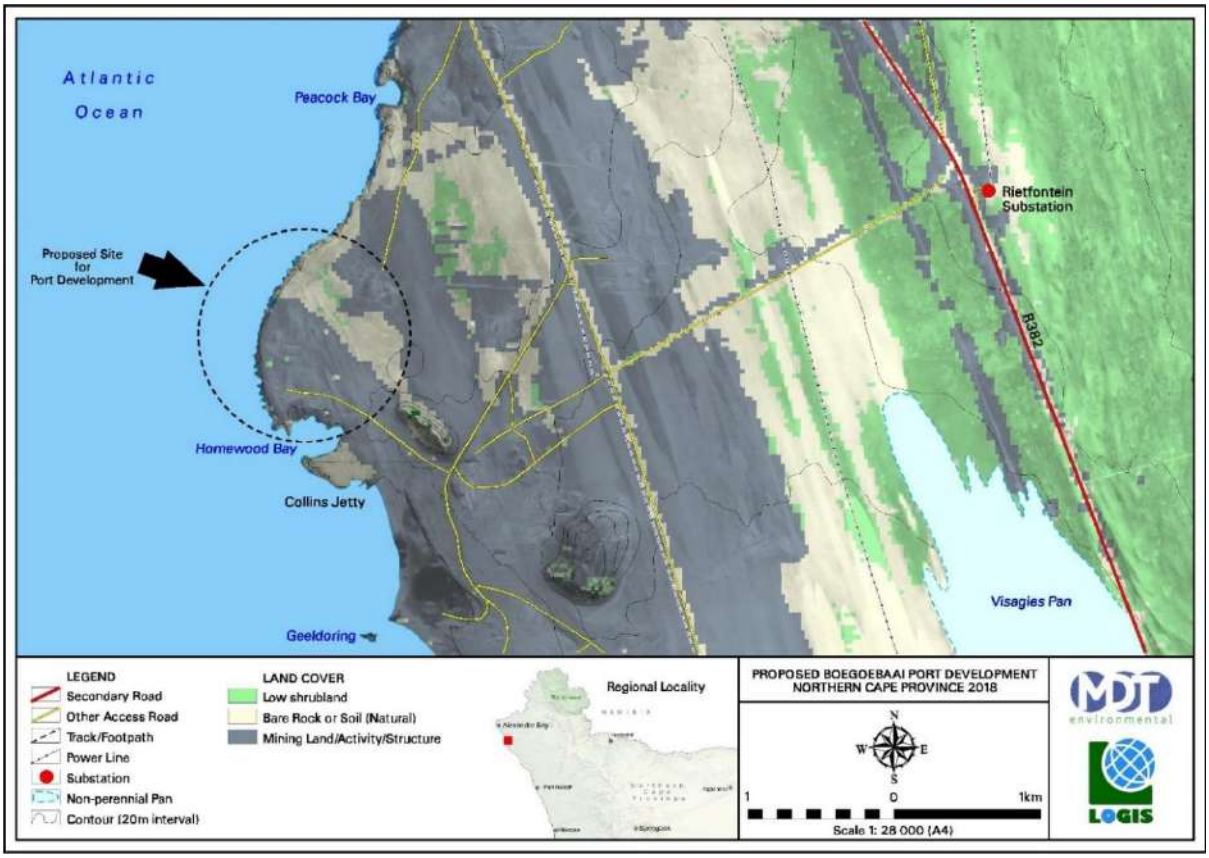


Figure 6-6: Land cover

6.6.4 Fauna

Phytoplankton, zooplankton and ichthyoplankton abundances in the study are expected to be comparatively low (PSJV, 2017). Due to the cold temperate nature of the region, the fish fauna off the West Coast is characterised by a relatively low diversity of species compared with warmer oceans. However, the upwelling nature of the region results in huge biomasses of specific species that supports a commercially important fishery.

The West Coast sustains large populations of breeding and foraging **seabird** and shorebird species. Most of the seabird species along the West Coast feed relatively close inshore (10-30 km). Cape gannets, however, are known to forage up to 140 km offshore. However, the nearest nesting ground for Cape Gannets is at Bird Island in Lambert's Bay. Most of the pelagic seabird species in the region reach highest densities offshore of the shelf break (200 to 500 m depth) (PSJV, 2017).

Five species of **turtles** occur off the West Coast. Only one, the Leatherback turtle, is likely to be encountered within the mining right areas, but abundance is expected to be low.

Thirty-four species of **whales** and **dolphins** are known or likely to occur in South African waters. The distribution of cetaceans in Namibian waters can largely be split into those associated with the continental shelf and those that occur in deep, oceanic water. Importantly, species from both environments may be found in the continental slope (200 to 2,000 m) making this the most species-rich area for cetaceans. Cetacean density on the continental shelf is usually higher than in pelagic waters, as species associated with the pelagic environment tend to be wide ranging.

The protected **Cape fur seal** is the only seal species that has breeding colonies along the West Coast. Seals are highly mobile animals with a general foraging area covering the continental shelf up to 220 km offshore. The Bucchu Twins seal colony occurs within the study area. There is a further seal colony at Kleinzee (incorporating Robeiland).

Seals generally show a high degree of site fidelity. Unfortunately, the information on the recent seal census lists the 2014 pup estimates at the Buchu Twins colony as 'Fog-covered'. A policy on the management of seals, seabirds and shorebirds was published in 2007 as part of the MLRA. This identified the cape fur seal as being one of the species requiring protection, and that killing or disturbance of seals is prohibited. Minimisation and regulation of disturbance to seals, especially breeding animals, will be subject to the issuing of a permit.

The Cape Fur Seal (Arctocephalus pusillus pusillus) have an IUCN Red List status of "Least Threatened" (Hofmeyr, 2015). Abundance of Cape Fur Seals is estimated to be approximately 2,000,000 animals and has been stable over the past two generations. Fluctuations in the abundance of Cape Fur Seals have been seen in the southern Namibian rookeries as a result of poor environmental conditions affecting prey populations. No major threats currently put any of the breeding sites at risk of extinction (Hofmeyr, 2015).

Cape Fur Seals are highly polygynous. The breeding season is highly synchronous, taking place between late October and the beginning of January, with adult males arriving at the colonies first. Females give birth 1.5-2 days after arrival ashore. The peak of pupping is in the first week of December. Adult females attend to the pup for about six to nine days before coming into oestrous, mating, and departing on their first foraging trip. Foraging intervals are an average of 5.2 days. While some pups may start foraging at seven months, they are usually weaned at 10-12 months, with suckling rarely continuing for two to three years (Hofmeyr, 2015).

Cape Fur Seals are generalist foragers that take a wide variety of prey, including Cape Hake, Horse Mackerel, Pelagic Goby, Pilchards, Anchovy, squid of the genus Loligo, Rock Lobster, shrimp, prawns and amphipods. They have also been reported to occasionally take African Penguins and several species of flying seabirds ((Hofmeyr, 2015). Cape Fur Seal pups are preyed on by Black-backed Jackals and Brown Hyenas.

The commercial harvesting of Cape Fur Seals in South Africa ceased in 1990 and is now prohibited under terms of the Policy on the Management of Seals, Seabirds and Shorebirds (MLRA 2007).

6.6.5 Protected and Critical Biodiversity Areas

The proposed Boegoebaai Port site does not impact on any areas protected for conservation.

Critical Biodiversity Areas are areas required to meet biodiversity targets for ecosystems, species and ecological processes, as identified in a systematic biodiversity plan. Ecological Support Areas are not essential for meeting biodiversity targets but play an important role in supporting the ecological functioning of Critical Biodiversity Areas and/or in delivering ecosystem services. Critical Biodiversity Areas and Ecological Support Areas may be terrestrial or aquatic.

The primary purpose of a map of Critical Biodiversity Areas and Ecological Support Areas is to guide decision-making about where best to locate development. It should inform land-use planning, environmental assessment and authorisations, and natural resource management, by a range of sectors whose policies and decisions impact on biodiversity. It is the biodiversity sector's input into multi-sectoral planning and decision-making processes.

The Northern Cape has developed a map of Critical Biodiversity Areas, and the Boegoebaai site will impact on Critical Biodiversity Areas (1). This may trigger additional listed activities in terms of GN 985 that require environmental authorisation.

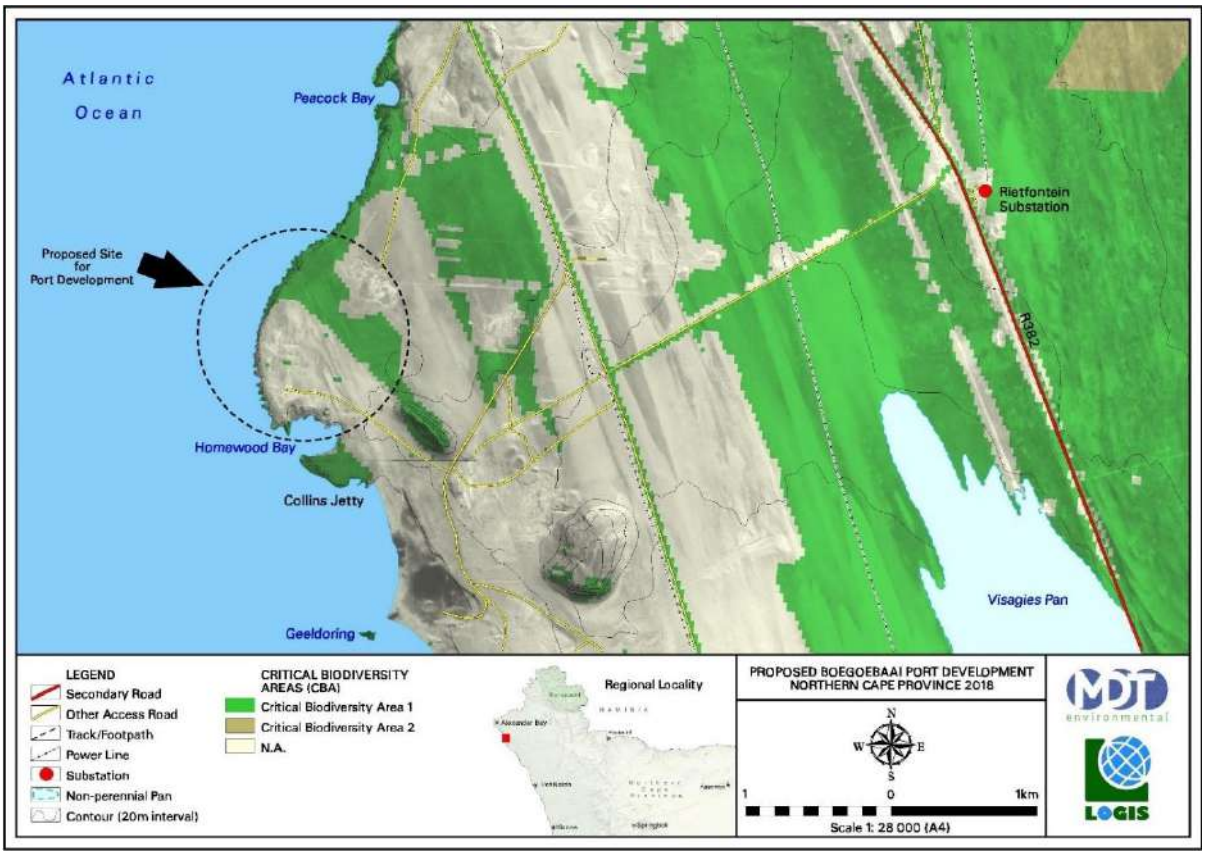


Figure 6-7: Critical Biodiversity Areas

6.7 Heritage

Over 2,000 shipwrecks are present along the South African coastline. The majority of known wrecks along the West Coast are located in relatively shallow water close inshore (within the 100 m isobath). At least 25 known shipwreck sites occur near Alexander Bay, Port Nolloth and Kleinzee. The majority of the wrecks found in the vicinity of the mining right areas were boats that sunk in the 19th century. It is, however, noted that the precise location of all these wrecks is unknown as they have been documented only through survivor accounts, archival descriptions and eyewitness reports recorded in archives and databases (PSJV, 2017).

6.8 Socio-Economic

Socio-economic activities in the study area include mining, commercial fishing, rock lobster and abalone harvesting, seaweed (kelp) harvesting and shipping.

6.8.1 Mining

Mining in the area includes diamonds, hydrocarbons, and other metals.

6.8.2 Fishing

Commercial fishing operates extensively off the West Coast. Fishing plays a significant role in providing livelihoods and income for local communities living in and around Port Nolloth. Key sectors include: traditional line-fish; West Coast rock lobster and beach-seine and gillnet fisheries. Vessels would also need to avoid fishing vessels that are limited in their maneuverability.

6.8.3 Rock Lobster and Abalone

Rock lobster and abalone could be harvested in the study area.

6.8.4 Seaweed Harvesting

The West Coast is divided into numerous **seaweed concession areas**. The study area is in Seeweed Concession area No 19. Access to a seaweed concession is granted by means of a permit from the Fisheries Branch of the Department of Agriculture Forestry and Fisheries (DAFF) for a period of five years. The seaweed industry was initially based on sun dried beach-cast seaweed, with harvesting of fresh seaweed occurring in small quantities only.

The actual level of beach-cast kelp collection varies substantially through the year, being dependent on storm action to loosen kelp from subtidal reefs. Permit holders collect beach casts of the both Ecklonia maxima and Laminaria pallida from the drift line of beaches. The kelp is initially dried just above the high water mark before being transported to drying beds in the foreland dune area. The dried product is ground before being exported for production of alginic acid (alginate).

In the areas around abalone hatcheries fresh beach-cast kelp is also collected as food for cultured abalone, although quantities have not been reported to the DAFF or exported for production of

alginic acid (alginate). In the areas around abalone hatcheries fresh beach-cast kelp is also collected as food for cultured abalone, although quantities have not been reported to DAFF (PSJV, 2017).

6.8.5 Shipping

Shipping is currently limited mostly to the outer edge of the continental shelf.

6.9 Sensitive Areas

Environmental sensitivity features are presented in Figure 6-8, and include the Seal and Cormorant Colony, Vulnerable and Rare Plants Species on the Boegoeberg Inselbergs, an Ancient Hyena Lair site and Grave Sites.

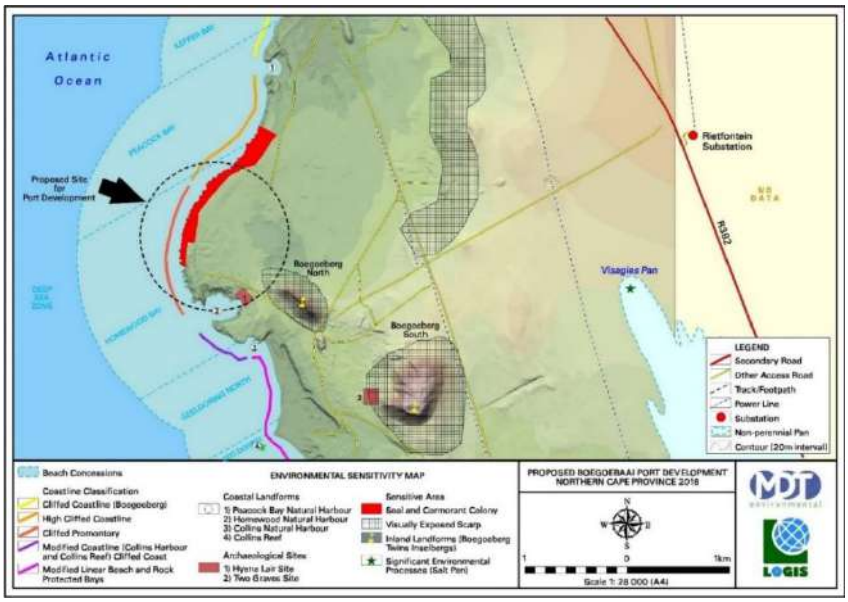


Figure 6-8: Environmental Sensitivity Map

6.10 Post Mining Landuse Plan

The Alexkor revised EMPr (2008) identifies the Boegoebaai Port study area as a cultural/tourism precinct (pink) that includes a resort, day visitor facilities, walks and fishing. This precinct is linked to the main road network by an access corridor (yellow) and includes a production precinct (purple) as indicated in Figure 6-9.

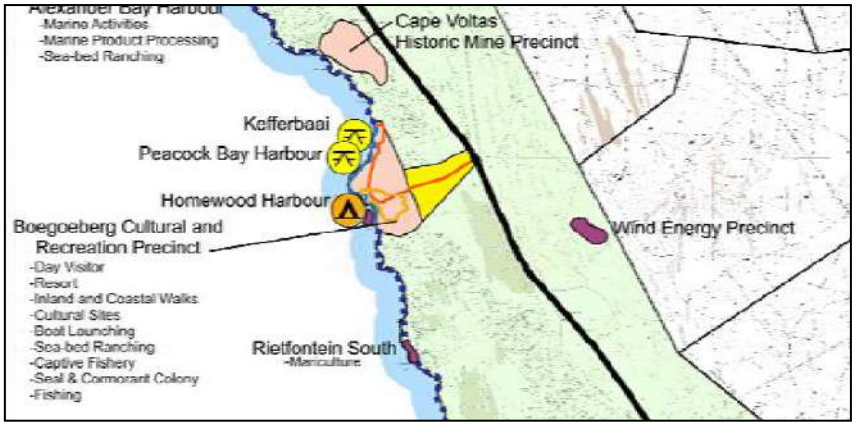


Figure 6-9: Post Mining Land Use Plan (Alexkor, 2008)

6.11 Climate Change

Over the past five decades significant changes in climate have been observed in South Africa. Mean annual temperatures have increased by about 1.5 times the observed average of 0.65°, and hot and cold extremes have increased and decreased respectively in frequency. Weather data also shows an increase in the intensity of rainfall events and increased dry spells (DEA, 2013).

One consequence of this warming is a global rise in sea level (SAEON, 2011). The main causes of the sea-level rise are attributed to:

- an increase in volume of the oceans caused by thermal expansion of the seas due to warming;
- melt-water entering the ocean from glaciers, ice caps and other ice at low altitude;
- melt-water from polar ice-sheets, especially from Greenland and West Antarctica.

These trends have been substantiated by measurements made in southern Africa, where analyses of about 50 years of data show that the sea level of the west coast of South Africa is rising by about 1.87 mm/yr, the south coast by about 1.47 mm/yr and the east coast by about 2.74 mm/yr, in agreement with current estimates of global trends.

With a rise in sea-level and increase in frequency and intensity of sea storms, accompanied by an increase in wave heights are expected. A storm surge refers to an abnormally high sea level, which is often accompanied by severe meteorological conditions and high tides. The effects of a storm surge are felt differently at different coastal environments, depending on many factors such as bathymetry, geology, shoreline shape, shoreline elevation, nature of the coastline defences and the degree of exposure to waves.

The South African coastline is expected to experience:

- greater risk of damage by storm surges;
- increased exposure to more intense and more frequent extreme events;
- increased saltwater intrusion and raised groundwater tables;

- greater tidal influence;
- increased flooding, with greater extent and frequency;
- increased coastal erosion;
- more frequent destruction of coastal property and infrastructure;
- periodic destruction or negative disruption of the coastal biosphere and environment.

Increased coastal erosion and inland flooding along the South African coastline is therefore a major concern (Humby, Kotze, Rumble & Gilder).

The project will have an impact on climate change by its contribution to Greenhouse Gasses and may be affected by the consequences of climate change, specifically increase in sea level and an increase in the frequency and intensity of storm events.

A comprehensive Environmental Impact Assessment should be embarked on in the preceding phases of this project.

LEGAL **DUE DILIGENCE**

7. Legal Due Diligence

7.1 Definitions

Unless otherwise stated, or the context otherwise requires, the words and expressions listed below shall bear the meanings ascribed to them:

Alexkor – Alexkor Limited, a company incorporated in accordance with the laws of South Africa, with registration number 1992/006368/06;

Annual CPA Report – the Communal Property Associations Annual Report for the year ended 2017/2018 prepared for the Department of Rural Development and Land Reform;

Business Case – the Boegoebaai Port Business Case dated September 2019;

CPA – communal property association as contemplated in the CPA Act;

Deed of Cession –the Notarial Deed of Cession of a Mining Right entered into between Alexkor and Richtersveld Mining Company on or about 28 March 2011, in respect of the cession and transfer of mining right 550 MRC;

DMR – the Department of Mineral Resources and Energy;

Environmental Report – the Boegoebaai Environmental Screening Report dated 18 April 2018 and prepared by MDT;

Equator Principles – a risk management framework adopted by financial institutions for determining, assessing and managing environmental and social risk in project finance;

Eskom – Eskom Holdings SOC Limited, a company incorporated in accordance with the laws of South Africa, with registration number 2002/015527/30;

Executive Council – the council designated with the collective management of the Northern Cape provincial government in terms of section 125 of the Constitution;

Farm 1 – Farm No 1, in the Richtersveld Municipality, in the Administrative District of Namaqualand, Northern Cape held under Title Deed No. T32346/1994;

Feasibility Study – the feasibility study required to be undertaken by the accounting officer or the accounting authority of an institution to whom the PFMA applies and which wishes to undertake a project, in terms of section 16.4.1 of the Regulations, to assist the relevant institution to decide, *inter alia*, whether conventional public sector procurement or a PPP is in the best interests of the institution for the delivery of the proposed project;

MDT – MDT Environmental Proprietary Limited, a company incorporated in accordance with the laws of South Africa, with registration number 2012/113506/07;

MPTRO – the Mineral and Petroleum Titles Registration Office of the DMR, which is an office performing a registry function in relation to mining titles;

NCDTSL – the Northern Cape Department of Transport, Safety and Liaison;

Nelutha Consulting – Nelutha Consulting Close Corporation, a close corporation incorporated in accordance with the laws of South Africa, with registration number 2005/136000/23;

PRDW – PRDW Consulting Port and Coastal Engineers;

Procurement Execution Plan – the PEP Draft Framework – Procurement Execution Plan report dated 7 August 2019 and prepared by PRDW;

Property – collectively, Farm 1 and farm Rietfontein;

Proposed Project – the development, construction and operation of a port with warehousing facilities in Boegoebaai, Northern Cape;

Provincial Mandate – refers to the provincial organs of State earmarked to assume the procurement and financial mandate for the Proposed Project;

Report – means this legal due diligence report and all of its annexures;

Richtersveld Community – the members of the Richtersveld community as determined in accordance with the customs and practices of such community;

Richtersveld CPA – the Richtersveld Sida !Hub Communal Property Association, a communal property association registered with the Department of Rural Development and Land Reform in terms of the CPA Act;

Richtersveld Mining Company – the Richtersveld Mining Company Proprietary Limited, a company incorporated in accordance with the laws of South Africa, with registration number 2006/034807/07;

Rietfontein – Farm Rietfontein No. 589, in the Richtersveld Municipality, Administrative District of Namaqualand, Northern Cape, held under Title Deed No. T4919/1990CTN;

Rural Development DG – the Director General: Land Reform and Administration or the Director General for the Department of Rural Development and Land Reform as the case may be;

Settlement Agreement – the Deed of Settlement entered into between the Richtersveld Community, Alexkor and the Government of the Republic of South Africa on or about 22 April 2007;

TM Consulting – TMQINA Consulting CC trading as TM Consulting, a close corporation registered in accordance with the laws of South Africa, with registration number 2011/104200/23;

TM/Nelutha Consulting –the joint venture between TM Consulting and Nelutha Consulting, as established in terms of the joint venture agreement dated 10 July 2017;

Transaction Advisor – TM/Nelutha Consulting, the appointed transaction advisor for the NCDTSL in respect of the Proposed Project;

Treasury Application – the application by the Transaction Advisor to the National Treasury for Treasury Approval 1 for the Proposed Project as contemplated in the Regulations.

7.2 Background and Context

This legal due diligence identifies certain legal issues related to Option 2 in the Procurement Execution Plan, being procurement by public private partnership (PPP) ("**Preferred Option**"), that may significantly impact on the Proposed Project. This due diligence investigation was limited to:

- an analysis of the title deeds of the Properties, with a view of ascertaining whether there are any registered encumbrances or conditions in relation to such properties which may restrict their use for the Proposed Project;

- identifying the legislation that the NCDTSL as the relevant institution would have to consider in respect of any arrangements to be entered into in relation to the Property in respect of the Proposed Project;
- any legislative restrictions on the NCDTSL as the relevant institution which may prevent it from being able to legally procure the Proposed Project or use amongst others, the property in respect of the Proposed Project or contracting such responsibility to a private party; and
- a high-level legislative review of national and provincial legislation to identify key approvals and consents that may be expected to be acquired for a project of this nature. The approvals required in respect of environmental legislation have not been considered in this Report as this was not included in the scope of work. Due to time constraints, a detailed list of all approvals required for the Proposed Project will be provided in the next iteration of the Report.

It is understood that:

- the NCDTSL is the relevant institution that will exercise the institutional function for the purposes of the Treasury Regulation 16 issued pursuant to the Public Finance Management Act No. 1 of 1999 (the "**PFMA**") for the Proposed Project;
- the scope of the legal due diligence report will cover the Preferred Option only. The Report is limited in nature and does not include any advice on black economic empowerment, employment law and related matters, analysis of the provincial legislation or municipal by-laws or road and transport legislation, (hereinafter referred to as the "**Scope of Work**").

7.3 Approach

In terms of the project life cycle set out in the guidelines of the Public Private Partnership Manual of National Treasury ("**PPP Guidelines**"), the Proposed Project is currently at feasibility study stage.

This legal due diligence is accordingly prepared in terms of part 4 of module 2 of the PPP Guidelines (section 3 of annexure 2), which sets out the feasibility study deliverables and considers the legal aspects of the Proposed Project, including use rights and certain regulatory and site enablement matters. However, this iteration of the legal due diligence does not consider the socio-economic and BEE aspects of the Proposed Project.

The approval process for the Proposed Project is perceived as taking place in various phases, the first of which seeks to understand whether the Proposed Project is feasible from amongst others, a legal perspective, bearing in mind issues such as the authority of the NCDTSL to implement the Proposed Project and the possibility for acquisition (by lease or purchase) of the land earmarked for the Proposed Project; and the next which seeks to understand amongst others, the full extent of the approvals required for the implementation of the Proposed Project, if the first phase approval is obtained.

In addition, as the Proposed Project is a provincial project, time was spent harmonizing the Provincial Mandates and the issues associated with acquiring the land to ensure that the Proposed Project passes constitutional muster as far as the land and Provincial Mandates are concerned.

The current Report is accordingly cognisant that there are various stakeholders and other pieces of legislation to be engaged and considered respectively, but in light of the above approach, does not

contain a comprehensive list of all the consents that would be required for the implementation of the Proposed Project. However, the comprehensive list of all the consents required for the implementation of the Proposed Project will be provided in the next phase, as part of the next iteration of the Report.

7.4 Limitations and Qualifications

This Report is subject to the following limitations and qualifications:

- The legal due diligence investigation and the items covered under this Report relate to legal issues only and are restricted to the Scope of Work.
- Save where otherwise stated to the contrary in this Report, in the course of compiling this Report, reliance was placed solely upon the documents listed in section 11.5 as at the date of this Report.
- Reliance was placed exclusively on the accuracy, truthfulness and completeness of the Due Diligence Documents and, save where otherwise expressly stated to the contrary in this Report, a separate and independent verification of those documents and information has not been undertaken. Accordingly, no responsibility is accepted for the accuracy, truthfulness and/or completeness of those documents and information.

This Report is produced on the instruction of the Transaction Advisor and is intended solely to aid the Transaction Advisor in finalising the Feasibility Study to be included in the Treasury Application. No person other than the Transaction Advisor may rely on this Report and no responsibility, duty of care or liability whatsoever is or will therefore be accepted by Fasken to any other person in connection with or arising from this Report.

In respect of the review:

- only laws that are in force as at the date of this Report were considered and not laws that have been passed but are not yet effective; and
- only laws that may be applicable to the establishment of the Proposed Project were considered and not laws relating to the potential users of the port / warehouses, who would themselves be responsible for complying with the laws governing their activities.

7.5 Procuring Authority (Institutional Mandate), Financial Authority, Port Specific and Ancillary Mandate and Procurement

It is understood that the Proposed Project will be managed and facilitated by the NCDTSL. It is not clear whether a resolution was passed by the Executive Council authorising the NCDTSL to implement the Proposed Project.

Notwithstanding the above, in order for the NCDTSL to enter into agreements in respect of the Proposed Project, it needs to have the requisite legislative and financial authority to undertake the Proposed Project. The legislation necessary to give the NCDTSL the legislative and financial authority to implement the Proposed Project has been considered, and the relevant findings are set out below.

7.5.1 Authority for Procuring Authority and the Institutional Function

There are three spheres of Government created under the Constitution of the Republic of South Africa, 1996 (the "**Constitution**"): National, Provincial and Local. Most powers afforded to these spheres of government are awarded to National Government. However, the Constitution recognises that there are certain functions which must be performed by provincial and local government, either exclusively or concurrently with National Government. These functions are listed in Schedules 4 and 5 of the Constitution.

It is understood that the Proposed Project will be managed and facilitated by the NCDTSL. However, the legislative review did not reveal any direct piece of enabling legislation allowing the NCDTSL to implement the Proposed Project without an administratively cumbersome process.

The NCDTSL's involvement in the Proposed Project is understandable given that the Proposed Project involves transportation and logistics and the NCDTSL has an oversight function upon general transportation and logistics and a somewhat indirect oversight function over the maritime mode of transportation, including the construction of ports. An indirect oversight function is no substitution for an express piece of legislation authorising the NCDTSL to undertake the Proposed Project.

In the absence of an enabling piece of legislation, Schedule 4 of the Constitution, which lists functional areas of concurrent national and provincial competence and which includes public transport, regional planning and development and road traffic regulation was considered. Schedule 5 of the Constitution, which lists those activities which are exclusively the competency of provincial and local government, which include provincial planning and municipal roads respectively, was also considered.

The Proposed Project, however, does not fall neatly within the Schedule 4 or Schedule 5 list of competencies set out in the Constitution. As such, the NCDTSL does not currently have the legislative authority under the Schedules to administer the Proposed Project.

The absence of an enabling piece of legislation or the lack of competency with regards to Schedules 4 and 5 will not necessarily pose an insurmountable challenge given that the Proposed Project is capable of being competently and constitutionally managed and implemented in terms of section 125 of the Constitution. In the circumstances, the National Land Transport Act No. 5 of 2009 ("**NLTA**") was reviewed. It is accordingly noted that in order for the Proposed Project to pass constitutional muster and fit neatly within the ambit of the NLTA, the following requirements will need to be met, namely:

- the NLTA will require amendments;
- the NLTA powers and functions will need to be assigned from the National Department of Transport to the Provincial Sphere of Government; and
- a provincial NLTA framework will need to be put into place by means of a legislative draft.

The NLTA requirements specified above are unwieldly and will inevitably result in extensive delays which will negatively affect and impact the progress of the Proposed Project.

Section 125 of the Constitution states that the executive authority of the Northern Cape Government vests with the Premier. The Premier, together with the Executive Council exercise such executive authority by (a) implementing provincial legislation in the province; (b) implementing all national legislation within the functional areas listed in Schedule 4 or 5 except where the Constitution or an Act of Parliament provides otherwise; (c) administering in the province, national legislation outside the functional areas listed in Schedules 4 and 5, the administration of which has been assigned to the provincial executive in terms of an Act of Parliament; (d) developing and implementing provincial policy; (e) coordinating the functions of the provincial administration and its departments; (f) preparing and initiating provincial legislation; and (g) performing any other function assigned to the provincial executive in terms of the Constitution or an Act of Parliament.

Three pertinent pieces of legislation were identified which enable the Executive Council to exercise their executive powers and functions in terms of section 125 (2) (a); (b); (e) and (g) of the Constitution. These pieces of legislation are as follows:

- the Northern Cape Planning and Development Act No. 7 of 1998 ;
- the Spatial Planning and Land Use Management Act No. 16 of 2013; and
- section 132 (2) of the Constitution.

