ANNEXURE A

www.transnet.net

RFP NUMBER: TNPA/2022/06/14/RFP

REQUEST FOR PROPOSALS FOR THE APPOINTMENT OF A TERMINAL OPERATOR FOR A LIQUID NATURAL GAS (LNG) TERMINAL AT SOUTH DUNES IN THE PORT OF RICHARDS BAY FOR A MINIMUM PERIOD OF 25 (TWENTY-FIVE YEARS).

PROJECT DESCRIPTION: Request For Proposals for the Appointment of a Terminal Operator to Operate and Maintain Port and Common User Infrastructure financed, designed and constructed by the TNPA, and to Design, Develop, Finance, Construct, Operate, Maintain Terminal Infrastructure and Terminal Equipment required for the handling of Liquid Natural Gas at South Dunes in the Port of Richards Bay for a minimum period of 25 (twenty-five years).

Name of Institution: Transnet SOC Ltd trading through its operating division **Transnet National Ports Authority.**

Place where the works or services are required:
Port of Richards Bay

Date Published: 14 December 2022
Compulsory Physical Briefing Session: 25 January 2023 at 10:00 CAT
Bid Submission Date: 14 April 2023 at 10:00 CAT
Venue: Port of Richards Bay
Employee Care Centre Ventura Road (corner of T-junction) near west gate entrance, Port of Richards Bay

Where RFP documents can be obtained: This bid may be downloaded from the National Treasury's e-Tender Publication Portal at www.etenders.gov.za, free of charge

Special Conditions:
The Briefing session is compulsory and physical in nature and therefore Respondents are requested to indicate their intent to attend the briefing session by sending their representative name, company name and contact details to the following email address: Richardsbaygasrfp@transnet.net by 20 January 2023. Please be advised that all communication should be directed to the project office email address: Richardsbaygasrfp@transnet.net

Transnet will not be held liable if Respondents do not respond by this date and do not receive the latest information regarding this RFP as a result thereof.

ANNEXURE B

PORT OF RICHARDS BAY

Annexure B

Legend

- Port Limits Boundary
- Future Port Expansion
- LNG Pipeline Route

FUTURE PORT BOUNDARY

PORT BOUNDARY

BAYVIEW PRECINCT

NEWARK PRECINCT

PIPELINE EXITING PORT

PROPOSED BERTH 207

PIPELINE ROUTE FROM BERTH 207

SOUTH DUNES PRECINCT

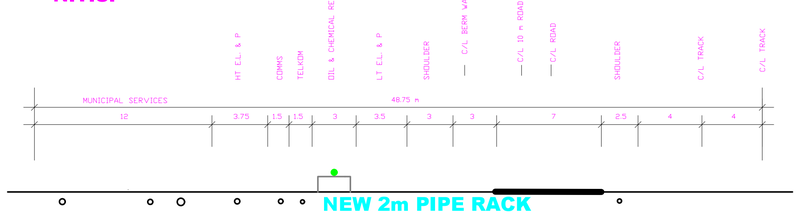
Richards Bay Harbour

Richards Bay Coal Terminal

Richards Bay Nature Reserve

Mfidatuzi Lagoon

SECTION C - C
N.T.S.



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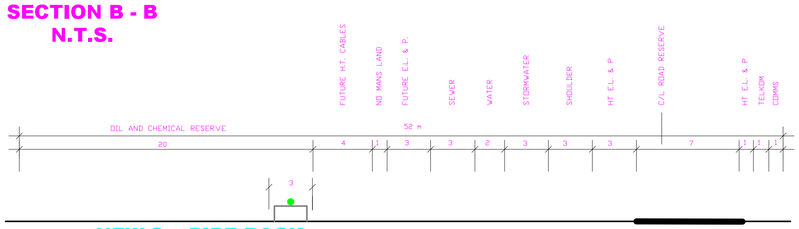
N.T.S.



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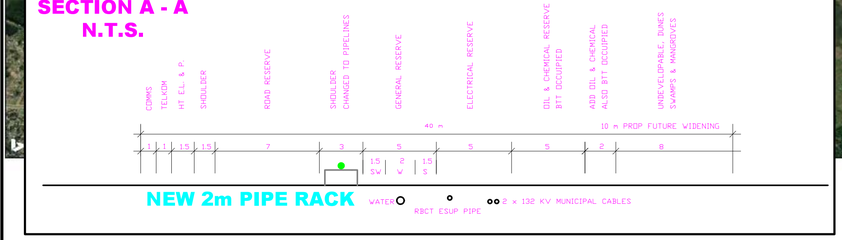

PROPOSED LNG PIPELINE ROUTE SITE PLAN
WITH SERVITUDE CROSS SECTIONS
NOT TO SCALE

RCB - HARBOUR MASTER	RCB - PORT MANAGER
SIGNATURE DATE	SIGNATURE DATE
RCB - RISK MANAGER	RCB - ENVIRONMENTAL MANAGER
SIGNATURE DATE	SIGNATURE DATE
RCB - SECURITY MANAGER	RCB - PROPERTY MANAGER
SIGNATURE DATE	SIGNATURE DATE
RCB - ELECT MAINTENANCE MANAGER	RCB -ICT MANGER
SIGNATURE DATE	SIGNATURE DATE
RCB - CIVIL MAINTENANCE MANAGER	RCB - CHIEF FIRE OFFICER
SIGNATURE DATE	SIGNATURE DATE

FOR APPROVAL

No.	DESCRIPTION / REVISIONS	DATE
00	ISSUED FOR APPROVAL	YYYY-MM-DD

TRANSNET national ports authority

PORT OF RICHARDS BAY
SOUTH DUNES PRECINCT

PROPOSED LNG PIPELINE ROUTE FROM BERTH 207 TO PORT BOUNDARY WITH SERVITUDE CROSS SECTIONS

DATE	2022-09-12	RCB - DESIGN CENTRE MANAGER DONOVAN NAIDOO
SCALE	AS SHOWN	SIGNATURE DATE
DESIGNED BY	AS	RCB - PORT ENGINEER FORTUNE W MAGGABI
CHECKED BY	AS	SIGNATURE DATE
DRAWN BY	DAN	RCB - PLAN DRAWER DONOVAN NAIDOO
CHECKED BY		SIGNATURE DATE

PAPER SIZE	TRANSNET DRW. NO.	SHEET	REV.
A1	RBH 80-A-283		

CAD REFERENCE NAME
LNG ROUTE FROM PORT

Annex C Business Case Guidelines

1. Introduction

The TNPA wishes to obtain a holistic view of the Bidders proposal to undertake the Project. In order to do so Bidders are required to prepare and submit a Business Case, which will be implemented by the Bidder should it be appointed as the Terminal Operator to undertake the Project. It is imperative that the Business Case reflects credible, realistic and achievable targets as the Bidder will be bound thereby with these proposals being incorporated as binding obligations for the Terminal Operator in the Terminal Operator Agreement.

2. Key Elements of Business Plan

2.1. Executive Summary

This section should briefly summarize each section of the business plan. The executive summary should provide an overview of the business and should outline and describe key points and issues.

2.2. Value Proposition

In this section Bidders are required to outline what value it appointment would add to the Port and its service offering to cargo interest, supported by the vision, mission and strategic objectives of the Terminal Operator. It should not exceed **500 words** and should be cross references to relevant points set out in the body of the Business Plan.

2.3. Market and Sustainability Analysis

In this section Bidders are required to set out a comprehensive LNG supply market analysis firstly, for the Republic of South Africa and how an LNG Terminal in the Port of Richards Bay enables the exploitation of opportunities identified. It should cover a SWOT, Competitor and Trend Analysis, identifying target markets and potential cargo volumes that could be handled in terms of the Project together with sustainability and growth assumptions. In addition it should cover current trends and developments in the LNG Sector and Industry, major players in the industry, industry segmentation, challenges in the industry faces and it likely to face, national and global events that influence the industry, industry growth forecasts, and the impact current South African legislation has on the multi-purpose

2.4. Financial Management Plan

2.4.1. The Financial Plan must cover all operational and non-operational expenditure, operational revenue all capital outlays, integrates capital expenditures with the term and funding from capital providers in terms of equity, loans and others. Demonstrate funders support in terms of sufficient capital to cover unexpected and

recurrent expenditures, it derives value in procuring the Terminal Equipment, budgeting to operation phase, and is aligned to the financial model. Financial Plan should where possible be supported Lenders Support Letter (Annex NN).

2.4.2. The Financial Model should cover the business, financial and industry risk, moderate scenarios with clear income and expenditure projections and demonstrate the Bidders ability to meet its obligations to shareholders, the TNPA and lenders with key assumptions cross referenced to the rest of the Business Plan and from which the key financial ratios could be easily ascertained and demonstrate alignment to relevant NERSA Tariff Methodologies.

2.5. Operational Model

Bidders are required to provide a clear operational plan outlining the approach to the execution of the Project, the operations methodology, the terminal cargo handling equipment to be deployed, the logistics plan, operations human resource plans, SHEQ, Risk and Quality management systems that will be applied to mitigate any operational risks and effectively monitor the performance of the Terminal clearly articulating the targeted Ship Working Hour.

2.6. Project Schedule

Bidders are to articulate a clear and concise Project Schedule which for the delivery and provision of the Port Infrastructure, Common User Infrastructure, Terminal Infrastructure and Terminal Equipment, which outlines how and within what timeframes it will be delivered and commissioned. The Schedule provided by the bidder must be relevant to the LNG sector.

2.7. **Preliminary Design & Bill of Quantities**

Bidders are required to include distinct Preliminary Designs and Bills of Quantities for the Port Infrastructure, Common User Infrastructure, Terminal Infrastructure and Terminal Equipment in its Busines Case making use of the Technical Information Pack which must include technical design brief reports and concepts layout drawings and the like.

3. An illustrative outline of the envisaged structure of a Bidders Business Case is set out below:

1. Purpose .....
2. Problem definition/Opportunity Statement .....
3. Proposed solution .....
4. Benefits .....
5. Capital Cost Estimates and Capital Cash Flows .....

Screening Report:

High-level Environmental Assessment of Bulk Services for the Liquefied Natural Gas Terminal, Port of Richards Bay

Report Prepared for

PRDW Consulting Port and Coastal Engineers

Report Number 525451/SR-01

Report Prepared by

srk consulting

November 2017

Screening Report:

High-level Environmental Assessment of Bulk Services for the Liquefied Natural Gas Terminal, Port of Richards Bay

PRDW Consulting Port and Coastal Engineers

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SRK Project Number 525451

November 2017

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Partner

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Philippa Burmeister, Tamaryn Hale

Executive Summary

Background

As part of the Independent Power Producer (IPP) programme, a Gas to Power (G2P) project has been launched by the South African Department of Energy (DoE) to address the electricity supply shortages in South Africa. The aim of the project is to develop and operate Liquefied Natural Gas (LNG) fired power stations at key locations in South Africa.

A Pre-Feasibility (FEL2) Study for LNG import projects in the Port of Richards Bay was undertaken in which two preferred sites for the location of the LNG import facility were identified. At the close-out workshop it was agreed that Berth 207 would be the preferred site for the LNG import facility.

The provision of bulk services for the Floating Storage Regasification Unit (FSRU) was excluded from the FEL2 stage of the IPP project. A review of the existing bulk services and those required by the FSRU, as well as the associated Berth 207 facility, was undertaken by PRDW in November 2017. PRDW thereafter estimated the upper and lower limits for the FSRU bulk services requirements and assessed the existing bulk service systems to identify any associated bulk services capacity constraints.

SRK Consulting (South Africa) (Pty) Ltd (SRK) has been appointed by PRDW Consulting Port and Coastal Engineers (PRDW) to assist with a high-level environmental assessment of the required bulk services for the LNG Terminal. SRK's scope includes the preparation of an environmental screening report (this report) to identify all environmental permitting, approval and regulatory requirements.

Summary of findings

The following upgrades were identified by PRDW:

- **Fire-fighting** – Sea water will be supplied from a new pump station onshore. The pump station will be located adjacent to the existing pump station and will run an approximately 615m long pipeline along the underside of the trestle to the new LNG Berth 207.
- **Electrical Supply** – Because the new water pump station for fire-fighting is to be located adjacent to the existing pump station, there will be small power requirements and general lighting needs. The 400V of power required will be sourced directly from the Berth 209 Substation.
- **Potable Water** – A second uPVC supply pipeline will be constructed from the M14 "Chemical Berth" take-off.

To determine whether the site includes sensitive terrestrial and aquatic habitats, three data sets (refer to Table ES-1) where considered.

Table ES-1: Presence of sensitive terrestrial and aquatic habitats

Dataset	Study Area
Ezemvelo KZN Wildlife Terrestrial Systematic Conservation Plan (TSCP)	100% transformed
South African National Biodiversity Institute (SANBI) National Biodiversity Assessment: Terrestrial Habitats	Entire Port of Richards Bay and surrounding area classified as Least Threatened
National Freshwater Ecosystem Priority Area (NFEPA)	Entire Port of Richards Bay classified as a National Freshwater Ecosystem Priority Area Estuary

Legal Review

The review of environmental legislation identified the following legislation as relevant to the proposed upgrades:

- National Environmental Management Act, 1998 (Act No. 107 of 1998) (NEMA) and the Environmental Impact Assessment (EIA) Regulations (2014) promulgated in terms of the NEMA; and
- National Heritage Resources Act, 1999 (Act No. 25 of 1999) (NHRA).

Conclusions

Based on SRK's understanding of the project and the screening assessment undertaken, SAHRA will need to be notified of the project and provided with information. Thereafter SAHRA will indicate their requirements in terms of compliance with the NHRA.

Barring the SAHRA requirements, no additional environmental authorisations, permits or approvals have been identified.

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Disclaimer

The opinions expressed in this Report have been based on the information supplied to SRK Consulting (South Africa) (Pty) Ltd (SRK) by PRDW Consulting Port and Coastal Engineers (PRDW). The opinions in this Report are provided in response to a specific request from PRDW to do so. SRK has exercised all due care in reviewing the supplied information. Whilst SRK has compared key supplied data with expected values, the accuracy of the results and conclusions from the review are entirely reliant on the accuracy and completeness of the supplied data. SRK does not accept responsibility for any errors or omissions in the supplied information and does not accept any consequential liability arising from commercial decisions or actions resulting from them. Opinions presented in this report apply to the site conditions and features as they existed at the time of SRK's investigations, and those reasonably foreseeable. These opinions do not necessarily apply to conditions and features that may arise after the date of this Report, about which SRK had no prior knowledge nor had the opportunity to evaluate.