The above pieces of legislation read together, confer the Executive Council with the requisite authority to implement the Proposed Project. The Premier is at liberty to delegate and assign his powers and functions for the implementation of the Proposed Project to the executive council member responsible for the NCDTSL by means of section 132 (2) of the Constitution.

However, the resolution from the Executive Council authorising the implementation of the Proposed Project alone, will not be sufficient given that there are rafts of other resolutions required from the earmarked municipalities to ensure regulatory compliance end-to-end. Municipalities and Provinces are each a distinct sphere of government and provincial resolutions are not binding on the municipality. For compliance and legislative soundness, earmarked municipalities will equally need to pass their own respective resolutions authorised by their respective municipal councils.

In the circumstances, upon discussions with the Transaction Advisor, the provisions of the Northern Cape Economic Development, Trade and Investment Promotion Agency Act No. 4 of 2008 were considered. The following is noted from the Act:

- the Act aims to facilitate economic development, trade and investment for the Northern Cape Province;
- the Northern Cape Economic Development, Trade and Investment Agency ("**NCEDA**") was established pursuant to the Act and was mandated to attract direct and indirect investment for targeted markets and is expected to develop, package and market investment opportunities for the Northern Cape Province;
- section 4 of the Act mandates NCEDA to actively promote the Northern Cape Province as an investor-friendly destination, foster and develop trade and industry, sector development and investments in the Northern Cape Province for the benefit of all by liaising and consulting with all stakeholders including: (i) individuals and communities; (ii) organised labour; (iii) organs of State; (iv) statutory bodies; (v) organised formal tourism; and (vi) organised business.

Further, in terms of Section 4 (5), (6) and (14) of the Act, NCEDA may, upon request: (i) facilitate joint ventures; (ii) participate in public private partnerships; (iii) with appropriate authority, acquire and dispose of immovable property; (iv) acquire, hire, sell, lease, burden or alienate any goods, supplies or services; (v) take up shares in any company established under the Companies Act No. 71 of 2008; and (vi) acquire a legitimate financial interest in any enterprise.

From the review of the Act, it seems NCEDA has the requisite legislative mandate to pursue all economic opportunities in the Northern Cape Province across all industries and sectors including projects earmarked for ports construction. Consequently, it will be beneficial if the Transaction Advisor could recommend to Executive Council to consider partnering NCEDA with the NCDTSL and let these two entities share the roles of procuring and financial authority for the Proposed Project.

There are definite benefits if the NCDTSL and NCEDA collaborate. This is so because: (i) NCEDA has the legislative mandate which cuts across the whole Northern Cape Province and is not hamstrung by provincial or local sphere of government. Additionally, NCEDA is authorised by its enabling legislation to enter into joint ventures, acquire shares and enter into PPP arrangements; and (ii) on the other hand, the NCDTSL has the vision and has consistently supported the Proposed Project and has stable leadership which is crucial for the success of the Proposed Project. Collaboration by these two entities in respect of the procuring, financial and institutional functions will no doubt simplify the legislative challenges identified above and will also ensure that the Proposed Project is not vulnerable to unwarranted legislative attacks which loom large in projects of this nature.

It is understood that the Northern Cape Government is planning on securing a role for NCEDA in respect of the Proposed Project. Although, a resolution to that effect has not yet been provided, it would appear the Northern Cape Government will in due course pass a resolution authorising NCEDA to participate in the Proposed Project. In the next iteration, resolutions passed by the Northern Cape Government as well as the NCEDA board authorising NCEDA to participate in the Proposed Project will be attached.

7.5.2 Financial Authority and Procurement

The PFMA was promulgated to provide for financial management in the national and provincial governments, to ensure that all revenue, expenditure, assets and liabilities of those governments are managed efficiently and effectively and to provide for the responsibilities of persons entrusted with financial management in those governments. The object of the PFMA is accordingly to secure transparency, accountability, and sound management of the revenue, expenditure, assets and liabilities of the institutions to which it applies.

The PFMA applies in a general manner to government departments in both the national and provincial spheres, to so-called "*trading entities*", to Parliament and the provincial legislatures, and to those public entities listed in Schedules 1, 2 and 3 to the PFMA.

The PFMA prevails over other legislation dealing with issues which the PFMA deals with. This does not mean that other legislation dealing with similar or overlapping issues is irrelevant and can be ignored. If the NCDTSL is subject to a number of statutes whose provisions are not necessarily inconsistent but may constitute duplication, those statutory provisions should be read together with

the PFMA where possible to make sense of and give meaning to them. Only where other similar legislation is clearly inconsistent with the PFMA, will the PFMA prevail and the inconsistent provision does not apply.

Part 2 of Chapter 5 of the PFMA sets out the powers, functions and responsibilities of various role players including officials who exercise a procurement function. An example of the role-players is the accounting officer of a department (at national or provincial level) whose general functions and responsibilities are set out in section 38 of the PFMA. It is for this reason that the accounting officer (i.e. the Head of Department for the NCDTSL) is the correct official to sign agreements which bind the NCDTSL.

Chapter 8 of the PFMA deals with loans, guarantees and other commitments. Section 66(1) (a) of the PFMA provides that an institution to which the PFMA applies, which includes the NCDTSL, may not borrow money or issue a guarantee, indemnity or security, *or enter into any other transaction that binds or may bind that institution or the Revenue Fund to any future financial commitment* [emphasis added], unless such borrowing, guarantee, indemnity, security or other transaction is authorised by the PFMA.

Section 66(2) of the PFMA provides that:

A government may only through the following persons borrow money, or issue a guarantee, indemnity or security, or enter into any other transaction that binds or may bind a Revenue Fund to any future financial commitment:

……..

A Provincial Revenue Fund: The MEC for finance in the Province, acting in accordance with the Borrowing Powers of Provincial Governments Act, 1996. [emphasis added]

The NCDTSL would need to procure compliance with the above sections of the PFMA in respect of the transactions to be concluded by it, relating to the Proposed Project. Any transaction concluded by the NCDTSL contrary to section 66 of the PFMA will not be binding on the State and the relevant procuring authority. Given that NCEDA may be involved in the implementation of the Proposed Project, this part of the Report will be updated once NCEDA has been allocated a defined role for the Proposed Project.

7.5.3 Port Specific Regulatory Mandate

For a project of this nature, the NCDTSL will need to ensure that various other stakeholders are engaged and various arrangements are made to ensure compliance with legislation applicable to the construction of a port. Amongst others, the stakeholders relevant to the construction of the port include, but are not limited to the National Ports Authority, as contemplated in the National Ports Act 12 of 2005 ("**NPA**") and the South African Maritime and Safety Authority as contemplated in the South African Maritime Safety Authority Act 5 of 1998. As indicated above, a more detailed list of the consents required and stakeholders to be engaged will be included as part of FEL3.

This section deals with port specific institutional arrangements. The list is by no means exhaustive but demonstrates some of the institutional arrangements which need to be considered in the next iteration of the business case.

National Ports Act No. 12 of 2005

The NPA provides a regulatory framework for the ownership, control and regulation of ports in South Africa. It provides for the establishment of the National Ports Authority, the Ports Regulator and the administration of certain ports by the National Ports Authority. In this regard, in order for any person or entity to construct and/or operate a port they need to:

have an agreement with the Transnet National Ports Authority (the "**TNPA**") in terms of section 56 of the NPA, in terms of which they are authorised to amongst others, design, construct, develop, finance, maintain or operate a port terminal, port facility or provide services relating thereto; and/or

be a licensed operator in terms of section 57 of the NPA, as applicable. The TNPA is, in terms of the NPA, deemed to be a licensed operator to provide port services and/or facilities. The deeming provision extends to port infrastructure.

The term '*port infrastructure'*, is defined in the NPA as "*the basic structure of a port, including breakwaters, seawalls, channels, basins, quay walls, jetties, roads, railways and infrastructure used for the provision of water, lights, power, sewage and similar services*". While the term '*ports services'* includes stevedoring, cargo handling, terminal operations, storage of cargo within a port, tug services, floating crane services, berthing services, firefighting, security, radio and radar services, waste disposal, vessel repairs and any other services provided within a port which are designated as such by the TNPA by notice in the Gazette.

The object of the NPA is amongst others, to establish appropriate institutional arrangements to support the governance of ports. This object suggests that the TNPA will have to collaborate with other people or institutions from time to time. It is also stated in section 3(1)(a)(i) that the TNPA is for all purposes deemed to be the National Ports Authority for any port function, which then means that the NCDTSL needs the TNPA as the relevant stakeholder under the NPA, in order to implement the Proposed Project. Section 10(2) of the NPA states that all ports fall under the jurisdiction of the National Ports Authority, but the Minister for Transport may by notice, in addition to the ports referred to in subsection 1; determine additional ports which fall under the jurisdiction of the TNPA.

Considering that the NCDTSL is in the process of establishing a new port, the Minister of Transport (the "Transport Minister") will have to make this determination. Collaboration by the National Ports Authority is further emphasised in section 12(g) where the NPA states that the aim of the TNPA is also to promote the development and expansion of port services, including safe and secure cargo-storage and cargo handling facilities elsewhere in the world in collaboration with other countries and international organisation in a manner consistent with the objectives stated herein.

For the effective management and oversight of the ports and in order to minimise the duplication of functions, the TNPA is obliged, in terms of section 13 of the NPA, to cooperate with the organs of state as defined in Chapter 3 of the Constitution. The TNPA will in this regard need to conclude a memorandum of understanding with such organs of state, which then will be published by the

Transport Minister in the Gazette. In this regard, if section 56 of the NPA is utilised for the Proposed Project, an appropriate memorandum of understanding or a term sheet specifying the envisaged cooperation will need to be concluded between amongst others, the NCDTSL, NCEDA (after its introduction) and the TNPA to regulate certain aspects of the implementation of the Proposed Project, as contemplated in the NPA.

Contrary to section 56, section 79(1) of the NPA grants the Transport Minister the power to direct the TNPA to perform or to refrain from performing certain functions which fall within the powers of the TNPA. The Transport Minister's power is exercised where a direction is necessary to safeguard the national security, promote the national, strategic or economic interests or to discharge an international obligation of South Africa. The Transport Minister's powers are of assistance to the TNPA as far as several issues regarding the port activities are concerned.

Before making the said direction, the Transport Minister must, in accordance with section 79(2) consult with the TNPA and the Shareholding Minister (being the Minister of Public Enterprises or his/her Representative). The TNPA on the other hand must, as stated in section 79(3), takes all the necessary steps to ensure its compliance with the Transport Minister's direction.

In terms of section 79(4)(a), it is the Transport Minister's duty to compensate the TNPA for loss suffered as a result of complying with the Minister's direction. The said compensation is paid from the monies appropriated by parliament for that specific purpose. It is the State's duty to finance acts performed by the TNPA in compliance with the Transport Minister's direction where such acts are not in the commercial interests of the TNPA.

If the Transport Minister makes a declaration in terms of section 79, in respect of the Proposed Project, he would also direct the extent of the TNPA's involvement in the Proposed Project, whereas, the process under section 56 entitles the TNPA to determine the extent of its involvement in the Proposed Project.

Accordingly, notwithstanding the section 56 process discussed above, it is envisaged and proposed that the Proposed Project is implemented through the section 79 process for the commercialization of the Proposed Project as this process is better suited to the implementation of the Proposed Project by way of PPP, under the auspices of the NCDTSL. There are successful port projects that have utilized the section 79 process successfully. An example of such is the Port of Ngqura Container Terminal Project.

It is understood from the Transaction Advisor that it is envisaged that the TNPA may be involved in respect of the infrastructure development of the Proposed Project. However as at the date of this Report, neither the NCDTSL nor the Transaction Advisor has received a letter of commitment or resolution from TNPA confirming its proposed involvement in the Proposed Project. The TNPA's involvement may necessitate an amendment to this Report, to provide for the applicable provisions of the National Ports Act, bearing in mind the TNPA's involvement and the possible collaboration with amongst others, the NCDTSL. Accordingly, in the event that such letter of commitment or resolution is received from the TNPA, then this Report will be updated to provide for the TNPA's involvement and the relevant consents to be sought pursuant thereto. In addition, the TA1 submission may, at the relevant time, be revised to provide for such involvement by the TNPA.

The Ports Regulator is established in terms of section 29 of the NPA, as an independent ports regulatory body with legal personality. The functions of the Ports Regulator include; the exercise of economic regulation of the ports system in line with government's strategic objectives, promotion of equity of access to ports and to facilities and services provided in ports; and monitor the activities of the TNPA to ensure that it performs its functions in accordance with the NPA. In terms of section 47(1) the Ports Regulator must hear appeals and complaints lodged against the TNPA in terms of section 30(3) and may accordingly be involved in the Proposed Project in the event that there are any complaints to be lodged by the NCDTSL against the TNPA in the scope of the implementation of the Proposed Project.

South African Maritime Safety Authority Act No. 5 of 1998

The powers of the Act are to provide for the establishment and the functions of the South African Maritime Safety Authority ("**SAMSA**"). SAMSA has an oversight function and has to ensure the safety of life and property at sea and prevent and combat pollution of the marine environment by ships and promote the Republic of South Africa's Maritime interests.

In terms of section 9 of the Act, SAMSA has the power to amongst others, institute and conduct civil proceedings in all matters relating to its functions. It will accordingly be necessary to engage the authority prior to the implementation of the Proposed Project to amongst others, ensure that the implementation of the Proposed Project does not endanger the safety of life and property at sea, and to ensure that to the extent necessary, measures are taken to reduce the risk thereof.

International Trade Administration Act No. 71 of 2002

The Act provides, within the framework of the Southern African Customs Union Agreement (the "**SACU Agreement**"), for the continued control of import and export of goods and amendment of customs duties. The Act also establishes the International Trade Administration Commission (the "**ITAC**"), provides for its functions and regulates its procedures. The object of the Act is to foster economic growth and development in order to raise income and promote investment and employment in South Africa and within the Common Customs Area (being the member states of SACU) by establishing an efficient and effective system for the administration of international trade subject to the Act and the SACU Agreement. ITAC has an oversight function in respect of the import and export of goods.

In terms of the Act, ITAC and the Minister for Trade and Industry (the "**DTI Minister**") have an oversight function in respect of the channels along which goods are transported, the manner in which goods are imported or exported and also regulate the life cycle and impact on the environment.

It will be important to ensure that any goods that will be imported and/or exported into the port are designated for such import and export by the DTI Minister in accordance with the Act.

The Currency and Exchange Act, Act No. 9 of 1933

The Currency and Exchange Act aims to amend the law relating to legal tender, currency, exchanges and banking. Exchange control regulations are issued under the Act and are meant to regulate inflow and outflows of capital from South Africa as well as the granting of the exchange control approvals. This Act as well the regulations applicable thereto will be applicable to any funds which come into or which go out of South Africa, as a result of any business taking place pursuant to the port.

7.5.4 Community Related Mandate

It is recognised that the Richtersveld Community will be affected by the Proposed Project for various reasons and is accordingly a stakeholder in the Proposed Project. The latter parts of this Report address, amongst others, engagements which the NCDTSL will need to have with the Richtersveld Community and the Richtersveld CPA, on the basis that amongst others, the Richtersveld CPA (whose members are the Richtersveld Community) is the registered owner of a portion of the land in respect of which the Proposed Project will be implemented. Given that the Richtersveld CPA has been placed under administration in terms of the provisions of the CPA Act, to the extent that it remains under administration, the NCDTSL will be required to submit a request for engagement with the Richtersveld CPA to the Acting Director General for the Department of Agriculture, Rural Development and Land Reform (the "**ADG**"), who is responsible for managing the affairs of the Richtersveld CPA while it is under administration.

In the next iteration of FEL 3, a list of the consents required from the Richtersveld Community and from the Richtersveld CPA will be prepared.

7.5.5 Municipality Mandate

The Proposed Project is located in the Richtersveld Municipality and the Namaqualand District Municipality. In due course, the relevant by-laws, municipal laws and ordinances will have to be reviewed to ensure complete compliance. This exercise will be conducted in the next iteration.

7.6 Proposed Model for the Project

The Procurement Execution Plan provides that procurement through public private partnerships ("**PPP**") is the preferred option for procurement for the Proposed Project.

In South Africa, national, provincial and certain other PPP are governed by Treasury Regulation 16 to the PFMA. Essentially, a PPP is a contractual right awarded by a public body to a private party to invest in assets, (usually public assets) and to deliver a public service for a fixed period.

A more detailed definition of a PPP is outlined in Regulation 16 as a commercial transaction between an institution and a private party in terms of which –

- the private party either performs an institutional function on behalf of the institution for a specified or indefinite period; or acquires the use of State property for its own commercial purposes, for a specified or indefinite period;
- the private party receives a benefit for performing the function or by utilising state property, either by way of:

- compensation from a revenue fund;
- charges or fees collected by the private party from users or customers of a service provided to them; or
- a combination of such compensation and such charges or fees.

A PPP for a deep-water port of the nature being contemplated by the NCDTSL at Boegoebaai would typically operate within a concession framework. This means that the private party/concessionaire is granted permission by the appropriate public procuring entity to design, build, finance, insure, operate and maintain the port and collect revenues from it, for a fixed period of time after which the port will be handed back to the public entity.

During the term of the concession the concessionaire would use the revenue stream from its operation of the port to cover its operating costs and to repay the debt (capital and interest) and provide a return on equity to its shareholders in respect of amounts incurred by it in designing and building the port asset.

This structure is sometimes commonly referred to as a species of Build, Operate, Transfer ("**BOT**") but is in fact better described as a Design, Build, Finance, Operate ("**DBFO**"). It is not likely that the Proposed Project would ever be structured as a Build, Operate, Own, Transfer ("**BOOT**") because it seems unlikely that the NCDTSL would wish the port assets to be owned privately by the concessionaire.

Below is a simple diagram that depicts the key parties and relationships in a typical Port Concession PPP.

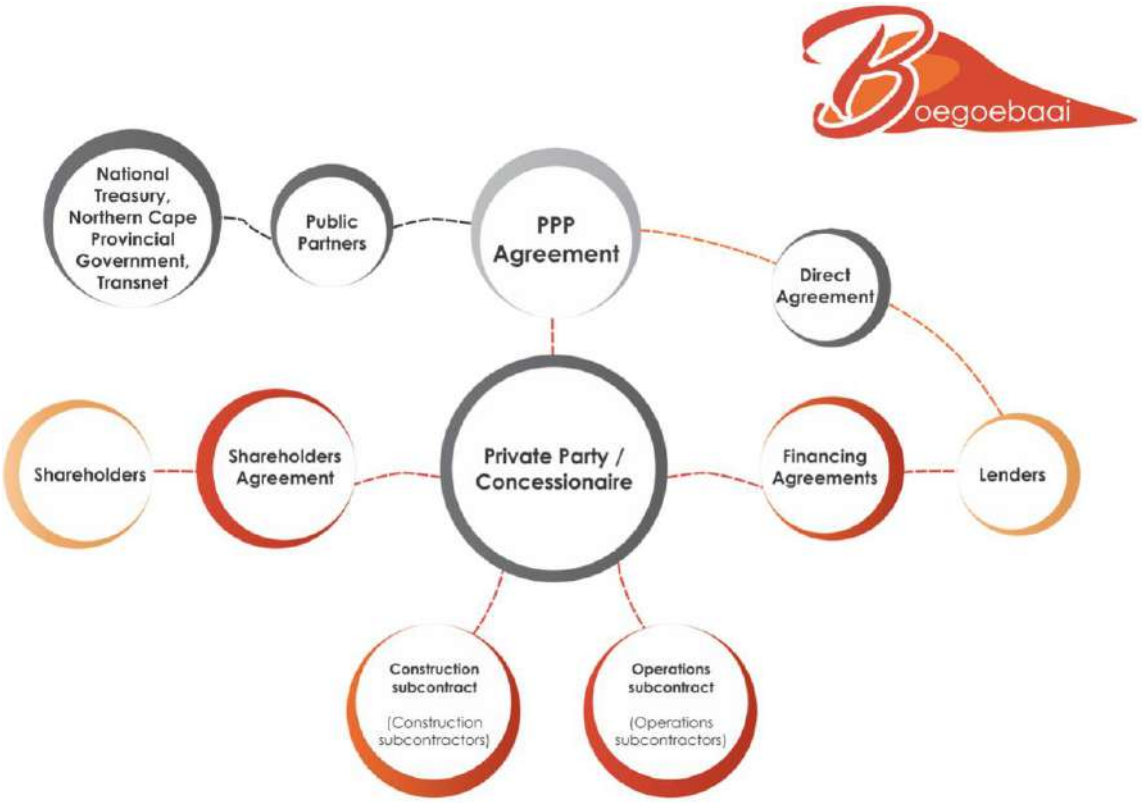


Figure 7-1: Proposed PPP Model for Boegoebaai

7.7 Equator Principles

Equator Principles are a set of voluntary guidelines adopted by private financial institutions, known as Equator Principles Financial Institution's ("**EPFI**"), to ensure that large scale development or construction projects appropriately consider the associated potential impacts on the natural environment and the affected communities. The adoption and application of the Equator Principles by EPFIs is therefore an additional risk management framework for determining, assessing and managing environmental and social risk in projects.

It is understood, from the preferred option portion of the Business Case that the financial projection of the first phase of the Proposed Project development is estimated at R13.8 billion. Based on this figure and on the assumption that the Proposed Project will be project financed, it can be assumed that the EPFI(s) that will finance the Proposed Project will apply the Equator Principles to the Proposed Project.

Given the nature and extent of the development, it is likely that the Proposed Project will be regarded as a Category A project and so Principles 5 and 6 of the Equator Principles, which deal with stakeholder engagement and grievance mechanisms respectively, will be particularly relevant to the Proposed Project.

The obligation to comply with the Equator Principles and their requirements is typically captured in the financing documents covenants.

The application and relevance of the Equator Principles will go towards bolstering the public participation processes that will need to be followed in engaging with various stakeholders, and especially, the Richtersveld CPA.

The Proposed Project will need to obtain the support of all stakeholders and interested and affected parties (such as the Richtersveld CPA), but in particular the communities located in the proposed project area. This acceptance of the Proposed Project will serve as the "*social licence*"- a concept emphasised by international bodies which encourages institutions and companies to obtain both regulatory and "*social*" permission to conduct their businesses.

Some of the consents required for the Proposed Project, such as the environmental authorisation, water use licence and air emissions license to name a few, are subject to internal appeals as provided for in the respective legislation. The type of project and its environmental and social impacts may determine the level of opposition from a legal challenges perspective.

The risk of appeals or judicial reviews is generally a low risk, although there has been increased community and environmental action group activism in South Africa. This risk can however be mitigated, although not entirely, by following a thorough public participation process and community and stakeholder engagement as prescribed by the law and coupled with international principles such as the Equator Principles.

Community and environmental action groups have challenged recent developments such as the construction and upgrade of the N2 Wildcoast Highway in the Eastern Cape, as well as various mining and infrastructure developments. These challenges have caused severe delays to project timelines which has resulted in some instances to sever prejudice to the investors and developers of the projects.

The overall level of risk of appeals and judicial reviews can only be determined once a due diligence investigation is conducted of the consents and/or applications for consents are submitted and obtained. It is recommended that as part of best practice and the process in obtaining consents, that the consents are managed so as to ensure that they do not lapse and that the period in which appeals and judicial reviews can be lodged is noted.

7.8 Land and Ancillary Matters

7.8.1 Ownership of the Project and Encumbrances

It is understood that the Proposed Project will be implemented in respect of Farm 1 and Rietfontein. The Windeed searches conducted in respect of the properties reflect the following:

Table 7-1: Property Searches

Property Description and Size	Registered Owner of Property	Comments
The Remainder of Farm No.1 Situated in the Richtersveld Municipality, Administrative District of Namaqualand, Province of the Northern Cape	Richtersveld Sida !Hub Communal Property Association Held under Title Deed T23364/2015	Farm No.1 was previously owned by Alexkor. It was transferred to the Richtersveld CPA in accordance with the Constitutional Court

Property Description and Size	Registered Owner of Property	Comments
Measuring: 69 876,5505 hectares		order that the Richtersveld Community is entitled in terms of section 2(1) of the Restitution of Land Right Act, No.22 of 1994 to the restitution of the right of ownership of Farm No.1.
Rietfontein No. 589 Situated in Namakhoi Municipality, Administrative District of Namaqualand, Province of the Northern Cape	Eskom Holdings Limited Held under title deed T4919/1990CTN	Please note that the name of the farm (Rietfontein No. 589) does not appear on the Windeed search, but the LPI Code C05300000000058900000 on the Windeed search corresponds with the SG number on the map provided. An instruction has been submitted to correspondence attorneys to attend to the Deeds Office to obtain a copy of the tittle deed in respect of the farm Rietfontein No. 589.

According to the Windeed search and the title deed in respect of Farm 1, Farm 1 is subject to several servitudes, but does not have any mortgage bonds or leases registered in respect of the property.

A '*servitude'* is a limited real right registered in the Deeds Office against the title deed of the property of a person in favour of another person or entity. The holder of the servitude (right) is therefore entitled to exercise some right on the property of another or prohibit the owner of the property from exercising some of his/her ownership rights. After registration in the Deeds Office the servitude forms part of the conditions contained in the title deed or it would be in the form of an endorsement on the said title deed. Servitudes can be cancelled by an application to the Registrar of Deeds.

The servitudes registered against Title Deed No. T32364/1994 in respect of Farm 1, may pose impediments to the intention to use the property. It is, therefore, critical that an investigation is done to determine whether the construction of the port on Farm 1, will cover any of the servitude areas registered against the title deed.

The Windeed search in respect of the farm Rietfontein as well as the title deed for Rietfontein did not reflect any servitudes, leases or mortgage bonds registered in respect of the property. A copy of the title deed for farm Rietfontein has been requested, however, as at the date of this report, it has not been received from correspondent attorneys.

7.8.2 Land Claims

The Restitution of Land Rights Act No. 22 of 1994 ("**Restitution of Land Rights Act**") entitled persons who have been dispossessed of a right in land as a result of past racially discriminative laws to lodge a claim in terms of the Act for restitution of such land.

As at 19 September 2019, in terms of correspondence from the Northern Cape Office of the Land Claims Commissioner dated 19 September 2019, Farm 1 and Rietfontein are not recorded as being subject to any land claims in respect of the Restitution of Land Rights Act.

7.8.3 Land Titles Adjustment

The Land Titles Adjustment Act No. 111 of 1993 (the "**Land Titles Adjustment Act**") was promulgated to regulate the allocation or devolution of certain land in respect of which one or more persons claim ownership, but do not have registered title deeds in respect thereof.

Farm 1 and Rietfontein have as at the date of this Report, not been designated as land which is subject to the Land Titles Adjustment Act.

7.8.4 Securing Rights to use the Property for the Proposed Project

It is understood that the Transaction Advisor and/or the NCDTSL have not made a determination regarding whether the Property will be leased or purchased from the owners. It is understood that the intention is to either purchase or lease the Property for the undertaking of the Proposed Project. This portion of the Report has accordingly been prepared to factor in consents to be obtained if the Property was to be leased and if the Property was to be purchased by the NCDTSL.

This Report has been prepared on the basis that the Proposed Project will be implemented in respect of Farm 1 and Rietfontein only.

As stated above, the registered owner of Farm 1 is the Richtersveld CPA and the registered owner of the farm Rietfontein is Eskom.

Securing Farm 1 for the development of the Proposed Project

Richtersveld CPA is a communal property association, established in terms of the Communal Property Associations Act No. 28 of 1996 ("**CPA Act**") .

The CPA Act was promulgated to amongst others, enable communities to form juristic persons, to be known as communal property associations (CPA), in order to acquire, hold and manage property on a basis agreed to by members of a community in terms of a written constitution. Therefore, the CPA Act enables communities to form communal property associations through which they may acquire and possess land that belongs indivisibly to the entire community. The members of the CPA are either members of an association or members of a community, as the case may be. CPAs are managed by committees, which are elected in accordance with the terms of the constitution of the CPA in question.

Section 8 of the CPA Act provides for the registration of CPAs and provides that a CPA must have a constitution which deals with matters set out in the schedule to the CPA Act. In addition, section 8 (6)(c) provides that an association may, subject to the provisions of its constitution, acquire and dispose of immovable property and real rights therein; and encumber such immovable property or real right by mortgage, servitude, or lease or in any other manner.

Section 9 of the CPA Act provides for the principles to be accommodated in CPA constitutions. More specifically, section 9(1)(d)(ii) provides that the constitution of an association shall provide for fair access to the property of the association in that the member of an association may not be excluded from access to or use of any part of the association's property which has been allocated for such member's exclusive or the communal use except in accordance with the procedures set out in the CPA's constitution.

Section 12(1) of the CPA Act provides that an association may not dispose of or encumber or conclude any prescribed transaction in respect of the whole or any part of the immovable property of an association, or any real rights in respect thereof, without the consent of the majority of members present at a general meeting of the members. Section 12(3) provides that any disposal which is in contravention of section 12(1) of the CPA Act, i.e. in the absence of the consent of the majority of the members of the CPA, shall be voidable.

Each CPA is required, under the CPA Act, to adopt a constitution. A copy of the constitution of the Richtersveld CPA has not been provided, however a request for it has been made to the Department of Rural Development and Land Reform. As at the date of this Report, the Richtersveld CPA constitution has not been received.

The purchase or lease of Farm 1 will be subject to the provisions of the CPA Act (particularly section 12) and the provisions of the constitution of the Richtersveld CPA. Therefore, should the NCDTSL wish to purchase or lease Farm 1 from the Richtersveld CPA it will have to comply with the provisions of the CPA Act and the constitution of the Richtersveld CPA. As stated above, in terms of section 12(1) of the CPA Act, an association may not dispose of or encumber or conclude any prescribed transaction in respect of the whole or any part of the immovable property of an association, or any real rights in respect thereof, without the consent of the majority of members present at a general meeting of the members.

The Richtersveld CPA is accordingly subject to the constitution of the Richtersveld CPA and the extent to which the Richtersveld CPA may dispose of or lease Farm 1 would be set out in the Richtersveld CPA constitution as read with section 12 of the CPA Act. While the constitution for the Richtersveld CPA has not been provided, it is noted that in terms of section 12(3) of the CPA Act, the disposal or lease (encumbrance) of any property held by a CPA requires the consent of a majority of the members of the CPA.

The consent of the members of the Richtersveld CPA will accordingly be required in order to purchase or lease Farm 1.

Section 12(6) of the CPA Act provides that the Rural Development DG shall, at the request of an association, appoint an authorised officer to attend a general meeting of an association and to take

such other steps as may be necessary in order to certify that a transaction referred to in subsection (1) has been duly approved at a general meeting and is in accordance with the constitution of the association. It is recommended that the NCDTSL should ensure that 'an authorised officer' contemplated in section 12(6) of the CPA Act attends the general meeting of the Richtersveld CPA when the members of the Richtersveld CPA are called upon to decide whether to sell or lease Farm 1 for purposes of the Proposed Project. This will minimise the risk of the meeting not conforming to the provisions of the CPA Act and the constitution of the Richtersveld CPA.

As stated above, according to the Windeed search on Farm 1, there are no mortgage bonds or leases registered over Farm 1. However, registration of leases over a property is usually done in respect of long-term leases (leases of 10 years or longer). Such leases are specifically regulated under the Formalities in respect of Leases of Land Act No. 18 of 1969, which provides that a long-term lease of land, will only be enforceable against third parties if the lease has been registered against the title deed of the property. Therefore, Farm 1 may be subject to a lease which is not registered against the title deed. This will have to be confirmed with the Richtersveld CPA.

It is understood, from the Annual CPA Report as well as correspondence received from the Department of Agriculture, Rural Development and Land Reform that (i) as at October 2018 the term of office of the committee of the Richtersveld CPA has expired and the Department of Rural Development and Land Reform has intervened and appointed an election agency, which the current committee of the Richtersveld CPA does not want to cooperate with; and (ii) in light of the foregoing the Acting Director-General for the Department of Rural Development and Land Reform instituted proceedings against the Richtersveld CPA in the High Court of South Africa, Northern Cape division ("**Court**"), under case number 961/19, with a view to have the Richtersveld CPA placed under administration.

It is recorded that on 28 February 2020, the Court made an order placing the Richtersveld CPA under administration. The Court also authorised the ADG to amongst others (i) attend to the day to day management and affairs of the Richtersveld CPA; (ii) convene, hold and chair annual general meetings or any other meetings of the Richtersveld CPA or meetings which the ADG deems necessary for the fulfilment of her tasks; and (iii) engage the services of the Independent Electoral Commission of South Africa or any other suitable body to serve as election monitors (for the election of a new committee for the Richtersveld CPA).

In the circumstances, to the extent that the Richtersveld CPA remains under administration, the NCDTSL will be required to submit a request for engagement on the acquisition of Farm 1, to the ADG, who is responsible for managing the affairs of the Richtersveld CPA while it is under administration. In these circumstances, it is anticipated that the ADG would consider the request and if deemed fit, call for a meeting of the members of the Richtersveld CPA to discuss the request from the NCDTSL.

As the Richtersveld CPA is a communal property association, the decision on the sale or lease of Farm 1 will be subject to the provisions of the CPA Act as well as the constitution of the Richtersveld CPA. The relevant meetings will accordingly be conducted under the supervision of the ADG and in accordance with the provisions of the constitution for the Richtersveld CPA and the CPA Act, and the decisions will be taken by majority decision of the members of the Richtersveld CPA.

With the Richtersveld CPA being placed under administration in terms of the CPA Act, there is a risk that the association may be deregistered. In the event that the deregistration results in Farm 1 being transferred to the State to be held in trust for and on behalf of the Richtersveld Community or to be held temporarily by the Department of Rural Development and Land Reform until transferred to the claimants, then the NCDTSL will be required to liaise with the Department of Rural Development and Land Reform with regard to the acquisition of the property, and the provisions of the Interim Protection of Informal Land Rights Act No. 31 of 1996 ("**IPILRA**") will likely be applicable.

IPILRA provides for the temporary protection of certain rights to and interests in land which are not otherwise adequately protected by law. Section 2 of IPILRA provides as follows:

1) *Subject to the provisions of subsection (4), and the provisions of the Expropriation Act, 1975 (Act No. 63 of 1975), or any other law which provides for the expropriation of land or rights in land, no person may be deprived of any informal right to land without his or her consent.*
2) *Where land is held on a communal basis, a person may, subject to subsection (4), be deprived of such land or right in land in accordance with the custom and usage of that community.*
3) *Where the deprivation of a right in land in terms of subsection (2) is caused by a disposal of the land or a right in land by the community, the community shall pay appropriate compensation to any person who is deprived of an informal right to land as a result of such disposal.*
4) *For the purposes of this section the custom and usage of a community shall be deemed to include the principle that a decision to dispose of any such right may only be taken by a majority of the holders of such rights present or represented at a meeting convened for the purpose of considering such disposal and of which they have been given sufficient notice, and in which they have had a reasonable opportunity to participate.*

Informal land right in this regard, is defined as including the use of, occupation of or access to land in terms of any tribal, customary or indigenous law or practice of a tribe; and a tribe includes any community living and existing like a tribe.

In the circumstances, and in the event that there are informal land right holders in respect of the property, such individuals must be consulted by the NCDTSL and the NCDTSL must obtain their consent in respect of the Proposed Project as the implementation of the Proposed Project will deprive the informal land right holders of the property. The consent required from such informal land right holders must be obtained in accordance with the customs of the relevant community and will be required irrespective of whether the NCDTSL wishes to lease or purchase the property.

Moreover, the State Land Lease and Disposal Policy (the "**Policy**") has been introduced by the Department of Rural Development and Land Reform to provide for the leasing of immovable assets of the Department of Rural Development and Land Reform. The Policy was approved by the Minister for the Department of Rural Development and Land Reform ("**Rural Development Minister**") on 25 July 2013. According to the Policy, it replaces all existing policies on the leasing of immovable assets of the Department of Rural Development and Land Reform and also takes precedence over any other department policy that contains any provision on leasing of immovable assets.

The Policy applies to all immovable assets for which the Department of Rural Development and Land Reform has legal title and which fall under the categories set out therein, which include amongst

others, (i) immovable assets held by the Rural Development Minister, in trust for traditional communities, as provided in the relevant title deeds; (ii) immovable assets transferred from other government departments for land reform purposes; (iii) immovable assets acquired in terms of the Restitution of Land Rights Act and temporarily held by the Department of Rural Development and Land Reform for future transfer to claimants.

The Policy differentiates between agricultural leases and commercial development leases and sets out, *inter alia*, different lease periods and procedures for approval of such leases.

Commercial developments under the Policy are dealt with in chapter 3 of the Policy. The Policy states that it has taken a '*non-protectionist*' approach in respect of commercial developments, in order to encourage private sector investment in the areas that were systematically marginalised.

Under the chapter dealing with commercial leases, the Policy refers to applications for land tenure rights or long-term leases. '*Land tenure right'* is defined as "*leasehold or any long-term lease*". Whilst '*leasehold'* is defined as "*the right to hold or use property for a fixed period of time at a given price, without transfer of ownership, on the basis of a written lease contrac*t". '*Long term lease'* is defined as "*any lease which is 10 years or longer*".

All applications for land tenure or long-term leases must be presented to a Provincial State Land Vesting and Disposal Committee ("**PSLVDC**"). After a recommendation by the PSLVDC, the head of the relevant provincial office shall then process the application for approval by the Rural Development Minister.

All commercial leases regardless of their term/period must be approved by the Rural Development Minister.

The approval of a land tenure right or long-term lease must be preceded by consultation, where applicable. Proof of such consultation must be in the form of a resolution signed by all the persons who attended such a meeting.

The Policy sets out that community participation or consultation must take place as follows: (i) where the envisaged development is to take place on land which, at any time prior to 27 April 1994, was allocated to a traditional community or other community, such community shall be consulted in accordance with procedures issued in terms of IPILRA; (ii) where the envisaged development is to take place on land where certain natural persons have enjoyed informal rights to land, such persons shall also be consulted in accordance with the same procedures referred to in paragraph 16.1 of the Policy.

The land development applicant or prospective lessee must initiate and manage the consultation process and incur all costs relating to the convening of consultation meetings.

The Policy requires a prospective lessee to simply demonstrate prospects for community participation in the intended enterprise. Such prospects need not be limited to potential employment but should also include the possibility of skills transfer and community shareholding in the enterprise. It is stated in the Policy that whilst existing sector specific Broad Based Black

Economic Empowerment targets may be used for guidance, the commercial entity operating in a communal area should allocate a minimum of 10% free-rider shareholding in the operating entity.

In terms of the Policy the Department of Rural Development and Land Reform does not require any prior approval from another authority for granting a lease for non-agricultural developments. The Policy also sets out some provisions that must be in the lease agreement. The Policy states that the lease period for all commercial developments leases shall be 30 years, which may be renewable for another 20 years.

In light of the above, and in the event that the NCDTSL wishes to lease Farm 1 and the property or a portion thereof falls under any of the categories listed above, then, in addition to any other approval or consent the NCDTSL may require, it will also require the approval of the Rural Development Minister.

The Policy is viewed as not being a legally binding instrument, but merely a guideline to be utilised by the Department of Rural Development and Land Reform on processing leases of land on which the Department of Rural Development and Land Reform has legal title.

Securing Farm Rietfontein for the development of the Proposed Project

According to the Windeed searches conducted in respect of farm Rietfontein as well as the title deed for Rietfontien, Eskom is the registered owner of the property.

As stated above, the Windeed search and the title deed did not reflect any servitudes, leases or mortgage bonds registered over the Rietfontein farm.

In order to secure the Rietfontein farm for the development of the Proposed Project, whether through a purchase or lease, the NCDTSL will have to engage with Eskom as the registered owner of the property.

If the property is already subject to a lease, then the NCDTSL may be required to enter into a sublease agreement in respect of the property, with the current lessee of the property, subject to any approval which may be required from Eskom in respect of the conclusion of the sublease, as may be set out in the relevant lease agreement.

7.8.5 Prospecting and Mining Rights on the Proposed Project Property

Alexkor Mining Rights

It is understood that Alexkor is currently conducting mining operations over Farm 1. It is understood further that Alexkor holds the following mining right granted over Farm 1:

- **Mining Right (DMR Ref: SNC 30/5/1/2/2/554)** ("**554 MR**") in respect of diamonds over Surf Zone along **Farm No. 1** and Farm No. 155 up to 31.49 metres below water; Middel of the Orange River to the bank of the following properties, **Farm No. 1**, Brandkaros 517, Arrisdrif

616 and Portions 15, 16 and 17 of Korridor Wes no.2; Sea Area 1(a), Sea Area 1(b), Sea Area 2(a) and Sea Area 3(a), in the Magisterial District of Namaqualand, Northern Cape, measuring 840.5197; 47.3711; 1470.7783; 3277.7400; 20 692.707; 3188.7047; 3205.7731 hectares in extent. This right was executed and commenced on 2 July 2010 and unless cancelled or suspended, continues to be in force for a period of 20 years, ending on **1 July 2030**. This right was registered with the MPTRO on 4 November 2010.

It is further understood that Alexkor holds the following marine mining rights, which entitle Alexkor to mine diamonds from the seabed:

- **Mining Right (DMR Ref: (SNC) 512 MR)** ("**512 MR**") in respect of diamonds (general) over Sea Concession 4(a), in the Magisterial District of Namaqualand, Northern Cape, measuring 3168.8402 hectares in extent. This right was executed and commenced on 2 July 2010 and unless cancelled or suspended, continues in force for a period of 10 years until **1 July 2020**;
- **Mining Right (DMR Ref: 30/5/1/2/2/10025MR)** ("**10025 MR**") in respect of diamonds (alluvial) over Sea Concession No. 1 (C), in the Magisterial District of Namaqualand, Northern Cape, measuring 3037304 square kilometres in extent. This right was executed and commenced on 18 February 2015 and unless cancelled or suspended, continues in force for a period of 10 years ending on **17 February 2025**. This right was registered with the MPTRO on 13 March 2015;
- **Mining Right (DMR Ref: (SNC) 30/5/1/2/2/513 MR)** ("**513 MR**") in respect of diamonds (general) over Sea Concession 4(b), in the Magisterial District of Namaqualand, Northern Cape, measuring 9484.709 hectares in extent. This right was executed and commenced on 2 July 2010 and unless cancelled or suspended, continues in force for a period of 10 years until **1 July 2020**. It is not clear whether the mining right was registered with the MPTRO.
- It is noted that **512 MR** and **513 MR** will expire on 1 July 2020 respectively. Whilst **10025 MR** expires on 17 February 2025. In terms of section 24 of the Mineral and Petroleum Resources Development Act No. 28 of 2002 (the "**MPRDA**"), Alexkor as the holder of the mining rights may lodge an application for the renewal of the mining rights.

According to the Environmental Report the Proposed Project could impact on certain of the mining areas covered under the 10025 MR. It must be considered whether the construction of the port will extend to the sea concession (sea-bed areas) covered by Alexkor's 512 MR, 513 MR and 10025 MR mining rights.

<u>Richtersveld Mining Right</u>

It is understood that Alexkor was the registered holder of the following mining right, which mining right was ceded to the Richtersveld Mining Company in terms of a notarial deed of cession dated 28 March 2011 and registered with the MPTRO on 6 April 2011. In view of the notarial deed of cession, Richtersveld Mining Company is the holder of the following mining right over Farm 1:

- **Mining Right (DMR Ref: (SNC)30/5/1/2/550 MRC)** ("**550 MRC**") in respect of diamonds over **Farm No.1**, Farm No 155; Remainder of Farm Gypsum No. 5; Arrisdrif no 616; Brandkaros No. 617 and portions 14, 15, 16, 17 and 19 of the farm Korridor Wes No. 2, in the Magisterial District of Namaqualand, Northern Cape, measuring 83638.8775 hectares in extent. This

right was executed and commenced on 19 May 2010 and unless cancelled or suspended, continues in force for a period of 25 years ending on **18 May 2035**. This right was registered with the MPTRO on 9 March 2011.

Vast Mineral Sands' Prospecting Right

Upon enquiry from the Northern Cape Office of the DMR as to whether there were any rights or permits granted in respect of Farm 1 and Rietfontein in terms of the MPRDA, copies of 550 MRC and 11923 PR which were granted in respect of amongst others, Farm 1 were provided.

The Northern Cape Office of the DMR did not provide any mining rights granted in respect of Rietfontein. It is accordingly assumed that there are no mining rights granted in respect of Rietfontein.

It is noted that Vast Mineral Sands holds a Prospecting Right (DMR Ref: NC 11923 PR) ("**11923 PR**") in respect of heavy metals (general) leucoxene (heavy mineral), monazite (heavy mineral), rutile (heavy mineral) and zirconium ore over the Remainder of Portions 8 and 9 of **Farm No. 1** and Farm No. 155, in the Magisterial District of Namaqualand, Northern Cape, measuring 82 413.0023 hectares in extent. This right was executed and commenced on 1 February 2018 and unless cancelled or suspended, continues in force for a period of 5 years, ending on **31 January 2023**.

In terms of section 18 of the MPRDA, a prospecting right may be renewed once for a period not exceeding three years and in terms of section 19(1) of the MPRDA, Vast Mineral Sands as the holder of the prospecting right, has an exclusive right to apply for and be granted a renewal of the prospecting right and an exclusive right to apply for and be granted a mining right in respect of the mineral and prospecting area in question.

Consequently, in the event that the construction of the port encroaches upon the areas covered by Vast Mineral Sands' prospecting right, the NCDTSL will, in addition to Alexkor (and Richtersveld Mining Company), have to engage with Vast Mineral Sands for the use of the areas covered by Vast Mineral Sands' prospecting right.

It is worth noting that the prospecting right held by Vast Mineral Sands in respect of the Remainder of Portions 8 and 9 of Farm 1 may pose a risk to both the layout of the port and the feasibility of the Proposed Project, in that, amongst others, Vast Mineral Sands may not be willing to abandon the prospecting right or to relinquish any portion of the prospecting area to which the prospecting right relates or future mining activities if its prospecting operations yield favourable results or it may be willing to abandon or relinquish any portion of the prospecting area to which the prospecting right relates, provided it receives some form of financial compensation. Provision may need to be made by the Transaction Advisor, for the possible financial compensation to Vast Mineral Sands in this regard.

Settlement Agreement

It is understood that Alexkor and the Richtersveld Mining Company formed a joint venture ("**PSJV**") in terms of which, amongst others: (i) the two entities would respectively put their marine and land mining rights under the full control of the joint board of the joint venture for purposes of mining

both marine mining resources and the land diamond resources; and (ii) the joint board of the PSJV shall have overall supervision of the activities of the pooled operations and shall be the sole representative of the parties in respect of the pooled operations, unless otherwise determined by the joint board by resolution.

In light of the contents of the rights considered above and the provisions of the Settlement Agreement and the Deed of Cession, the NCDTSL will require the cooperation of Alexkor, Richtersveld Mining Company, the joint board of the PSJV and Vast Mineral Sands to proceed with the Proposed Project in respect of Farm 1.

7.8.6 Use of Land contrary to the MPRDA

Section 53(1) of the MPRDA provides that any person who intends to use the surface of any land in any way that may be contrary to any object of the MPRDA, or which is likely to impede any such object, must apply to the Minister for the Department of Mineral Resources and Energy (the "**DMR Minister**") for approval ("**Section 53 Approval**").

Failure to comply with the provisions of section 53(1) of the MPRDA constitutes an offence in terms of section 98(a)(viii) and, in terms of section 99(1)(g) punishable with a fine or imprisonment not exceeding six months or both.

Section 53(1) provides that, save in the circumstances where section 53(2) applies, any person who intends to use the surface of any land in any way which *may* be contrary to any object of the MPRDA or which is *likely* to impede any such object must apply to the DMR Minister for approval.

Section 53 of the MPRDA provides a mechanism for ensuring that, *inter alia*, the mining of mineral resources is not detrimentally affected through the use of the surface of land and which may, for example, result in the sterilisation of a mineral resource. Section 53 prohibits person, who intend to use the surface of land in ways which could detrimentally affect the mining of mineral resources, from so using the land, unless the DMR Minister approves of their intended action. This restriction operates in addition to the generally applicable requirement that the intended use must be authorised under the applicable planning law.

Because Farm 1 is a subject of mining rights and a prospecting right and prospecting and mining operations have been undertaken on Farm 1, Farm 1 can be said to have real prospects of containing commercially exploitable minerals, and as such section 53 of the MPRDA is applicable to any particular use of such land.

Consequently, the NCDTSL will need to submit a Section 53 application to the DMR, since the intended use of developing the Proposed Project on Farm 1 *'may'* be contrary to an object of the MPRDA and/or such use will *'likely'* impede any such object.

On 27 March 2020, the DMR Minister published amendments to the Mineral and Petroleum Resources Development Regulations for implementation (the "**Amended MPRDA Regulations**"). The recent Amended MPRDA Regulations prescribe the form to be used and content to be included in a section 53 application. Amongst others, the NCDTSL will be required to include in the section 53 application, a report on meaningful consultation with interested and affected persons in the mining

industry and a report on meaningful consultation with the Council for Geoscience regarding both the mineral potential of the land concerned and the possible presence of dolomitic formations thereon. The term '*interested and affected persons*' is defined in the Amended MPRDA Regulations "as a natural person or an association of persons with direct interest in the proposed or existing prospecting or mining operation or may be affected by the proposed or existing prospecting or mining operation. These include, but are not limited to:

- Mine Communities (as defined in the amended Regulations),
- landowners,
- the Traditional Council as defined in the Traditional Leadership and Governance Framework Act, 2003),
- land claimants who have lodged claims in terms of the Restitution of Land Rights Act 1994 which have not been rejected or settled in terms thereof,
- lawful land occupier,
- holders of informal rights in terms of the Interim Protection of Informal Land Rights Act 1996,
- the Department responsible for Agriculture, Land Reform and Rural Development,
- the Department responsible for Co-operative Governance and Traditional Affairs,
- the Department responsible for Human Settlements, Water and Sanitation,
- any other person (including on adjacent and non-adjacent properties) whose socioeconomic conditions may be directly affected by the proposed or existing prospecting or mining operation,
- the local municipality,
- civil society, and
- the relevant government departments, agencies and institutions responsible for the various aspects of the environment and for infrastructure which may be affected by the proposed project.

Further, as part of the section 53 application, the NCDTSL would also be required to confirm whether the holders of prospecting, mining, exploration or production rights within a 2 kilometre radius of the application area have been identified and consulted with meaningfully and to record whether these individuals have objected to the proposed land development.

In the circumstances Alexkor, the Richtersveld Mining Company and Vast Mineral Sands must be consulted as holders of mining rights and a prospecting right respectively, granted in respect of Farm 1. In addition, the NCDTSL will also have to consult with some of the parties listed above, if applicable, as part of its Section 53 application. Thus a Section 53 Approval must be obtained by the NCDTSL prior to the construction of the port.

Given these complexities, it is advisable that a Section 53 Approval be obtained as early as possible to avoid incurring excessive costs which would result in a loss for the NCDTSL if an application for a Section 53 Approval is refused.

It is worth noting that section 53 is of such broad application that not only is a Section 53 Approval required for the use of the surface of land, which is the subject of, *inter alia*, a mining right or prospecting right, but is also required, for example, for the use of the surface of mineralised land over which no mining right or prospecting right has yet been granted. Consequently, it should be noted that the mere fact that the construction of the port may sterilise minerals and/or impede potential future mining operations may be a sufficient basis for the DMR Minister to reject an application submitted pursuant to section 53.

There are instances where the developers of the port and the holders of the rights (Alexkor, Richtersveld Mining Company and Vast Mineral Sands) are able to co-exist, subject to the NCDTSL obtaining a Section 53 Approval and compliance with the applicable zoning requirements. Such a relationship can be regulated by a land use agreement whereby, for example, the mining of the mineral resource may have to take place prior to the construction of the port to prevent the sterilisation of the mineral resource.

7.8.7 Closure and Rehabilitation of Mined Land

It has not been specified when Alexkor (and/or Richtersveld Mining Company) will cease its mining operations on Farm 1. It is understood from the Environmental Report that it is intended that Alexkor will complete its mining operations on the areas affected by the Proposed Project before the commencement of the construction of the port.

It is further understood that the intention is to commence construction of the port by the year 2022. The uncertainty as to when Alexkor (and/or Richtersveld Mining Company) will cease its mining operations and to the extent applicable, when Vaal Mineral Sands will cease prospecting operations on Farm 1 may impact the Proposed Project timetable in terms of when consents are applied for and obtained and whether the intention to commence construction by 2022 is practicable.

In terms of section 43(3) of the MPRDA, the holder of a mining right or prospecting right must apply for a closure certificate upon: (i) the lapsing, abandonment or cancellation of the right in question; (ii) cessation of the prospecting operation or mining operation; (iii) the relinquishment of any portion of the prospecting of the land to which a right relates; or (iv) completion of the prescribed closing plan to which a right relates.

Section 38(1)(d) and (e) of the MPRDA provides that the holder of a prospecting right or mining right must, as far as it is reasonably practicable, rehabilitate the environment affected by the prospecting or mining operations to its natural or predetermined state or to a land use which conforms to the

generally accepted principle of sustainable development and is responsible for any environmental damage, pollution or ecological degradation as a result of his/her prospecting or mining operations and which may occur inside and outside the boundaries of the area to which such right relates.

Therefore, mine closure is a process undertaken when the operational stage of a mine is ending or has ended, and the final decommissioning and mine rehabilitation is underway.

Section 43(4) of the MPRDA provides that an application for a closure certificate must be made within 180 days of the occurrence of the lapsing, abandonment, cancellation, cessation, relinquishment or completion contemplated in Section 43(3) of the MPRDA.

Prospecting activities undertaken by Vast Mineral Sands on the Remainder of Portions 8 and 9 of Farm 1 will also be subject to the provisions of section 43 of the MPRDA. Should Vast Mineral Sands agree to abandon the prospecting right or to relinquish any portions of the prospecting area which the prospecting right relates, it will be required to apply for a closure certificate in accordance with the provisions of section 43 of the MPRDA.

The rehabilitation objectives on Farm 1 by Alexkor (and Richtersveld Mining Company and Vast Mineral Sands) must be aligned with the approved environmental authorisations and closure plans' objectives and commitments.

Therefore, the NCDTSL must consider the implications of the rehabilitation and mine closure process on its proposed construction of the port. It may be necessary to engage with Alexkor (and Richtersveld Mining Company) and Vast Mineral Sands regarding their rehabilitation activities and mine closure process. The rehabilitation and mine closure process may influence the layout of the Proposed Project.

Over and above the need to obtain a closure certificate, Alexkor (and Richtersveld Mining Company) and Vast Mineral Sands will need to apply for an environmental authorisation for conducting activities that require a closure certificate, namely, the closure and rehabilitation of their mining and prospecting activities which is a specific listed activity requiring environmental authorisation as prescribed by the National Environmental Management Act No. 107 of 1998 ("**NEMA**"). This process in itself may cause delays to the Proposed Project timeline since these parties will need to obtain environmental authorisation in terms of NEMA prior to conducting the closure activities. An application for environmental authorisation for closure activities will trigger the need for a Basic Impact Assessment to be conducted, following which environmental authorisation may be granted. The timeframe for completing a Basic Impact Assessment is 107 days from application phase however may take longer.

It is also highly recommended in terms of mitigating the environmental liability of the Proposed Project, that as part of the environmental impact assessment processes that will be carried out for the Proposed Project, a baseline assessment be conducted. An environmental baseline assessment documents the pre-project environmental conditions and may be of particular necessity in light of the fact that mining and prospecting activities are currently been undertaken in the area. It is therefore important to properly assess the baseline condition before the Proposed Project takes place, so as to understand which impacts existed before the implementation of the Proposed Project

and which could be impacts from Proposed Project activities. This will limit the proposed Project's liability for any environmental degradation that may have been caused or resulted from mining activities.

Should the Proposed Project proceed on the basis that it will commence construction in 2022, it would be necessary to commence with the various processes to obtain the necessary environmental and regulatory consents.

In the event delays are occasioned by the delay in Alexkor (and Richtersveld Mining Company) and Vast Mineral Sands ceasing their operations and obtaining closure certificates, the environmental and regulatory consents, some of which may be subject to validity periods, could be at risk of lapsing, expiring and therefore new applications having to be submitted for new consents and approvals or applications for extensions submitted.

It will therefore be essential to obtain certainty as to when the Alexkor (and Richtersveld Mining Company) and Vast Mineral Sands intend ceasing their operations as this will greatly influence the planning of when consents are obtained and associated Proposed Project timelines.

7.8.8 Land Use Planning and Other Considerations

Zoning and Land Use Planning

Land use planning law such as the Land Use Planning Ordinance, 1985 (and other similar ordinances applicable in South Africa's provinces) governs the zoning and rezoning of land and the uses to which land may be put. These provincial ordinances authorise local government (municipalities) to design and implement land use schemes to govern how land within the jurisdiction of the relevant municipality may be used. Land use management in South Africa is currently governed by these ordinances and their related land use management schemes, and the system of provincial legislative authority over land use planning and local government's implementation, execution and administration of land use law is enshrined in South Africa's Constitution.

Therefore, the development of the Proposed Project may only be undertaken on land if the zoning scheme permits. If not, rezoning of the land must be obtained before the commencement of development of the Proposed Project.

As such, the use of land for purposes other than those permitted is prohibited. If one wants to use land for a purpose not so permitted, he or she has to apply to the municipality for rezoning or for a use departure.

The zoning of the Property must be investigated and determined. It may be necessary to undertake an enquiry as to whether a town-planning scheme has been promulgated over the land which is the subject of the Proposed Project.

Subdivision of Agricultural Land Act

The Subdivision of Agricultural Land Act 70 of 1970 ("**Agricultural Land Act**") prohibits the subdivision of agricultural land or the leasing of a portion of agricultural land for a period of 10 years or longer, without the Minister of Agriculture's prior consent. The courts have determined that a

contract in respect of a portion of agricultural land, that was entered into prior to obtaining the Ministers prior consent, was void from the outset.

Please note that it may be necessary to determine the zoning of the Property so as to ascertain whether the Subdivision of Agricultural Land Act is applicable. If the Property is zoned as agricultural land, the provisions of the Agricultural Land Act will be applicable.

7.8.9 Community Engagement and Participation

A common issue being raised by communities during engagements with potential developers on community land are issues around shareholding, employment, procurement and community development.

Notwithstanding that it may not be a legal requirement, practically the requirement to incorporate an equity stake for communities has been increasingly emphasised by communities. This is a commercial issue that the NCDTSL will have to take a view on.

There are number of ways to deal with the above issues; and provision, financial or otherwise, should be made to address the above issues as part of the implementation of Proposed Project. Issues of employment, procurement and community development can be dealt with in various ways, such as through a company's corporate social investment/responsibility policies, non-binding/binding memorandum of understanding with communities or non-profit organisations representing the community.

It is proposed that the NCDTSL engages the Richtersveld CPA or community, as applicable, as soon as possible after Treasury I approval is obtained, in order to: (i) understand and address the community's demands (if any) timeously; and (ii) control the information relayed to the community regarding the Proposed Project and to ensure that the community is meaningfully engaged regarding the Proposed Project, thereby developing a meaningful relationship with the community.

VALUE **ASSESSMENT**

8. Value Assessment

8.1 Introduction

The value assessment stage of the feasibility study evaluates the procurement options that the department has available for the implementation of the port project. Traditionally, Government has funded projects from budgeted allocations or issued debt (government bonds) to be repaid over a specific period. The value assessment determines whether a PPP is the best procurement option for the project. A comparative assessment is made between a risk adjusted public sector comparator (PSC) and a PPP reference model.

Treasury Regulation 16 of the PFMA prescribes the need to assess the affordability and the value for money of the project, and the appropriate transfer of risk from the institution to the private party. This chapter addresses these issues in terms of the broad technical definition of the port project, the modelling assumptions applicable to both PSC and PPP models, a description of the PSC model and its results, a description of the PPP model and its results, a general risk assessment and specific assessment of the PSC versus PPP models, an affordability analysis for both models and a value for money determination between the options. The outcome of this work provides the basis for the final procurement choice and the value assessment recommendations.

8.2 Technical Definition of the Project

The port is the core infrastructure around which value adding logistics services are developed. The basic logistics services include intermodal transfer from ship to land and vice versa, loading, unloading and storage, whilst value added logistics services include groupage, stuffing and destuffing of containers, clearing and forwarding insurance and container repair. Once these services are available, commercial, and financial services follow almost by default since they are required to sustain and serve the value-added logistics services.

The scope of this study is summarised in Figure 8-1.

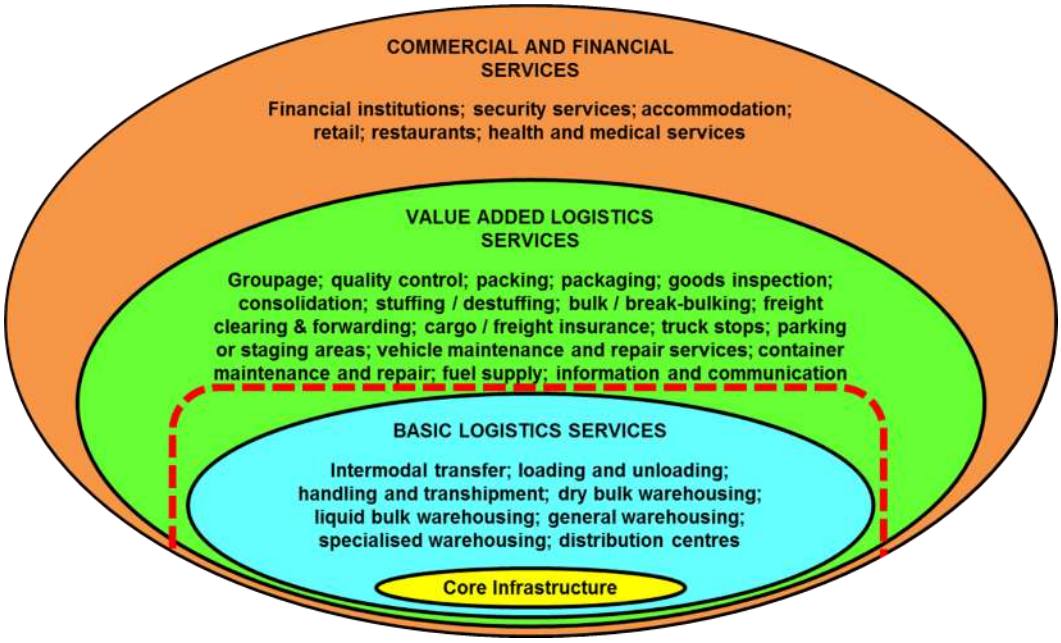


Figure 8-1: Scope of study within the Port Zone Framework

Benefits to the port operations occur because the terminal serves as the central point and a hub for all bulk cargo, liquid products and containers. The flow of bulk cargoes and containers to and from the target area becomes more cost-effective in this way and benefits both importer and exporter, by making them more competitive in the global markets. The port as a standalone facility is not usually a highly profitable business as the infrastructure and operations equipment are highly capital intensive and volume sensitive. However, the services associated with the terminals and their inherent efficiencies can add significant value to the overall return on investment.