1 Introduction and Background

1.1 Port of Richards Bay

The Port of Richards Bay is South Africa's largest port. It occupies 2,157 ha of land area and 1,495 ha of water area. It was built in 1976 for the export of coal from South Africa to international markets. Prior to the construction of the harbour the area was a natural lagoon. Since its construction the Port has grown to include the following infrastructure:

- **Liquid Bulk Terminal** – this terminal consists of two berths that service two bulk liquid storage companies, namely Island View Storage (IVS) and Joint Bunker Services (JBS). The terminal has a current throughput of 1.4 million tonnes per year and a future throughput capacity of 2.7 million tonnes per year. Island View Storage, Bidvest Company, handles a wide range of bulk liquids, mainly chemicals and specialised liquefied gases. The terminal has a total storage capacity of 260 000 m^3. Joint Bunker Services operates what is referred to as the Bunker Terminal which also operates from the berths included in the Liquid Bulk Terminal. The capacity of the terminal for the storage of fuel is increased by the use of two bunker barges also operating in the Port. The proposed project lies within the liquid bulk terminal area of the Port.
- **Multipurpose Terminal** – this terminal resulted from merging the Bulk Metal and Combi Terminals. The terminal is now able to handle break bulk, neo-bulk and containers. The terminals covered storage has a capacity of 22 500 m^2 and open storage of 530 000m^2. It has 6 berths with and annual throughput of 7.2 million tonnes and a throughput capacity of 8.2 million tonnes for break bulk cargo. The terminal is operated by Transnet Port Terminals.
- **Dry Bulk Terminal** – this terminal handles various products via a conveyor system. No one part of the conveyor system is dedicated to a particular commodity and therefore to prevent contamination the belts, transfer points, rail trucks and vessel loaders/unloaders need to be thoroughly washed between handling of different commodities. The Dry Bulk Terminal has 7 berths that have varying depths ranging between 14.5 and 19m. The Dry Bulk Terminal currently handles in excess of 20 million tonnes of cargo annually and is operated by Transnet Port Terminals.
- **Coal Terminal** – The Port of Richards Bay was originally designed to export coal. When it opened on 1976 it had a capacity of 12 million tons per annum. This has grown to a current design capacity of 91 million tons per annum and an annual throughput of 70 million tonnes. This makes the coal terminal the largest export coal terminal in the world. The coal terminal is 276 ha in extent. It has 6 berths and four ship loaders. The coal terminal stockyard has a capacity of 8.2 million tons. The Coal terminal is privately operated by Richards Bay Coal Terminal Company Limited.
- **Support Infrastructure** – The Port has a dedicated railway line that connects the port to Gauteng and Mpumalanga. The line was designed specifically for coal handling. The port is also connected to Durban and Swaziland via rail networks. Trains of up to 200 wagons deliver coal to the Coal Terminal on a daily basis. Each payload averages 16,800 tonnes. The port is also supported by road networks.

Refer to Figure 1-1 for the location of the various components of the Port of Richards Bay.

Data Source:	
Scale 1:65 000	
Projection:	Datum: HH94
Central Meridian/Zone:	

srk consulting

SCREENING REPORT - BULK SERVICES FOR THE LNG TERMINAL, PORT OF RICHARDS BAY

LOCATION OF THE PORT OF RICHARDS BAY COMPONENTS

Date: 19/11/2012	Compiled by: REEL
Project No. 525451	Fig No. 1-1

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Revision: B Date: 27 11 2017

1.2 Project background

As part of the Independent Power Producer (IPP) programme, a Gas to Power (G2P) project has been launched by the South African Department of Energy (DoE) to address the electricity supply shortages in South Africa. The aim of the project is to develop and operate Liquefied Natural Gas (LNG) fired power stations at key locations in South Africa.

A Pre-feasibility (FEL2) Study for LNG import projects in the Port of Richards Bay was undertaken in which two preferred sites for the location of the LNG import facility were identified. At the close-out workshop (held on 20 September 2016) it was agreed that Berth 207 would be the preferred site for the LNG import facility.

The provision of bulk services for the Floating Storage Regasification Unit (FSRU) was excluded from the FEL2 stage of the IPP project. This study aims to assess the bulk services requirements at a pre-feasibility (FEL2) level of project development.

SRK Consulting (South Africa) (Pty) Ltd (SRK) has been appointed by PRDW Consulting Port and Coastal Engineers (PRDW) to assist with a high-level environmental assessment of the required bulk services for the LNG Terminal. SRK's scope includes the preparation of a screening report (this report) to identify all environmental permitting, approval and regulatory requirements.

1.3 Assumptions and limitations to the report

SRK's screening assessment is subject to the following assumptions and limitations:

- The required approvals for the construction and fixing of the trestle and associated new LNG Berth 207 have been obtained in a separate process and therefore fall outside of the scope of this environmental screening assessment.
- No bulk services providing an interaction between the FSRU and the berth have been identified and therefore have been excluded from the scope of this environmental screening assessment.
- Any infrastructure and service requirements falling outside of the bulk service provision are excluded from the scope of this environmental screening assessment.

2 Approach

SRK undertook the following steps in determining the environmental permits, approvals and regulatory requirements for the project:

- Develop an understanding of the project, which included:
  - Initiation meeting with PRDW;
  - Review of the Bulk Services Capacity Assessment, Demand Forecast and Options Identification report prepared by PRDW; and
  - Review of the alternatives identified for each bulk service.
- Develop an understanding of baseline environment through review of existing maps to identify sensitive environmental features on site and surrounding the site. This included a review of available information and historical reports available for the site;
- Undertake an environmental legal review to determine potential authorisations, permits and licenses required; and
- Compile a Screening Report, this report, that provides:
  - An overview of SRK's understanding of the proposed project;
  - An understanding of what potential environmental permits and/or licences will be required for the site; and
  - A description of the site baseline that underpins the legal requirements, based on existing information.

3 Understanding of the project

3.1 Review of existing bulk services and future requirements

A review of the existing bulk services and those required by the FSRU, as well as the associated Berth 207 facility, was undertaken by PRDW in November 2017. The existing services and the required services for the operation of the LNG berth are detailed in the sub-sections that follow.

3.1.1 Fire-fighting

The FSRU will be equipped with its own seawater intake for fighting fires on board the vessel. Therefore, it is anticipated that only fire-fighting requirements for the berth itself need to be considered.

3.1.2 Potable water

A bulk water pipeline currently extends to the proposed location of the FSRU at Berth 207 and a reverse osmosis plant on the vessel will typically provide the potable water requirements for the vessel. An additional potable water will be needed to supply the fire hydrants at Berth 207 as described in Section 3.1.1 above.

3.1.3 Power supply

The FSRU is typically powered by an on-board power plant using fuel gas and oil and therefore, an external electrical power supply for the FSRU is not deemed necessary. For the purposes of this assessment it has been assumed that no bunkering to supply the vessel with fuel gas and oil will be required.

Bulk electrical power currently extends to the proposed location of the FSRU at Berth 207. Additional bulk electrical power supply will be required for the fire-fighting pump station, which is to be located adjacent to the existing fire-fighting pump station.

The only bulk electrical power required is for the fire-fighting pump station.

3.1.4 Sewage

Sewage will most likely be treated on the vessel using an on-board plant, such as a membrane bioreactor. Therefore, no bulk sewage services requirements are anticipated for the vessel. However, concentrated sludge will need to be removed periodically from the settling holding tank and disposed of at a suitable onshore sewage treatment plant. For the purposes of this assessment it has been assumed that the current process undertaken at the other Berths (i.e. use of sludge handling vehicles to remove sludge from the quayside) will be implemented and as such no additional bulk sewage services will be required.

In terms of the Berth 207 requirements, should an additional control tower be required the sewage flows from the toilet facilities in this building would be handled in a similar manner to that of the existing control tower facilities (i.e. installation of a septic tank and soakaway pit system). The need for an additional control tower is, however, unlikely as the existing tower has capacity for an additional berth. As such, for the purposes of this assessment it has been assumed that no additional bulk sewage services will be required for the Berth.

3.1.5 Storm water

Any storm water on the vessel is expected to be routed back to sea. Therefore, it is not expected that any onshore storm water handling will be required for the FSRU.

As is done for Berth 208, any storm water runoff from the deck of the proposed berth structure will need to be collected in sumps and pumped to shore where the flow is then passed through an oil trap prior to draining out through a soak-away pit. Therefore in terms of the storm water for the berth, this is treated locally and as such there is no additional demand on existing bulk services.

3.2 Proposed upgrades to bulk services

PRDW estimated the upper and lower limits for the FSRU bulk services requirements and assessed the existing bulk service systems to identify any associated bulk services capacity constraints. PRDW identified the need to upgrade the fire-fighting, electrical supply and potable water supply services. PRDW identified alternatives to meet the bulk service requirements. SRK reviewed the alternatives and provided environmental input. Once the input was received PRDW presented the alternatives to Transnet National Ports Authority (TNPA) and Alternative 1 was selected as the preferred alternative for all three bulk services. The proposed upgrade alternatives and SRK's environmental are detailed in Table 3-1.

Table 3-1: Upgrade alternatives options summary

Bulk Service	Alternative 1	Alternative 2
Fire Fighting	Sea water will be supplied from a new pump station onshore. The pump station will be located adjacent to the existing pump station and will run an approximately 615m long pipeline along the underside of the trestle to the new LNG Berth 207 (refer to Figure 3-1). In terms of potential environmental impact, this is the marginally preferred alternative as the potential impacts of pumping water from the sea are already experienced at the existing pumping site and it is assumed the required scour protection is in place. Alternative 1 has been confirmed in the PRDW *Bulk Services Options Evaluation Report* as the final upgrade option.	Sea water will be supplied from a new pump station located on the access trestle near the new LNG Berth 207. An approximately 100m long pipeline will be installed along the underside of the trestle (refer to Figure 3-2). This alternative will require the installation of a pump within the sea. There is some uncertainty at this stage as to how far down the pump will go and the depth of the sea floor. Should the sea floor be close to the abstraction point then this could potentially impact the benthos of the sea floor.
Electrical Supply [NOTE: the electrical supply alternatives are dependent on the fire fighting alternatives]	Should the new water pump station for fire-fighting be located adjacent to the existing pump station then there will be small power requirements and general lighting needs. The 400V of power required will be sourced directly from the Berth 209 substation. Alternative 1 has been confirmed in the PRDW *Bulk Services Options Evaluation Report* as the final upgrade option.	Should the new pump station for fire-fighting be located near the new LNG Berth 207 then a miniature substation will need to be installed at the new LNG Berth 207 to accommodate sea water pump requirements of 11kV. This alternative will also include small power requirements and lighting of 400V, however, an 11kV powerline will be required from the miniature substation to the pump station. Additional infrastructure will be required, albeit with a negligible environmental impact, and as such Alternative 1 is marginally preferred.
Potable Water	A second uPVC supply pipeline would need to be constructed from the M14 "Chemical Berth" take-off (refer to Figure 3-3). This alternative will involve trenching along a stretch of land to the west of the water pump station and therefore may have more construction phase impacts than that of Alternative 2. Alternative 1 has been confirmed in the PRDW *Bulk Services Options Evaluation Report* as the final upgrade option.	The existing pump station does not have sufficient pressure for the additional water requirements and as such a new booster pump station will be constructed in order to provide the required pressure at the proposed new LNG Berth 207 (refer to Figure 3-3). This alternative involves excavations that will be localised to the pump station site as opposed to extending over a stretch of land. As such, this is marginally the preferred alternative in terms of environmental impact.

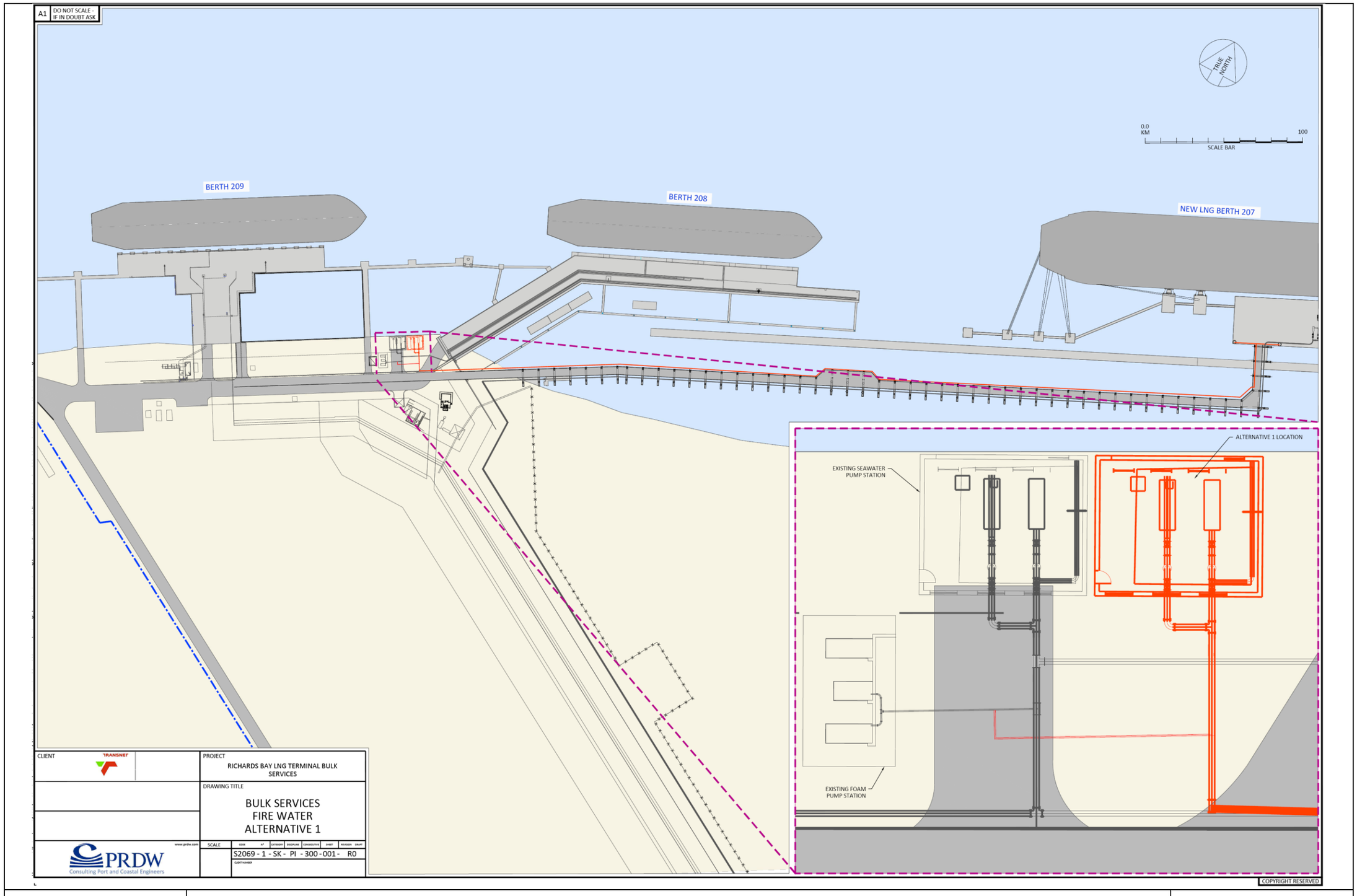

Figure 3-1: Provision of fire water – Alternative 1 (Note: the red indicates the proposed new infrastructure)