The definition of a port clearly indicates that the core infrastructure of the facility (primary function) is surrounded in an outward direction by various peripheral activities and value adding logistics services (secondary and tertiary functions). The ideal development will have all these functions as close as possible to the core infrastructure, where the bulk cargo and containers are lifted from one mode to another ("touch"), placed into stack/stockpile or retrieved from stack ("move"), placed on ship (‘loading”),removed from ship at the destination ("unloading”), and manoeuvring of the ship ("marine services"). These activities are the main contributors to the revenue of the port and the terminal operators.

Specifically, this project is a port comprising a multi-purpose, a dry bulk and a liquid bulk terminal. The envisaged port would have the following infrastructure and services provided:

- Quays for loading and offloading cargo;
- Warehouse facilities for storage of bulk and containers in bonded facilities;
- Warehouse facilities to let to other logistics operators;
- Ship refurbishment and re-supply;
- Container cleaning ;

- Specialised warehousing (e.g. refrigerated, high security, liquid/bulk handling and storage);
- Road transport, delivery and pickup; and
- Groupage (consolidation of loads).

The ideal and most cost-effective design of a port in the supply chain requires that all primary, secondary and tertiary activities be located as close as possible to each other inside the port environs (or logistics precinct) with proper quays having adequate draft available.

8.3 Modelling Assumptions

This is a greenfield project and there has been no budgetary provision made to date for the implementation of the project. On account of the available budget constraints, the public sector funding for the project, using a unitary fee or payment for the project with conventional procurement, may not be practical. In order to assist the NCDTSL with the procurement method that can be used, the value assessment considered and evaluated the Public Sector Comparator (PSC) and the Concession Agreement (PPP) option.

The rationale is to quantify the costs for the department and explore various options to enable the department to have a decision-making tool which can be used during the budget vote and get funding.

These options have been analysed according to Treasury Regulation 16 of the PFMA. In carrying out this assessment, the value assessment seeks to establish the following:

- Affordability of the option
- Risk transfer dynamics i.e. does the chosen option appropriately transfer risk from the department to the private party
- Value for money
- Assess the costs of the Project
- Assess the quantification of the risk transfer possible, through either option;
- Determine whether value for money is achievable, through either option; and
- Make a recommendation on the best option to be implemented for all stakeholders.

Under all options, there exist a set of assumptions that are common. These assumptions relate to:

- The real capital cost of the port.
- Operational cost benchmarks
- Forecast revenue

8.3.1 Construction and Design Base Case Capital Cost Estimate

The estimated costs are based on the preliminary design of the port. The project has various facets that involve port development, upgrading of access roads to the port and development of the terminals in the port. Developing the entire project simultaneously is not possible, hence a phased approach was chosen. The value assessment is based on phase one of the project.

The base case capital cost estimate is R 12,216 billion. Refer to Section 5.13 of this report for more detail. A breakdown of the capital costs is per the Table 8-1 below:

Table 8-1: Capital cost for base case model

Capital Costs Summary (ZAR Million)				
	Port	**Dry Bulk**	**MPCT**	**Liquid Bulk**
Port Marine & Landside Infrastructure	8 644			
Equipment& Terminal Infrastructure		2 027.2	274.0	317.3
Sub-Total	**8 644**	**2 027.2**	**274.0**	**317.3**
Total Phase 1A project Capital Cost				**11 262.5**
General Design & Development Costs[1]				773.0
Success Fee				180.5
Total Phase 1A Project Capital Cost				**12 216.0**
1. TA 1 development cost of R73mill included				

The capital cost listed above included the following items:

- The bulk infrastructure including breakwaters and quaywalls;
- Other infrastructure such as buildings, roads and bulk services;
- Construction of facilities such as bulk handling terminals, a liquid fuel terminal and a multi purpose terminal (MPT);
- Marine Services such as tugs and other harbour support vessels; and
- Equipment such as conveyors, mobile cranes, forklifts, container reach stackers and other vehicles.
- Associated EPCM and Owner's Engineer Fees
- The Project Development Fee to financial closure. The TA1 development funding of R73 million has been included in this amount.
- A Project Success fee paid to the transaction advisor. The awarding of this success fee of 1.5% was included in the contract between the Department and the Transaction Advisor. It was deemed prudent that it be applied against the total project cost (excluding Success Fee) listed in Table 8-1 above.

8.3.2 Revenue Income Assumptions

Projections of volumes to be handled at the port are based on the market commodity mix analysis undertaken by the team of advisors. The port ramps up over time reaching a maximum 13.5 to 14 Mtpa operating capacity in 10 years. The revenue projections are based on the services to be provided such as:

- Terminal handling costs
- Vessel handling and cargo dues
- Marine services,
- Storage,
- Primary and secondary lifting of cargo
- Handling services
- Administration and documentation income
- Rental of terminal land.

The main driver for revenue projections is the growth of volumes exchanged at the port over the duration of the project and annual inflation increases to the tariffs adjusted at an average of 4.5% per year. The rates used are set by the port regulator and the model is based on current port tarrifs regardless of whether the port is managed by the Public Sector or the Private Sector.

The base assumptions for revenue per annum are as follows:

Table 8-2: Base case revenue assumptions

Commodity	**Unit**	**ZAR Tariff**
Minerals		
Manganese & Iron Ore Terminal	Ton	91.88
Other Minerals Terminal	Ton	154.35
Manganese & Iron Ore Port	Ton	9.39 & 27.04
Other Minerals Port	Ton	27.04
Containers Terminal	TEU	1 800
Containers Port	TEU	572 &1932
Fuel Terminal	Ton	200.00
Fuel Port	Ton	32.44
Revenue Streams	**ZAR' million**	
Total Revenue Over Period: Liquid Terminal		13 987.26
Total Revenue Over Period: Dry Bulk Terminal		40 478.36
Total Revenue Over Period: Container Terminal		15 937.61
Total Revenue Over Period: Port Marine		54 080.74
Total Revenue (ZAR' million):		**124 483.97**

All rates utilised in the model were based on the TNPA and the TPT tariff books. The other terminal handling fees used for bulk minerals and liquid bulk tariffs were benchmarked with various South African port terminal tariffs.

8.3.3 Economic Assumptions

The economic assumptions are listed in the table below:

Table 8-3: Base case economic assumptions

Economic Assumptions	**%**
Corporate tax	28.0%
Value Added Tax	15.0%
Annual inflation rate	4.5%
Interest on Loans[1]	7.6%
Required real return on equity[1]	18.0%
1. Note these only apply to the PPP model	

The figures above were based on economic benchmarks in the market and regulatory aspects for issues such as tax rates.

8.3.3.1 Inflation Rate

The Consumer Price Index (CPI) has been used as the inflation rate at which the base operating costs and revenues are escalated to get nominal figures throughout the concession period of 21 years. The inflation forecast has been set at 4,5% which is mid-way in the South African Reserve Bank target range of between 3% and 6%.

8.3.3.2 Taxation

The provisions of the Income Tax Act and the VAT Act have been used in forecasting the tax implications of the transactions in order to determine the tax cash flows.

8.4 Public Sector Comparator (PSC)

The PSC estimates the cost as if the project were to be financed, owned, and operated by the state or its nominated agent being Transnet.

The PSC model is where the NCDTSL, either, directly or through an implementing agent, is responsible for and secures the development and operational execution through a number of individual contracts placed and managed independently. The capital funding required will be provided through the Government or its Agent's budget. In this analysis Transnet was used as the nominated agent for the NCDTSL.

The PSC model represents all capital and operating costs associated with the project delivering the required service according to the specified outputs using conventional public sector procurement.

Due to the Agent (Transnet) having a longer design and development process, it is expected that the project will only commence operations 3 years after that of the PPP option, but will ramp up to full capacity faster than the PPP option.

8.4.1 PSC Capital Cost

The project is based on a model of the port that has a capacity of 14 Mtpa of different types of cargoes, reaching full capacity by the 8th operating year. The estimated capital expenditure required to set up infrastructure for the port and 3 adjacent supporting terminals is projected at R13,306 billion.

Table 8-4: PSC capital needs

Capital Costs Summary (ZAR Million)				
	Port	**Dry Bulk**	**MPCT**	**Liquid Bulk**
Marine & Landside Infrastructure	10 156.70			
Equipment & Terminal Infrastructure		2 381.96	321.95	372.83
Pre-TA1 Capital costs				73
Total Phase 1A Project Capital Cost				**13 306.44**

Infrastructure costs were calculated with the assistance of the technical and infrastructure workstreams. In addition to the base case Capital Costs the public sector makes larger allowances within their estimates for:

- EPCM (15% of Construction Costs)
- Insurance (0.5% of Direct Costs)
- TCP Management Fees (2.5% of Direct Costs)
- Design and Development Allowance (5% of Construction Costs).

8.4.2 PSC Operating Costs

The operating costs include the costs of running the port such as labour, general office overheads, fuel, insurance and rentals.

The key areas include:

- Energy costs which are based on current costs in Southern African ports and these were compared to publicly available Transnet costs to ensure consistency.
- Labour costs which are based on benchmarks of current costs in Southern African private sector terminals and these were compared to publicly available Transnet costs to ensure consistency. It was found that TNPA / Transnet rates were marginally higher per ton and this has been included in the PSC calculation at a factor of 5%, except in the case of marine services where there is no private sector benchmark.
- A factor for covering head office costs which was included in the PSC model, due to the larger head office structure being carried within the Transnet environment. This increased

the general administrative costs as a factor of revenue, up to 5% - 10% depending on operations.

- External land rental costs which were included and assumed to be similar for both alternatives. This cost is payable to property or landowners, in this case being Richtersveld communal property association (CPA) and the NCDTSL as the landlord for the port.

The annual operational cost estimate is R 74 661 million. A breakdown of the operational costs per terminal is shown in the Table 8-5 below:

Table 8-5: PSC operating costs

Opex Item in ZAR over Operating Period Years	Dry Bulk	Liquid Bulk	Container	Port Marine
	ZAR Million	ZAR Million	ZAR Million	ZAR Million
Energy	2 243.71	368.15	801.35	
Maintenance	2 472.58	640.47	648.38	43.80
Manpower	1 417.26	1 066.87	2 643.67	
Insurance and Sub-Concession	16 789.11	8 895.42	6 597.86	
Depreciation	2 407.83	374.90	325.45	10 266.99
Interest	0	0	0	0
General Admin Services	4 126.92	1 423.27	809.92	
Marine Services				7 323.79
Other			2 973.41	
TOTAL	**29 457.41**	**12 769.08**	**14 800.04**	**17 634.58**

8.4.3 PSC Maintenance Costs

Costs were computed based on the expected utilisation of the equipment at the port. The operating costs were based on the activity of business (that is tons or containers moved) and were benchmarked against peer ports in the country and other global regions. It was found that there was marginal difference between private sector costs and those of TNPA.

8.4.4 Revenue Projections

The revenue projections are based on the services to be provided such as terminal handling, port handling, cargo dues, marine services, storage, primary and secondary lifting of cargo, handling services, administration income, documentation income and rental of land. Due to the slightly higher volume uptake of the PSC option the comparable revenue is R126 791.69 million.

8.4.5 Specific Modelling Assumptions

8.4.5.1 Project Timing

The table below indicates the dates assumptions used in the financial model. The model base date for all costing is 2019. Construction will start in middle 2025 and operation will commence in middle 2028.

Table 8-6: Project timing

ITEM	DATE
Model base date	2019
Construction costs base date	2025
Concession Operating Starts	
Start	2028
Duration Years	21
End	2049

Drawing from the table above, the duration of construction before the first operations start is 36 months and the operating phase is 21 years and four months. In total, the development, construction, and operating period is assumed to be 26 years. Note the project start is delayed by three years due to the public sector implementation schedule.

8.4.5.2 Discount Rates

The discount rate has been benchmarked against the hurdle rate as applied by Transnet for its various port divisions. For the PSC comparator the hurdle rate as per Transnet benchmarks for port infrastructure is set at 11.55% and at 18.5% for terminal infrastructure.

8.4.6 PSC Model Results

A summary of the model results for the PSC base case is shown in the Table 8-7 below:

Table 8-7: PSC model results

Item	ZAR' Million
Capital Costs	13 306
Operating Costs	74 661
IRR of Project	11.77%
NPV of Project at Transnet hurdle rates	(1 295.71)

The negative NPV value is mainly due to the later start of the project even though the production ramp up of the port is shorter. The negative NPV implies that the project return is less than the hurdle rate applied by Transnet for its port type projects.

8.5 PPP Concession Agreement Model

The Concession Agreement (PPP) option assumes that the Department will enter a contract with a Private Party to Design, Finance, Build, Operate, Maintain, and transfer the property back to the department after the contract term. Securing private sector funding for the project through a Special Purpose Vehicle (SPV) means that the private sector takes on the project risk for the loan and guarantees. This risk transfer results in the banks taking a keen interest in the performance of the SPV. The banks will, with its appointed advisors review the technology selected for long term sustainability, the suitability and functionality of the design solution, the progress and the quality of the work performed in delivering the works and the commissioning process.

The banks will advance payment to the SPV for services of the constructor, designers and technology suppliers. During the operating phase, the banks will monitor the ability of the SPV to secure the revenue stream and thus its ability to repay the outstanding loan. The banks will also monitor the planned and actual programme to contract expiry.

Below is a discussion of the assumptions and outputs of the project finance model.

8.5.1 PPP Concession Capital Cost

The Table 8-8 below provides a summary of the base case capital cost for the PPP Model.

Table 8-8: PPP capital cost

Capital Costs Summary (ZAR Million)				
Description	**Port Authority**	**Dry Bulk Terminal**	**Multi-purpose Terminal**	**Liquid Bulk Terminal**
Landside & Marine Infrastructure	8 644			
Equipment & Terminal Infrastructure		2 027.2	274.0	317.3
Total	**8 644**	**2 027.2**	**274.0**	**317.3**
Total Phase 1A Project Capital Cost				**11 262.5**
Project Development Fund				773
Success Fee				180.53
DSRA				588.90
MMRA				121.05
Interest During Construction				875.17
Grand Total				**13 801.15**

The base case Capital Cost estimate stands at R11 262.5 million. Added to this amount is the Success Fee of R180 million and Project Development Fund of R773 million, funds are refunded to the department at financial closure. Funding provisions were also made for upfront funded DSRA and MMRA accounts constituting R589 million and R121 million, respectively. This results in an inclusive project delivery cost of R13 801 million.

8.5.2 PPP Concession Operating Costs

The annual operational cost estimate is R 79 249 million. A breakdown of the operational costs per terminal is shown in the Table 8-9 below:

Table 8-9: PPP operating costs

Opex Item in ZAR over Operating Period Years	Dry Bulk	Liquid Bulk	Container	Port Marine
	ZAR Million	ZAR Million	ZAR Million	ZAR Million
Energy	2 203.39	359.83	786.84	
Maintenance	2 428.14	629.43	636.64	37.28
Manpower	1 327.56	1 000.09	2 499.41	
Insurance and Sub-Concession	18 538.83	9 445.71	6 893.10	117.3
Depreciation	2 204.40	319.88	297.82	9395.33
Interest	1 123.19	164.60	141.71	6 135.88
General Admin Services	2023.92	699.36	398.44	
Marine Services				6 521.40
Other			2 919.58	
TOTAL	**29 849.43**	**12 618.90**	**14 573.54**	**22 207.19**

The base case operating cost is summarised per facility namely the port, liquid bulk, dry bulk and multi-purpose terminals. Each facility cost make-up comprises the cost base for energy, manpower, marine services and other sundries. Operations are controlled and run by the private operator on behalf of the SPV, and as such the operator will sign direct contracts with the main suppliers of operations services including utilities and manpower. The operator will facilitate the procurement of services and equipment required to operate and maintain the port terminals and make payments to service providers on behalf of the SPV.

8.5.3 Specific Modelling Assumptions

8.5.3.1 Project Timing

The table below indicates the dates assumptions used in the financial model. The model base date for all costing is 2019. Construction will start in middle 2022 and operation will commence in middle 2025.

Table 8-10: Project timing

ITEM	DATE
Model base date	2019
Construction costs base date	2022
Concession Operating Starts	
Start	2025
Duration Years	21
End	2046

Drawing from the table above, the duration of construction is 36 months before operations start and the operating phase is 21 years and four months. In total, the development, construction, and operating period is assumed to be 26 years.

8.5.3.2 Discount Rates

The discount rate has been benchmarked against a government bond yield rate and lending rates from mixed variety of sources be they DBSA, AfDB or commercial banks, over a term similar to the length of the project term. A discount rate of 9.7% was applied for the valuation of the PPP model, accommodating an 80:20 debt: equity ratio.

8.5.4 PPP Concession Model Results

A summary of the model results for the PPP base case is shown in the Table 8-11 below:

Table 8-11: PPP model results

Item	ZAR' Million
Capital Costs	13 801
Operating Costs	79 249
IRR of Project before Interest and Tax	13.33%
NPV of Project	4 406.31

8.5.5 Funding Assumptions of PPP option

The envisaged project structure is to be undertaken by a Special Purpose Vehicle (SPV) responsible for the design, construction, funding, and subsequent operation of the port. In return for its investment, the SPV (private party) will collect revenue from its customers based on the revenue projects stated in the sections above (the SPV will have agreements similar to off take agreements to secure the certainty of cashflows), the revenue will cover:

- A recovery of operating costs including regular costs
- The repayment of debt borrowed to finance the project
- The return to providers of equity finance to the project.

The key funding assumptions are presented below:

- Funding mix

  The base case financial model assumes that the project costs will be funded by a mix of debt and equity ratio of 80%:20% respectively.

- Debt Assumptions

  Eighty percent (80%) of the total funding required is funded through a single senior debt facility for the PPP reference model.

- Dividend Policy

  The project finance model assumes a 25% dividend pay-out to equity shareholders if there is cash available for distribution. The Department, Private party and BBBEE shareholders are entitled to receive dividend pay-outs according to their shareholding.

- Equity Returns

  A real rate of return of 18% pre-tax is assumed as the required rate by equity providers. In calculating the unitary payment, this is the target return that is set in order to determine the unitary payment required.

- Debt Service Reserve Accounts

  An estimated R589 million is reserved to finance the DSRA as required by Project Finance terms, this amount is funded upfront at the financial closure.

- Maintenance Reserve Accounts

  The total maintenance cost for 1st year is estimated at R121 million for all terminals including the port, as a result provision of R121 million has been made for a Major Maintenance Reserve Account (MMRA). This figure is escalated by variable maintenance projections going forward.

The proposed PPP funding requirements and results are indicated in the Table 8-12 below.

Table 8-12: PPP funding requirements and results

FUNDING REQUIRED	**ZAR' Million**
Building costs, EPCM and equipment costs	11 262.5
PDF	773
Success Fee	180.53
DSRA	588.90
MMRA	121.05
Capitalised Interest	875.17
Project Financing Required	**13 801.15**
FUNDING STRUCTURE	**ZAR' Million**
Commercial Debt – Drawdowns (real terms)	9 441.04
Commercial Debt - Capitalised interest	875.17
Operational loan/Short-term loan	709.94
Shareholders' Equity	2 775
TOTAL	**13 801.15**
REVENUES	**ZAR' Million**
Revenue collected before VAT adjustment	124 483.97
RETURNS	**Nominal**
Post Finance IRR (Real) (Excluding Inflation)	9.1%
Post Finance IRR (Nominal) (Including Inflation)	13.3%
	ZAR' Million
NPV Real PPP (stripped inflation factor in discount rate)	3 575.7
NPV Nominal PPP	4 406.3
FUNDING RATIOS	
Minimum Debt Service Cover Ratio	1.38
Average Debt Service Cover Ratio	2.11
Minimum Loan Life Cover Ratio	1.38
Minimum Project Life Ratio	1.83
• **Note this table includes payment of Added Equity (Success fee & PDF) R953.3 million**	

8.5.6 Concession Fee

The Concession and rental Fee for the project is the fee paid by the terminal operations to the port operation/authority. There is a loan amount provided over the project lifetime to compensate the

current landowners and community for the land upon which the port will be sited. This is summarised in the Table 8-13 below:

Table 8-13: Concession fee

Concession Fee	R Millions over project lifetime
Concession & Rental Fee from Liquid Bulk Terminal	8 742.04
Concession & Rental Fee from Dry Bulk Terminal	16 487.39
Concession & Rental Fee from Container Bulk Terminal	6 490.94
Rental Fee towards Landowners	72.61
Total	**31 792.98**

8.6 Risk Assessment

By following a private sector participation process the Northern Cape government would be able to mitigate some of the project development risks and allocate most of them to the private party. This is important from a financial point of view as not only does the required project get developed but the risks associated with the project are not taken on by the government. The Table 8-21 at the end of the chapter details the overall project risks in the form of a matrix with mitigation factors and allocation to the relevant party.

8.6.1 Project Specific Risk and Sensitivity Analysis

A project of this nature has several areas which can be highlighted as risk-prone or sensitive to changes in the global or national economic environment. A workshop with demand commodity experts and the engineering teams was conducted to identify the most likely factors that could affect the project environment. The consultants included these changes in the affected variables, resulting from this workshop, into the financial models to create various possible scenarios. These scenarios were then measured against the agreed upon base case to evaluate the extent of the identified changes on the results.

The results have been divided into two primary areas of focus, broadly defined as risks and sensitivities. The results of all the risk and sensitivity scenarios have been summarised in this section.

8.6.1.1 Project Specific risks

The risk scenarios considered in this section, focus more on issues related to CAPEX inputs and the impact of changes in cargo volumes to be moved through the port, or nearby ports.

The first scenario was a change to the capital cost of the project. Due to the nature of the project, there is a possibility of cost overruns. Therefore, the team looked at the impact of a 20% cost overrun. The results indicate that, even at such a large increase in capital costs, the project would remain financially viable and would remain very beneficial economically to the broader national and

regional economy. An alternative-scenario of a 10% reduction in capital cost was also run. The decrease in CAPEX made the project more financially viable, with a project financial IRR of almost 16%.

In terms of cargo demand, the scenarios were as follows:

- Firstly, the port of Boegoebaai has a large economic impact as it aims to free capacity on the OREX railway line (Sishen-Saldanha) by removing less compatible commodities (lead, zinc and manganese) from the supply chain. This means that more iron ore, than is currently being exported by South Africa, can move via Saldanha and this will increase mining earnings for shareholders and the country. The team analysed the scenario where there was no increase in demand for iron ore and thus no additional iron ore is moved. Two scenarios were analysed: one where only 40% of this capacity is utilised by iron ore and one where no freed OREX capacity is used by iron ore. In both cases the project's financial return is not affected. This proves that even if the freed capacity is not utilised by iron ore exporters, this is not a deal breaker for the project.
- In the second case, the consultants analysed scenarios pertaining to demand patterns for the port of Boegoebaai itself. One scenario analysed where commodities flowing through the port were limited by capacity issues due to the land transport networks feeding the port, leading to a 20% reduction in port volumes. For this, the financial IRR is reduced to around 12%. Another scenario is where port productivity and berth utilisation are improved and the port capacity (at around 14 Mtpa) is increased to 17.5 Mtpa over time. The change resulted in an increased financial IRR, of 14%.
- Another scenario considered is where the railway line for the export of manganese through Port Elizabeth is upgraded by Transnet and Boegoebaai loses all its manganese volume after 2032. In this case, even though the financial results drop to below the estimated WACC, it is still not a catastrophic scenario.
- Building on this scenario is where, due to no more iron ore being available for export after 2032, manganese moves to the OREX railway line via Saldanha. Ultimately, the results are reasonably similar to the Port Elizabeth scenario. This seems to indicate that, from a national point of view, an early solution to current capacity constraints in the mineral export supply chain would justify the investment in the new port.

The results of the analysis are summarised in the Table 8-14 below.

Table 8-14: Results on sensitivity analysis

Elements	**Factor**			**Results**	
	Change Factors	**Factor**	**% Change**	**Project IRR**	**Project NPV R'million**
Base Case	N/A	N/A	N/A	13,3%	4 406
Increased capital cost	CAPEX Cost	% Change in CAPEX	20%	11,6%	2 674

Decrease capital cost	CAPEX Cost	% Change in CAPEX	-10%	14,4%	5 246
Limited throughput due to surface transport capacity limits	Market Volume Mix	Cap the Commodity Mix	20% decrease	10,6%	1 084
Increase Volume	Market Volume Mix	Cap the Commodity Mix	Increase thru'put to 17,5 Mtpa	13,7%	5 067
Ngqura terminal and rail upgrade		Changes to Commodity Mix	No manganese after 2032 all to PE	10,7%	993
Development of competing supply chains		Changes to Commodity Mix	Orex has no Iron Ore after 13 years (2034)	11,4%	1 715
Changes to Overall Inflation	Inflation Factor	Change Inflation	Increase all to 6%	14,8%	6 975
Changes to Cost Factors	Cost Inflation Factors	Change OPEX Inflation	Opex inflation to 6%	12,2%	3 045
Changes to Pricing Inflation	Revenue Inflation Factor	Change Revenue Inflation	Revenue Inflation is 2%	9,0%	-671
Changes to Pricing Base	Pricing	Change Pricing	20% lower terminal price	11,1%	1 665
	Pricing	Change Pricing	10% higher terminal price	14,3%	5 746
Changes to OPEX Base	OPEX Factors	Change OPEX	20% increase in Opex	12,7%	3 570

8.6.1.2 Project Sensitivity

The detailed sensitivity analysis including economic factors is addressed in section 9.13.

When analysing the project sensitivity to changed assumptions it is clear that the project and its broader economic benefits are not overly reliant on one specific element working properly. This will mean that the risks to an investor and the country of undertaking this project are spread across many elements, because:

- There are a number of different commodities wanting to make use of the port.
- There is an underlying demand for high-volume mineral exports which is not currently met cost effectively by existing supply chains.
- There are a number of diverse terminals operating within the port.
- The port has a broad number of revenue streams which limits the risk of being reliant on one or two revenue sources.

8.6.2 Logistical Risk Comparison PPP vs PSC

In analysing the risk comparison between the PPP and PSC models the most important logistics risks appear to be:

- The Opex costs of the PSC have higher Management Fees than the private sector, implying an increase of R 3 239 million in general administrative and management costs over the project lifetime.
- There is a greater chance of labour absenteeism and stay-away, due to the public sector strikes that are not resolved as quickly as private sector strikes. This could reduce PSC revenue and operating expenditure in the year compared to the private sector.
- PSC has no insurance on Fixed Assets, Vehicles and Equipment in their comparison, therefore we need to add an insurance risk factor (similar percentage levels to private sector insuring) as a risk factor. This amount is R 152.89 million over the project period.
- Risks associated with the PSC internal approval processes imply that they will be unable to move at the same speed as the private sector in initiating the project. To allow for this, the project starts 3 years later under the PSC scenario. This has a capex implication. An increase of 6 months over and above the 3 year extension, increases the Project Development Capex Cost by a factor of 4.25%.

8.6.3 The Impact of Logistical Risks on the PSC Model

The impact of each logistics risk and the likelihood of it occurring is summarised below.

- The Opex costs for the PSC have higher management fees than the private sector. These have been covered in base PSC model as they were benchmarked against Transnet criteria. There is a risk that the difference could be another 20% higher for management fees. The probability of this occurring is around 40%.
- The cost of labour absenteeism and stay-away are accounted for by a factor of one extra week lost which adds 1,92% to the labour operating costs in the base PSC model at R 98.61 million over the project lifetime. The probability of this occurring is around 25%.
- PSC has no insurance on Fixed Assets in their comparison, therefore we need to add an insurance risk factor (similar percentage levels to private sector insurance) as a risk factor for PSC. This has been looked at and the PSC can mitigate by getting insurance for project assets, at a cost of R 152.89 million. Probability of this occurring is around 30%.
- PSC has no insurance on Vehicles and Equipment which have greater chance of damage, in their comparison, therefore we need to add an insurance risk factor (similar percentage levels to private sector insurance) as a risk factor for PSC. Same actions as per (3) above. Probability of this occurring is around 20%.

- Risk of the PSC going through internal approval processes at same speed as the private sector and extending over 6 further months at a cost of R 565.52 million. Probability of this being longer than the 3 years is around 20% with a moderate impact.

8.6.4 Risk Costs

The risk costs are summarised in the Table 8-15 below:

Table 8-15: Risk costs

Risks	Risks impact on Net Present Cost	PV Risk Factor	Risk mitigation strategy	Allocation
1. The Opex costs of the PSC greater than the Management Fees than the private sector.	- R 3 239 million	-R 129.56 million	Fixed price construction contracts. Contingency provisions. Standby debt facilities/additional equity commitments; provided that these commitments are made upfront.	Transfer: PPP
2. There is a greater chance of labour absenteeism and stay-away, due to the public sector strikes that is not resolved as quick as the private sector strikes, thus reduce PSC revenue and operating expenditure by the amount of 1 week of operating days in the year compared to the private sector.	- R 98.61million	- R 4.93 million	Train sufficient amount of staff, negotiate productivity rewards	Retain: Institutional knowledge in area and allow for greater productivity contracts.
3. PSC has no insurance on Fixed Assets in their comparison, therefore we need to add an insurance risk factor (similar % levels to private sector insuring) as a risk factor for PSC.	- R 129.96 million	- R 7.80 million	Obtain contracts for additional insurance.	Insurance transfer
4. PSC has no insurance on Vehicles and Equipment in their comparison,	- R 22.93 million	- R 0.92 million	Obtain contracts for additional insurance.	Cover provided by insurance company

therefore we need to add an insurance risk factor (similar % levels to private sector insuring) as a risk factor for PSC.				
PSC Project Development Cycle is longer by another 6 months over expected extension compared to PPP	R 565.52 million	-R 22.62 million	Define time period for project development	Pass time risk over to consulting engineers.

8.6.5 The Risk Adjusted PSC Model

The results of the risk adjusted PSC Model after the consideration of the risks is shown in Table 8-16 below:

Table 8-16: The risk adjusted PSC model results

Item	R Million
Capital Costs	13 306.41
Risk Adjustment on Capex	22.62
Risk Adjusted PSC Capital costs	13 329.03
Operating Costs	74 661.44
Risk Adjustment on Opex	143.21
Risk Adjusted PSC Operating Costs	74 804.65
Risk Adjusted IRR for the PSC Model	11.74%
Risk Adjusted NPV for the PSC Model	(1 324.51)

8.7 Application of B-BBEE Targets and Local Economic Development Imperatives

In implementing Public Private Partnerships (PPPs), the government has the responsibility to regulate procurement, in an open, transparent and fully competitive bidding procedure to ensure cost effective us of state financial resources. Notwithstanding, every such function, even if it is implemented within the PPPs, must be evaluated on its ability to meet the Broad Based Black Economic Empowerment (BBBEE) and socio-economic set of criteria.

Although the criteria will be expanded in more detail during the Transaction Advisory Stage 2 (TA2), the application of the BBBEE criteria must be read in the context of Section 10 of the BBBEE Amended Act 57, of 2014 which states that, every organ of state and public entity MUST apply any relevant code of good practice (including sector codes) issued in terms of this Act in (when) -

- Determining qualification criteria for the issuing of licences, concessions or other authorisations in respect of economic activity in terms of any law;
- Developing and implementing a preferential procurement policy;
- Determining qualification criteria for the sale of state-owned enterprises;
- Developing criteria for entering ***into partnerships with the private sector;*** and
- Determining criteria for the awarding of incentives, grants and investment schemes in support of broad-based black economic empowerment.

Depending on the area of economic value, the BBBEE Codes and/or sector specific gazetted codes will be applicable to determine procurement criteria. Therefore, BBBEE aligned targets and sector empowerment goals that are aligned to Local Economic Development will have to be agreed for each workstream of the project in accordance with specific locations.

Whilst the mandate of the NCDTSL is for the project ports to provide value adding logistics service and port presence in the Northern Cape area, through which employment opportunities can be created, transformation and local economic development of designated businesses is also a fundamental priority.

In this regard the Cost Benefit Analysis summarised in Section 9 of this report points towards big opportunities for specific job creation opportunities and the upliftment of local communities and economies.