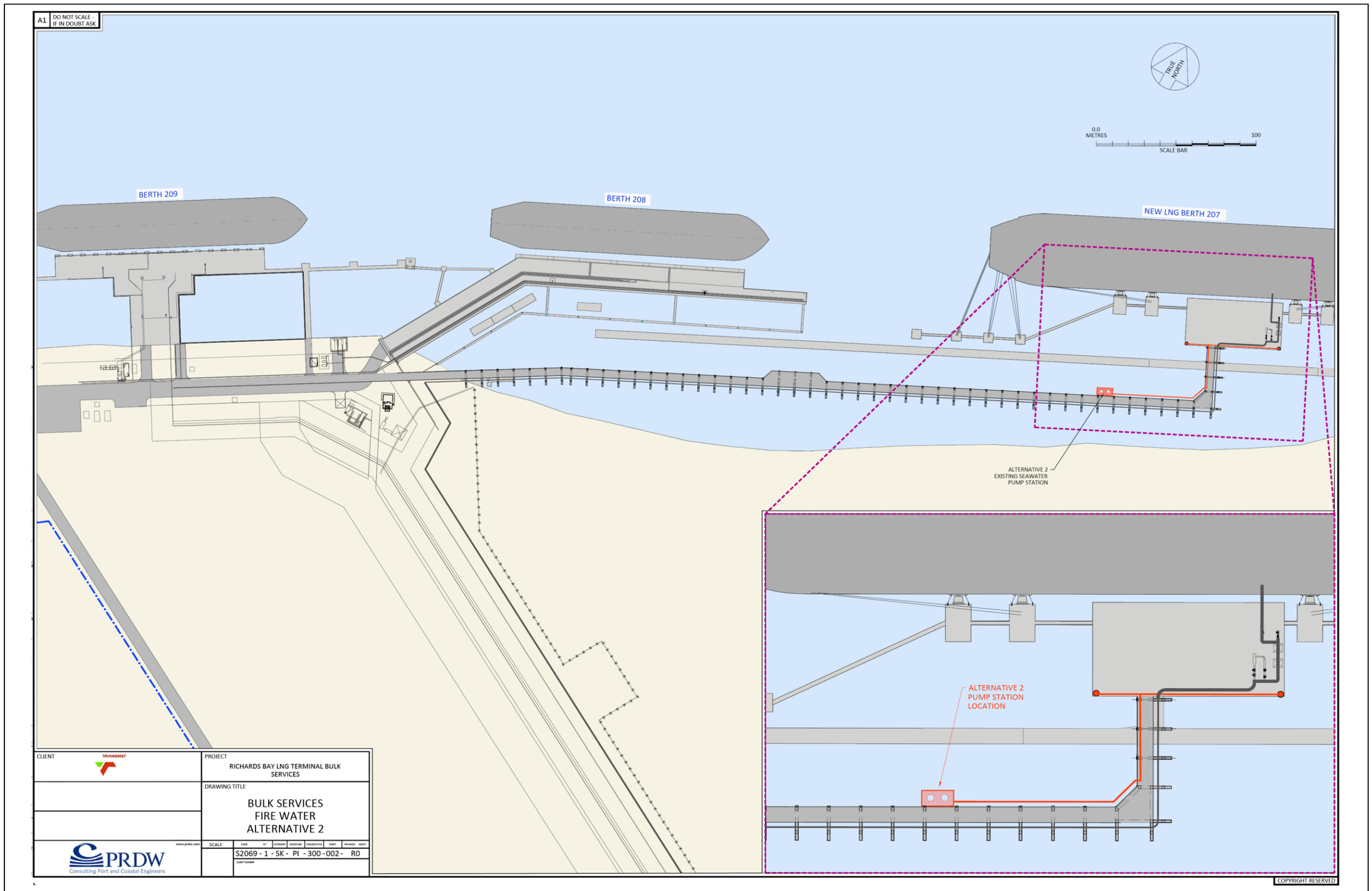

Figure 3-2: Provision of fire water – Alternative 2 (Note: the red indicates the proposed new infrastructure)

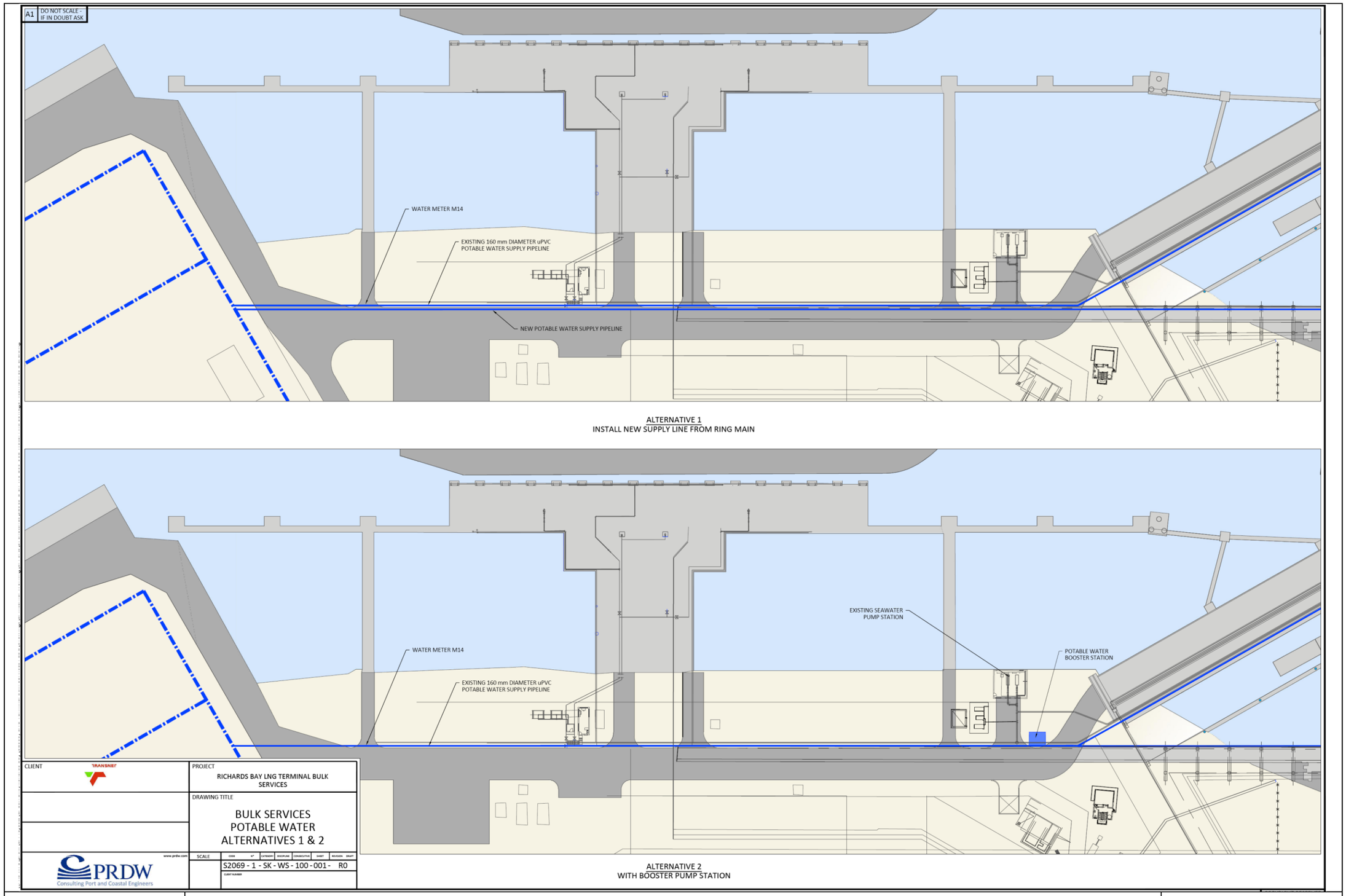

Figure 3-3: Provision of potable water – Alternatives 1 (new supply line) and 2 (installation of a booster pump station)

N

0 62.5 125 250 Meters

Legend

Bulk Services Upgrade

- Potable Water
- Fire Fighting
- Roads
- TNPA Port Boundary
- Project Study Area

srk consulting

SCREENING ASSESSMENT: BULK SERVICES LNG BERTH

PROPOSED BULK SERVICE UPGRADES

Data Source:	
Scale: 1:5,000	
Projection: TM	Datum: HH94
Central Meridian/Zone: Lo31	
Date: 09/11/2017	Compiled by: STBOD
Project No: 525451	Fig No: 3-4

Revision: A Date: 09 11 2017

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4 Baseline description of the project area

According to the National Ports Plan 2016 Update, the Port of Richards Bay is divided into three Precincts, namely the Bayvue Precinct, Newark Precinct and South Dunes Precinct. The proposed project falls within the South Dunes Precinct (Figure 4-1).

srk consulting	SCREENING ASSESSMENT: BULK SERVICES FOR LNG BERTH PRECINCTS & BERTH LAYOUT OF THE PORT OF RICHARDS BAY	Project No. 525451

Figure 4-1: Precincts and berth layout of the Port of Richards Bay (extracted from the National Ports Plan 2016 Update)

To determine whether the site includes sensitive terrestrial and aquatic habitats, the following data sets where considered:

- **Ezemvelo KwaZulu-Natal Wildlife (EKZNW) (2011) KZN Terrestrial Systematic Conservation Plan (TSCP) database of priority conservation areas (also referred to as C-Plan):** EKZNW uses the C-Plan programme as part of its TSCP to identify a provincial reserve system for KZN that satisfies specified conservation targets for biodiversity features. The C-Plan is an effective conservation tool when determining priority areas at a regional level and is used in KZN to identify areas of high conservation value. As indicated in Figure 4-2, large sections of the South Dunes Precinct lies within the area classified as '100% Transformed'. In spite of this, ground truth surveys indicate that certain ecosystems have recovered sufficiently to be regarded as highly valuable assets to conservation of plant communities and suitable habitat for faunal species of conservation concern. This is evident with Red Data species and plants specially protected under provincial legislation having been recorded in the South Dunes Precinct (SAS *et. al.,* 2017). The project study area, however, occurs within a completely transformed site and all proposed infrastructure will be within the confines of existing infrastructure.
- **South African National Biodiversity Institute (SANBI) (2011) National Biodiversity Assessment Terrestrial Habitats:** The National Biodiversity Assessment (NBA), led by SANBI (2011) assigned 4 categories of sensitivity to various habitat types, namely: Critically Endangered,

Endangered, Vulnerable and Least Threatened. As indicated in Figure 4-3, the project study area lies within the Least Threatened category.

- **National Freshwater Ecosystem Priority Areas (NFEPA) wetlands and estuaries (2011):** The NFEPA project aims to: Identify Freshwater Ecosystem Priority Areas (FEPAs) to meet national biodiversity goals for freshwater ecosystems; and develop a basis for enabling effective implementation of measures to protect FEPAs, including free flowing rivers. The NFEPA project responds to the high levels of threat prevalent in river, wetland and estuary ecosystems of South Africa (Driver *et al*. 2005) and provides strategic spatial priorities for conserving the country's freshwater ecosystems and supporting sustainable use of water resources. As indicated in Figure 4-4, the entire Port is considered to be a NFEPA estuary.

Legend

Bulk Services Upgrade

- Potable Water
- Fire Fighting
- Roads
- Project Study Area

eKZNW Priority Conservation Areas

- Conservation Areas
- 100% Transformed

Data Source: eKZNW C-Plan 2010	
Scale: 1:12,000	
Projection: TM	Datum: HH94
Central Meridian/Zone: Lo31	
Date: 09/11/2017	Compiled by: STBOD
Project No: 525451	Fig No: 4-2

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SCREENING ASSESSMENT: BULK SERVICES LNG BERTH

MAP SHOWING EKZNW PRIORITY CONSERVATION AREAS

Path: G:\525451_PRDW_LNG_RBAY_PORT_SCREEN\8GIS\GISPROJ\MXD\Alternative 1_Final\525451_F4_2_PRDW_Alt1_EKZNW_A3L_11092017.mxd

Revision: A Date: 09 11 2017

N

Harbour Arterial

0 150 300 600 Meters

Legend

Bulk Services Upgrade

Potable Water

Fire Fighting

Roads

Project Study Area

NBA Ecological Status

Critically Endangered

Endangered

Least Threatened

Data Source: NBA 2011: Vegetation Map	
Scale: 1:12,000	
Projection: TM	Datum: HH94
Central Meridian/Zone: Lo31	
Date: 09/11/2017	Compiled by: STBOD
Project No: 525451	Fig No: 4-3

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SCREENING ASSESSMENT: BULK SERVICES LNG BERTH

MAP SHOWING SANBI NBA TERRESTRIAL HABITATS

Path: G:\525451_PRDW_LNG_RBAY_PORT_SCREEN\8GIS\GISPROJ\MXD\Alternative 1_Final\525451_F4_3_PRDW_Alt1_SANBI_A3L_11092017.mxd

Revision: A Date: 09 11 2017

N

Harbour Arterial

0 150 300 600 Meters

Legend

Bulk Services Upgrade

Potable Water

Fire Fighting

Roads

Project Study Area

NFEPA Wetlands and Estuaries

Data Source: NFEPA Wetlands 2011	
Scale: 1:12,000	
Projection: TM	Datum: HH94
Central Meridian/Zone: Lo31	
Date: 09/11/2017	Compiled by: STBOD
Project No: 525451	Fig No: 4-4

srk consulting

SCREENING ASSESSMENT: BULK SERVICES LNG BERTH

MAP SHOWING NFEPA WETLANDS AND ESTUARIES

Path: G:\525451_PRDW_LNG_RBAY_PORT_SCREEN\8GIS\GISPROJ\MXD\Alternative 1_Final\525451_F4_4_PRDW_Alt1_NFEPA_A3L_11092017.mxd

Revision: A Date: 09 11 2017

5 Legal review

Key legislation that regulates environmental matters in relation to development projects (i.e. where environmental authorisations, permits or licences may be required) are discussed in terms of their applicability to the proposed project below.

5.1 National Environmental Management Act

The National Environmental Management Act, 1998 (Act No. 107 of 1998) (NEMA) provides for co-operative governance by establishing decision-making principles on matters affecting the environment including:

a) Sustainable development;
b) Integrated environmental management;
c) Polluter pays principle;
d) Cradle-to-grave responsibility;
e) Precautionary principle;
f) Involvement of stakeholders in decision making.

NEMA provides for the management and protection of environmental resources through *inter alia* the imposition of Environmental Authorisation requirements. Section 49 of NEMA outlines offences in terms of NEMA that include commencing with an activity without first having obtained Environmental Authorisation as detailed below. Section 49 of NEMA also details the penalties associated with offences that include fines, imprisonment or both.

The Competent Authority responsible for the administration and enforcement of the NEMA for Parastals such as TNPA is the National Department of Environmental Affairs (DEA).

5.1.1 Environmental Impact Assessment Regulations

NEMA identifies activities that require Environmental Authorisation. Activities listed in Listing Notice 1[1] and Listing Notice 3[2] require a Basic Assessment (BA) process, while activities listed in Listing Notice 2[3] require Scoping and Environmental Impact Reporting (S&EIR, interchangeably referred to as a "full" EIA). The Listing Notices were reviewed in order to identify potential listed activities triggered and it was established that no listed activities will be triggered. As such, no environmental authorisation will be required for this project.

A review of the listed activities potentially triggered by this project, together with an explanation of whether SRK believe these activities to be applicable or not is provided in Table 1 of Appendix A.

5.2 National Heritage Resources Act

The National Heritage Resources Act, 1999 (Act No. 25 of 1999) (NHRA) requires that for certain categories of development, including "*The construction of a road, wall, powerline, pipeline, canal or other similar form of linear development or barrier exceeding 300m in length*" (Section 38(1)(a)), the responsible heritage resources authority must be notified as early as possible and provided with information about the location, nature and extent of the proposed development. The responsible authority may require that a Heritage Impact Assessment (including archaeology and palaeontology) must be conducted prior to providing approval in terms of the NHRA.

[1] Government Notice (GN) R983 of 2014, as amended by GN 327 of 2017
[2] GN R985 of 2014, as amended by GN 325 of 2017
[3] GN R984 of 2014, as amended by GN 324 of 2017

The construction of the additional water pipeline for the fire-fighting equipment will exceed 300m in length and as such the responsible heritage resources authority, namely the South African Heritage Resource Agency (SAHRA), will need to be notified and provided with information on the project. Following the submission of an initial online application, SAHRA may require additional Heritage studies to be undertaken by a suitably qualified heritage consultant.

5.3 Additional applicable legislation

The following additional legislation was reviewed to determine whether it may be applicable to the project:

- National Environmental Management: Waste Act, 2008 (Act No. 59 of 2008) (NEM: WA);
- National Environmental Management: Air Quality Act, 2004 (Act. No. No 39 of 2004) (NEM: AQA);
- National Environmental Management: Biodiversity Act, 2004 (Act No. 10 of 2004) (NEM: BA);
- National Environmental Management: Integrated Coastal Management Act, 2008 (Act No. 24 of 2008) (NEM: ICMA);
- National Water Act, 1998 (Act No. 36 of 1998) (NWA);
- Mineral and Petroleum Resources Development Act, 2002 (Act No. 28 of 2002) (MPRDA); and
- KwaZulu-Natal Heritage Act, 1997 (Act No. 10 of 1997) (KZNHA).

No additional permits and/or licenses were identified as being required.

A brief summary of additional legislation reviewed is provided in Table 2 in Appendix A. Please note that this is not intended to be definitive or exhaustive, and serves to highlight key environmental legislation and requirements only. Although other legislation may be applicable to the proposed development, the list provided has been limited to those laws which require application processes that can be included in the scope of works covered in this proposal.

6 Conclusions and recommendations

Based on SRK's understanding of the project and the screening assessment undertaken, SAHRA will need to be notified of the project and provided with information. Thereafter SAHRA will indicate their requirements in terms of compliance with the NHRA.

Barring the SAHRA requirements, no additional environmental authorisations, permits or approvals should be required. In addition to legal requirements, the TNPA Policy requires adherence to certain Environmental Management documents. The conditions and requirements of these documents will need to be factored into the construction phase of the project. Based on SRK's experience, it is anticipated that the requirements will include the preparation of an EMPr based on the TNPA generic EMPr and the implementation thereof. Further some auditing of compliance with the EMPr is usually required by TNPA. SRK recommends that these requirements be confirmed with TNPA.

Prepared by

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All data used as source material plus the text, tables, figures, and attachments of this document have been reviewed and prepared in accordance with generally accepted professional engineering and environmental practices.

7 References

SAS and SRK Consulting (2017), *Terrestrial and Wetland Ecosystem Trade Off Definition and Implementation Plan as well as Biodiversity Management Framework for the Transnet Port of Richards Bay South Dunes Precinct, Richards Bay, Kwazulu-Natal, South Africa*, prepared for Transnet National Ports Authority.

PRDW (2017), *Bulk Services Capacity Assessment, Demand Forecast and Options Identification,* prepared for Transnet National Ports Authority.

SRK (2013), *Strategic Environmental Assessment of the Transnet Long Term Planning Framework*, prepared for Transnet Capital Projects.

Appendices

Appendix A: Detailed Legal Review

Table 1: Listed Activities potentially triggered by the project

No.	Listed Activity	Comment
Listing Notice 1 (GN R983)		
9	The development of infrastructure exceeding 1 000m in length for the bulk transportation of water or storm water— (i) with an internal diameter of 0,36m or more; or (ii) with a peak throughput of 120L per second or more; excluding where— (a) such infrastructure is for bulk transportation of water or storm water or storm water drainage inside a road reserve or railway line reserve; or (b) where such development will occur within an urban area.	The installation of a new bulk water pipeline to supply the fire-fighting equipment at the Berth will be required. This Listing Activity is, however, not applicable as the length of the pipeline is approximately 615m, which will not exceed 1 000m. ***Finding: Not applicable***
11	The development of facilities or infrastructure for the transmission and distribution of electricity— (i) outside urban areas or industrial complexes with a capacity of more than 33 but less than 275 kilovolts; or (ii) inside urban areas or industrial complexes with a capacity of 275 kilovolts or more; excluding the development of bypass infrastructure for the transmission and distribution of electricity where such bypass infrastructure is — (a) temporarily required to allow for maintenance of existing infrastructure; (b) 2 kilometres or shorter in length; (c) within an existing transmission line servitude; and (d) will be removed within 18 months of the commencement of development.	Power supply from the substation at Berth 209 to the new pump station situated adjacent to the existing pump station will be required. This Listing Activity is, however, not applicable as only 400V will be required which falls well below the threshold. ***Finding: Not applicable***
12	The development of— (ii) infrastructure or structures with a physical footprint of 100m^2 or more; where such development occurs— (a) within a watercourse; (b) in front of a development setback; or (c) if no development setback exists, within 32 metres of a watercourse, measured from the edge of a watercourse; — excluding—	The combined footprint area of the proposed project will exceed 100m^2. This Listed Activity is, however, not applicable as the development will not occur within a watercourse and falls behind the development setback line. Furthermore, the infrastructure will be constructed within an existing port and will not result in an increase in the development footprint of the Port. ***Finding: Not applicable***

No.	Listed Activity	Comment
	(aa) the development of infrastructure or structures within existing ports or harbours that will not increase the development footprint of the port or harbour; (bb) where such development activities are related to the development of a port or harbour, in which case activity 26 in Listing Notice 2 of 2014 applies; (cc) activities listed in activity 14 in Listing Notice 2 of 2014 or activity 14 in Listing Notice 3 of 2014, in which case that activity applies; (dd) where such development occurs within an urban area; (ee) where such development occurs within existing roads, road reserves or railway line reserves; or (ff) the development of temporary infrastructure or structures where such infrastructure or structures will be removed within 6 weeks of the commencement of development and where indigenous vegetation will not be cleared.	
15	The development of structures in the coastal public property where the development footprint is bigger than 50m^2, excluding— (i) the development of structures within existing ports or harbours that will not increase the development footprint of the port or harbour; (ii) the development of a port or harbour, in which case activity 26 in Listing Notice 2 of 2014 applies; (iv) activities listed in activity 14 in Listing Notice 2 of 2014, in which case that activity applies.	The combined footprint area of the proposed project will exceed 50m^2. This Listed Activity is, however, not applicable as the Port is not considered Coastal Public Property. ***Finding: Not applicable***
17	Development— (ii) in an estuary; in respect of— (e) infrastructure or structures with a development footprint of 50m^2 or more— but excluding— (aa) the development of infrastructure and structures within existing ports or harbours that will not increase the development footprint of the port or harbour; (bb) where such development is related to the development of a port or harbour, in which case activity 26 in Listing Notice 2 of 2014 applies; (cc) the development of temporary infrastructure or structures where such structures will be removed within 6 weeks of the commencement of	According to NFEPA the site is considered to be an estuary and the proposed infrastructure will exceed 50m^2 in extent. This Listed Activity is, however, not applicable as the development occurs within an existing Port and the development footprint of the Port will not be increased. ***Finding: Not applicable***

No.	Listed Activity	Comment
	development and where coral or indigenous vegetation will not be cleared; or (dd) where such development occurs within an urban area.	
48	The expansion of— (i) infrastructure or structures where the physical footprint is expanded by 100m^2 or more where such expansion occurs— (a) within a watercourse; (b) in front of a development setback; or (c) if no development setback exists, within 32 metres of a watercourse, measured from the edge of a watercourse; excluding— (aa) the expansion of infrastructure or structures within existing ports or harbours that will not increase the development footprint of the port or harbour; (bb) where such expansion activities are related to the development of a port or harbour, in which case activity 26 in Listing Notice 2 of 2014 applies; (cc) activities listed in activity 14 in Listing Notice 2 of 2014 or activity 14 in Listing Notice 3 of 2014, in which case that activity applies; (dd) where such expansion occurs within an urban area; or (ee) where such expansion occurs within existing roads, road reserves or railway line reserves.	The combined footprint area of the proposed project will exceed 100m^2. This Listed Activity is, however, not applicable as the development will not occur within a watercourse and falls behind the development setback line. Furthermore, the infrastructure will be constructed within an existing port and will not result in an increase in the development footprint of the Port. ***Finding: Not applicable***
52	The expansion of structures in the coastal public property where the development footprint will be increased by more than 50m^2, excluding such expansions within existing ports or harbours where there will be no increase in the development footprint of the port or harbour and excluding activities listed in activity 23 in Listing Notice 3 of 2014, in which case that activity applies.	The combined footprint area of the proposed project will exceed 50m^2. This Listed Activity is, however, not applicable as the Port is not considered Coastal Public Property. ***Finding: Not applicable***
54	The expansion of facilities— (ii) in an estuary; in respect of— (e) infrastructure or structures where the development footprint is expanded by 50m^2 or more,	According to NFEPA the site is considered to be an estuary and the proposed infrastructure will exceed 50m^2 in extent. This Listed Activity is, however, not applicable as the development occurs within an existing Port and the development footprint of the Port will not be increased. ***Finding: Not applicable***

No.	Listed Activity	Comment
	but excluding— (aa) the expansion of infrastructure or structures within existing ports or harbours that will not increase the development footprint of the port or harbour; or (bb) where such expansion occurs within an urban area.	
Listing Notice 2		
No potential Listed Activities were identified.		
Listing Notice 3		
No potential Listed Activities were identified.		

Table 2: Additional legislation and requirements

Legislation	Overview and Requirements
National Environmental Management: Waste Act, 2008 (Act No. 59 of 2008) **(NEM: WA)**	Section 20(b): A Waste Management Licence (WML) must be obtained from the competent authority for projects that trigger activities listed in GN 921 of 2013. All applications must conform to the requirements of NEMA, with additional requirements with respect to stakeholder engagement (advertising) and the application must be accompanied by "such documentation and information as may be required by the licensing authority". Waste management activities listed in Category A require a BA process, while Category B activities require an S&EIR process conducted in terms of NEMA. A separate application form must be submitted with the application for EA, and additional stakeholder engagement (advertising) applies to an EIA process for a WML application. The competent authority for WML applications is the National DEA for applications involving Parastatals. **Requirements for this project:** A WML is not required for this project as any material to be disposed of will be temporarily stored on site during construction then disposed of at a registered landfill site.
National Environmental Management: Air Quality Act, 2004 (Act. No. No 39 of 2004) **(NEM: AQA)**	Section 21: Provides for the listing of activities that result in atmospheric emissions that have or may have a significant detrimental effect on the environment. An Atmospheric Emission License (AEL) from the licensing authority is required for these activities, which are listed in GN 893 of 2013 and include a range of combustion, manufacturing, petrochemical, carbonisation, metallurgical, mineral processing/handling, chemical, thermal treatment and pulp processes. All applications must conform to the requirements of NEMA and the application must be accompanied by "such documentation and information as may be required by the licensing authority". A separate application form must be submitted at the beginning of the EIA process, and an Air Quality specialist study is likely to be required as part of the EIA. The licencing authority for AELs has an additional 60 days for decision making following the issue of the Environmental Authorisation. **Requirements for this project:** The project will not trigger any Listed Activities in terms of the NEM: AQA and will therefore not require an AEL.
National Environmental Management: Biodiversity Act, 2004 (Act No. 10 of 2004) **(NEM: BA)**	The purpose of NEM: BA is to provide for the management and conservation of South Africa's biodiversity and the protection of species and ecosystems that warrant national protection. Threatened or Protected Species (TOPS) Regulations (2007) and a National List of Ecosystems that are Threatened and in Need of Protection (2011) have been promulgated in terms of NEM: BA. **Requirements for this project:** The proposed upgrades are limited to highly transformed areas and will not involve the removal or disturbance of protected species or ecosystems and will therefore not require a permit or license.
National Environmental Management: Integrated Coastal Management Act, 2008 (Act No. 24 of 2008) **(NEM: ICMA)**	The NEM: ICMA provides for the integrated management of the coastal zone, including the promotion of social equity and best economic use, while protecting the coastal environment. The enforcing authority is the Department of Environmental Affairs: Oceans and Coasts (DEA: O&C). **Requirements for this project:** The proposed upgrades will not trigger the NEM: ICMA.
National Water Act 36 of 1998 **(NWA)**	Section 21: Specifies a number of water uses that require Water Use Authorisation (WUA) – either via a Water Use Licence (WUL) or General Authorisation (GA) (issued in terms of Section 39 of the NWA) through a registration and application process – in terms of Section 22(1) of the Act. A WUA process must be conducted to obtain authorisation for any of these activities, unless the specific use is listed in Schedule 1 of the NWA or is an existing lawful use. The competent authority for WUAs is the Department of Water and Sanitation (DWS). For a WUL, DWS require an application, registration as a water user and the completion of a Technical Report which addresses all water uses in accordance with the requirements of Section 28 and Section 29 of the NWA, including a Section 27 motivation for the water uses. For GA, DWS require an application, registration as a water user and may require the completion of a Technical Report depending on the nature of the water use. In March 2017, DWS gazetted regulations stipulating the WULA process and timeframes. A pre-application enquiry meeting with DWS is required, and DWS must take a decision within

Legislation	Overview and Requirements
	300 days of application. Similar to the EIA process, a considerable quantum of work will be required before formal submission of an application. **Requirements for this project:** The proposed project will be undertaken in an estuary, however, because the site is within a Port it falls outside of the jurisdiction of the NWA and therefore a WULA is not required.
Mineral and Petroleum Resources Development Act, 2002 (Act No. 28 of 2002) (MPRDA)	The MPRDA makes provision for equitable access to and sustainable development of South Africa's mineral and petroleum resources and aims to, *inter alia*, provide for security of tenure in respect of prospecting, exploration, mining and production operations. The fundamental principles of the MPRDA are: • Petroleum resources are non-renewable; • Petroleum resources belong to the nation and the State is the custodian; • Protection of the environment for present and future generations to ensure sustainable development of the resources by promoting economic and social development; • Promotion of local and rural development of affected communities; • Reformation of the industry to bring about equitable access to the resources and eradicating discriminatory practices; and • Guaranteed security of tenure. **Requirements for this project:** The proposed upgrades will not trigger the MPRDA.
KwaZulu-Natal Heritage Act, 1997 (Act No. 10 of 1997) **(KZNHA)**	The aim of the KZNHA is "*To provide for the conservation, protection and administration of both the physical and the living or intangible heritage resources of the Province of KwaZulu-Natal; to establish a statutory Council to administer heritage conservation in the Province; to determine the objects, powers, duties and functions of the Council; to determine the manner in which the Council is to be managed, governed, staffed and financed; to establish Metro and District Heritage Forums to assist the Council in facilitating and ensuring the involvement of local communities in the administration and conservation of heritage in the Province; and to provide for matters connected therewith*". This Act is implemented by Amafa aKwaZulu-Natali/Heritage KwaZulu-Natal, the provincial heritage resources authority charged to provide for the conservation, protection and administration of both the physical and the living or intangible heritage resources of the province; along with a statutory Council to administer heritage conservation in the Province. Permission from the heritage authority, (national and/or provincial), will be required in appropriate circumstances, which may include the issue of the heritage resources identified and whether any formal protections under the statutes have been assigned to any resources which are located in the project area. **Requirements for this project:** This Act will only apply should the National HRA not apply.

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DATE 2008-07-04

PROJECT No. 412011
DRAWING No. BDD059C | SH. A4 | REV. ZZ

CLIENT: National Ports Authority of South Africa
PORT ENGINEER RICHARDS BAY

PROJECT: PORT OF RICHARDS BAY
CHEMICAL BERTH 208

TITLE: GENERAL DRAWINGS
GENERAL ARRANGEMENT

ON ORIGINAL (mm)
0 10 20 30 40 50

SECTION A
1 : 75

700 DIA. PILE
1:4 RAKED
CHART DATUM (CD)
PILE CAP
PRECAST BEAM
PRECAST SLAB
+2.70 CD
+4.80 CD
+4.73 CD
+4.82 CD
1:100
1:67
ACCESS ROAD
SERVICES
15m LIGHT POLE PROVIDED BY SUB CONTRACTOR
5m LIGHT POLE PROVIDED BY SUBCONTRACTOR
HANDRAILING
18700
19400
18750
1700
9000
6000
400
300
1800
2200
5000
1550

SECTION B
1 : 75

+1.00 CD
80t BOLLARD

ELEVATION
1 : 250

PLAN
1 : 250

EXISTING CHEMICAL BERTH 209
TRELLEBORG FENDER
80t BOLLARD
CHART DATUM (CD)
20000
18500
1 2 3 4 5 6 7 8 9 10 11 12 13 14

ACCESS ROAD
SERVITUDE
RAMP
MONITOR TOWER
HANDRAILING
15m LIGHT POLES
CATWALK
FOAM MONITOR PLATFORM
5m LIGHT POLES
EXISTING BERTH 209
17710
5058O
3685O
18100
1400
12820
17215
2405
143280
37080
900
17686S
8100
8750
21800
2200

SECTION D
1 : 30

TOP OF DECK

SECTION C
1 : 30

2030
1700
330
1000
1800
1820
1865

NATIONAL PORTS AUTHORITY

PORT RICHARDS BAY

CONSTRUCTION OF BULK LIQUID BERTH 208

Rev 01

04 April 2005

Revision	Date	Author	Checked	Status	
01	04 April 2005	H d W	GC	Comment	
Keywords: Design, Geometry, Loading,, Alternatives					

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EXECUTIVE SUMMARY

The import and export of bulk liquids via the Island View Storage tank farm (IVS) as well as the import of bunker fuel destined for the Richards Bay Bunker Terminal (RBBT) currently takes place over the sole bulk liquid handling berth in the port, being berth 209. Apart from the growing volume of the bulk liquid product handled, the existence of a single berth represents a high risk to the bulk liquid operation in terms of the consequences of damage to this structure.