The proposed B-BBEE criteria for the port project is summarized in the Table 8-17 below.

Table 8-17: Proposed B-BBEE criteria

Applicable Economic Activity	Relevant BBBEE Sector Code	Overriding Targets and Requirements for qualification criteria
For the Infrastructure Development of the Ports	The Amended Construction Sector Code (ACSC) notice 931 of 2017 gazette 41287	At least 35% Black Ownership of the entities eligible for qualification and all other relevant requirements.
For all Agriculture, Fishing and Aquaculture related economic activities	The Agri-BBBEE Sector Code	At least 30% black ownership of the entities eligible for qualification and all other relevant requirements.
For all tourism related economic activities	Tourism BBBEE Sector Code gazette no 39430	At least 30% Black Ownership of the entities eligible for qualification and all other relevant requirements.
For all Mineral and Energy related economic activities	The revised Mining Charter issued in terms of the Mineral Resources and Petroleum Development Act (MRPDA)	Over 26 % of Black Ownership of the entities eligible for qualification and all other relevant requirements.
For all Manufacturing related activities	The Generic BBBEE Codes of Good Practice gazetted in May 2015	At least 25% of black ownership of the entities eligible for qualification and all other relevant requirements.

8.8 Affordability

Affordability relates to whether the cost of the project over the project lifespan can be accommodated within the budget of the sponsoring department given its existing commitments. A comparison between affordability of the options is as follows:

8.8.1 Budget Identified

An analysis of the budget from the Medium-Term Expenditure Framework indicates that there is no budget allocation for the port project. What is not clear is whether there will be funds made available in a long run. In this report it is assumed that there is no budget available for the project.

8.8.2 Evaluation of Affordability under the PSC Option

The PSC option requires an initial R 13,306 billion investment from the fiscus. This is a greenfield project and there has been no budgetary provision made available to date for the development of the port. On account of the available budget constraint, the public sector funding for the project using a unitary fee or payment for the project with conventional procurement may not be practical.

Table 8-18: Available budget for Operating costs

Affordability Assessment	R Million
Available Capital Budget for the project from MTEF	0
Potential Revenue	124 483
Operating Cost	74 661
Difference Required to be funded from Budget	N/A

It is observed from the table above that, over the entire operations period of the PSC option, the projected rental revenue collected is sufficient to cover the operating cost.

8.8.3 Evaluation of Affordability under the PPP Concession Agreement Option

Ideally, the concession agreement option does not impose an affordability constraint on the NCDTSL in that it is not expected to make a unitary fee payment. On the contrary, the option must create the possibility for the department to share in the revenues of the port over and above the lease payments on the land. The affordability test for this project is demonstrated in the Table 8-19 below:

Table 8-19: Affordability assessment

Affordability Assessment	R Million
Available Capital Budget for the project from MTEF	0
Revenue needed as Concession Fee for Port Operator/Authority & for Rentals	-31 792.98
Concession fee to Port Operator from Terminals	31 720.37
Rental to Landowners	72.61
Total	31 792.98
Difference Required to be funded from Budget	N/A

8.8.4 Conclusion of Affordability

An affordability assessment of the options shows that:

A. The PSC model is not feasible due to budgetary constraints and a negative NPV.

B. Based on the current commodity mix the PPP concession option does not require MTEF funding from the department. This option does not require any commitment of funds from the department. This presents the department with an opportunity to get varying proposals with different business options that can work.

8.9 Value for Money

Value for money is determined by comparing the Net Present Value (NPV) of the options under consideration. A proposed PPP project may provide value for money but could be unaffordable if the specifications are too high. Value for money is a necessary condition for PPP procurement, but may not be enough. If a project is unaffordable it undermines the institution's ability to deliver other services and it should not be pursued.

The option with the highest relative Net Present Value creates the highest value for money for the Government and economy of South Africa. The Table 8-20 below is a value for money comparison:

Table 8-20: Value for money comparison

Value for money comparison	PSC	PPP
Items		
Financial model	Done	Done
Impacts on Options	Done	Done
Date of First Ship at Berth	Mid 2028	Mid 2025
Capex	R 13 306 million	R13 801 million
Opex	R 74 669 million	R79 249 million
Discount Rate	13.2%	9.7%
Funding Options	Equity	Equity & Debt
Government Contribution	100%	0%
Net Present Value	(R 1 295 million)	R 4 406 million
Defined Risk Adjustment to costs	(R 166 million)	R 0
Net Present Value including risk	(R 1 325 million	R 4 406 million
Project IRR after risk adjustment	11.74%	13.3%

The PPP model has a slightly higher capital cost due to debt service (DSRA) and maintenance reserve (MMRA) allowances, budgeted success fees as well as needing to provide for capitalized interest during construction. Operating costs are slightly higher due to needing to provide for interest. The PPP model still indicates a better return because the PSC project start is delayed by three years and is funded with equity.

The results presented in the table above indicates that the PSC option results in a lower NPV compared to the Concession Agreement and therefore the PPP option does represent value for money.

8.10 Procurement Choice

Based on the yields of the project, it is recommended that development of the new port is procured through an external mechanism, which entails a private sector party being engaged through the concession.

8.11 Recommendation

In summary, we recommend the Reference Model, including Debt and including Government support, be followed, as this will be an affordable and value for money project, as can be seen from the higher positive NPV of the Reference Model as compared to the PSC Model.

The Reference Model including Debt and including a Government Grant yields value for money, due to the ability of the private sector to expedite the early execution and commissioning of the project.

Also, additional indications are that the Boegoebaai Port is well suited to be a PPP. This is justified by the following:

- **Risk Transfer:** Risks can be transferred to the private party sufficiently, therefore providing a compelling risk mitigation plan to the government.
- **Market Appetite:** There would be sufficient market appetite for this project based on the commercial viability of the Reference Model and the future of mineral exports from the Northern Cape Province.
- **Faster entry:** The likelihood that private sector can bring this port into operation, owing to the faster approval processes exercised by the private sector.
- **Output specification:** There are existing models in South Africa, in the region, and internationally, that can be considered for how to structure the payment mechanism of the port. The options tend to be largely volume driven, which provides for a clear variable to measure, quantify, and around which a payment mechanism and output specifications can be defined.

Therefore, the Boegoebaai Port seems to have the attributes that would make structuring a PPP in a Reference Model advantageous.

8.12 Summary Risk Table

The table below refers to section 8.6 in the document.

Table 8-21: Risk matrix for the PPP vs PSC proposal

No	Categories	Description	Mitigation	Allocation
1.	Availability risk	The possibility that the services to be provided by the Private Party do not meet the output specifications of the project.	Clear output conditions. Performance monitoring. Penalty against Unitary Payments.	Private Party.
2.	Completion risks	The possibility that the completion of the works required for a project may be (i) delayed so that the delivery of the services cannot commence at the scheduled service commencement date, or (ii) delayed, unless greater expenditure is incurred to keep to the scheduled service commencement date, or (iii) delayed because of variations.	Special insurance (project delay insurance). Appointment of an Independent Certifier to certify the completion of the works. Liquidated damages, construction bonds and other appropriate security from the Private Party to achieve completion, unless caused by the Institution. Relief Event.	Private Party, unless the delay is caused by the Northern Cape Government.
3.	Cost overrun risk	The possibility that during the design and construction phase, the actual Project costs will exceed projected Project costs.	Fixed price construction contracts. Contingency provisions. Standby debt facilities/additional equity commitments; provided that these commitments are made upfront and anticipated in the base case Financial Model.	Private Party.
4.	Design risk	The possibility that the Private Party's design may not achieve the required output specifications.	Clear specifications. Design warranty. Patent and latent defect liability consultation with and review by the Government of Northern Cape (but review must not lead to input specifications by the Government of Northern Cape). Independent Expert appointment to resolve disputes on expedited basis.	Private Party.
5.	Environmental risk	The possibility of liability for losses caused by environmental damage arising (i) from construction or operating activities (see operating risk) during the	Thorough due diligence by the bidders of the Project Site conditions. Independent surveys of the Project Site commissioned by the Government of Northern Cape at its cost.	In relation to (i), the Private Party. In relation to (ii), the Government of Northern Cape, but the Government of Northern Cape's liability

No	Categories	Description	Mitigation	Allocation
		Project Term, or (ii) from pre-transfer activities whether undertaken by the Government of Northern Cape or a third party and not attributable to the activities of the Private Party or the Subcontractors.	Institution indemnity for latent pre-transfer environmental contamination, limited by a cap (subject to value for money ("VFM") considerations), for a specified period. Remediation works to remedy identified pre-transfer environmental contamination as a specific project deliverable. Independent monitoring of remediation works.	to be capped (subject to VFM considerations).
6.	Exchange rate risk	The possibility that exchange rate fluctuations will impact on the envisaged costs of imported inputs required for the construction or operations phase of the Project	Hedging instruments (e.g. swaps). Greater emphasis on local suppliers especially for cement, quarry material and steel.	Private Party.
7.	Force Majeure risks	The possibility of the occurrence of certain unexpected events that are beyond the control of the Parties (whether natural or "man-made"), which may affect the construction or operation of the Project.	Define "Force Majeure" narrowly to exclude risks that can be insured against and that are dealt with more adequately by other mechanisms such as Relief Events. Relief Events. Termination for Force Majeure.	Private Party unless specific risk cannot be insured. In our findings, the transaction advisors did not identify risks that cannot be transferred or insured.
8.	Inflation risk	The possibility that the actual inflation rate will exceed the projected inflation rate. This risk is more apparent during the operations phase of the Project.	Tariffs and expenses have factored in inflationary increases.	The Private Party will be responsible for inflation risk.
9.	Insolvency risk	The possibility of the insolvency of the Private Party.	SPV structure to ring-fence the Project cash flows. Security over necessary Project Assets. Limitations on debt and funding commitments of the Private Party. Reporting obligations in respect of financial information and any litigation or disputes with creditors. Institution has right to terminate the PPP Agreement.	Private Party.

No	Categories	Description	Mitigation	Allocation
			Substitution of Private Party in terms of the Direct Agreement. Substitution of the Private Party with a New Private Party if there is a Liquid Market and the Retendering procedure is followed	
10.	Insurance risk	The possibility (i) that any risks that are insurable as at the signature date pursuant to the agreed Project Insurances later become uninsurable or (ii) of substantial increases in the rates at which insurance premiums are calculated.	In the case of the option of Government of Northern Cape, self-insurance by the Government of Northern Cape or, if the uninsurable event occurs, then termination of the PPP Agreement as if for Force Majeure with compensation to the Private Party Reserves.	In relation to the Private Party caused the uninsurability or, even if it did not, but the Private Party cannot show that similar businesses would stop operating without the insurance in question, then the Private Party bears the risk.
11.	Interest rate risk	These are factors affecting the availability and cost of funds.	Hedging instruments (e.g. swaps). Fixed rate loans.	Private Party.
12.	Latent defect risk	The possibility of loss or damage arising from latent defects in the Facilities included in the Project Assets (compare, the treatment of latent pre-transfer environmental contamination, see environmental risk).	Wherever possible, the design and construction of the facilities must be performed or procured by the Private Party. If, however, a project involves the takeover by the Private Party of existing facilities, then the bidders must undertake a thorough due diligence of these facilities to uncover defects. The procedure for and cost of the remediation of such discovered defects can then be pre-agreed with the Private Party. Reporting obligation on Private Party to promptly disclose discovered defects.	If the Private Party (or any of the Subcontractors) designs and constructs the Facilities, the Private Party.
13	Maintenance Risk	The possibility that (i) the cost of maintaining assets in the required condition may vary from the projected costs, or (ii) is not carried out.	Clear output specifications. Penalty regime and performance monitoring. Adequate O&M contract. Substitution rights. Special insurance and special security in the form of final maintenance bonds. Procuring Fixed Maintenance Lease contracts with Equipment Manufacturer's	Private Party.

No	Categories	Description	Mitigation	Allocation
14	Market, demand or volume risk	The possibility that the demand for the services generated by a project may be less than projected (whether for example because the need for the services ceases or decreases, or because of competitors entering into the relevant market, or because of consumer opposition to the outsourcing of the services).	None	Private Party.
15.	Operating risk	Any factors (other than Force Majeure) impacting on the operating requirements of the Project, including projected operating expenditure and skills requirements, for example, labour disputes, employee competence, employee fraud, technology failure, environmental incidents and any failure to obtain, maintain and comply with necessary operating consent.	Clear output conditions, Penalty regime and performance monitoring. Adequate O&M contract. Substitution rights. Special insurance.	Private Party.
16.	Planning risk	The possibility that the proposed use of the project site in terms of the PPP Agreement and, in particular, the construction of the facilities on the project site will fail to comply with any applicable laws relating to planning, land-use or building (for example, any town-planning or land-zoning scheme) or any consent required pursuant thereto, or that any such consent will be delayed or cannot be obtained or, if obtained, can only be implemented at a greater cost than originally projected.	The Government of Northern Cape must identify at the feasibility phase any macro-level planning consents not required for the detailed design and construction proposal for the project, such as, any land-use and zoning consents. These are provided for in the legal due diligence and will be obtained prior to procurement or award of the project.	In relation to any land-use and zoning consent, the Department of Transport, Safety and Liaison, In relation to any building consent or other design or construction specific planning consent, the Private Party.

No	Categories	Description	Mitigation	Allocation
17.	Political risk	The possibility of (i) Unforeseeable conduct by the Government of Northern Cape or by any other government authority that materially and adversely affects the expected return on equity, debt service or otherwise results in increased costs to the Private Party, or (ii) expropriation, nationalisation or privatisation (collectively, "expropriating actions") of the assets of the Private Party. This risk overlaps with some financial risks (e.g. tax rate change risk).	Limit risk to unforeseeable conduct for which there is no other relief in the PPP agreement and to expropriating actions. Distinguish between general and discriminatory unforeseeable conduct. In relation to discriminatory unforeseeable conduct, special compensation. In relation to expropriating actions, termination and compensation.	In relation to discriminatory unforeseeable conduct and expropriating actions, the Northern Cape Government. In relation to general unforeseeable conduct, the Private Party.
18.	Regulatory risk	The possibility that consents required from other government authorities will not be obtained or, if obtained, can only be implemented at a greater cost than originally projected (compare, the treatment of planning and environmental consents, see planning risk and environmental risk).	During the feasibility phase of the project, a legal scan was undertaken by the Government of Northern Cape to identify all such consents. Implementation by the Government of Northern Cape of an inter-governmental liaison process with the responsible government authorities before the procurement phase. Due diligence by Private Party to identify the consents required for its operating requirements. If permitted under applicable law and if this is practical, obtain all such consents before the signature date.	If any such consents (other than those relating to Private Party's operating requirements) can be obtained before the signature date and they are capable of transfer to the Private Party. In relation to the Private Party's operating requirements, the Private Party. Changes to regulation such as the Ports Act or ability of the port to provide custom clearance due to change in regulations post the PPP Agreement will be the risk of the Institution.
19.	Residual value risk	The risk that the project assets at termination or expiry of the PPP agreement will not be in the prescribed condition for hand back to the Government of Northern Cape.	Obligations on Private Party to maintain and repair. Audit of project assets towards the end of project term. Security by the Private Party in favour of the Government of Northern Cape e.g. major maintenance reserve or	Private Party.

No	Categories	Description	Mitigation	Allocation
			deduction from unitary payment. Reinstatement obligations on Private Party.	
20.	Resource or input risk	The possibility of a failure or shortage in the supply of the inputs or resources (for example, diesel or electricity) required for the operation of a project including deficiencies in the quality of available supplies.	Supply contracts for supply of total project requirements, such as take and pay contracts. Relief events but only if failure or shortage not attributable to the Private Party.	Private Party, unless the inputs are supplied by the Government of Northern Cape.
21.	Subcontractor risk	The risk of subcontractor (first-tier and below) defaults or insolvency. This risk may arise at the construction and/or operations phases of the Project.	Subcontractors must have expertise, experience and contractual responsibility for their performance obligations. Replacement subcontractors to be pre-approved by the Government of Northern Cape. Due diligence by the Government of Northern Cape must include review of first-tier subcontracts to confirm the pass through of risks down to the first-tier subcontractors.	Private Party.
22.	Tax rate change risk	The possibility that changes in applicable tax rates (income tax rate, VAT) or new taxes may decrease the anticipated return on equity	If change arises from discriminatory unforeseeable conduct, then special compensation.	In relation to tax increases or new taxes arising from discriminatory unforeseeable conduct, the Government of Northern Cape. Otherwise, the risk is the Private Party's.
23.	Technology risk	The possibility that (i) the technology inputs for the outsourced institutional function may fail to deliver the required output specifications, or (ii) technological improvements may render these technology inputs out-of-date ("technology refresh or obsolescence risk").	Obligation on Private Party to refresh technology as required from time to time to meet the output specifications. Penalty deductions for failure to meet output specifications.	Private Party.
24.	Utilities risk	The possibility that (i) the utilities (e.g. water, electricity or gas) required for the construction and/or operation of a project may	Emergency back-up facilities, e.g. generators. Emergency supply contracts. Special insurance (project delay or other business	Private Party unless the Government of Northern Cape is the responsible utility.

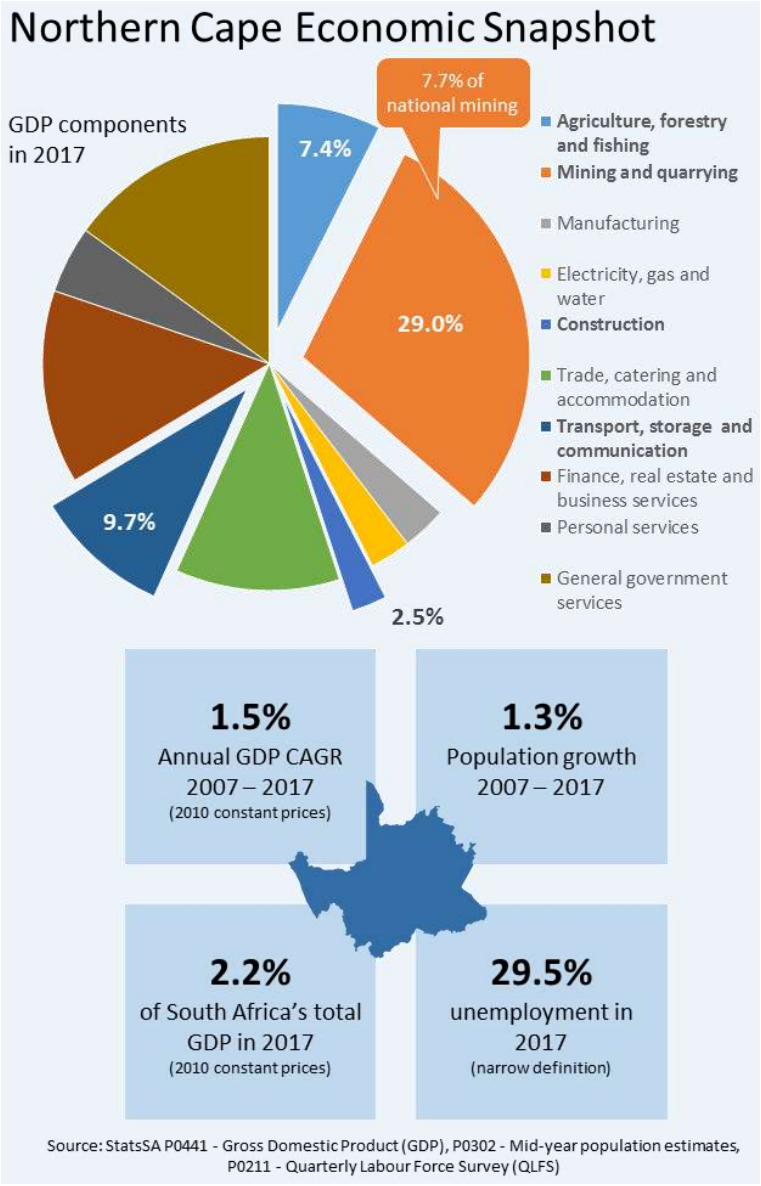
No	Categories	Description	Mitigation	Allocation
		not be available, or (ii) the project will be delayed because of delays in relation to the removal or relocation of utilities located at the project site.	interruption insurance). Provision by the Government of Northern Cape of off-site connections. In the case of (i), Relief event for off-site interruptions in the supply of utilities (unless attributable to the Private Party). In the case of (ii), Relief event for delays in the removal or relocation of utilities (unless attributable to the Private Party).	In the case of (i), even if the Government of Northern Cape is not the responsible utility, the Government of Northern Cape may share in this risk in circumstances where insurance is not available or unaffordable, but only if this will ensure better VFM.
25.	Financial risk	The possibility that there is a lack of initial funding for the project.	Obtain a National Government Grant. Take out of additional debt from third party institutions through working capital to fund the project initially.	Shared between the Private Party and the Department of Transport, Safety and Liaison, as both the Private Party and the Government of Northern Cape would negotiate the risk of initially funding the project.

SOCIO-ECONOMIC **PROFILE**

9. Socio-Economic Profile

9.1 Economic Profile of the Northern Cape

The Northern Cape is South Africa's largest province, covering 30.5% of its total land mass.[2] However, it has the smallest population (1.2 million[3]) and GDP[4] of the nine provinces. Furthermore, both the Northern Cape's GDP and population growth have been below South Africa's growth between 2007 and 2017 (1.5% vs 1.7% and 1.3% vs 1.6% respectively). Further, the unemployment rate in the Northern Cape was 29.5% in 2017, compared to South Africa's unemployment rate of 27.5%.



The Kalahari Desert covers large portions of the Northern Cape's land mass, particularly the northern half of the province. The desert could be a limiting factor in the expansion of population and capital investment in these areas.

The biggest economic driver in the Northern Cape remains mining, which contributed 29% of the province's GDP in 2017.

While mining tends to be focused on iron ore and manganese in particular, other notable products include diamonds, zinc and lead.[5]

[2] Northern Cape Provincial Government Estimates of Capital Expenditure 2018; StatsSA.
[3] Compared to 57.7 million in South Africa in 2018, as per StatsSA P0302 – Mid-year population estimates 2018
[4] R68.5 million in 2017, as per StatsSA P0441 – Gross Domestic Product (GDP) 4th quarter 2018. The GDP measure is in constant 2010 prices
[5] Northern Cape Business 2017/18 edition – Northern Cape Department of Economic Development & Tourism

Out of the four provinces with a sea border, the Northern Cape is the only province without a major port in operation. Port Nolloth is the largest port in the province however is ill-suited for bulk exportation of commodities.

The lack of a port in the Northern Cape that compares to the likes of Durban, Cape Town, Saldanha Bay or Port Elizabeth means the Northern Cape relies on the ports of its neighboring provinces to export its mining output, in particular, Saldanha Bay along the OREX line.

In 2014, the expenditure profile of the Northern Cape (Table 9-1) found around 60% of an average household's spend was on housing (including electricity and water), transport as well as food and non-alcoholic beverages.

This means that more than half of all household income was spent on providing basic needs, with relatively little being spent on non-essentials (for example, spending on recreation and culture was only 4.3%).

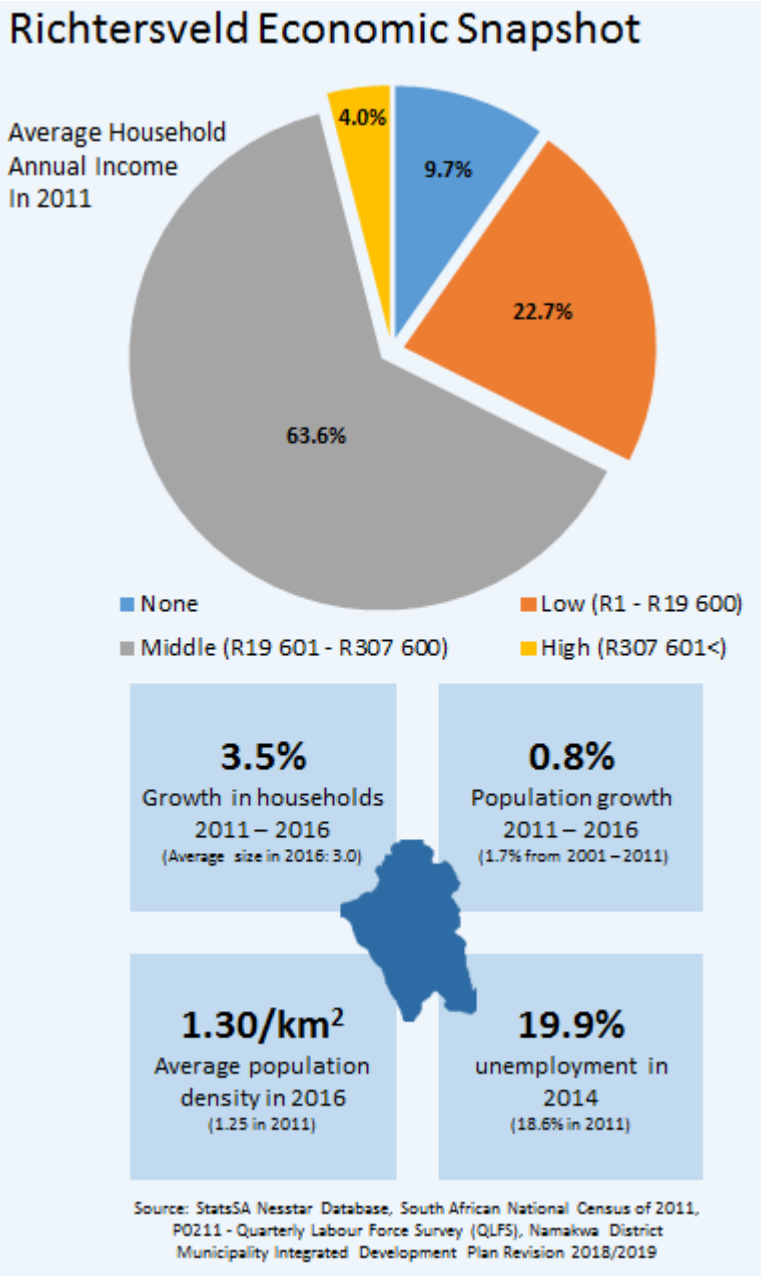
Table 9-1: Consumption profile of the average household in the Northern Cape in 2014

Northern Cape	Rand per Household	Percentage
Housing, water, electricity, gas and other fuels	19,922	24.5%
Transport	16,625	20.5%
Miscellaneous goods and services	12,897	15.9%
Food and non-alcoholic beverages	12,293	15.1%
Clothing and footwear	4,838	6.0%
Furnishings, household equipment and routine maintenance of the house	4,325	5.3%
Recreation and culture	3,481	4.3%
Communication	2,893	3.6%
Restaurants and hotels	1,295	1.6%
Education	996	1.2%
Alcoholic beverages, tobacco and narcotics	860	1.1%
Health	821	1.0%
Other unclassified expenses	13	0.0%
Total household spend in 2014	**81,259**	**100.0%**

Source: StatsSA P0310 – Living Conditions Survey 2014/15

9.2 Economic Profile of the Richtersveld

The Richtersveld Local Municipality is situated in the most north-western corner of the Northern Cape and forms part of the Namakwa District Municipality.



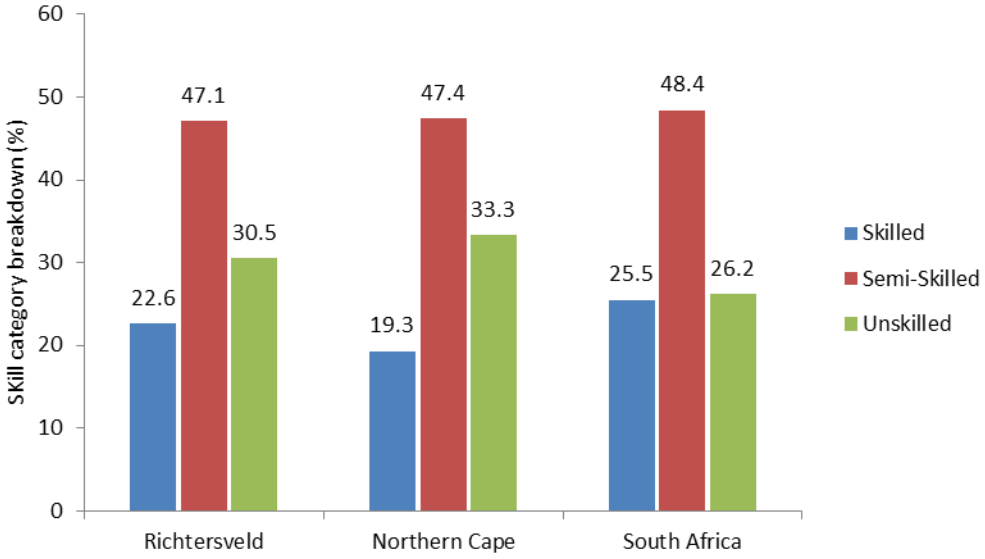
The Richtersveld has experienced a slowing population growth, recording only 0.8% growth between 2011 and 2016. This is down from 1.7% between 2001 and 2011. However, the growth in households of 3.5% annually between 2011 and 2016 implies household size has fallen (3.0 average in 2016, down from 3.1 in 2011). The population density has also increased marginally from 1.25 in 2011 to 1.30 in 2016 (4% total increase over the five year period).

The Richtersveld reported a 19.9% unemployment rate in 2014, above its 2011 figure of 18.6% but below the provincial average unemployment rate of 29.9% in 2014 and 28.4% in 2011.[6]

From the 2011 Census[7], the majority of households were earning in the middle income bracket (R19,601 to R307,600).

Combined with the percentage of skilled and semi-skilled workers (Figure 9-1) being higher than the provincial average, the implication is that there is potentially a larger pool of skilled people to draw on when planning for future projects compared to the Northern Cape in general.[8]

[6] StatsSA P0211 – Quarterly Labour Force Survey (QLFS)
[7] South African National Census of 2011
[8] StatsSA defines skill levels by occupation as: Skilled (Managers, Professionals and Technicians), Semi-Skilled (Clerks, Sales & services, Skilled agriculture, Craft and Machine operators) and Low-skilled/Unskilled (Elementary and Domestic workers) – (Statistics South Africa, 2014)



Source: StatsSA Netstar database, South African National Census of 2011

Figure 9-1: Skill category breakdown of Richtersveld in 2011(%)

From a household transport perspective, the following information is noteworthy: the primary mode of transportation in the Richtersveld is by motor vehicle (driver or passenger, 31.8%), as shown in Figure 9-2.[9] The second-most popular mode of transport is walking all the way (28.2%). These two modes of transport dominate the Richtersveld (together 60%) and stand in stark contrast to the prevalence of taxi transport (on average) in both the Northern Cape and South Africa (both more than 50%). This implies that travel in the Richtersveld is either very short distances (i.e. walking distance) or unsuitable to establish major taxi routes (possibly due to the vast distances between towns).