Protekon Design was appointed by the National Ports Authority (NPA) in May 2004 to carry out a geotechnical investigation of the site abutting berth 209 on the east, and to carry out a preliminary design based on the results of this investigation. The Geotechnical Investigation was duly carried out over a six-month period from June to November 2004. Laboratory testing of the soil samples recovered was undertaken during December 2004 and January 2005. Based on this report, various design alternatives have been considered during the month of March 2005, the results of which are presented in this report.

The requirement is for a berthing facility which will duplicate that of the bulk liquid facilities existing at berth 209. In addition, it is required that an extension to the berthing facility be provided for the accommodation of the two existing bunker barges in a way which will not impact on the occupancy of the bulk liquid berths.

The design ship is characterized as follows:

Deadweight Tonnage (DWT)	:	50 000
Displacement (t)	:	66 000
Length Overall (m)	:	250
Beam (m)	:	32
Draft (m)	:	13

The bunker vessels have a shallow draft and an overall length of 75m.

The results of the geotechnical investigation have been used for the evaluation of alternative berth types. A variety of gravity type structures have been evaluated, along with a number of piled structures. As the site is characterized by very poor founding conditions, arising from the presence of a deep paleochannel across the site, the use of any type of gravity structure is ruled out on technical grounds. Piled foundations are a viable alternative. Because of the great depth of piling required, optimization of the design requires that the number of piles be minimized. This can be achieved at the expense of a more costly superstructure. A deck span module of the order of 25m in length is found to yield the most economical structure.

The site is an environmentally sensitive one. Accordingly, the proposed layout is such that there will be minimal disruption to the environment during both construction and operation of the facility.

PORT OF RICHARDS BAY

CONSTRUCTION OF BULK LIQUID BERTH 208

MARCH 2005

CONTENTS

1. INTRODUCTION

The import and export of bulk liquids via the Island View Storage tank farm (IVS) as well as the import of bunker fuel destined for the Richards Bay Bunker Terminal (RBBT) currently takes place over the sole bulk liquid handling berth in the port, being berth 209. The berth is also used for the berthing of the two bunker barges, utilised for servicing vessels in the port.

Apart from the growing volume of the bulk liquid product handled, the existence of a single berth represents a high risk to the bulk liquid operation in terms of the consequences of damage to this structure. The structure comprises a reinforced concrete deck on piles. This type of structure is susceptible to severe damage by ship impact. Typically, the bulbous bows of vessels are able to penetrate beneath the deck and damage or destroy the supporting piles. This has already occurred on at least two occasions. Fortuitously, the structure has remained standing on both occasions and it has been possible to repair the structure with only modest disruption to operations. Combined with other risks, such as damage by fire, the current situation is not tenable from an operating and risk perspective.

Protekon Design was appointed by the National Ports Authority (NPA) in May 2004 to carry out a geotechnical investigation of the site abutting berth 209 on the east, and to carry out a preliminary design based on the results of this investigation.

The Geotechnical Investigation was duly carried out over a six-month period from June to November 2004. Laboratory testing of the soil samples recovered was undertaken during December 2004 and January 2005. Based on this report, various design alternatives have been considered during the month of March 2005, the results of which are presented in this report.

2. DESIGN OPTIONS

2.1 Introduction

The choice of structure type that will best fulfill the functional requirements for the berth is typically influenced by:

- site conditions : environmental, geotechnical etc.
- methods of construction : available expertise and plant
- available construction materials
- programme requirements

In the case of berth 208, the geotechnical and environmental considerations have dominated the berth design process.

Two generic types of structure have been considered:

- gravity structures
- piled structures

2.2 Gravity Structures

A number of gravity type structures have been investigated.

- A dolphin structure utilizing isolated caissons for the berthing and mooring dolphins is a possibility. Apart from the high costs of this type of structure, the founding conditions are not conducive to this solution.
- An anchored sheet pile wall has been evaluated but is ruled out on environmental grounds as it will adversely affect the heritage site shoreline. This type of structure also has technical drawbacks in terms of settlements and cost.
- Alternative gravity structures such as block walls and counterfort units, which require good founding conditions, have not been evaluated as they are ruled out in terms of the poor soil profile.

2.3 Piled Structures

Owing to the poor soil profile, the only viable type of structure is one founded on piles. In this regard, these are a number of options. Of overriding importance is the depth and type of pile which can be successfully installed.

On the basis of the geotechnical investigation, the possibility of end bearing piles founded in bedrock is ruled out due to the excessive depths to bedrock, in the order of 70m to 80m below chart datum. Although there is no continuous founding horizon which is suitable for founding piles above bedrock, there are lenses of medium dense to dense sands which will allow for founding most of the piles at depths in the order of 40 to 50m below chart datum. These relatively deep founding levels have a bearing on the type of piles and on the type of structure adopted.

The use of isolated mooring and breasting dolphins is not very cost effective in the case of deep piling. In the current situation, where access is in any event required to the bunker berth, it is possible to use the deck as a structural plate for the distribution of mooring forces on the northern dolphins. On the south side, the outermost dolphin is shared with the existing berth 209 north dolphin. The mooring forces on the other two bollards on this side will be resisted

by frame action in which the loads are transferred by beams to the deck rather than to dolphin piles. A single pile will then be required for the vertical load component only.

This is the selected solution, further detail of which is given in the Design Premise.

3. DESIGN PREMISE

3.1 Berth Function and Design Ship

The requirement is for a berthing facility which will allow for a duplication of the bulk liquid facilities existing at berth 209. In addition, it is required to provide an extension to the berthing facility for the accommodation of the bunker barges in a way which will not impact on the occupancy of the bulk liquid berths.

The design ship is characterized as follows:

Deadweight Tonnage (DWT)	:	50 000
Displacement (t)	:	66 000
Length Overall (m)	:	250
Beam (m)	:	32
Draft (m)	:	13

The bunker vessels have a shallow draft and an overall length of 75m.

3.2 Environmental Considerations

The site is located off the north shore of the natural heritage site, which is located adjacent to the entrance channel of the port. As such, the berth is to be developed in such a way that the impact on the heritage site is absolutely minimized. This has been taken into consideration in the evaluation of alternatives, dealt with in paragraph 2. A suggestion for minimizing the impact of the berth on the shoreline has been to avoid any form of alteration to the existing slope, including the construction of slope protection. This possibility has been investigated and is considered to be viable. Apart from reducing construction costs, the omission of slope protection will result in the minimum disturbance to the existing ecology. The proposed design is accordingly based on this approach.

3.3 Founding Conditions

The subsoil conditions in the port are characterized by a number of very deep submerged paleochannels which have developed in prehistoric regressions of the sea level, only to fill up with silts and clays in subsequent transgressions of the sea level. Most of the existing quay

structures in the port have been founded in areas of relatively shallow cretaceous bedrock, using gravity type structures. The adjacent chemical berth 209 is founded on piles, although the bedrock levels at this location are relatively shallow, varying in depth from 14m to 20m below Chart Datum (CD).

Unfortunately, a paleochannel having a north-south orientation occurs immediately to the east of berth 209. Consequently, the bedrock depths at the site for berth 208 increase rapidly from a depth of 40m below CD at the western end of the site to 75mCD in the central and eastern half of the site. A repetition of the use of end bearing piles founded in bedrock, as used for berth 209, will therefore not be an economically viable option for berth 208. The implications are considered in greater detail hereunder.

3.4 Layout and Geometry

3.4.1 Geometric Layout

The proposed layout of the berth is shown in the General Arrangement drawing BDD059C. The berth and its approach bridge are located in such a way that the heritage site shoreline remains essentially untouched. The approach bridge uses the north-west extremity of the existing retaining wall as an abutment, to which it is aligned at 90°. The approach bridge then swings 35° eastward at a distance of 99m from the abutment, to form the quay deck of the same width as the approach bridge. The quay alignment is deflected by 7° from the existing berth 209. This alignment will allow for potential future berths toward the east to be aligned with berth 208, well clear of the heritage shoreline.

Rather than adopting isolated mooring dolphins on the eastern side of the quay, a reduced width deck structure is extended in this direction to serve the multiple purposes of providing chemical berth mooring points, bunker barge berths, and access to the bunker berths. The advantages of this layout are as follows:

- Resistance of the mooring forces on the east side of the berth is more economically provided by the bridge structure than by dolphins as only the transverse component of the mooring force must be resisted by the pile bents, the longitudinal component being resisted by the bridge deck.

- The bridge deck is in any event required for access to the bunker berths. By providing a deck width of 7m, it is possible to gain vehicular access to the bunker berths. This is considered important for safety reasons. This will also constitute the vehicular access to any future berth(s) constructed east of berth 208.

- The bunker berths are based on the same structure as the approach bridge/dolphin mooring structure. Whilst this structure is over designed for the forces applied by the bunker barges, it is considered important to provide the required structural capacity for future use as "dolphin" mooring in the event of another berth being constructed east of berth 208.

One problem associated with the bunker berths is that of deck level. The +4,5m CD elevation of the chemical berth deck, and access to the bridge deck , is too high for safe bunker crew access. The ideal elevation in this respect is considered to be +3,0m CD, which is above the level of normal wave action, but low enough for safe crew access. The proposed method of achieving this is to provide a 1,2m walkway at this level, which is 1,5m below deck level.

A second problem associated with the bunker berths is that of fendering. The fendering for the barges must necessarily be at a significantly lower elevation than that for the chemical berth. The proposal in this regard is to provide continuous fender panels between an elevation of +1m CD and + 3m CD. Fenders will be of the arch type, fixed vertically, and extending from +1,5m CD to +2,8m CD, which should provide coverage for the barges over their draft ranges.

A third problem is that of how to deliver the bunker oil pipes to the berth without hampering vehicular traffic. The proposal in this respect is to take the bunker pipes through the chemical berth deck in bay 5, dogleg the pipes beneath the deck, and run them at a convenient height above the bunker berth walkway.

A services reserve of 10m is proposed for the various piped liquids. This reserve is located on the waterside of the structure, with a 7m road reserve located on the landside. The services reserve is carried through to bay 5, where it ends. The oil bunker pipes dip through the deck at bay 5, leaving bay 4 and a portion of bay 5 clear as a 16m diameter turning circle. As there is no turning circle at the bunker berths, vehicular access is by backing up from the turning circle.

3.4.2 Piling Layout

Because of the poor founding conditions relative to the existing chemical berth, the relationship between the cost of substructure (piling) and superstructure (deck) is different so that of the existing structure. As the unit cost of piling is much higher at this site owing to the greater piling depth, it is necessary to reduce the number of piles and increase the deck spans. Compared with 155 piles in the existing berth, it is proposed to reduce the number of piles to 51 piles in the new structure. The pile grid spacing will be altered from essentially 8m x 6m

in the existing structure to 5m x 25m in the new structure. The longer spans will be decked using prestressed concrete beams.

Notwithstanding the reduction in the number of piles, it is considered prohibitively costly to take piling down to bedrock. Moreover, the geotechnical investigation has revealed the presence of a boulder layer at the invert level of the paleochannel, which would render piling through this layer all but impossible at this depth. It is accordingly proposed to utilize combined friction and end bearing in medium dense to dense sand lenses occurring at depths of 40m to 50m below chart datum. Bottom driven tubular steel piles are envisaged, the detail of which will be determined in the detailed design stage. As a majority of the piles need to be raked, the option of underreaming is not considered viable. Alternative methods of increasing the end bearing will be investigated.

3.5 **Loading**

3.5.1 Mooring

Bow, stern and breasting mooring points will be provided, 3 per end at 25m centers, located approximately 10m behind the cope line in the east and 14m behind the cope line in the west. Six spring line moorings will be provided at 25m centres along the cope. Standard 80t NPA type bollards will be used.

3.5.2 Berthing

Fenders are provided at 25m intervals along the cope over a distance of 125m i.e. 6 fenders. It is proposed to use 3m diameter earth-mover tyres, bolted directly to the wall. Bolting is preferred to chain suspension for durability reasons, and also to avoid the possibility of spark generation in the suspension components.

The fender cope face will be set forward of the general cope line by 2,5m. The reasons for this are twofold:

- The set-back of 3m of the piles from the fender cope is a significant improvement over the current 1,9m in terms of reducing the chance of damage from a bulbous bow. The tyre fender depth of 1m yields an effective offset of 4m. Whilst this is still within the reach of a bulbous bow, the greater pile spacing of 25m should effectively reduce the chance of pile damage by approximately two thirds over that for the current 8m pile bent spacing. The consequences of losing a single cope pile will be more serious, and this is addressed in the detailed design. The raking piles will be set back much further than in the current berth: 13m for the transverse rakers (vs. 7,7m

in the existing structure) and 15m for the longitudinal rakers (vs. 4,2m in the existing structure). It is noted that some of the longitudinal rakers in the existing structure have been severely damaged by bulbous bow impact.

- As the usual restraint to cope set back arising from crane beam reach is not a factor in this instance, the additional standoff distance should not prove to be a problem. The only potential issue is that of the gangway landing position. In this regard, bays 4 and 5 will be clear of services and presumably adequate for the landing of the gangways.

3.5.3 Live Loads

As the decks will not be subjected to goods handling and heavy stack loading, but will nevertheless be required to carry vehicular loading , including potentially heavy vehicle loading, the proposed design loading intensity is 10 kPa over the entire deck. To allow for the possibility of a mobile crane having to operate on the deck, allowance will be made for an outrigger load of 80t on an area of 1m x 1m.

3.6 **Services**

It is proposed that fire monitors, similar to those recently fitted to the existing berth, be provided on the new berth. As bunkering will be by bunker barge, no bunkering facilities will be provided. Fresh water supply can be provided if required. All services will be located on top of the deck in the servitude, with the exception of that portion of the oil bunker pipe which will be routed below the deck.

3.7 **Safety**

Safety aspects, some of which have been dealt with hereabove, include the following:

- Structural integrity : berthing impact. Preventive measures include the setting back of the piles and a reduction in the number of pile bents to minimize the chance of bulbous bow impact. Measures to mitigate the damage resulting from the loss of a cope pile will be investigated during the detailed design phase.
- Fendering will be attached in a manner which will eliminate the possibility of sparks being generated.
- Vehicular access will be provided to all berths.
- The southernmost dolphin of the new berth will be connected to the northernmost dolphin of the old berth via a footbridge to provide an alternative escape route to the bridge from the new berth.

3.8 **Durability**

The structure will be designed for compliance with "very severe" corrosion conditions. Tubular steel pile casings will be considered sacrificial and the piles will be reinforced for the condition of complete loss of the casings by corrosion. Prestressed concrete beams will be treated with silane to enhance their durability.

4. COST ESTIMATE

A summary cost estimate, excluding the costs incurred to date (e.g. geotechnical investigation), escalation and financing costs, is as follows:

Engineering : Investigations,Design etc.	:	R 12 000 000
Preliminary and General costs	:	R 20 000 000
Piling	:	R 31 000 000
Superstructure	:	R 25 000 000
Fittings	:	R 7 000 000
Contingencies	:	R 15 000 000
TOTAL	:	**R110 000 000**

It should be noted that no allowance is included for dredging or slope protection. In terms of available bathymetric survey information, the water depth at the berth is sufficient for the design ship. The omission of any form of slope protection is in accordance with the comments made under environmental aspects. These omissions lead to substantial cost savings to the project.

5. SUMMARY AND RECOMMENDATIONS

The geotechnical investigations have revealed the extent of the paleochannel underlying the site of the berth. The founding conditions require the use of deep piled foundations. Because of the high cost of piling, the overall cost of the structure is optimized by using the minimum number of piles and by increasing deck span lengths accordingly.

The proposed layout results in an economical structure which will meet the environmental constraints to the greatest degree possible by restricting construction mainly to offshore work, except for the abutment and first one or two pile bents.

H de Wet 2005-04-04 Attachment: BDD059C: General Arrangement Drawing

Bridge & Marine

Discipline's involvement

Port of Richards Bay: New Chemical Berth 208

Bridge & Marine

Discipline's involvement

- Piling and Pile Caps
- Superstructure
    - Precast Elements
    - Insitu Deck

Bridge & Marine

Design criteria

- **Design ship characteristics**
  - Deadweight tonnage (DWT) 50 000
  - Displacement (t) 66 000
  - Length overall (m) 250
  - Beam (m) 32
  - Draft (m) 13
- **Alternative ships**
  - Two bunker barges each 75m in length

Design criteria and assumptions

- Vessel Loading
  - Mooring

    Bow, stern and breasting, 3 per end at 20m centres, ± 10m behind cope

    Six spring line moorings at 20m centres along cope
  - Berthing

    Eight fenders at 20m intervals along cope over ± 140m

    Set forward of the cope to prevent pile damage

Bridge & Marine

Design criteria and assumptions

- Live Loading
  - Vehicular loads - 10kPa over entire area
  - Crane outrigger load of 80t on 1m x 1m area

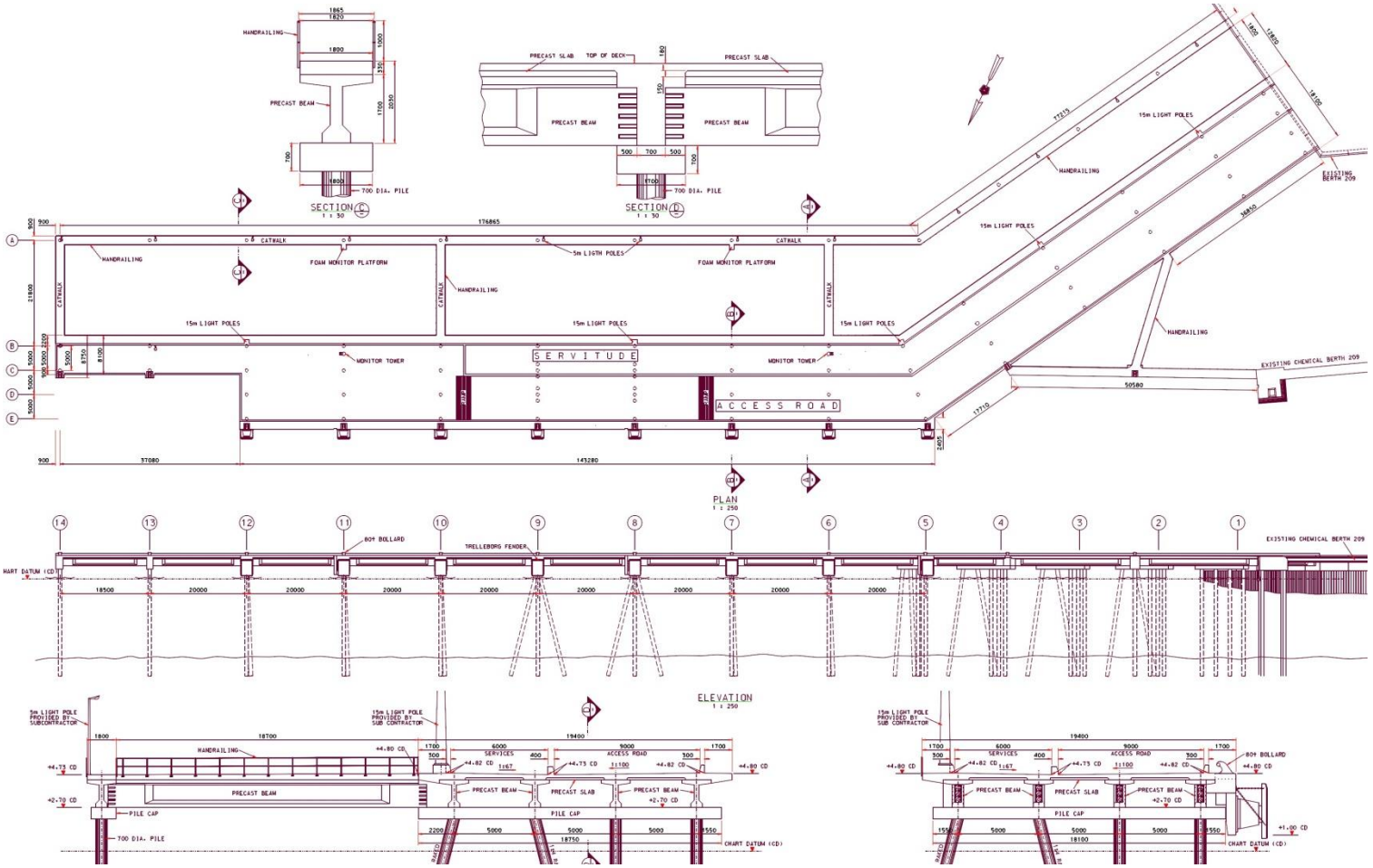
- Geometric requirements
  - Link to existing Berth 209
  - Link to possible future chemical berths
  - Have minimum effect on shoreline

Bridge & Marine

Possible structures considered

- Gravity Structures
  - Dolphin structure with caissons
  - Anchored sheetpile wall
  - Block or counterfort wall structure
- Piled Structure
  - Due to poor soil conditions the only viable solution

Bridge & Marine



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Piling load transfer considerations

- End bearing piles – bedrock too deep at 70 - 80m
- Friction piles – mostly sand, friction not very high
- Combination of the above – most suitable

Piles used

- Tubular steel driven piles with sacrificial casings
- Full load to be carried by reinforced concrete inside casing
- 73 dia. 700 and 5 dia. 800 piles
- Some piles raking to carry lateral loads
- Installation by vibration followed by top driving

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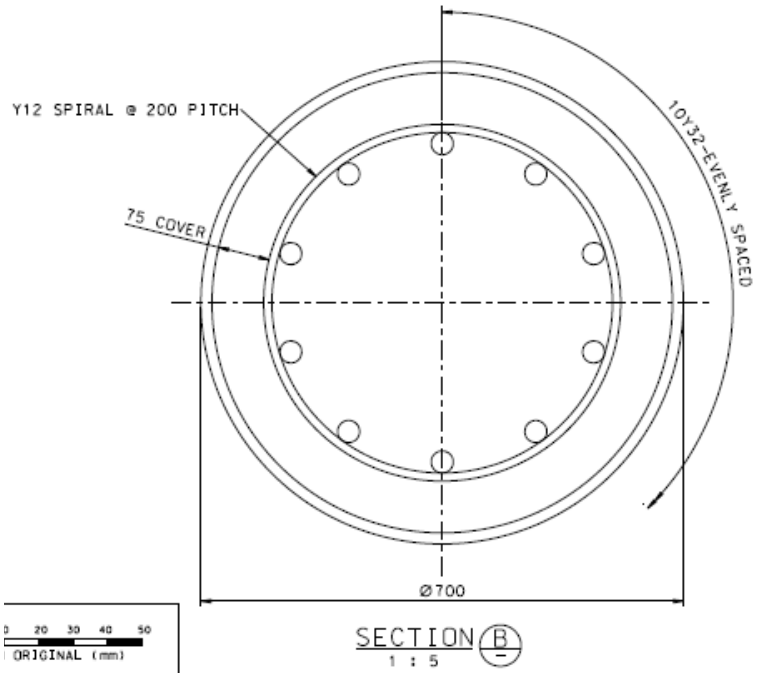

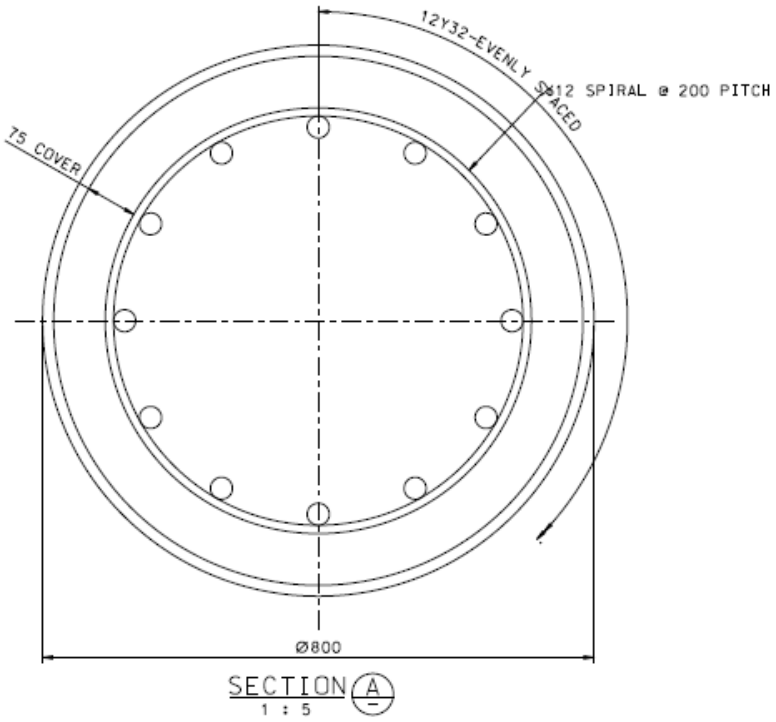

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Port of Richards Bay: New Chemical Berth 208

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Port of Richards Bay: New Chemical Berth 208

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Deck Structure

- Precast Elements
  - Beams
  - Slab panels
  - Fender panels
- Insitu reinforced concrete
  - Pile caps
  - Beam connections
  - Deck
  - Upstand walls
  - Foam monitor towers

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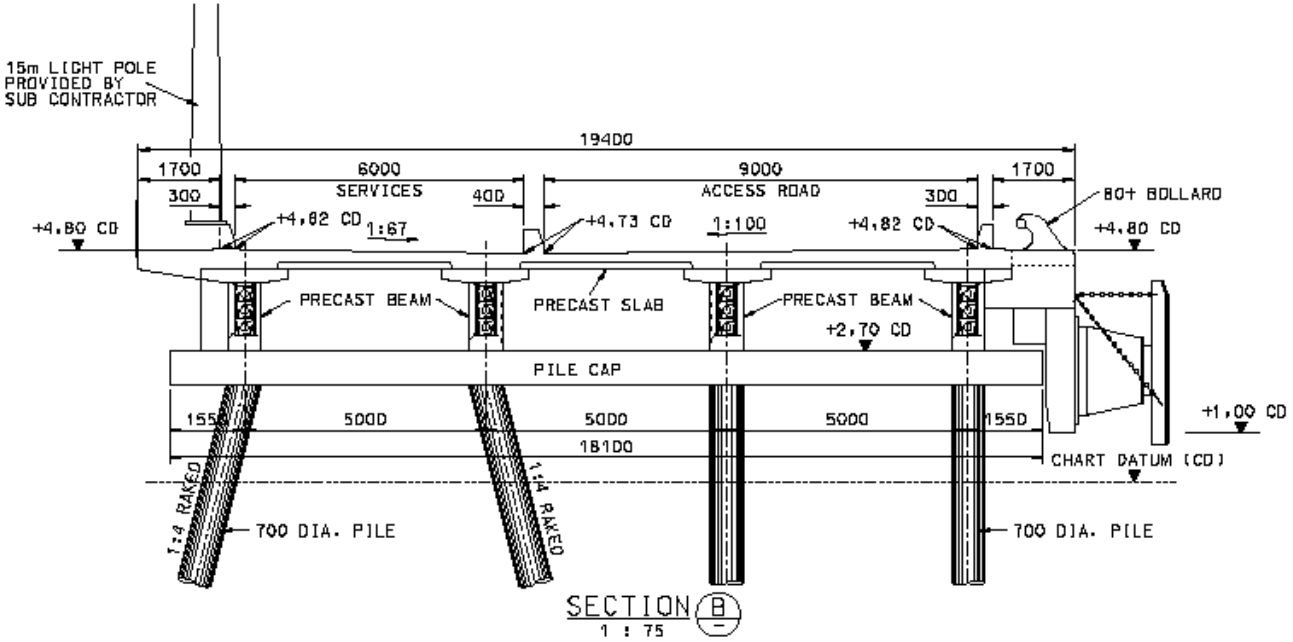

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Port of Richards Bay: New Chemical Berth 208

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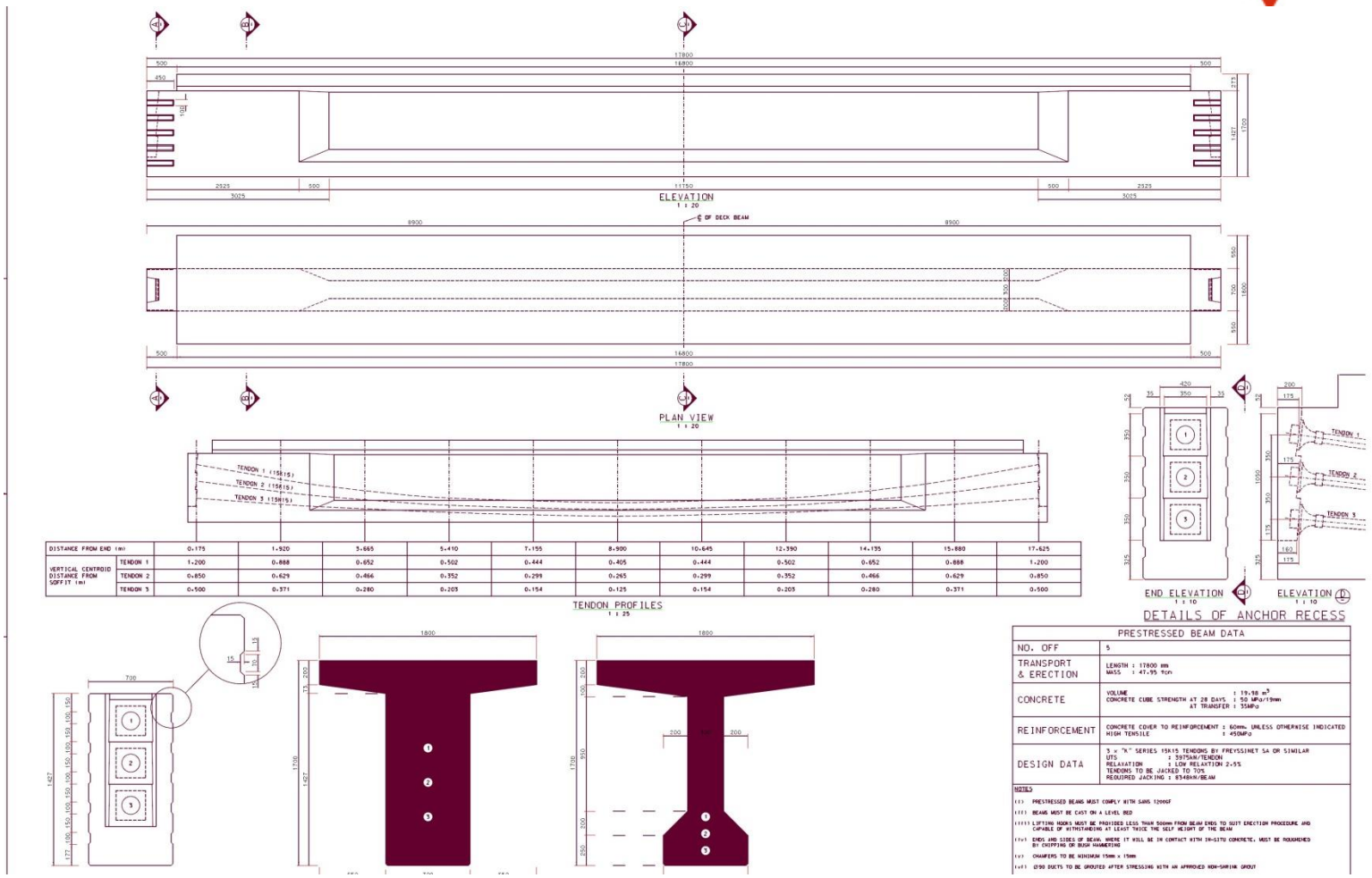