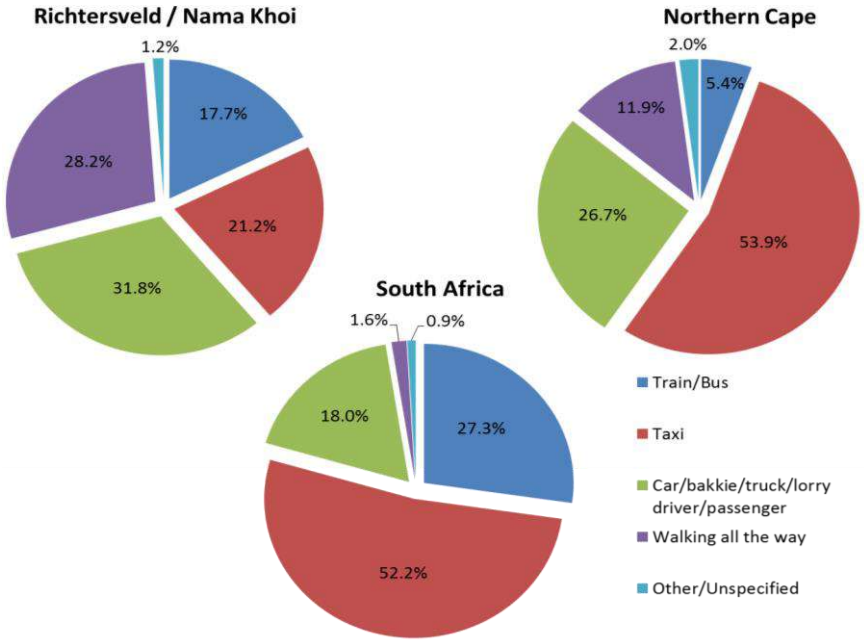


Figure 9-2: Household transport profile of Richtersveld, Northern Cape and South Africa 2014

[9] StatsSA P0320 – National Travel Household Survey (2013), revised July 2014

9.3 Freight Transport Profile Southern Namibia

Southern Namibia has a demonstrated mineral potential, as indicated by the Rosh Pinah and Skorpion lead zinc mines.

There are also a number of smaller potential deposits, including minerals such as pegmatite. There are a number of projects ongoing in Southern Namibia, including:

- The upgrade of the container terminal, liquid and bulk facilities at the Port of Walvis Bay[10]; and
- Small upgrades at the port precinct of Walvis Bay and Lüderitz to transform them into fully-fledged logistics hubs.

9.4 Freight Transport Profile of the Northern Cape – Road

In 2015, the Department of Transport (DoT) conducted a number of road traffic counts of heavy vehicles (HVs) at various waypoints. These counts, performed between 05h00 and 19h00, were aimed at determining the trailer types being transported at these waypoints and in which direction these trailers were travelling. The trailer type counts were performed by the number of axles as well as how many vehicles were seen to be empty[11].

Across the Northern Cape, counts were performed at the waypoints of Springbok, Upington (North, South and West) and Kimberly. For the purposes of the Boegoebaai study, only the road counts from Upington/South[12] and Springbok[13] were analysed. Further, HVs are categorised by axle count into three broad categories:

- Light HVs (two axles).
- Medium HVs (three to five axles).
- Heavy HVs (six plus axles as well as all car carriers).

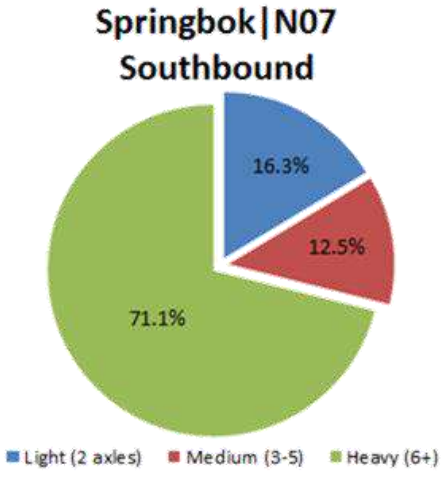


Figure 9-3: Springbok southbound traffic (2015 HV traffic counts by the DoT[14])

[10] (Weidlich, 2018)
[11] Curtainside and container trailers could not have their load observed, and therefore were included under the "Don't know" category for their load status
[12] Upington lies on the road between the Northern Cape's eastern mining areas (such as Sishen, Kathu and Hotazel) and the ports of Saldanha and Cape Town
[13] Springbok is the closest town to the Richtersveld Local Municipality in the DoT traffic counts and lies along the major national highway between the proposed Boegoebaai site and the ports of Saldanha and Cape Town
[14] The traffic counts for Springbok occurred over two days and are aggregated

Table 9-2: Springbok southbound traffic by type (2015 HV traffic counts by the DoT[15])

Springbok southbound traffic	
Not empty	25.9%
Empty	10.3%
Don't Know	63.9%

Figure 9-3 shows that the waypoint at Springbok primarily accommodates heavy HVs, accounting for over 70% of all southbound traffic. The DoT traffic counts in Table 9-2 imply that the majority of the traffic is unknown from a load point of view. However, over 70% of all the observable trailers are not empty. As Springbok is situated along the road network from the Sishen/Kathu area to Saldanha and Cape Town, the heavy southbound HV results could indicate that Boegoebaai would be able to capture some of this traffic, especially given its (relative) proximity to Springbok.

Another demand area for traffic at Springbok on the N7 is that of movement of traffic between the Western Cape and Southern Namibia. Although this traffic would not necessarily influence Boegoebaai demand, it could have an impact on traffic density on the roads in the Northern Cape.

The Upington/South traffic displayed in Figure 9-4 shows a more even split of the three HV types than the Springbok analysis. Light and Medium HVs make up over 50% of the traffic (compared to less than 30% in Figure 9-3.

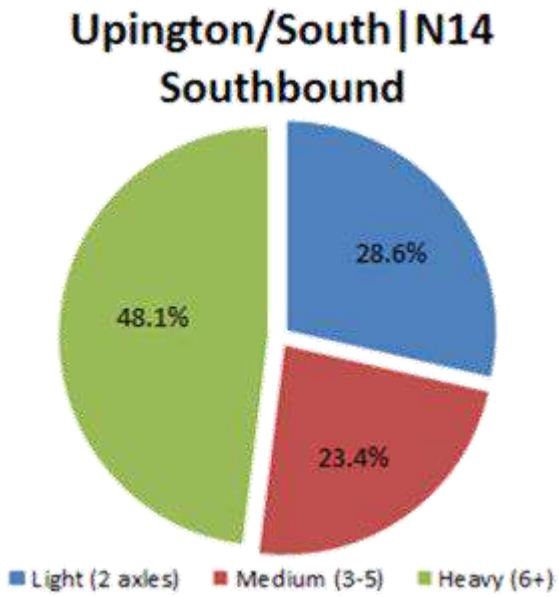


Figure 9-4: Upington/South southbound traffic (2015 HV traffic counts by the DoT[16])
Source: Department of Transport's Traffic Count Survey 2015

[15] The traffic counts for Springbok occurred over two days and are aggregated
[16] Only the traffic counts for Upington/South|N14 were considered in Figure 9-4 Due to the process of traffic counts at Upington, the westbound traffic is traffic is bound for Namibia along the N10 whilst the southbound traffic is bound for Springbok along the N14.
Figure 9-4.

Table 9-3: Upington/South southbound by type (2015 HV traffic counts by the DoT[17])

Upington/South Southbound Traffic	
Not empty	28.6%
Empty	23.4%
Don't Know	48.1%

Table 9-3 shows almost half of all observed trailer traffic heading southbound through the waypoint is empty. This could imply that more cargo demand at the proposed Boegoebaai port will increase trailer traffic heading South through the waypoint and work to reduce these 'empty trips'.

9.5 Freight Transport Profile of the Northern Cape – Rail

The most notable rail line running in the Northern Cape is the Sishen – Saldanha railway line, also known as the OREX line. This rail line runs from the iron ore mines near Sishen to the port of Saldanha, and primarily transports iron ore along with a few other commodities. Table 9-4 reflects the 2014 transport profile of the OREX line.

Table 9-4: Commodity transport profile of the Sishen – Saldanha railway line (OREX line)

Commodity	% of total
Iron Ore Exports	98.1%
Other Mining	1.8%
Manufacturing	0.1%
Agriculture	0.0%
Not listed as a commodity	0.0%

Source: Transnet Long term Planning Framework (2014), Transnet Long term Planning Unit

Another notable rail corridor in the Northern Cape is the Hotazel to Port Elizabeth Rail Corridor, also known as the Manganese Line. This line starts very close to the OREX line but diverts away just south of Kathu and travels through Kimberly and De Aar to arrive in Port Elizabeth.

Table 9-5 shows the first section and last section of the rail corridor. This serves to exclude commodities such as Iron Ore exports, which travels only part of the way along the Manganese line before diverting. The commodity transport profile of the line is more manganese focused, as expected.

Table 9-5: Commodity transport profile of the Hotazel – Port Elizabeth Rail Corridor in 2014

Hotazel – Kamfersdam		Noupoort – Port Elizabeth	
Commodity	**% of total**	**Commodity**	**% of total**
Manganese Exports	40.9%	Manganese Exports	90.3%
Other Mining	50.1%	Other Mining	4.9%
Manufacturing	8.7%	Manufacturing	0.9%
Agriculture	0.2%	Agriculture	3.0%
Not listed as a commodity	0.1%	Not listed as a commodity	0.9%

[17] Only the traffic counts for Upington/South|N14 were considered in
Figure 9-4. Due to the process of traffic counts at Upington, the westbound traffic is traffic is bound for Namibia along the N10 whilst the southbound traffic is bound for Springbok along the N14.

9.6 Trans Oranje Corridor

The Trans Oranje road corridor, which runs through the Northern Cape and towns such as Springbok, connects Cape Town to Windhoek, Walvis Bay and further into northern Namibia and as far north as Angola. From Windhoek, the road further connects east to Botswana towards the province of Gauteng.

The rail route from Upington coincides with the Trans Oranje route at Grünau through to Windhoek. The rail and road route through Upington carries traffic from Gauteng and the Eastern Cape as it historically was the only cargo route from Gauteng through to Namibia.

Table 9-6 shows statistics from the South African National Roads Agency Limited (SANRAL) on the type of traffic flowing on the N7 corridor north of Springbok in 2016.

Table 9-6: North and southbound traffic on the N7 corridor at Springbok (2016)

Issue	Southbound	Northbound	Total
Average Daily Traffic (ADT)	294	302	595
Average Daily Truck Traffic (ADTT)	85	90	175
Percentage of Trucks	28.9%	30.0%	29.5%
Truck Split % (short : medium : long)	18 : 9 : 73	19 : 7 : 74	18 : 8 : 74
Percentage of Night Traffic (20h00 to 6h00)	17.9%	16.6%	17.3%

Source: The South African National Roads Agency SOC Ltd, 2016

Similarly, Table 9-7 shows the type of traffic flowing on the corridor on the N14 between Springbok and Upington.

Table 9-7: East and Westbound traffic on the N14 corridor – Springbok and Upington (2016)

Issue	Eastbound	Westbound	Total
Average Daily Traffic (ADT)	634	643	1,277
Average Daily Truck Traffic (ADTT)	58	57	116
Percentage of Trucks	9.2%	8.9%	9.1%
Truck Split % (short : medium : long)	38 : 21 : 41	41 : 21 : 38	39 : 21 : 40
Percentage of Night Traffic (20h00 - 6h00)	12.1%	14.3%	13.2%

Source: The South African National Roads Agency SOC Ltd, 2016

Both Table 9-6 and Table 9-7 indicates that the number of vehicles per day is relatively low, with N14 traffic flow equating to around 93 vehicles per hour in daylight and even lower at night. On the N7 route, the vehicle flow is much less: only 41 vehicles in both directions per hour in daylight hours. This implies the road utilisation is well below capacity.

In terms of expected traffic flowing from the Western Cape and Northern Cape to Namibia, as well as in the reverse direction, Table 9-8 details the volumes from desktop commodity analysis using Trade Map and the consultants' own calculations. The consultants based the high-level forecast on economic growth factors impacted by economic activity and population growth.

Table 9-8: Sectoral trade data between South Africa and Namibia (Thousands of Tons)

Sector	2017	2023	2030
Agriculture	185	215	255
Mining	260	440	523
Manufacturing	950	1 200	1 426
Total	**1 395**	**1 855**	**2 204**

Source: Trade Map, June 2019 and consultants' own calculations

9.7 Economic Cost Benefit Analysis

Planning for the possibility of a port infrastructure project requires the inclusion of a comparison of the costs and benefits of the project. Through the Cost Benefit Analysis (CBA) tool, it is easy to perform a Financial (monetised) CBA by capturing the outputs of the proposed project's financial projections. However, one must also take the economic costs and benefits into account. The difficulty lies in the quantification of these economic costs and benefits, some of which are distorted through market interference (e.g. taxes and subsidies) or difficulty in quantifying (e.g. time-savings).

Through an Economic CBA, one can attempt to:

- Apply shadow prices to elements of the Financial CBA to remove market influences; and
- Quantify those elements that lie outside of the Financial CBA.

By performing both of these actions, one can attempt to capture the 'true' costs and benefits of a project.

When determining the viability and necessity of a project, it is important and necessary to forecast the traffic demand for the use of that project over the entire evaluation period. The construction of the port should further be considered along with the possibility of a 'no-go' scenario. With this in mind, it is important to note that traffic forecasts are required both with and without the project in place, not before and after its implementation, for a proper comparison of its costs and benefits.

The current and future freight demand volumes can be broken down into three main scenarios:

- The existing actual demand and the normal growth of existing facilities without any new investments ('no-project' scenario).
- A scenario where a consignor may wish to divert traffic to a new facility, either from other modes of transport or from other facilities in the transport network. Transport cost differences between existing facilities and this new facility would be the measure of the benefits for diverted shipments. To determine this scenario, stakeholder engagements will be important to embark on.
- Induced demand, which represents the increase in shipments as a result of lowering of transport costs or opening transportation options that previously did not exist.

Execution of the economic CBA for a port project includes:

- Calculation of an economic net present value (ENPV);
- Calculation of an economic internal rate of return (EIRR);

- Calculation of an economic benefit cost ratio (EBCR);
- Calculation and application of shadow prices for tradable and non-tradable inputs and outputs; and
- Quantification of both tangible and intangible economic costs and benefits (including externalities).

In undertaking the detailed economic CBA, it is vital that the economic appraisal uses demand forecasts, engineering specifications and operational plans through a financial CBA.

The economic CBA output is portrayed in the format of an Excel workbook. This required the preparation of Excel spreadsheets for the various options and the calculation of their:

- Discounted Net Present Value (ENPV); and
- Economic Rates of Return (EIRR, EBCR).

Ultimately, an economically viable project will fulfil the following conditions:

- ENPV > 0
- EIRR > Social discount rate
- EBCR > 1

These three conditions mean that a project's economic benefits outweigh its costs and that its returns justify the initial capital investment and continued operational expenditure. A project that does not fulfil the three conditions above requires further justification in terms of non-monetised benefits to justify continued interest.

9.7.1 Economic Assumptions and Data Description

The nature of an Economic CBA is to expand upon a Financial CBA to incorporate additional costs and benefits not necessarily reflected in a project's financial statements. To this end, one must identify, and in some cases quantify, these additional costs and benefits. To aid this process, the European Commission released a guide to Cost-Benefit Analysis[18] for appraising infrastructure projects.

Within the European Commission's CBA guide, the typical economic costs and benefits identified for a transport related project are:

- Travel time-savings;
- Vehicle operating costs savings;
- Operating costs of carriers;
- Accidents savings;
- Variation in noise emissions;
- Variation in air pollution; and
- Variation in GHG (greenhouse gas) emissions.

[18] (Sartori, D. et al, 2015). All results contained within this publication are provisional.

The costs and benefits of travel time-savings, vehicle operating cost savings and operating costs of carriers are typically associated with consumers and operators of the line.

The accidents savings and variations in noise emissions, air pollution and GHG emissions are attributable to third parties and are termed externalities. The South African Department of Environmental Affairs published a study discussing the socio-economic impact of a modal shift of freight from road to rail.[19] The report references Transnet SOC Ltd. when discussing the following externalities:

Table 9-9: Cost of externalities (Transnet, 2013)

Externalities	SA road (c/t.km)	SA rail (c/t.km)
Accidents	4.9	0.4
Congestion	1.9	0.0
Emissions	4.6	0.8
Landway	1.0	0.1
Noise	1.9	0.02
Policing	0.3	0.0

Source: (Environmental Affairs, Deutsche Gesellschaft für Internationale Zusammenarbeit, 2015), pp. 14

However, for analysing the effects of greenhouse gas emissions in this study, the World Bank's Carbon Pricing 2018[20] and 2019[21] publications were referenced.

This study considers the effects on jobs the port project could have if the project did go ahead. It was determined that any additional jobs created as a result of the port project would be equivalent to one less person being a 'burden on society'.

To price this burden on society in economic terms, the consultants used the minimum wage of R20 per hour[22] as a proxy.

Given the placement of the port, the consultants considered the extra distance and travel costs consumers of the port would have to bear. This is particularly relevant for commodities shifting off the rail line and on to road.

Finally, this section considers the benefits to consumers of the port in terms of increased port capacity.

9.7.2 Final Aggregate List for the Economic CBA

After considering all the sources and assessing what would be economically relevant to the project's costs and benefits, the consultants arrived at the following final list:

- Producer Surplus, comprising the shadow priced Financial CBA.
- Consumer Surplus, comprising:
  - Time-savings in terms of inventory carrying cost.

[19] (Environmental Affairs, Deutsche Gesellschaft für Internationale Zusammenarbeit, 2015)
[20] (Ramstein, Goyal, Gray, & Kallhauge, 2018)
[21] (Ramstein, Dominioni, & Ettehad, State and Trends of Carbon Pricing 2019, 2019)
[22] (The Presidency, 2018)

    - Non-time savings, primarily due to the release of capacity for iron ore exports and development of capacity prior to current logistics planning.
    - Extra travel costs, as road haulage will be utilised compared to rail haulage on some routes and distance to ports change for some commodities.
- Externalities, comprising:
    - Accidents
    - Emissions (CO_2)
    - Congestion
    - Noise
    - Landway
    - Policing
    - Road damage.
- Impact on jobs.

When looking into the future years of the project, an average rate of inflation of 4.5% was assumed. This is the South Africa Reserve Bank's mid-point of the target inflation rate range[23] and is assumed to be the rate the central bank will target over the project's analysed lifetime.

9.7.3 Shadow Prices

According to the Manual for Cost Benefit Analysis in South Africa[24]:

"Shadow prices are the **opportunity costs of products and services** when the market price, for whatever reason, **does not reflect these costs in full**."

In effect, shadow prices attempt to remove distortions of prices that occur when uncompetitive pricing affects inputs and outputs. An example of this is petroleum fuel. Only a portion of the fuel price is the basic fuel price, whereas the rest of the price consists of levies and taxes. This means that, in a perfectly competitive space with no external influences, the fuel price would be lower. Therefore, the market price of petroleum fuel would require a shadow discount in an Economic CBA.

When considering capital investment, one must be cognisant of the lifetime of the investment. This is due to natural wear and tear that occurs as a result of normal usage of the capital as well as technological advancements that eventually cause the capital to become irrelevant. To counteract this devaluation of the asset, an annual replacement allowance is assigned to the asset namely depreciation. However, depreciation is never reflected directly in a CBA model and is instead indirectly brought into the analysis by crediting the asset at the end of the project analysis period. This credit is equal to the portion of its remaining natural life over its total natural life.[25] This discounting was performed in the Financial CBA and as such is not considered in the Economic CBA to avoid potential double-counting.

When discussing shadow pricing for labour costs, it is important to distinguish between skilled labour and unskilled labour.[26] In skilled labour, the scarcity of skill means that the shadow price of

[23] (South African Reserve Bank, 2019)
[24] (Mullins, P, Mosaka, Jurgens, & Majoro, 2014)
[25] (Mullins, P, Mosaka, Jurgens, & Majoro, 2014), pp. 35
[26] (Mullins, P, Mosaka, Jurgens, & Majoro, 2014), pp. 74-76

the labourer is roughly equal to the market price. This also holds for some semi-skilled labourers, dependent on the scarcity of the skill in question. However, unskilled labourers are generally seen as more homogenous and thus the presence of unemployment (especially in South Africa) means their shadow price is a discounted factor of their market price.

Within the Guide to Cost-Benefit Analysis[27], the following formula is provided to calculate the shadow wage for unskilled labourers:

$$SW = W * (1 - t) * (1 - u)$$

where *SW* is the shadow wage, *W* is the market wage, *t* is the income taxation and *u* is the unemployment rate. However, if the income of unskilled labourers is assumed to be the national minimum wage of R20/hour or R3,500/month[28], income taxation falls to zero[29] and the formula simplifies to:

$$SW = W * (1 - u)$$

The study is based on the most recent unemployment rate for the Richtersveld (19.9% in 2014[30]), which equates to a shadow price factor of 0.801 for unskilled labour employed in the Richtersveld. Skilled and scarce semi-skilled labourers remain at a shadow price factor of 1.

9.7.4 Social Discount Rate

A social discount rate is the rate at which **households** are **willing to trade** present consumption for future consumption within a specific social setting. It is also therefore a measure of the **social cost of capital**.[31]

Within the Manual for Cost Benefit Analysis in South Africa[32], the authors advocate for a social discount rate of 8% for South Africa. This, the authors argue, is in line with other developing countries as well as a reflection of the low savings rate in South Africa.

9.8 The 'No Go' or Baseline Scenario in Absence of the Project

The alternative scenario to developing Boegoebaai is known as the 'no-go' or baseline scenario. In this scenario the consultants have described how the chosen volumes would be exported or not if the port of Boegoebaai is not developed.

In Table 9-10, the commodities identified to potentially move through the port of Boegoebaai are listed. In the second column for the specific commodity, the consultants detailed the port that would have been utilised in the 'no-go' scenario. The three final columns show commodity allocated in three different years. In the case of manganese the split was developed from information from the Transnet Long Term Planning Framework of 2017. Therefore, the initial 6.0 million tons per annum

[27] (Sartori, D. et al, 2015), pp. 59
[28] (Omarjee, 2019). R3 500/month or R42 000/annum. The consultants are cognisant of the lower minimum amounts for farm and domestic workers, as well as those employed in the expanded public works programme, but have chosen to ignore these two categories for the purposes of standardising the societal benefit/cost.
[29] (South African Revenue Services, 2019)
[30] (Namakwa District Municipality, 2018)
[31] (Warusawitharana, 2014)
[32] (Mullins, P, Mosaka, Jurgens, & Majoro, 2014), pp. 69

would go mainly through Saldanha port in the 'no-go', with a smaller amount in intermodal format through Durban port and a minor amount going via Lüderitz, which is currently under trial.

Table 9-10: Ports utilised in project 'no-go' scenario

Commodity Volumes	'No-go' Port	2025 Mtpa	2030 Mtpa	2046 Mtpa
Manganese	Saldanha	4.10	6.60	0.00
	Durban	1.54	1.54	0.00
	Lüderitz	0.36	0.36	0.00
	Port Elizabeth	0.00	0.00	9.00
Lead and Zinc	Saldanha	0.70	0.70	0.70
Magnetite	Saldanha	0.30	0.30	0.30
Ilmenite (from Alexander Bay)	Saldanha	0.10	0.25	0.50
Salt (from Upington)	Walvis Bay	0.03	0.03	0.03
Iron Ore/minerals	Saldanha	0.00	0.00	0.00
Diesel Import (to Upington and Kuruman)	Cape Town	1.37	1.44	1.68
General Cargo (to Upington and Kuruman)	Cape Town	0.90	1.09	1.28
Agriculture (from Upington and Kuruman)	Cape Town	0.21	0.29	0.42
Total		**9.60**	**12.60**	**13.91**

As for the other commodities, many of the smaller volume mineral exports would likely have moved to Saldanha or Cape Town for handling, depending on the method of packaging (bulk, containers or liquids). In general, freight enroute to Saldanha or Port Elizabeth would use rail transport to transit, while freight going through Cape Town and the Namibian ports would utilise road transport.

Distances from specific mines or towns in the hinterland of the port were based on information from Transnet's Freight Rail Distance Calculator and standard web based calculators for road distances. The transit time was based on benchmarks provided by Fleetwatch[33] for road haulage, while rail transit times were based on interviews with Transnet executives. The Economic CBA model details all the benchmarks and inputs utilised in comparing the transit scenarios.

9.9 Discussion of the Costs and Benefits used in the Analysis

Detailed in the section below are the calculation and application of shadow prices for all inputs and outputs (both tradable and non-tradable).

9.9.1 Direct Benefits (Consumer and Producer Surplus)

The producer surplus/deficit is calculated using the net benefit/cost of the project in the financial CBA. However, in the economic CBA, the input numbers are subjected to shadow prices. This allows for the true price of inputs to be analysed as opposed to the market prevailing input prices.

When considering consumer surplus, the aspects of **time-savings**, **non-time savings** and **extra travel costs** were included.

[33] FleetWatch Road Haulage costs February 2020

Time-savings in particular are difficult to quantify. It was opted to view any time saved as less inventory holding time for commodities (i.e. a reduction in inventory holding costs). Conversely, increased travel time would mean an increase in inventory holding costs.

Non-time savings are the benefits that accrue to consumers of the project outside of time saved using the new port, especially given the currently constrained capacity on the OREX line and need for more capacity for certain commodities.[34] For this benefit, it was determined that consumers could theoretically export more of their product where they may not have been available to without the port (i.e. the project 'no-go' scenario). The profit margin on the 'extra' exported products represents the net benefit to consumers.

Extra travel costs occur when a commodity will have to move at a higher cost than it did before to reach a port of exit. This means a consumer of the port is effectively worse off using the port project versus the project 'no-go' baseline scenario. The converse was also considered, whereby a commodity is now able to reach a port of exit more cost effectively because of the proposed port project.

9.9.2 Externalities

Externalities are typically difficult to quantify because their impacts tend to fall on third parties unconnected to producers or consumers of the project. To assist in quantifying these externalities, additional documentation as a supplement to the European Commission's CBA guide were considered. One such document was the South African Department of Environmental Affairs who published a study discussing the socio-economic impact of a modal shift of freight from road to rail[35]. The consultants identified the following externalities for inclusion in the economic CBA:

- Accidents;
- Congestion;
- Emissions;
- Landway (use of additional land);
- Noise;
- Security; and
- Road Damage (obtained from a separate CSIR publication[36]).

The externality prices obtained for everything, save from emissions and road damage were from 2013. The consultants obtained road damage from a 2010 CSIR publication[37] and thus road damage is a 2010 price. The consultants inflated every externality (except SA road emissions) using the CPI inflation figures published by Statistics South Africa[38] from their respective year's average inflation to May 2019. The inflated numbers in May 2019 prices are:

[34] (Kumba Iron Ore, 2018), pp. 20
[35] (Environmental Affairs, Deutsche Gesellschaft für Internationale Zusammenarbeit, 2015)
[36] (Nordengen, 2010)
[37] (Nordengen, 2010)
[38] (Statistics South Africa, 2019)

Table 9-11: Revised cost of externalities (May 2019)

Revised externalities	SA road (c/t.km)	SA rail (c/t.km)
Accidents	6.6	0.5
Congestion	2.6	-
Emissions	*	1.1
Landway	2.6	0.03
Noise	1.4	0.1
Policing	0.4	-
Road damage	1.3	-

* The emissions for road vehicles was calculated using a separate carbon pricing calculation

9.9.3 Road Emissions

The World Bank's Carbon Pricing 2018[39] and 2019[40] publications were used to determine the road vehicle costs of carbon dioxide emissions, which contribute to global warming as a greenhouse gas. It was determined that there is a large disparity between emissions of different types of road vehicles that could be unaccounted for compared to rail. Further, while the costs of carbon dioxide contained within the publications contain South Africa's adopted carbon tax, the nature of greenhouse gases as a global problem led the consultants to adopt the World Bank's cost of carbon.

When conducting an economic analysis of a project, The World Bank provides both a low[41] and a high[42] carbon cost. The World Bank did not provide carbon pricing for 2019, and thus the average growth of the cost of carbon from 2020 to 2021 was used to back-estimate the 2019 cost. For the purposes of this Economic CBA, an average of the low and high carbon costs for the years under analysis was used. It was determined that the flat deck interlink (7-axle) would likely be the road transport vehicle of choice for any shifted freight and applied the calculated carbon cost to the estimated annual carbon output the 7-axle flat deck interlink.

Table 9-12: Cost of carbon emissions of a 7-axle flat deck interlink over project lifetime

Cost of carbon emissions	2019	2020	2025	2030	2039
Low (US$/tCO2)	39.1	40.0	44.7	50.0	61.1
High (US$/tCO2)	78.2	80.0	89.4	100.0	122.2
Average (US$/tCO2)	58.7	60.0	67.1	75.0	91.6
Average Social Cost (US$/ton-km)	0.003	0.003	0.003	0.003	0.004
Average Social Cost (USc/ton-km)	0.3	0.3	0.3	0.3	0.4
Average Social Cost (ZAc[43]/ton-km)	3.7	3.8	4.3	4.8	5.8

[39] (Ramstein, Goyal, Gray, & Kallhauge, 2018)
[40] (Ramstein, Dominioni, & Ettehad, State and Trends of Carbon Pricing 2019, 2019)
[41] US$40/tCO2e in 2020 to US$50/tCO2e by 2030, and increasing at 2.25% per annum thereafter to 2050
[42] US$80/tCO2e in 2020 to US$100/tCO2e by 2030, and increasing at 2.25% per annum thereafter to 2050
[43] R14.50 per US$ is the exchange rate used in the Economic CBA

9.9.4 Social Impacts (Impact on Job Opportunities)

The effects on jobs the port project could create if the project proceeded were assessed. To capture this from an economic point of view, it was determined that any additional jobs created as a result of the port project would be equivalent to one less person being a 'burden on society'.

While analysing the types of jobs the project would affect, it was determined that the project 'go' could create more new jobs without destroying established jobs. This would occur as shifted freight off the rail and on to road would create capacity on the rail line for other exports. In other words, the truck drivers who would transport freight to the port by road would not displace rail jobs. The number of trucks required to shift the initial freight from rail to road was estimated and assigned one driver and one assistant driver to each truck.

It is noted that despite classifying truck drivers as a high skilled job and truck driver assistants classifying as semi-skilled, they both reflect the same economic burden on society.[44] This is because both are an equal burden on society without a job, despite their inherent skills. The social impact should be seen not as creating a job opportunity for a driver/assistant, but rather as creating new employment capacity that can be filled.

9.9.5 Shadow Prices

For the purposes of removing distortions in the market price of inputs and output, shadow prices were used to determine the 'true' costs in the economic CBA. The different inputs and outputs of the financial CBA were considered and which elements require shadow prices determined. Shadow price factors were calculated to cover the applicable inputs and outputs as detailed in Table 9-13.

Table 9-13: Shadow price factors applied in the Economic CBA

Shadow Price Element	Price Factor
Value Added Tax (VAT)	0.85
Labour (skilled and semi-skilled)	1.00
Labour (unskilled – Richtersveld [2014])	0.80
Labour (unskilled – Northern Cape [Q1 2019])	0.74
Labour (unskilled – South Africa [Q1 2019])	0.72
Diesel (Construction and Marine Operations)	0.62
Diesel (Road Operations)	0.76
Electricity	1.24

VAT shadow pricing was applied to remove VAT from certain CAPEX and OPEX costing items which are inclusive of VAT. As not all elements are subject to VAT, the consultants determined which elements from the financial CBA are subject to the VAT shadow factor.

When considering **skilled and semi-skilled employees**, a shadow factor of 1 was used. As explained in the shadow price methodology section, this is due to the scarcity of relevant skills. However,

[44] StatsSA defines skill levels by occupation as: Skilled (Managers, Professionals and Technicians), Semi-Skilled (Clerks, Sales & services, Skilled agriculture, Craft and Machine operators) and Low-skilled/Unskilled (Elementary and Domestic workers) – (Statistics South Africa, 2014)

unskilled employees are subject to the shadow pricing. In analysing the unskilled labour, it was determined that the unskilled labour will likely be sourced from local communities. Therefore, the unskilled labour factor chosen was 0.80 to reflect the lower unemployment in the Richtersveld compared to the Northern Cape and South Africa.