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Port of Richards Bay: New Chemical Berth 208

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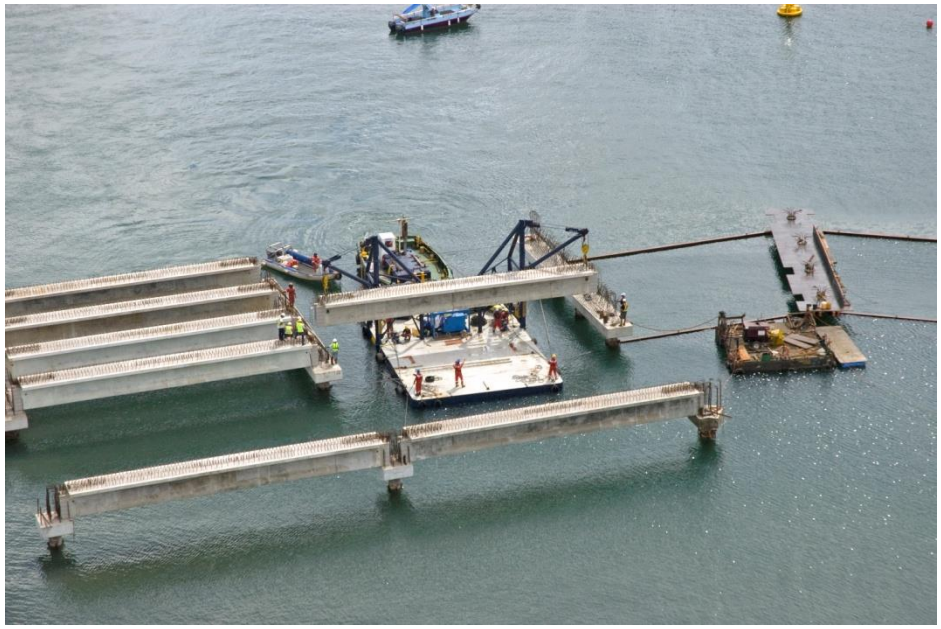

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Problems encountered and solutions

- Contractor's Problems
  - Pile testing
  - Cracks in precast slab units
  - Placing of precast beams during construction
  - Access to place beams after last pile in position
  - Swells caused by passing vessels – especially tugs
  - Cracks in walkway slab

- Design Problems
  - Cracks in some cantilever portions of the main deck
  - Cracks in upstand walls

Pile testing

- CAPWAP (Case Pile Wave Analysis Program) method of analysis
  - Safety Factor for working Load
  - Estimated settlement at 1 and 1.5 times design load
- Results
  - FOS of 1.82 compared to 2.00
  - Predicted settlements within prescribed 15 and 18mm respectively
  - 58% of load carried in end bearing

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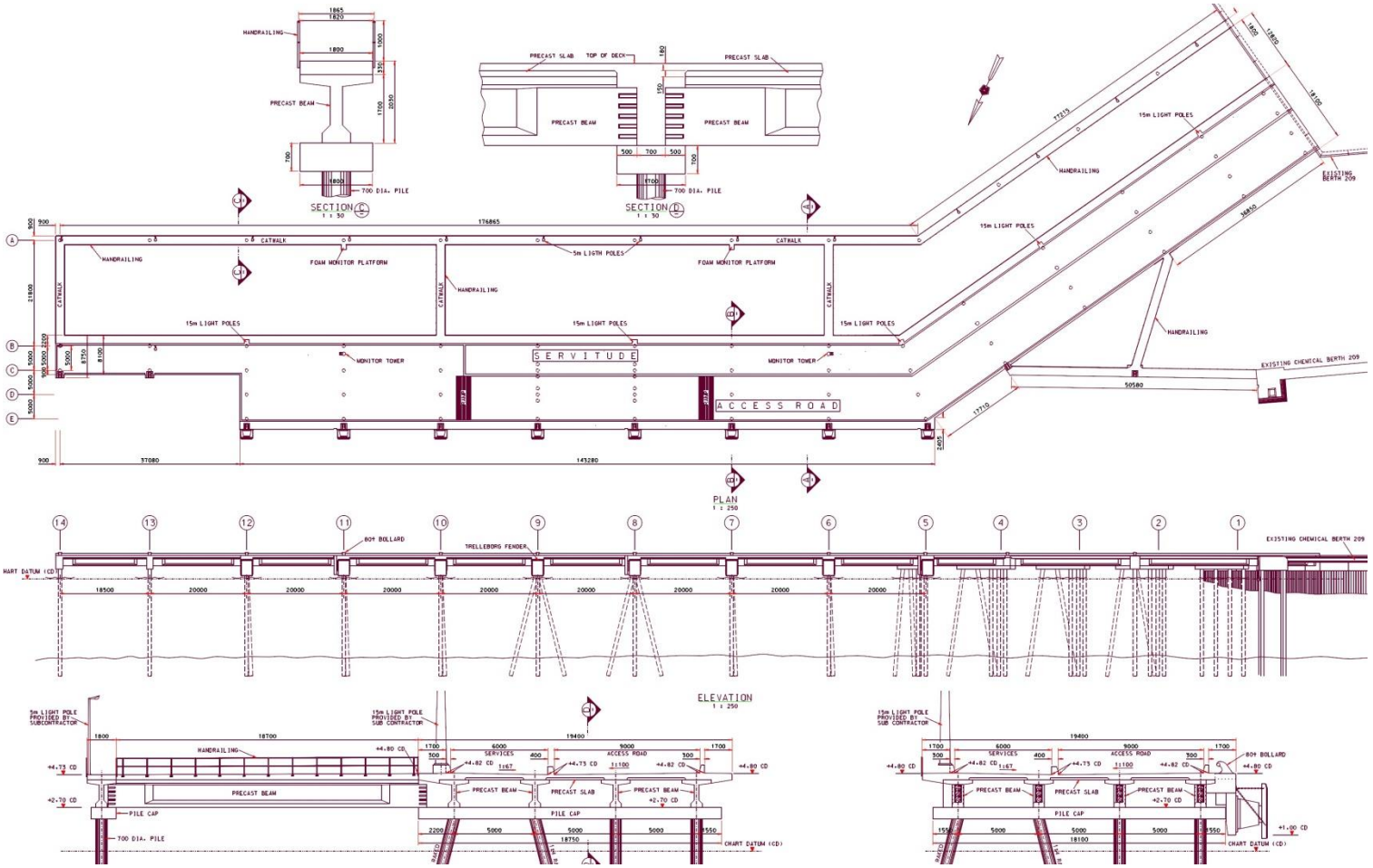

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Port of Richards Bay: New Chemical Berth 208

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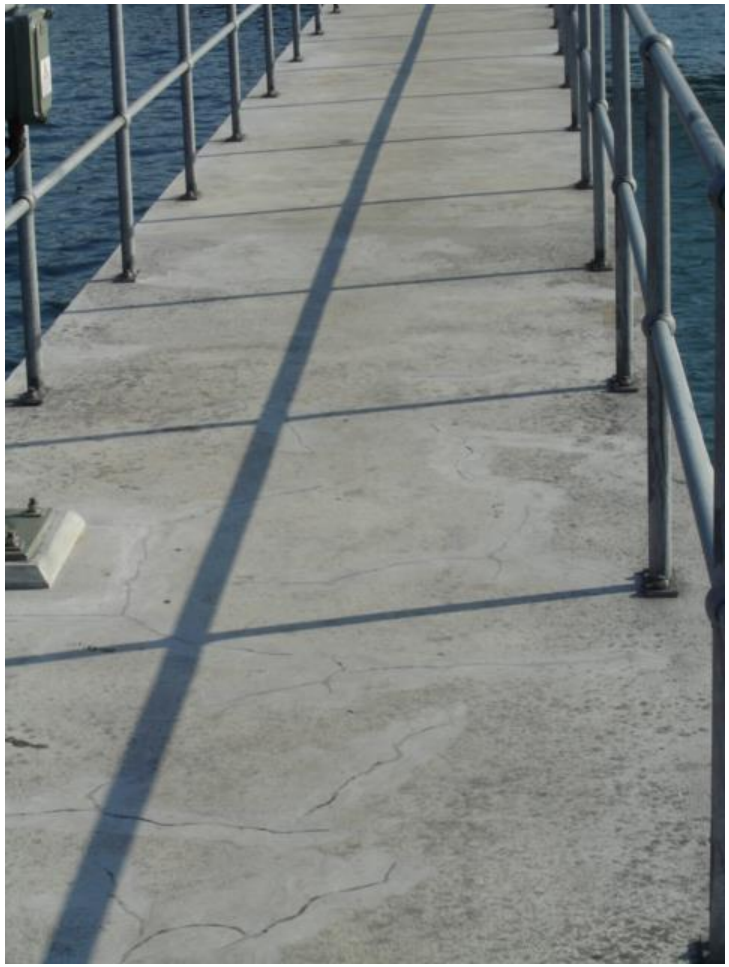

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Port of Richards Bay: New Chemical Berth 208

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Lessons learnt

- Do not specify beam weight on construction drawings
- Ensure that prestressing sleeves can fit between the reinforcing
- Have sufficient construction joints in smaller elements i.e. bund walls
- Get Contractor to cast adjoining concrete elements at the same time

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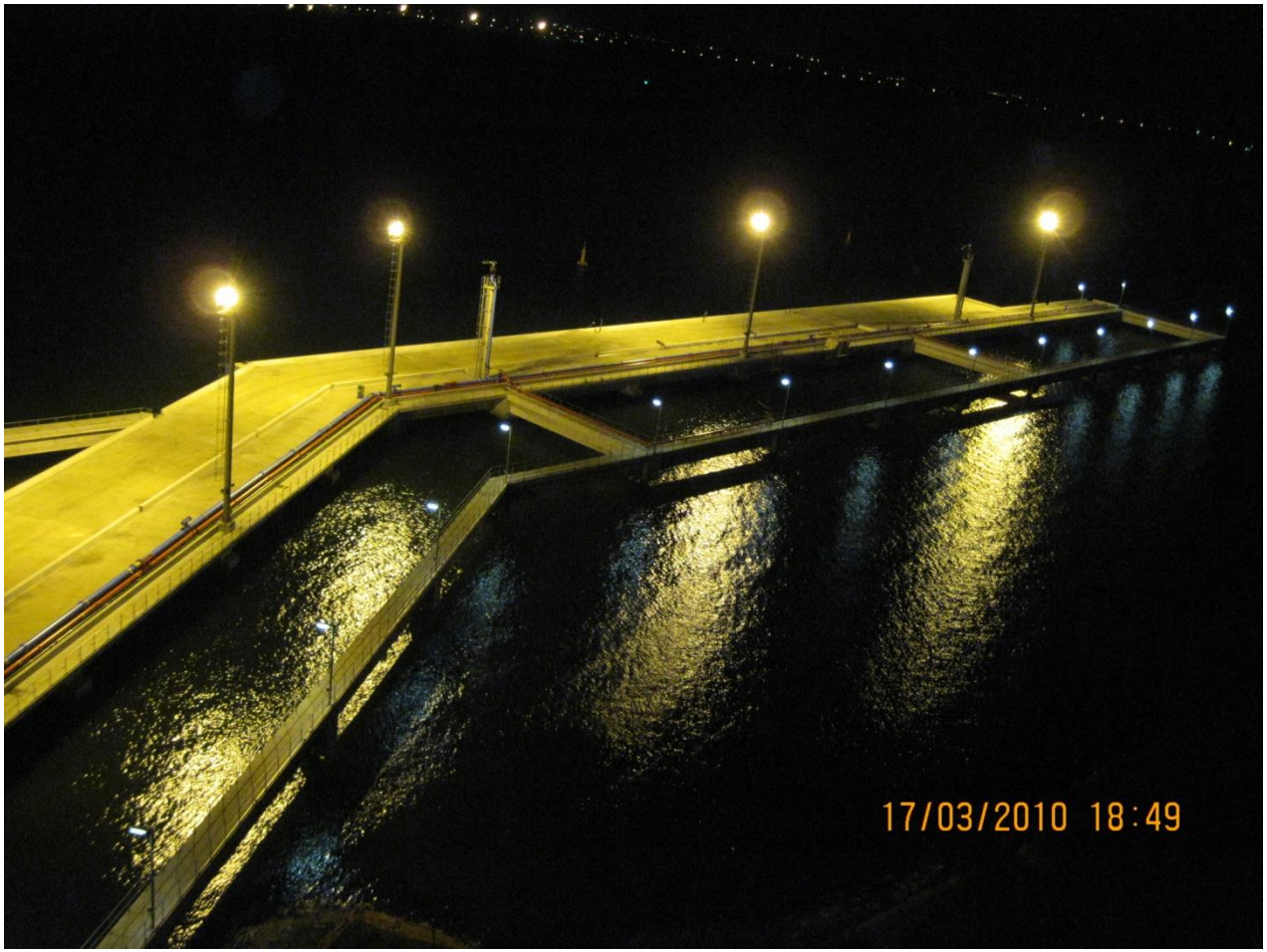

Port of Richards Bay: New Chemical Berth 208

REPORT

Note: In all cases check against online version for the latest revision prior to use

KINDLY IGNORE ANY REFERENCES TO TIME FRAMES

PRE-FEASIBILITY STUDY REPORT

For: Port of Richards Bay

Project Name: Richards Bay LNG Terminal Bulk Services Study
Project Number: TBA

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Preston Khomo Date

PREFACE

This pre-Feasibility Study (PFS) is a precursor to a Feasibility Study (FS). The purpose of this document is to document the scope, procedure and outcomes of FEL-2 in a clear and consistent manner, in order to facilitate the quick and accurate review and evaluation of those outcomes. It also provides a detailed summary of the process and various actions taken for record purposes.

This pre-feasibility study is intended to investigate a range of options for any required upgrades to the bulk services and, after evaluating each option, to report and document the preferred option(s).

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EXECUTIVE SUMMARY

i. Introduction

As part of the Independent Power Producer (IPP) Procurement Programme, a gas to power (G2P) project has been launched by the South African Department of Energy (DoE) to address the electricity supply shortages in South Africa. The aim of the project is to develop and operate Liquefied Natural Gas (LNG) fired power stations at key locations in South Africa.

The pre-feasibility study for the Port of Richards Bay identified two preferred sites for the location of the LNG import facility and it was subsequently decided that Berth 207 should be adopted as the single preferred site. PRDW were subsequently appointed by TNPA to complete a pre-feasibility study for the supply of the required bulk services to the Phase 1 development of the LNG import facility which consists of a floating storage and regasification solution.

ii. Study Methodology

The main items of the pre-feasibility study methodology can be summarised as follows:

- Assess bulk services requirements for proposed LNG facility
- Assess existing bulk services systems
- Options assessment and multi-criteria assessment
- Pre-feasibility design of the bulk services infrastructure upgrades

iii. Options Identified and Preferred Option

Two options were identified for the required upgrades to the fire-fighting, electrical supply and potable water bulk services. No upgrades are required to the sewage and stormwater systems. The preferred options for the required upgrades are:

- Fire-fighting: Deluge system supplied from a new seawater pump station and a new foam pump station on shore adjacent to existing pump station.
- Electrical supply: Small power requirements and general lighting to the berth supplied directly from Berth 209 Substation at 400 V. The pumps will be supplied directly from the Berth 209 substation.
- Potable water supply: Install a second supply line from the M14 "Chemical Berth" take off.

iv. Risks

A preliminary project-wide risk register was developed to identify risks which may impact on the implementation or feasibility of the project. A total of 17 potential risks were identified.