Diesel comprises of a number of taxes and levies applied on top of a basic fuel price. To obtain the shadow price for diesel, it was determined what the price of diesel would be without taxes and levies that don't benefit the users. The most prominent example of a tax that does not benefit the users of diesel is the 'Fuel tax', which government collects on diesel sales for its general expenditure. To distinguish between different diesels, the consultants considered the following diesel margins as obtained from the Department of Energy[45,46]:

$$\begin{aligned} Diesel = \quad & Basic\ Fuel\ Price + Fuel\ Tax + Customs\ \&\ Excise + Tracer\ Dye\ Levy \\ & + Pipeline\ Levy + Road\ Accident\ Fund + Transport\ Cost \\ & + Wholesale\ Margin + Secondary\ Storage + Secondary\ Distribution \\ & + Slate\ Levy \end{aligned}$$

When considering construction and marine operations diesel, *Fuel Tax*, *Customs & Excise* and *Road Accident Fund* were removed from the diesel margins. This is because these three items of the diesel margin are not related to diesel usage in construction and marine operations and thus were removed to reflect the 'true' diesel cost. In comparison, road operations diesel only excludes *Fuel Tax* and *Customs & Excise*, as the *Road Accident Fund* is seen to be related to diesel used for road operations.

Electricity was informed from the latest price application submitted by Eskom to the National Energy Regulator of South Africa (Nersa)[47], as well as the response from Nersa to Eskom[48]. In its application, Eskom applied for a 15% increase for three years, from 2019/20 to 2021/22. Nersa's approval was less than applied for. The consultants used these differences to estimate how undervalued the price of electricity is. The reasoning is that in a more competitive market environment, the price would likely have been higher than Nersa's approved tariff increase.

Table 9-14: Comparison of the Eskom request and Nersa approval for 2019/20-2021/22

Year	Eskom Request (%)	Nersa Approval (%)	Difference (percentage point)	Index (2018/19=100)
2018/19	–	–	–	100.0
2019/20	15.00%	9.41%	5.59%	105.6
2020/21	15.00%	8.10%	6.90%	112.9
2021/22	15.00%	5.22%	9.78%	123.9
Final Shadow Price Factor for Electricity				1.239

Source: (Eskom, 2019), (Nersa, 2019)

Lastly, the terminals in the economic CBA operate through an Energy Mix. It was determined that this Energy Mix would be a certain percentage diesel and otherwise electricity. As the Energy Mix is

[45] (Department of Energy, 2019)
[46] (Department of Energy - Diesel, 2019)
[47] (Eskom, 2019)
[48] (Nersa, 2019)

not further disaggregated, the consultants used the Diesel (Road Operations) shadow price so as not to potentially under-price the diesel usage.

Table 9-15: Shadow Price for the Energy Mix Input for the three Terminals

Energy Input Mix per Terminal	Diesel (%) Factor: 0.76	Electricity (%) Factor: 1.24	Energy Mix Factor
Multi-Purpose and Container	67%	33%	0.92
Dry Bulk	10%	90%	1.19
Liquid Bulk	15%	85%	1.17

9.10 Other Economic Impacts due to Project Implementation

9.10.1 High-Level Economic Impact Study

A formal Economic Impact Assessment model changes in the local and regional economies stimulated by some form of external intervention, in this case the port of Boegoebaai. This intervention is a new investment in infrastructure and impacts on its associated trade supply chains. In this section, a qualitative assessment of some of the more likely economic impacts of the port infrastructure project is discussed. The consultants will discuss three types of economic impacts, namely, direct, indirect and induced impacts:

- The new port generates direct economic effects that results in an increase in job creation, GDP, production, business sales and household income associated with operating the port.
- Indirect economic effects occur when the suppliers of goods and services to the new port experience a larger demand and can potentially expand. Indirect impacts result in an additional increase in job creation, GDP and household income.
- The induced economic effects represent shifts in spending on food, clothing, shelter and other consumer goods and services as a consequence of the change in workers and payroll of both directly and indirectly affected businesses. This leads to further business growth throughout the economy.

This section will focus on the impacts that take place during both the construction and operational phases of the project. The construction phase is temporary and thus only has a temporary effect. On the other hand, the operational phase of this port project can last for the rest of the port's lifetime (as long as 50 years) and is more sustainable.

Some of the issues included in the impact of the port are:

- Capital investment and duration of the construction phase; and
- Annual operational revenue and expenditure.

Some of the associated benefits can be monetized. However, there are others that impact on either the direct users of the port facilities or on South African society as a whole that cannot. Some examples of quantifiable and unquantifiable benefits to the project are as follows:

- Greater export opportunities for businesses in the Northern Cape and Southern Namibia;

- Increased impact on surface freight transport and road conditions;
- Skills development in local regions around the port; and
- Increased reputation for the local area, including potential tourist attraction and business lodgings.

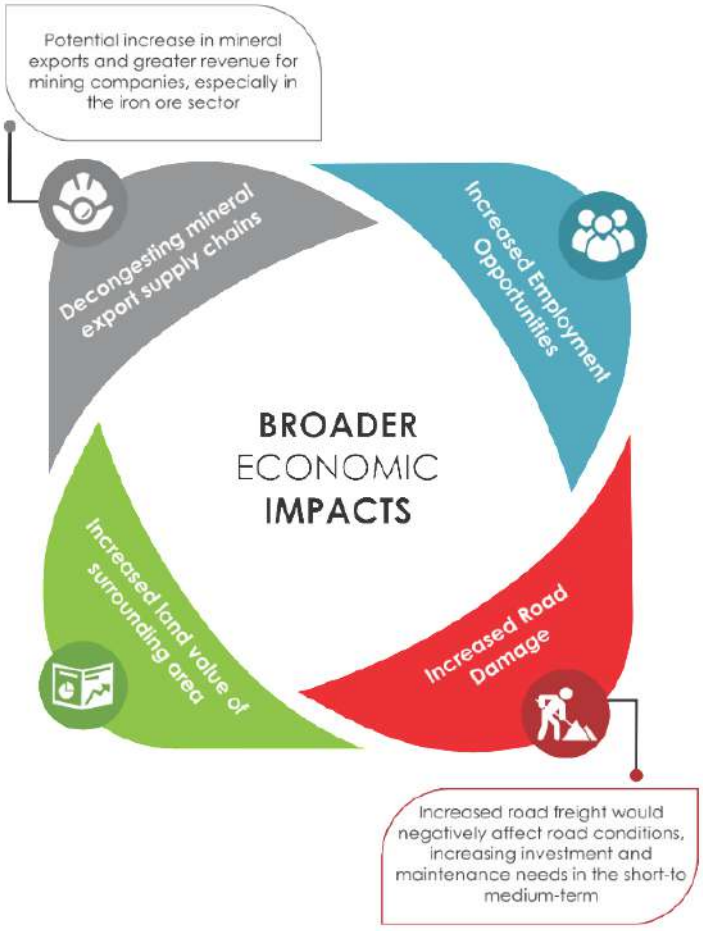


Figure 9-5: Broader Economic Impacts of the Project

9.10.2 Decongesting the Mineral Export Supply Chain

South Africa has a number of export supply chains designed for movement of key commodities throughout the world. Industry has, at times, commented that these supply chains tend to be constrained and thus the industry cannot supply commodities according to global demand. Capacity on both the OREX and coal lines tend to be constrained, with a number of other minerals such as manganese and chrome ore supplanting the optimal movement of iron ore and coal to world markets. For this reason, the port at Boegoebaai could focus on higher value, lower volume mineral exports. This could free up capacity for higher volumes of iron ore exports which need a very low cost supply chain built around the OREX line to remain globally competitive. Based on the above reasoning, the impact of the port would be to free up 5.9 million tons of capacity on the OREX line and allow iron ore miners to make use of this additional capacity. This could generate a revenue of R9.25 billion for the South African economy (based on benchmarked iron ore prices in June 2019), with trickle-down effect to miners, services and transport operators.

Another benefit the port affords is the opportunity to export smaller volumes of minerals such as ilmenite, zircon and rutile, from mines in the Northern Cape (up to 800,000 tons per annum). This could allow miners to earn almost R2.5 billion per annum over the longer term. There is also the potential to export magnetite from Boegoebaai, potentially generating an additional R171 million for miners.

Finally, it is possible that the availability of cost-effective supply chains in the Northern Cape could allow developments of new mineral prospects. This could then increase the contribution of mining to both the Northern Cape and South Africa's GDP.

9.10.3 Impact on Road Conditions

As outlined, an extra cost to the economy of the project would stem from using more trucking operations for transporting the additional freight on roads. This is because increased road traffic has an impact on the quality of the road surface. Having fewer trucks on the road will therefore result in a reduction in the costs associated with both having to maintain road infrastructure and the costs associated with transporting goods on constantly worsening road conditions.

The larger the volumes of vehicles that travel on the roads, the more capital is required to maintain them – this is especially important in the case of heavy freight transport. Having more freight traffic implies extra costs to the Northern Cape Province and the country as a whole, as provincial and national governments are required to spend more resources maintaining existing roads (through agencies such as SANRAL). These cost impacts are important to note when aiming to establish a port fed by road vehicles.

South African roads vary in condition. Currently 1,225 km or 5.7% of SANRAL roads are in a poor to very poor surface condition[49], which is well within the international norm of 10% for a well-maintained network. This is largely due to the preventative maintenance-first strategy followed by SANRAL. The impact of this preventative maintenance on roads incorporated since 2012 is evident in 2016 condition results[50]. This is an improvement on the results of over 10% which were the norm in the period 2012 to 2015. This improvement on road conditions will have a sizeable impact on the direct costs experienced by transporters of freight via road. If road conditions remain at this standard, then the current extra costs of transport, as well as externalities cost, could be lower than estimated in the economic models over the longer term, namely through:

- Increasing the operational life of trucks through decreased wear and tear;
- Increasing the operational life of tyres used;
- Decreasing vehicle maintenance costs; and
- Decreasing fuel consumption, especially due to travel times.

9.10.4 Increase in Land Values

An increase in the value of land because of the project investment is a benefit that cannot be included in the Economic CBA but is worth mentioning alongside the results. In a 2016 publication

[49] (Kannemeyer, 2016)
[50] (Kannemeyer, 2016)

prepared for Infrastructure Australia by Applied Economics[51], Dr Abelson states that while the value of land is certainly a benefit of infrastructure, benefits could be double-counted if the value of land is included. This is because in most CBA's, estimations of the project infrastructural costs and benefits are created with the aim of evaluating the project. Thus, the benefits derived from the value of land increasing are dependent on estimations of the value of the land's increase. In the author's words:

"**Wherever benefits are estimated directly**, and this is the preferred evaluation method, **inclusion of value uplift would be double counting**".

The consultants feel it pertinent to mention that, while the potential increase of land values does not form part of the Economic CBA, the increase value of the land should be kept in mind and considered alongside the Economic CBA. This is especially important as the potential position of the port development is situated on undeveloped arid land with a low commercial value with little development in the near vicinity. The impact of a development of this magnitude would therefore be substantial for the surrounding area.

The project would further create a need for commercial and industrial developments to service the port, as well as for companies that would want to be close to the port. The subsequent servicing and development of the surrounding port land for these purposes will, over time, result in further increases in land values as well as increasing the value of adjacent land. The project will thus increase land value prices in the region, such as the surrounding towns of Alexander Bay, Springbok and Port Nolloth.

The existing towns would benefit from the increased demand for industrial, commercial and residential facilities during the construction and operational phase of the project. This would result in long term value being created through increases in land value and the development thereof.

9.10.5 Employment

9.10.5.1 Estimated Direct Jobs for Boegoebaai

In order to estimate direct temporary employment during the construction phase, the study was based on standard construction industry estimates for labour required per construction spend. It is important to note that the estimates used are for indicative purposes and not highly accurate as they are meant to give an indication of the potential employment impacts.

Direct household income impacts flow from all wages paid during construction. These were estimated by multiplying the projected number of direct jobs associated with the project with assumed average monthly salary packages for each skill category. Again, the consultants note that these estimates are indicative rather than accurate and that the following assumptions were used:

- The estimates are high level estimates for the marine and landside portion of the work;
- On a normal building project, the labour cost would be in the order of 30% of the cost. However, for a project of this magnitude, the assumption is less than 30% due to the nature of the construction; and

[51] (Abelson, 2016)

- The average salaries are different across the different skill categories.

The estimated labour for Phase 1A (marine and landside) portion of the construction project follows.

Table 9-16: Direct job estimates for the construction of the port

Number of jobs per skill category in person years				
Years	**High skill**	**Medium skill**	**Low skill**	**Total**
Year 1	92	327	376	795
Year 2	204	723	832	1,759
Year 3	48	171	197	417
Total	**345**	**1,221**	**1,405**	**2,971**

Source: PRDW Africa

Typical skills needed for the jobs Tabled above, are:

- General labour (unskilled).
- Drivers, Trade hands, General labour, Motorman, Marine shorehand.
- Administrative staff, Security Officer, Plumber, Millwright, Facilities Manager, Technical Officer (Operations).
- Administrative staff, Financial officers, Communications officer, Occupational health staff, Engineering technician, Electrician, Maintenance Manager, Human resources staff, Environmental Officer, Petty Officer, Master Pilot and Workboat, Performance analyst.
- Manager Human resources, Engineer Electrical and Mechanical, Procurement Manager, Senior Facilities Manager, Pilot, Project Managers, Financial Manager, Information Management, Senior Manager Operations, Senior Accountant, Harbour Master, Port Manager, Port Engineer, Pilot, Information Technology Officer etc.

Table 9-17: Direct income estimates for the construction of the port

Direct construction related income per skill category (Rand million)				
Years	**High skill**	**Medium skill**	**Low skill**	**Total**
Year 1	R32m	R71m	R26m	**R129m**
Year 2	R72m	R158m	R57m	**R287m**
Year 3	R17m	R37m	R15m	**R69m**
Total	**R121m**	**R266m**	**R98m**	**R485m**

Table 9-18: Direct job estimates for the ongoing operation of the port and terminals

Job description	Ongoing jobs
Wellness	5
TNPA	190
Emergency Services	20
Arrival and Induction Centre	25
Washbays	5
Truck Offload	5
Three Terminals	150
Total	**400**

Source: PRDW Africa, Nako Iliso

9.10.5.2 Estimated Labour Multipliers for Boegoebaai

The financial model for the proposed port estimated the direct jobs associated with the port's operations to be 400. However, the associated supply chains that could emerge as a result of the port's operations were analysed as part of the economic cost-benefit analysis. In particular, the increased number of road hauliers was considered for the transit of bulk commodities to the proposed port. Furthermore, the value of land was qualitatively determined to have a positive link to the port's development as linked value-chain operators begin operating. These two considerations are examples of indirect jobs, whereby the operations of the port have an impact on the immediate value-chain industries [52]. In other words, the value-chain industries are able to create and sustain these jobs as a result of the port's operations.

Given the aforementioned increased salaries and wages will be generated. The spending of these salaries and wages will in itself have an impact on jobs in the greater economy, as adjacent industries will find themselves able to create and sustain more jobs. These impacts are defined as induced jobs [53]. The sum of direct, indirect and induced jobs is defined as total jobs.

Given the special investment case of a port, a more in-depth study into the indirect and induced jobs will likely need to be performed for example, as part of a full Economic Impact Assessment in the next phase of the project. This is because a port is a complex investment, with many different facets to its operations and a number of inter-linked supply chains [54]. However, for the purposes of this submission, an estimation of the job multipliers will be provided to give an indication of what can be expected when considering a port investment. This estimation will be considered in line with the impacts of other port projects, both inside South Africa and globally.

Example of Port Impacts: Expansion of Richards Bay

Transnet Port Terminals (TPT) planned an expansion of Richards Bay in 2013 [55]. As part of the approximately R10 billion investment [56], AECOM estimated TPT could create over 21,000 jobs on average [57] as detailed:

Table 9-19: Estimated Jobs created from Richards Bay Expansion in 2015 (low)

R10 013 investment	Direct	Indirect	Induced	Total
Jobs	8,800	3,700	7,900	20,400
Labour Multiplier	0.88	0.37	0.79	2.04

Source: (Transnet DEA REF NO: 14/12/16/3/3/3/103, 2014), (Transnet Port Terminals, 2013), authors' own calculations

Table 9-20: Estimated Jobs created from Richards Bay Expansion in 2015 (average)

R10 013 investment	Direct	Indirect	Induced	Total
Jobs	9,150	3,850	8,200	21,200
Labour Multiplier	0.91	0.38	0.82	2.12

[52] (London Government, 2016)
[53] (London Government, 2016)
[54] (Rodrigue, Comtois, & Slack, 2016)
[55] (Transnet DEA REF NO: 14/12/16/3/3/3/103, 2014)
[56] (Transnet Port Terminals, 2013), pg18
[57] (Transnet DEA REF NO: 14/12/16/3/3/3/103, 2014), pp. 92

Table 9-21: Estimated Jobs created from Richards Bay Expansion in 2015 (high)

R10 013 investment	Direct	Indirect	Induced	Total
Jobs	9,500	4,000	8,500	22,000
Labour Multiplier	0.95	0.40	0.85	2.20

As is evident from the table, the direct jobs' impact is less than half of the total jobs impact of the port despite being the largest single job contributor. Furthermore, the indirect- and induced jobs created by the port are likely to benefit the Namakwa District.

Upon discussion, the advisors concluded that the 'low' scenario provided by TPT was the most reasonable of the three scenarios.

Construction Industry Multipliers

The Trade and Industrial Policy Strategies (TIPS) prepared a presentation for the City of Johannesburg Metro in 2015 [58] to estimate multipliers for the City of Johannesburg.

TIPS estimated that **1.9446 jobs** are created for every **R1 million stimulus** provided in the Construction industry. Whilst construction of a port falls within the Construction industry, this measure is used mainly as a point of comparison.

Ports as Catalysts for Growth

In a publication by Jamie Simpson from TIPS, he explored the linkages between ports, growth and employment [59]. Within the document, Simpson talks about ports as catalysts for growth and enablers of trade. Simpsons further states:

"Direct port related jobs [are] relatively small… [however] ***indirect employment far exceeds*** *[the] direct"* – (Simpson, 2015)

In summary, Simpson estimates in this paper that **800 direct, indirect and induced jobs** are created for **every one million metric tons** of port throughput.

The Richards Bay expansion numbers closely correspond to the TIPS estimation of the construction industry labour multipliers. In line with this, the advisors estimate that the port of Boegoebaai's indirect and induced labour multipliers could be similar to the Richards Bay multipliers. The advisors' view is that Richards Bay, similar to the proposed port of Boegoebaai, is a bulk handling port with a signature bulk commodity for export: Coal at Richards Bay, and Manganese exports at Boegoebaai.

However, direct port jobs were calculated as part of the financial model (total of at 400 jobs) for the operational phase. Thus, there is no need to estimate the impact of these jobs in terms of a direct labour multiplier. Presented in the following table is the estimation of the indirect and induced labour multipliers for the operational phase of the proposed port of Boegoebaai.

Table 9-22: Labour Multipliers for the Operations Phase of Boegoebaai

Boegoebaai (estimated)	Indirect	Induced	Indirect and Induced
Labour Multiplier	0.37	0.79	**1.16**

[58] (Trade & Industrial Policy Strategies, 2015), pp. 19
[59] (Simpson, 2015), pp. 2, 8 & 13

Source: (Transnet DEA REF NO: 14/12/16/3/3/3/103, 2014), (Transnet Port Terminals, 2013), authors' own calculations

This implies that an investment amount of R13.8 billion could generate around 13,770 indirect and induced jobs. This includes around 2,300 indirect jobs for truck drivers and assistants that is included in the economic cost-benefit analysis. The proposed port of Boegoebaai is expected to handle around 13.9 million tons by 2046 (the last year under analysis), which according to TIPS [60] would create just over 11,000 jobs. However, as this development is planned for an undeveloped area, the advisors are comfortable to state that more jobs than estimated by TIPS could be created as the surrounding area is developed as the port's operations unfold.

In line with the operational phase labour multipliers, the construction multipliers can also be estimated based on the TIPS's construction labour multipliers [61]. The multiplier of 1.9446 jobs per R1 million stimulus provides an estimate of 16,790 construction-phase total jobs for the total estimated port infrastructure construction cost of R 8.614 billion. This number includes the 2,971 direct jobs estimated by PRDW Africa and NAKO Iliso for the port construction.

The significance of job creation for a project of this nature is high, as the potential creation of almost 20,000 employment opportunities is highly significant in the South African context, regardless of the breakdown of where the employees are from.

9.11 Economic CBA Presentation of Key Results

Table 9-23 depicts the results of the analysis, indicating a total positive economic benefit for the project up to 2046.

Table 9-23: Results of the Economic CBA

Results of the Economic CBA for the Boegoebaai Port Infrastructure Project		
Elements of the Economic CBA	**Rand Million**	**Percentage of Total**
Producer Surplus	9 485	21.3%
Consumer Surplus	45 203	101.9%
Time-savings	610	1.4%
- Non time-savings	63 651	143.2%
- Extra travel costs	-18 963	-42.7%
- Externalities	-11 559	-26.0%
Accidents	-4 521	-10.2%
- Emissions (CO2)	-843	-1.9%
- Congestion	-1 992	-4.5%
- Noise	-1 961	-4.4%
- Landway	-894	-2.0%
- Policing	-315	-0.7%
- Road damage	-1 033	-2.3%
- Impact on jobs	1 211	2.7%
Total (2019 Net Present Values)	**44 435**	**100.0%**

[60] (Simpson, 2015), pp. 2, 8 & 13
[61] (Trade & Industrial Policy Strategies, 2015), pp. 19

Note: Results are presented at an 8% social discount rate

- ENPV: R44 435 million
- EIRR: 48.4%
- EBCR: 2.46

It has been determined that the project incurred large economic costs through shifting freight on to road off the rail lines. This shift incurred externality costs, as road transit typically counts a higher externality cost than rail transit, as well as increased travel costs for freight shifting to Boegoebaai. Despite this, the benefits flowing from increased (trucking) jobs, time savings through lower inventory holding costs and most notably increased consumer surplus from increased export capacity more than justifies the economic costs incurred. This is demonstrated by determining a successful project's criteria:

- ENPV > 0
- EIRR > 8% (Social discount rate)
- EBCR > 1.

9.12 Stakeholder Analysis

The scope of this study included a desktop analysis of potential industries that would acquire economic benefits from the project. The emphasis here is on comments made by the potential economic beneficiaries in the public domain or project team.

In terms of iron ore, the following comments were made by Kumba Iron Ore (at present the biggest iron ore mining company in South Africa :

"Kumba notes its logistical challenges which indicate certain supply chain challenges including high stock levels at mine but not enough inventory to export at the port of Saldanha." - (Kumba Iron Ore, 2018)

This would indicate that even though the mine can produce sufficient iron ore for increased exports, it is struggling to get this increased production to ships for sea movement, including the following comments:

- Low opening stocks at the port in January 2019;
- Seven derailments in FY18;
- Ship loader refurbishment;
- Railway bridge damaged and force majeure declared on Kumba; and
- High finished inventory levels at mines which increased by 1 million tons in 2018.

In the 2018 integrated annual report by Assore Ltd., another large iron ore exporter, the issue of logistics is seen as one of the factors that influence the group's operating context.

"The existence or establishment of sufficient overland logistical capacity (railage capacity). In this case Assore sees it as a high impact risk, though fortunately it is not probable, but Boegoebaai may free iron ore rail capacity and improve the performance of Assore."

"The available channels for the export of commodities from the mines to the ports, as well as the facilities in South Africa's ports, are both dependent on the level of infrastructural investment by the state through Portnet and Transnet. The level of maintenance and quality of management of the logistical facilities have a direct bearing on the group's sales volumes. Assmang management and representatives of Ore & Metal meet regularly with all levels of Transnet's port and rail management to ensure optimum use of the existing channels and to explore expansion and optimal maintenance of these channels." – (Assore Limited., 2018)

Again, Boegoebaai will aim to take smaller minerals from the Sishen – Saldanha line and allow for more iron ore to move.

In terms of Vedanta, who are mining lead and zinc in Aggeneys, the following was provided in a letter addressed to the Northern Cape Government concerning the project :

"Although, the socio-economic benefit of Zinc Smelter Refinery is high, it is highly capital intensive and energy intensive. The project returns are highly marginal and to make the project succeed and ensure the Smelter Refinery is viable, FIVE critical factors are important [but only three of these are referenced]. Smelter competitiveness in value addition will be highly dependent on these:

- Cost of Power
- Logistics Infrastructure including road, rail and port facilities
- Town Infrastructure…." – (Kumar, 2019)

South32 discussed in their 2017 financial results that, in terms of manganese exports, prices more than doubled due to:

"Increasing ore supply tightness due to rail disruptions in South Africa… environmental-related stoppages in China" - (South32, 2017)

A few years ago, in an article written by Graham Kerr, CEO of South32, the following comment was made concerning the need to unlock capacity in the manganese supply chain :

"*Sufficient supply exists to satisfy demand growth, and low-cost growth options for supply occur mostly in South Africa by virtue of the available reserves and high grades.*

The challenge for manganese has been fragmented growth in South Africa's Kalahari basin over the past five years, leading to suboptimal outcomes in rail allocation and export logistics supply chain management." – (Kerr, 2016)

In the 2019 financial annual report for Jupiter Mines, the following statement indicates the need for more effective surface transport needs:

"During the year, Tshipi Borwa broke their export volume record when the team shipped 3,511,461 tonnes. Cost of production remained steady, averaging USD2.27 per dmtu over the year, up from USD2.09 in FY2018. This was mainly due to the mechanics of increased royalties as a result of the higher manganese price realised during FY2019. The Tshipi management team continue to monitor further cost optimisation initiatives, as well as converting as much road to rail logistics as allowable within the Transnet network, over and above their 2.3 million tonne allocation.

Tshipi has consistently increased its production, with 3,448,523 tonnes produced in FY2019. Tshipi's state of the art rail load-out facility can ultimately accommodate 5 million tonnes per annum, and expansion plans are currently being evaluated." – (Jupiter Mines Limited, 2019)

9.13 Risks and Sensitivities of the Project

A project of this nature has a number of areas which can be highlighted as risk-prone or sensitive to changes in the global or national economic environment. In this section, the consultants will look at the effect of a few such changes, not only in terms of the project's financial results but also in terms of its economic results. A workshop with demand commodity experts and the engineering teams was conducted to identify the most likely factors that could vary within the project environment, as well as how these would vary. The consultants inputted the affected variables resulting from this workshop into the financial and economic models to create various scenarios. These scenarios were then measured against the agreed upon base case to understand the extent of the identified changes on the results.

The effects have been divided into two primary areas of focus, broadly defined as risks and sensitivities. The results of all the risk and sensitivity scenarios have been tabulated as a summary to this section.

9.13.1 Risks

The risk scenarios focus more on issues related to CAPEX inputs and effects on volumes to be moved through the port, or nearby ports.

The first scenario was a change to the capital cost of the project. Due to the nature of the project, there is a possibility of cost overruns. Therefore, the team looked at the impact of a 20% cost overrun. The results indicate that, even at such a large increase in capital costs, the project would remain financially viable and would remain very beneficial economically to the broader national and regional economy. An alternative scenario of a 10% reduction in capital cost was also run. The decrease in CAPEX made the project more financially viable, with a project financial IRR of almost 16% and an EIRR close to 43%.

In terms of cargo demand, the scenarios were as follows:

- Firstly, the port of Boegoebaai has a large economic impact as it aims to free capacity on the OREX railway line (Sishen-Saldanha) by removing less compatible commodities (lead, zinc and manganese) from the supply chain. This means that more iron ore, than is currently being exported by South Africa, can move via Saldanha and this will increase mining earnings for shareholders and the country. The team analysed the scenario where there was no increase in for iron ore and thus no additional iron ore is moved. Two scenarios were analysed: one where only 40% of this capacity is utilised by iron ore and one where no freed OREX capacity is used by iron ore. In both cases the project's financial return is not affected, but the EIRR drops to around 39% and 32% respectively. This proves that even if the freed capacity is not utilised by iron ore exporters, this is not a deal breaker for the project.

- In the second case, the consultants analysed scenarios pertaining to demand patterns for the port of Boegoebaai itself. One scenario analysed where commodities flowing through the port were limited by capacity issues due to the land transport networks feeding the port, leading to a 20% reduction in port volumes. For this, the financial IRR is reduced to around 12% and the EIRR to 44%. Another scenario is where port productivity and berth utilisation are improved and the port capacity (at around 14 Mtpa) is increased to 17.5 Mtpa over time. The change resulted in an increased financial IRR of 14%, as well as an increased economic benefit to the broader economy.
- Another scenario considered is where the railway line for the export of manganese through Port Elizabeth is upgraded by Transnet and Boegoebaai loses all its manganese volume after 2032. In this case, even though the financial results drop to below the estimated WACC, it is still not a catastrophic scenario and still retains a high EIRR for the country as a whole.
- Building on this scenario is where, due to no more iron ore being available for export after 2032, manganese moves to the OREX railway line via Saldanha. Ultimately, the results are reasonably similar to the Port Elizabeth scenario. This seems to indicate that, from a national point of view, an early solution to current capacity constraints in the mineral export supply chain would justify the investment in the new port.

9.13.2 Sensitivities

For sensitivities, the results of the model were tested against other sensitive factors. Even though, in some cases, the factors do not affect the project itself, they do affect the broader economic results. The different matters tested include:

- Landside transport rates feeding traffic into the port could be affected in a number of ways. One possible scenario is for the Northern Cape Government to allow road transporters to operate longer and heavier truck and trailer combinations on the specific route between mines and the port. These so-called road trains could lead to a reduction in trucking costs per ton of about 25% and this would affect the EIRR (increasing to just over 50%).
- Scenarios were also run to analyse the impact of Boegoebaai if manganese shifts away in 13 years to other competing supply chains, due to either upgrades in Ngqura or iron ore reserves being exhausted and allowing manganese to go via the OREX line after 2032. In both cases, the returns were marginally below WACC. However, neither case brings the EIRR below the social discount rate.
- Another scenario tested was an increase in fuel costs for trucking and the port by about 30% and here the effects on both financial IRR and EIRR were marginal.
- The next scenario was to adjust the social (economic) discount rate from the current 8% for a more developed economy to 11% for a developing economy. The only result was on economic NPV which decreased to R33.0 billion.
- A higher inflationary environment investigated, within which the project will operate, where inflation increased from the estimated mid-range average of 4.5% to 6.0%. As expected, the

financial IRR and EIRR increase substantially in such an environment to around 15% and 51% respectively.

- An increase in cost inflation to 6%. In this scenario, the port regulator would only allow tariff increases at the mid-range 4.5%. Here the financial IRR of the port is reduced to around 12% but the project still remains viable.
- A further scenario is where, for national reasons, the port is forced by the port regulator to keep its increase in pricing to a low 2% in a mid-range inflationary environment (4.5%). In this case, the effect on the port financials is substantial as it results in a financial loss on the project. This issue will need to be well managed in future, but fortunately this is a regulatory risk and can be managed. The Economic Return, however, remains positive, with the EIRR around 47%.
- A scenario was run whereby the WACC for the project was increased, due to long term interest rates for debt financing being set at 3% higher than estimated. This primarily affected the financial NPV which drops to R 1.2 billion over the lifetime of the project.
- The consulting team reduced the terminal price by 20% from that benchmarked from other similar South African operations and tested the financial result. In this case the project remains above viability and maintains has an EIRR of over 47%. This was also tested with a 10% higher terminal price and as expected the project becomes more viable. The benchmark rates for port authority pricing were not tested, as the rates applied by TNPA are in the public domain and are set in association with the ports regulator.
- Finally, a scenario was run whereby the OPEX factors as benchmarked by the broader consulting team were increased by 20% and the effect of this change was marginal with financial IRR dropping by less than 1 percentage point. This would seem to indicate that the effect of CAPEX is much greater than on-going OPEX factors.

When analysing the project sensitivity to changed assumptions it is clear that the project and its broader economic benefits are not overly reliant on one specific element working properly. This will mean that the risks to an investor and the country of undertaking this project are spread across many elements, because:

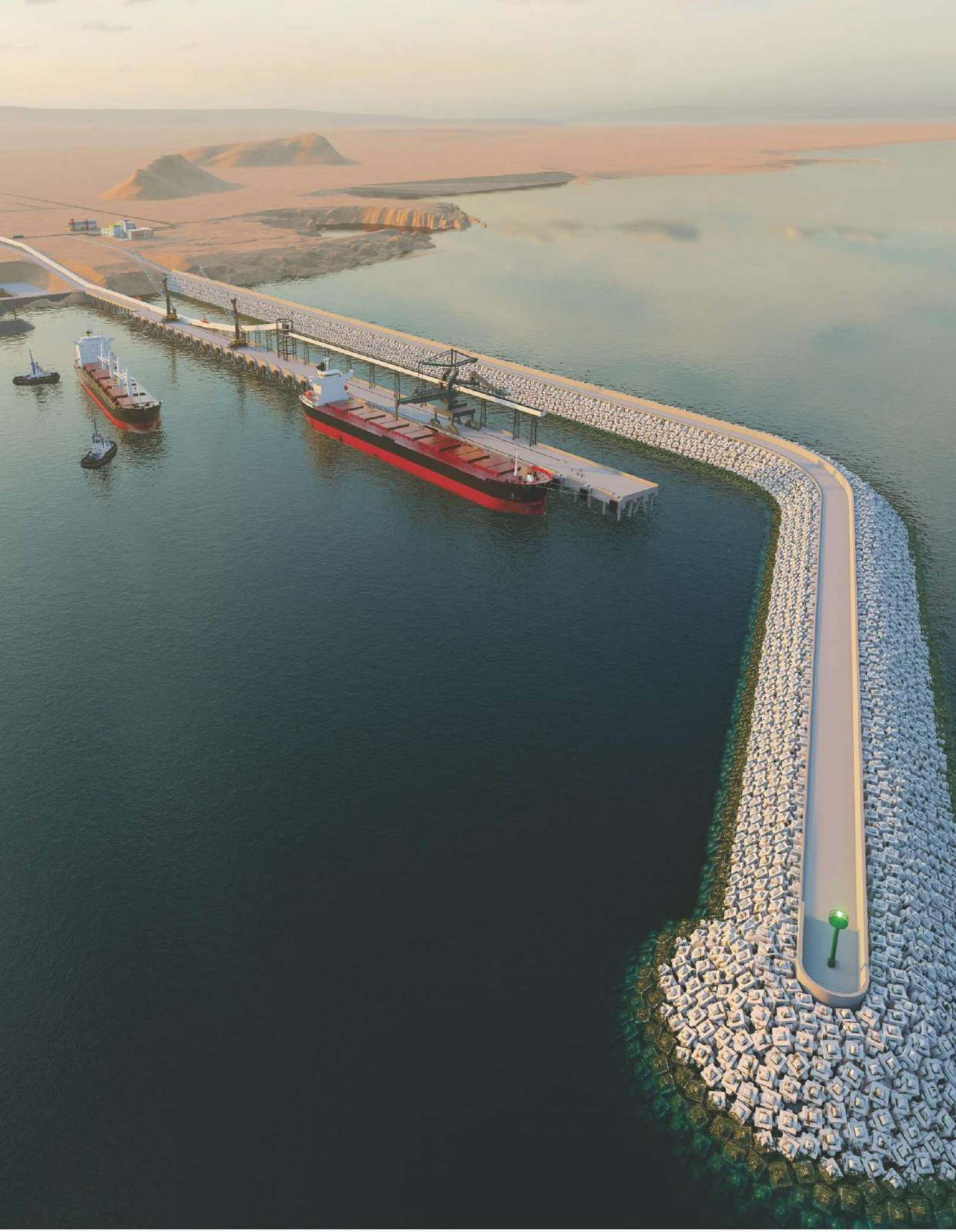
- There are a number of different commodities wanting to make use of the port.
- There is an underlying demand for high-volume mineral exports which is not currently met cost effectively by existing supply chains.
- There are a number of diverse terminals operating within the port.
- The port has a broad number of revenue streams which limits the risk of being reliant on one or two revenue sources.

The Table 9-24 below summarises the risks and sensitivities result through testing the various scenarios.

Table 9-24: Summary of risks and sensitivity results								
- **Elements**	- **Factor**	-	-	- **Results**	-	-	-	-
-	- **Change Factors**	- **Factor**	- **% Change**	- **Project IRR**	- **Project NPV**	- **Ecn IRR**	- **Ecn NPV**	- **Ecn BCR**
- Base Case	- N/A	- N/A	- N/A	- 13,3%	- 4 406	- 48,4%	- 44 435	- 2,46
-	-	-	-	-	-	-	-	-
- Increased capital cost	- CAPEX Cost	- % Change in CAPEX	- 20%	- 11,6%	- 2 674	- 44,0%	- 42 816	- 2,40
- Decrease capital cost	- CAPEX Cost	- % Change in CAPEX	- -10%	- 14,4%	- 5 246	- 50,9%	- 45 245	- 2,48
- Change in Demand for Iron Ore	- Volume Changes	- % Change in Volumes	- down 60%	- 13,3%	- 4 406	- 39,2%	- 29 586	- 1,97
-	- Volume Changes	- % Change in Volumes	- down 100%	- 13,3%	- 4 406	- 32,4%	- 19 687	- 1,65
- Limited throughput due to surface transport capacity limits	- Market Volume Mix	- Cap the Commodity Mix	- 20% decrease	- 10,6%	- 1 084	- 48,4%	- 44 435	- 2,46
- Increase Volume	- Market Volume Mix	- Cap the Commodity Mix	- Increase thru'put to 17,5 Mtpa	- 13,7%	- 5 067	- 48,4%	- 45 483	- 2,49
- Ngqura terminal and rail upgrade	-	- Changes to Commodity Mix	- No manganese after 2032 all to PE	- 10,7%	- 993	- 5,1%	- 9 963	- 1,16
- Development of competing supply chains	-	- Changes to Commodity Mix	- Orex has no Iron Ore after 13 years (2034)	- 11,4%	- 1 715	- 48,4%	- 45 676	- 1,81
- Transport costs	- Transport Rates	- Change Rate per Tonkm Road or Rail	- Road Trains drop Interlink costs by 25%	- 13,3%	- 4 406	- 50,0%	- 52 732	- 3,37
-	- Transport Rates	- Change Rate per Tonkm Road or Rail	- Increase fuel price by 30%	- 13,3%	- 4 406	- 42,8%	- 24 378	- 1,48
- Changes to Economic Discount Rate	- Social Discount Rate	- Change Social Discount Rate	- Increase to 11%	- 13,3%	- 4 406	- 48,4%	- 33 024	- 2,67
- Changes to Overall Inflation	- Inflation Factor	- Change Inflation	- Increase all to 6%	- 14,8%	- 6 975	- 50,9%	- 51 935	- 2,36
- Changes to Cost Factors	- Cost Inflation Factors	- Change OPEX Inflation	- Opex inflation to 6%	- 12,2%	- 3 045	- 50,1%	- 46 250	- 2,21
- Changes to Pricing Inflation	- Revenue Inflation Factor	- Change Revenue Inflation	- Revenue Inflation is 2%	- 9,0%	- -671	- 47,2%	- 37 467	- 2,23

- Changes to WACC	- WACC Factor	- Change WACC Factor	- LT Interest Rate by 3%	- 13,3%	- 1 220	- 48,4%	- 44 435	- 2,46
- Changes to Pricing Base	- Pricing	- Change Pricing	- 20% lower terminal price	- 11,1%	- 1 665	- 47,3%	- 40 848	- 2,34
-	- Pricing	- Change Pricing	- 10% higher terminal price	- 14,3%	- 5 746	- 48,9%	- 46 229	- 2,51
- Changes to OPEX Base	- OPEX Factors	- Change OPEX	- 20% increase in Opex	- 12,7%	- 3 570	- 48,1%	- 43 321	- 2,42

In general, a port does not provide very high financial returns as a project. However, it does provide more stable returns. Further, it can be seen from the results that a port has a fairly high economic benefit for the country. The sensitivities and risk analysis demonstrate that the port's economic benefit is still positive under all reasonable scenarios detailed above.



IMPLEMENTATION **READINESS**

10. Implementation Readiness

10.1 Procurement Plan

This procurement plan demonstrates the capacity and budget of the team to undertake the procurement of the PPP for the proposed new port development at Boegoebaai in the Northern Cape Province.

10.2 Funding Mechanisms

The best procurement practice and procedures suited to the project type and structure will be followed:

Two different options have been considered:

- Public Sector Comparator (PSC): NCG request DOT/TNPA in terms of the National Ports Act (2005) to design, finance, build and operate the port as the landlord. Further, TNPA would proceed to concession the terminal in terms of said Act. Funding would be sourced from Transnet and the national fiscus.

- Public Private Partnership (PPP): NCG request DOT in terms of the National Ports Act (2005) to concession the port and terminals, on a BFOT basis, to the preferred bidder for a period of 30 years. The infrastructure would be privately funded, and costs recovered from the new port users.

  As an alternative to the complete outsourcing of the port and terminals, it is proposed that the NCG work together with TNPA, whereby DOT in terms of the National Ports Act (2005) are requested to follow a process by which a private sector party will compete to build, finance and transfer the port, and build, finance, operate and transfer the terminals after an agreed concession period.

  Funding the port would be sourced partly from TNPA cargo dues and partly from a sovereign infrastructure fund which would be financed by a royalty on cargo using the new port and the OREX railway line. The terminals would be funded based on commercial tariffs over the concession period.

The latter project structuring is preferred as it ensures that the main benefactors of the project contribute to the funding of the project, the cost and delivery schedule is agreed at financial close, the state is only required to provide a guarantee for the sovereign infrastructure fund and TNPA maintains its designated role as the landlord as intended by the National Ports Act (2005).

10.3 Project Timetable

The project timetable for the key milestones and all approvals which will be required to take the project from TA I to TA III is presented overleaf. The schedule is dependent on approval dates for TA1 and will have to be adjusted accordingly:

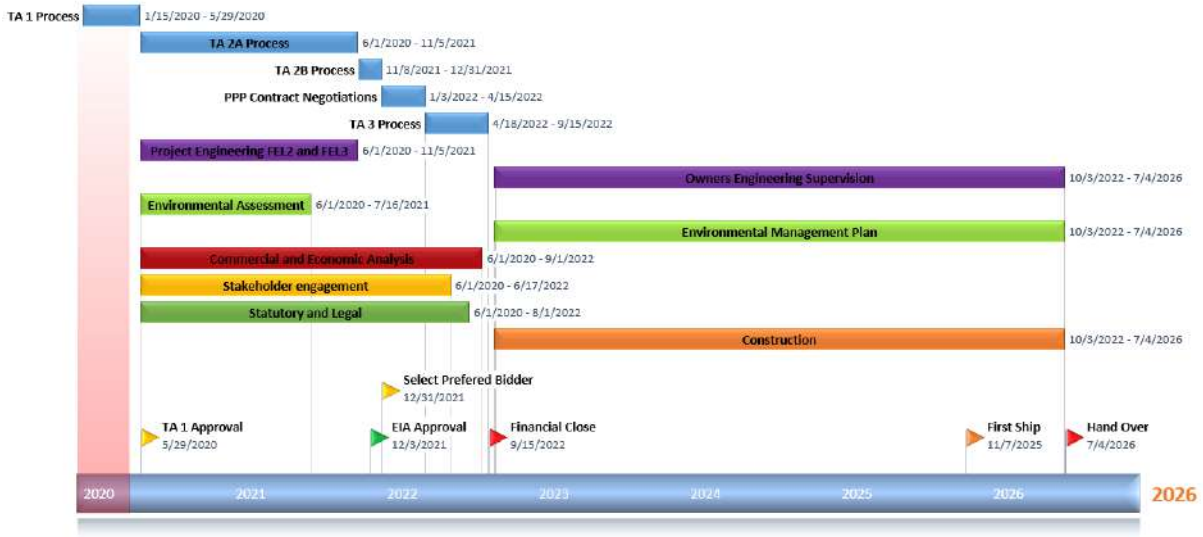


Figure 10-1: Project Schedule

10.4 Project Work up to TA III: Scope of Work

The Scope of Work required to be completed by financial close is presented below:

- Project Management and Advisory
  - Communication and co-ordination between relevant role players
  - Manage the design engineering process
  - Apply for and secure development funding
  - Prepare procurement plan and documents for the TA process
  - Prepare and manage a process of risk assessment for the project.

- Port and Terminal Feasibility Design
  - Execute an engineering feasibility study (FEL3) for the port and terminal and landside infrastructure
  - Execute all port and terminal site investigations
  - Assess marine services and port operations
  - Assess surface transport operations.

- Market and Financial Analysis
  - Perform a market viability assessment of key commodities
  - Perform a freight demand supply chain analysis
  - Prepare an economic and business case model for the facility indicating value for money.

- Environmental Study
  - Execute specialist studies for environmental assessment
  - Prepare environmental impact assessment for permitting process.

- Statutory and Regulatory
  - Provide legal requirements and terms and conditions for the TA procurement process

- Prepare the contractual agreements between stakeholders and role players to complete PPP process
- Ensure compliance and due diligence related to the following aspects:
  - Corporate
  - Commercial
  - Operational
  - Environmental
  - Construction
  - Human Resources
  - Security and Insurance
  - Surface Transport Safety
  - Taxes, Customs and Excise
  - Property
  - Legal
  - Concession.
- The advisory team under the direction of the NCPG will undertake all permit applications.

The reports that are to be produced include:

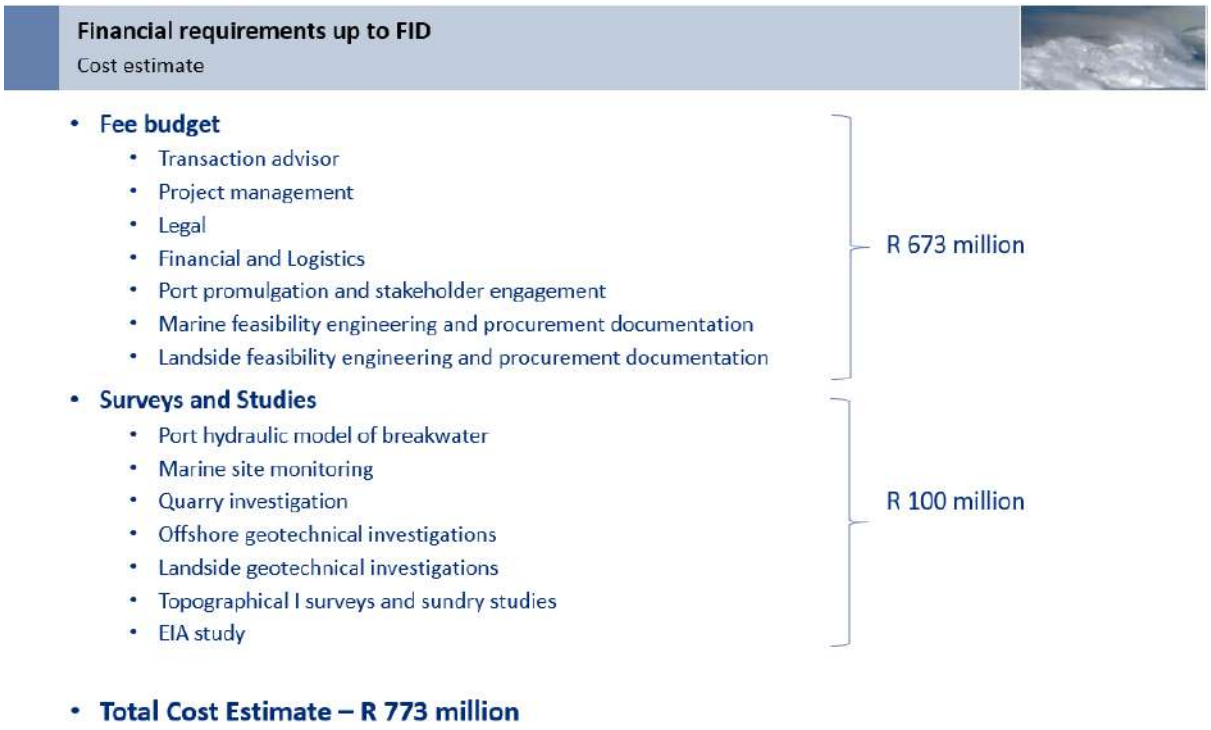
- For Supply Chain
  - Market Assessment Report
  - Feasibility Study Report
  - Economic and Business Case Report
  - Financial Report
  - Surface Transport Report
  - Project Implementation Strategy Report
  - Legal, Institutional and Regulatory Report.

- For Port and Terminals
  - Feasibility Site Investigation Reports
  - Feasibility Specialist Engineering Study Reports
  - Feasibility Costing and Scheduling Report
  - Feasibility Study Report.

- Environmental
  - Environmental Scoping Report
  - Environmental Basic Assessment Report
  - Environmental Specialist Reports
  - Environmental Impact and Risk Assessment Report.

- Preparation of deliverables and reports from these design actions as well as the subsequent planning reports to be generated by owner's representatives in co-ordination with owner's engineers on the detailed design phase of the program.

The funding requirement for this stage of the work up to financial close of the project is provided in the table below:



It is proposed that this funding be sourced through the Northern Cape Government (NCPG) from National Infrastructure Development agencies.

10.5 Project Challenges

A list of any potential challenges for the project and a note on how these will be addressed by the project team and transaction advisor is listed below:

- Development stage funding from national government
    - A submission for development funding to be made to the NCPG or DBSA.
- Agreement with key stakeholders on the project structure
    - The key stakeholders in the project have established a steering committee to guide the transaction advisory team and share information regarding the project.
- Establishment of royalty based sovereign infrastructure fund
    - The preferred funding model requires the establishment of a funding mechanism which will ensure that the stakeholders that benefit from the new port contribute to the capital cost through a royalty (tax) on the iron ore exported via the OREX railway line and all other cargo handled by the new port.
    - All parties that are subject to this tax will benefit from the new port to a greater extent than without the development.
    - The net benefit to users should be enough incentive for the participants to support the funding model.

    - It is proposed that this fund be ringfenced for port, related roads and agreed negative externalities arising from the project.

- Land acquisition for the port
    - The Richtersveld Sida !Hub CPA are the owners of the land.
    - Early engagement is proposed to ensure that the owners receive appropriate compensation for the port land.
    - Should this process not be successful or become moribund then alternative statutory options could be considered.

- Statutory approvals
    - A broad range of statutory requirements need to be met in order to proceed with the project.
    - Delays could arise from anyone of the key permits not being obtained prior to financial close.
    - The PMO will undertake all permit applications on behalf of the NCPG.
    - These approvals will be ceded to the successful bidder prior to financial close.

- Achieving project bankability
    - For the project to proceed it is essential that the preferred bidder can meet financial close.
    - The transaction advisor will develop a funding model as part of the RFP.
    - Early technical, financial, environmental and legal work will be undertaken to a detail feasibility level in order to quantify project risk prior to financial close.
    - The RFP will only be issued once statutory uncertainties have been removed.
    - The competition between the bidders will be setup around the cost of capital.

10.6 Institutional Capacity of Department

The Department has appointed a Project Officer to manage the implementation of the Project on behalf of the Northern Cape Government, to complete the following:

- Register the Project as a PPP;
- Develop the Transaction Advisor (TA) Terms of Reference (TOR);
- Appoint and manage the TA;
- Develop the Feasibility Study;
- Manage the Procurement of the Project; and
- Deliver the Project through an effective output focussed turnkey solution

This function will report to the Head of Department based on responsibility lines and to the Office of the Premier. The Head of Department is in full support of the Project and is committed to the delivery of the project.

10.6.1 Capacity of the Private Sector to provide the Service

The NCDTSL itself does not have the necessary ability and capacity to provide the services required to construct the Port, but they have appointed various consultants with specific expertise that cover the spectrum of the feasibility study. The different teams in the TA team are responsible for the following areas:

- Project Management
- Technical work stream
- Demand work stream
- Finance work stream
- Economic work stream
- Legal work stream

The private sector has sufficient capacity to provide the services required to construct the Port, as depicted in the Table 10-1 below.

Table 10-1: Private sector team

Work Stream	Lead Company	Company Expertise
Project Management	TM Nelutha JV	Project and transaction advisory
Technical	PRDW and Iliso	Port Design and Civil Infrastructure
Demand	PSP Logistics and Aurecon	Cargo Flow and Freight Logistics Expertise
Finance	CNR Logistics/ TM Nelutha JV	Financial Modelling and Assessment
Economic	CNR Logistics	Economic CBA's
Legal	FASKEN	Legal due diligence

10.6.2 How Complex is the Project

The project is very complex. To implement and operate this project requires among others:

- Logistics experts to plan and optimise on cargo traversing Northern Cape;
- Port Operations and Maritime Services to manage the operations of the port, be able to attract traffic to the port, plan for value-add services that would make the port attractive to logistics companies, and be able to manage the complex array of operators and stakeholders required for a successful port;
- Terminal Operations experts to provide the required services at the port; and
- Surface Transport and other modal operations experts to plan on the design and operation of the port and ensure its smooth running.

Due to the complexity of this project, it is reasonable to assume that some private sector involvement may be required in the project. The detailed feasibility study will make recommendations on the suited roles for both public and private players in this project.

10.7 Stakeholders

10.7.1 National Treasury

The project is registered with the National Treasury PPP unit and the technical advisor representing National Treasury is Mr Lindokuhle Hlatswayo and the role of National Treasury is as follows:

- Regulating that the project is in compliance with PMFA and Treasury Regulation 16.
- Continued liaison with TA in development of project deliverables
- Observe the bid evaluation process
- Granting approvals for the project at TA I, IIa, IIb and III stages of the Project

10.7.2 Provincial Treasury

The role of Provincial Treasury is to facilitate, manage and oversee PPPs at a Provincial level, in accordance with the Legislative mandates. The specific responsibilities of the unit, is summarised as follows:

- Providing substantial technical, financial and legal guidance and advice to support the PPP project;
- Communicating the government's public private partnerships strategy clearly and consistently to all spheres of government, potential private investors and other stakeholders;
- Assisting departments, public entities and municipalities to prepare and implement cost-effective and affordable public-private partnership projects. Such assistance would be available throughout the PPP project cycle, from project identification through to financial closure; and
- Supporting capacity enhancement activities by initiating, managing and as appropriate, executing technical assistance and training activities.

10.7.3 Transnet National Ports Authority (TNPA)

The role of TNPA in the Port would normally be a port landlord and marine service provider. It is envisaged that the TNPA may be involved in respect of the infrastructure development, however TNPA is yet to provide the TA with a letter of commitment or resolution to that effect.

TNPA are supportive of the new port development and are part of a steering committee comprising the major stakeholders (NCPG, DOT, DPE, TNPA) that has been established to guide the development and procurement process. In the next stage of the project the roles of the different stakeholders in the development will be defined further.

10.7.4 Other Stakeholder

Other key stakeholders that would play a role in the establishment of a PPP are:

- Northern Cape Economic Development, Trade and Investment Promotion Agency (NCEDA)
- Namakwa Regional Council: Socio Economic Investment
- Richtersveld Sida !Hub Communal Property Association: current landowner and Alexkor
- Port users: (mining, agriculture, oil and gas, shipping companies).

10.8 Required Approvals

Various approvals are required of which some are addressed in the legal due diligence. Amongst these are:

1. Internal Approvals
    - NCPG – As per the Provincial Government requirements for the establishment of a PPP
2. External Approvals
    - DOT: National Ports Act (2005) (section 79): Approval to develop new deep-water port
    - DEA: NEMA/ EIA process: Approval of construction permit and EMP
    - DMR: Minerals Act: Approval of mining permit (EMPR) for establishing and operating a quarry and in terms of section 53 of the act to use the land for non-mining purposes
    - DOT Regulations (2007) Department of Transport
    - Port of Boegoebaai Proclamation Bill.

10.9 Governance Processes

The governance processes to be used by the institution in its management of the procurement process, especially regarding decision-making will include the following:

- The Treasury PPP procurement process is to be followed. The NCDTSL will administer and manage the process of procuring the developer with agreed administrative assistance from the transaction advisor.

- A steering committee comprising the major stakeholders (NCPG, DOT, DPE, TNPA) has been established to guide the development and procurement process. A project management office (PMO) has been set up by the Department to coordinate, manage and administer the process of procuring a project developer.

10.10 Procurement Process Schedule

A GANTT chart of the procurement process, including approvals and work items necessary for obtaining these approvals is presented below:

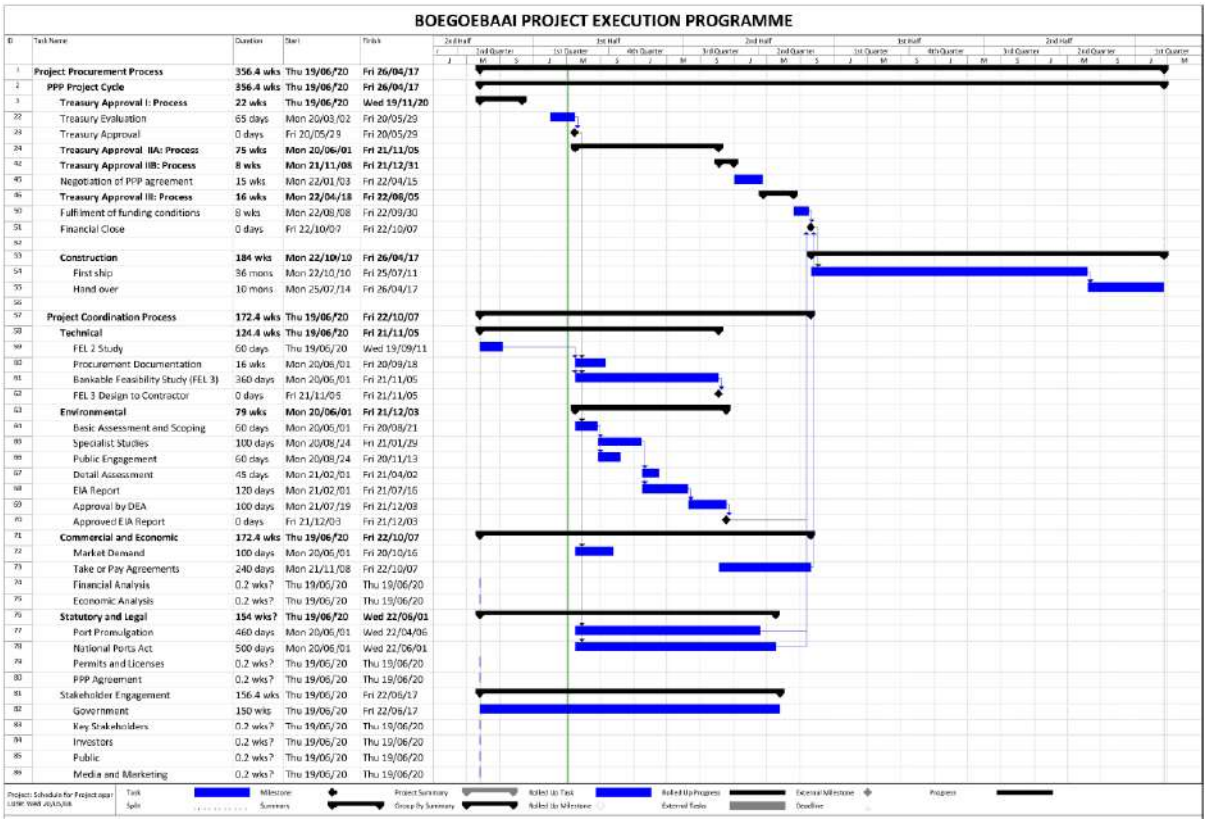


Figure 10-2: Procurement Process Schedule

10.11 Contingency Plans

The following contingency plans have been considered to deal with time and budget deviations:

- Development funding budget: A 10% contingency allowance has been provided to deal with scope related changes during the procurement process. The PMO will report monthly on planned versus actual and forecast estimate to completion.

- Time related deviations: Several regulatory processes are required to be met for this project to proceed. Each process could delay the project. The contingency plan to deal with this risk is to undertake all statutory approvals prior to the achievement of financial close. Whilst this will not obviate any delay occurring, it does minimize the risk to the project.

- Unforeseen technical conditions: The technical risks for the project include the prevailing metocean conditions, the rubble mound breakwater design, the foundation conditions for the quay walls, the yield of the rock quarry and the actual condition of the R 382 provincial road. The transaction advisor will undertake the detail site investigations and design work prior to the award of the project to the preferred bidder. This will reduce the time required to financial close, ensure the design complies with the National Ports Authority standards and reduce the risk for the successful bidder.

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Boegoebaai Port FEL 2 Phase 2 – Technical Inputs for Treasury Approval 1 dated 12 August 2019 and prepared by PRDW (Technical Report);

Deed of Settlement entered into between the Richtersveld Community, Alexkor and the Government of the Republic of South Africa dated 22 April 2007;

Boegoebaai Port Business Case dated September 2019;

Mining Right (DMR Ref: SNC 30/5/1/2/2/554) held by Alexkor in respect of diamonds over Surf Zone along Farm No. 1 and Farm No. 155 up to 31.49 metres below water; Middel of the Orange River to the bank of the following properties, Farm No. 1, Brandkaros 517, Arrisdrif 616 and Portions 15, 16 and 17 of Korridor Wes no.2; Sea Area 1(a), Sea Area 1(b), Sea Area 2(a) and Sea Area 3(a), in the Magisterial District of Namaqualand, Northern Cape, measuring 840.5197; 47.3711; 1470.7783; 3277.7400; 20 692.707; 3188.7047; 3205.7731 hectares in extent and due to lapse on1 July 2030;

Mining Right (DMR Ref: (SNC)30/5/1/2/550 MRC) held by Richtersveld Mining Company pursuant to a notarial deed of cession with Alexkor, in respect of diamonds over Farm No.1, Farm No 155; Remainder of Farm Gypsum No. 5; Arrisdrif no 616; Brandkaros No. 617 and portions 14, 15, 16, 17 and 19 of the farm Korridor Wes No. 2, in the Magisterial District of Namaqualand, Northern Cape, measuring 83638.8775 hectares in extent and due to lapse on 18 May 2035;

Mining Right (DMR Ref: (SNC) 512 MR) held by Alexkor in respect of diamonds (general) over Sea Concession 4(a), in the Magisterial District of Namaqualand, Northern Cape, measuring 3168.8402 hectares in extent and due to lapse on 1 July 2020;

Mining Right (DMR Ref: 30/5/1/2/2/10025MR) held by Alexkor in respect of diamonds (alluvial) over Sea Concession No. 1 (C), in the Magisterial District of Namaqualand, Northern Cape, measuring 3037304 square kilometres in extent and due to lapse on 17 February 2025;

Mining Right (DMR Ref: (SNC) 30/5/1/2/2/513 MR) held by Alexkor in respect of diamonds (general) over Sea Concession 4(b), in the Magisterial District of Namaqualand, Northern Cape, measuring 9484.709 hectares in extent and due to lapse on 1 July 2020;

Prospecting Right (DMR Ref: NC 11923 PR) held by Vast Mineral Sands in respect of heavy metals (general) leucoxene (heavy mineral), monazite (heavy mineral), rutile (heavy mineral) and zirconium ore over the Remainder of Portions 8 and 9 of Farm No. 1 and Farm No. 155, in the Magisterial District of Namaqualand, Northern Cape, measuring 82 413.0023 hectares in extent and due to lapse on 31 January 2023;

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The court order made by the High Court of South Africa (Northern Cape Division) on 7 June 2019, in the matter between the Acting Director General: Department of Agriculture, Rural Development and Land Reform and the Richtersveld CPA, under case number 961/19;

The email correspondence from the Northern Cape office of the Department of Agriculture, Rural Development and Land Reform dated 29 August 2019;

The letter from the Office of the Regional Land Claims Commissioner: Northern Cape, dated 19 September 2019;

The letter from the Northern Cape office of the DMR dated 27 September 2019;

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The following public records:

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