A Hazard and Operability (HAZOP) Study was completed which identified a total of 13 hazards, 2 of them being classified as 'High' risk. Specific actions have been assigned to the FEL3 Designer, Terminal Operator and Port Engineer to mitigate these risks during future design phases and during operation.

v. Recommendations

The following recommendations are drawn from this study:

- The FEL3 phase should only proceed once there is certainty over the Gas-to-Power Programme and preferably once the Terminal Operator, responsible for the design and build of the LNG import facility, is appointed so that the specific Terminal Operator requirements can be accommodated.
- The feasibility of connecting the new fire-fighting supply system to the existing fire-fighting system be investigated to provide redundancy to the fire-fighting systems for Berth 207, 208 and 209.
- Opportunities for efficiently managing maintenance costs are to be specifically addressed in the FEL3 engineering stage.
- The emergency response time, and the possibility of developing a satellite fire station within the South Dunes Precinct, should be assessed during the Terminal Operator's detail design phase for the facility to ensure compliance with the requirements of SANS 10090.

1. INTRODUCTION

1.1. Background

As part of the Independent Power Producer (IPP) Procurement Programme, a gas to power (G2P) project has been launched by the South African Department of Energy (DoE) to address the electricity supply shortages in South Africa. The aim of the project is to develop and operate Liquefied Natural Gas (LNG) fired power stations at key locations in South Africa.

The DoE, in collaboration with Transnet SOC Ltd, and specifically its operating division Transnet National Ports Authority (TNPA), has undertaken a Pre-feasibility (FEL2) Study for LNG import projects at the Ports of Richards Bay, Ngqura and Saldanha Bay. The provision of bulk services was excluded from the FEL2 stage of the IPP project as this work was identified as being the direct responsibility of TNPA.

The pre-feasibility study for the Port of Richards Bay identified two preferred sites for the location of the LNG import facility, namely Berth 207 and the dig-out basin in the South Dunes area. The pre-feasibility study presented two distinct phases for the development of the LNG import facility – Phase 1 which consists of a floating storage and regasification solution and Phase 2 which consist of a land-based storage and regasification solution.

At the close-out workshop, held in the Port of Richards Bay on 20 September 2016, it was agreed that Berth 207 should be adopted as the single preferred site. PRDW were subsequently appointed by TNPA to complete a pre-feasibility study for the supply of the required bulk services to the Phase 1 facility at Berth 207.

1.2. Location of Project

The site for the proposed facility is located at the site identified in the Transnet Port Development Framework Plan (Transnet, 2015) for the development of Berth 207, adjacent to Berth 208. The proposed location and layout of the Phase 1 LNG import facility is illustrated in Figure 1-1 below.

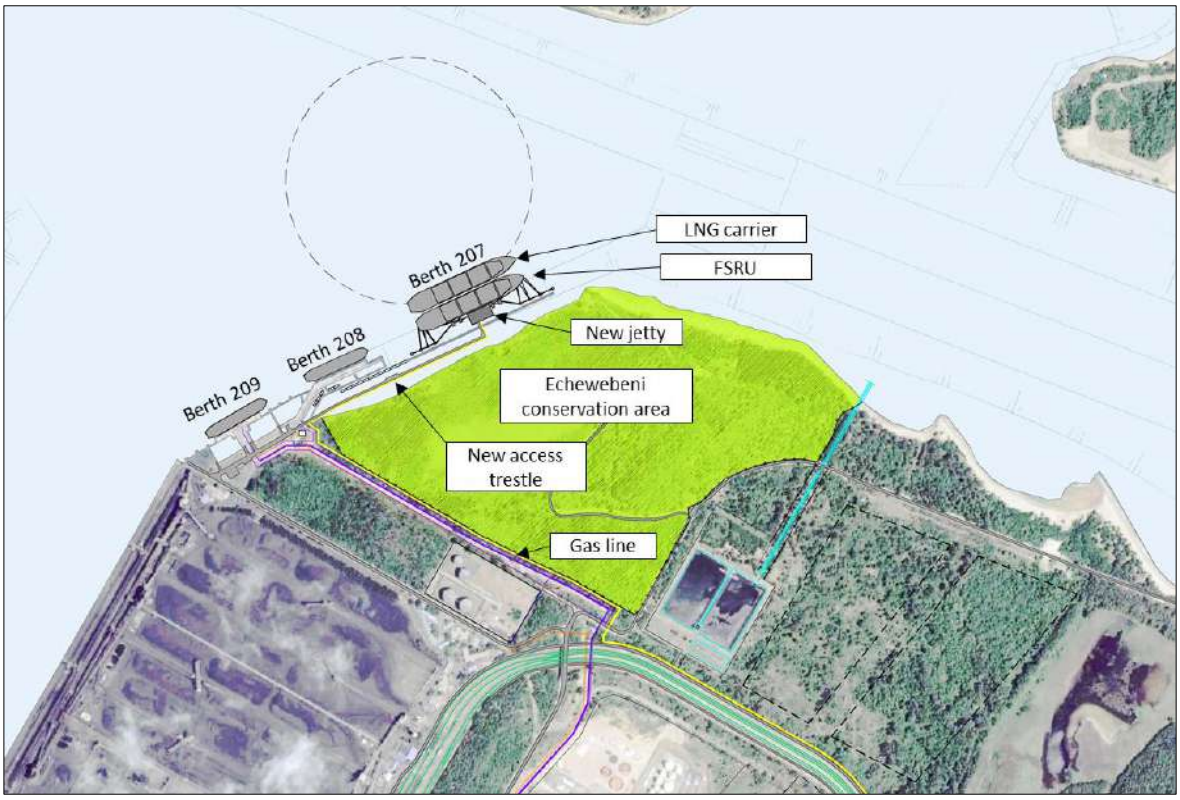

Figure 1-1: Location of the proposed LNG import facility

1.3. Pre-feasibility Study Scope of Work

The scope of work for this pre-feasibility study (FEL2) comprises an assessment of the bulk services requirements for the proposed LNG facility and the identification and assessment of options for upgrading the bulk services infrastructure where required. A multi-criteria analysis (MCA) was used to select the preferred options which will then be carried forward to the FEL3 phase.

A high-level summary of the scope of works required for this FEL2 study is as follows:

- Study coordination
- Assess bulk services requirements for proposed LNG facility
- Assess existing bulk services systems
  - Collate and review available (existing and planned) services information
  - Identify capacity constraints
  - Review impact of proposed LNG facility on the existing infrastructure
- Options assessment
  - Identify options for upgrading capacity (if applicable)
  - Complete high-level MCA to select preferred option
- Design bulk services infrastructure upgrades for preferred option
  - FEL2 design of required upgrades
  - Drawing development

- High-level environmental assessment
- Reporting
- Attend Gate Review

1.4. Pre-feasibility Study Participants

PRDW's key members on the project team were as follows:

Resource	Project Role	Position
Sahil Patel	Project Director	Director
Darren Cloete	Project Leader	Senior Engineer
Kenneth Pedersen	Bulk Services Technical Lead	Technical Director
Ryan Abrey	Bulk Services Engineer	Engineer
Craig Hinde	Quantity Surveyor Lead	Technical Director

1.5. Pre-feasibility Study Methodology

The following methodology was employed to fulfil the scope of works defined in Section 1.3:

- **Assess bulk services requirements for proposed LNG facility**

  For this study, operators of existing LNG import terminals were approached to provide input regarding the typical bulk services requirements for LNG facilities. However, as no responses were received from the operators, the bulk services requirements for the facility were rather based on typical demands identified from literature and previous project experience.

- **Assess existing bulk services systems**

  The capacity of the existing bulk services infrastructure within the South Dunes area was based on the available infrastructure drawings and Master Plans provided by the Port. A site visit was also conducted to assess the condition of the existing infrastructure and to identify any constraints on the existing facilities.

  The projected bulk requirements for the LNG import facility were then compared against the capacities of the existing bulk services infrastructure to identify areas where upgrades to the infrastructure may be required.

- **Options assessment and multi-criteria assessment**

  Multiple options were identified for each of the areas where upgrades to the existing bulk services infrastructure is required. These options were then assessed in in a multi-criteria assessment to objectively assess each option. The criteria for the assessment were weighted based on their importance and overall contribution to the assessment and each option was then scored against the assessment criteria to identify the preferred option.

- **Pre-feasibility design of the bulk services infrastructure upgrades**

  The designs of the preferred option, as identified by the MCA, were developed to a sufficient level of detail to allow for the completion of a level 2 capital cost estimate within the required accuracy levels (-20% to +30%).

- **Environmental assessment**

  SRK Consulting South Africa (Pty) Ltd (SRK) was appointed to undertake a high-level environmental assessment of the proposed bulk services upgrades. The assessment included assessment review of existing relevant literature and previous studies, identification of fatal flaws and key environmental considerations, input into the MCA for the upgrade options, identification of the required specialist studies and potential environmental offsets and scoping of the Environmental Impact Assessment.

The study battery limits extend from the from the site of the proposed LNG facility to the closest connection point into the existing bulk services infrastructure within the South Dunes area.

This study focuses on the additional capacity requirements for the development of the Phase 1 (floating storage and regasification) LNG facility and does not consider the additional requirements the future land-based storage and regasification facility or for any other proposed developments within the South Dunes area.

2. OPTIONS IDENTIFICATION

The requirements for upgrading the bulk services infrastructure, and the associated options for doing so, were determined through an assessment of the existing bulk services infrastructure and the bulk services demand for the proposed LNG facility. This Section of the report summarises the identification of the options while full details of the assessment are presented in the Bulk Services Capacity Assessment, Demand Forecast and Options Identification technical note (PRDW, 2018a), included as Appendix A of this report.

2.1. Bulk Services Requirements

Floating Storage Regasification Unit (FSRU) vessels are typically designed to be self-sufficient such that they can operate both within a port (at a berth) or offshore (berthed at either a single point mooring or a multi-buoy mooring). Additional bulk services may however be required to support complementary infrastructure at the terminal (control tower, loading equipment, lighting, etc.).

As part of this study, multiple FSRU operators were contacted to provide typical bulk services requirements for LNG facilities. Since no feedback was received from the FSRU operators, the bulk services requirements were estimated based on a literature review and previous experience on projects of a similar nature.

2.2. Proposed Upgrade Options for Bulk Services

The following options were identified for the required upgrades to the existing bulk services infrastructure:

Bulk Service	Option 1	Option 2
Firefighting	Deluge system supplied from a new seawater pump station on shore adjacent to existing pump station. Foam supplied by the existing foam pump station.	Deluge system supplied from pumps on the access trestle near the new berth. Foam tanks accommodated along the access trestle.
Electrical Supply*	Small power requirements and general lighting to the berth supplied directly from Berth 209 Substation at 400 V. The sea water pumps will be supplied directly from the Berth 209 substation.	Miniature substation provided at new berth to accommodate sea water pump requirements at 11 kV as well as the small power requirements and lighting at 400 V.
Sewage	No bulk services upgrade required.	
Potable Water	Install a second supply line from the M14 "Chemical Berth" take off.	Construct a booster pump station to provide the pressure required at the proposed LNG berth utilising the existing pipeline.
Storm water	No bulk services upgrade required.	

*depending on fire-fighting requirements.

Table 2-1: Upgrade options summary

3. OPTIONS EVALUATION

A Multi-criteria Assessment (MCA) was completed to select a single preferred option for the required system upgrades for each category of bulk services (fire-fighting, electrical supply and potable water systems). The methodology and outcomes of the assessment are summarised in the following sections while full details of the assessment are presented in the Options Evaluation technical note (PRDW, 2018b), included as Appendix B of this report.

3.1. Evaluation Criteria

The criteria considered in the MCA are described in Table 3-1 below.

Main Criteria	Sub-criteria	Description
Inherent Safety	Safety of personnel	Safety of personnel during construction and operation and the inherent system redundancy.
	Redundancy implications for existing services	
Accessibility	Safe access for operation and maintenance	Ease of access for maintenance and operation of the facility.
Implementation	Availability of skills and materials	Ease of implementation or construction considering both the technical aspects during construction and the interface between the Port and the Private Terminal Operators during construction and operation.
	Speed of construction	
	Risk of delays during construction	
	Interface between port & terminal operators	
Maintainability	Localisation and repairability of damage	Ease of maintaining the infrastructure for the duration of its operational life.
	Special maintenance requirements (e.g. anodes, painting, etc.)	
Value and Cost	Capital cost	Relative quantitative assessment of the envisaged capital and operational costs associated with the facility.
	Operating and maintenance cost	
Environmental	Construction footprint and marine abstraction impacts as applicable	Relative assessment of the envisaged environmental impacts during construction or operation.

Table 3-1: Multi-criteria assessment criteria

For all criteria, other than value and cost, the options were assigned qualitative scores, relevant to the other options being considered, according to the scoring guideline outlined in Table 3-2 below.

Score	Comment
10	Good
5	Average
1	Bad

Table 3-2: Multi-criteria assessment – scoring guideline

The value and cost criteria were assigned quantitative scores, based on the concept-level cost estimates. The quantitative scores were assigned according to the following formula:

$$Assigned\ score = \frac{Minimum\ value\ for\ all\ options}{Value\ for\ the\ option\ considered} \times 10$$

3.2. Criteria Weighting

The options were assessed against base weightings for the MCA criteria after which a sensitivity analysis was also completed to assess the sensitivity of the MCA to the criteria weightings. The criteria weightings for the various scenarios considered in the MCA are presented in Table 3-3 below.

Main Criteria	Base Case	Sensitivity Analysis Weighting Bias						
		Equal	Inherent Safety	Accessibility	Implementation	Maintainability	Value and Cost	Environmental
Inherent Safety	20%	17%	50%	10%	10%	10%	10%	10%
Accessibility	15%	17%	10%	50%	10%	10%	10%	10%
Implementation	10%	16%	10%	10%	50%	10%	10%	10%
Maintainability	10%	16%	10%	10%	10%	50%	10%	10%
Value and Cost	25%	17%	10%	10%	10%	10%	50%	10%
Environmental	20%	17%	10%	10%	10%	10%	10%	50%
TOTAL	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**

Table 3-3: Multi-criteria assessment – criteria weightings

3.3. MCA Results

The outcomes of the MCA, indicating the overall option scores (as a percentage of the maximum possible score) for both the base weighting and sensitivity analysis criteria weightings, are summarised in Table 3-4 below.

Weighting Bias	Fire-fighting		Potable Water	
	Option 1: New pump station adjacent to existing pump station.	*Option 2: New pumps on the access trestle near the proposed berth.*	*Option 1: Second supply pipeline from chemical berth take-off.*	*Option 2: New booster pump station on existing supply line.*
Base Case	91%	64%	77%	68%
Equal	91%	60%	77%	69%
Inherent Safety	94%	56%	77%	62%
Accessibility	94%	56%	67%	62%
Implementation	84%	60%	83%	68%
Maintainability	90%	56%	87%	78%
Value and Cost	86%	76%	87%	66%
Environmental	94%	56%	67%	82%

Table 3-4: Multi-criteria assessment results

For the fire-fighting requirements Option 1 scores consistently higher than Option 2 due to the benefits that will be realised by constructing the pump station adjacent to the existing pump stations. From an environmental perspective, it is also preferable to combine the seawater extraction point with the existing pump station's extraction point.

For the potable water requirements Option 1 scores higher than Option 2 for all criteria except for the environmental criteria primarily due to the simplicity of installing an additional pipeline and the associated safety, implementation, maintenance and cost benefits when compared to installing a booster pump station.

From an environmental perspective, Option 1 scores relatively poorly due to the length of trenching required to install the additional pipeline. It is however noted that the entire area affected by the excavations is already disturbed from its natural state and therefore the potential environmental impacts should be marginal.

As noted in Table 2-1, the selection of the preferred option for the electrical supply to the proposed berth is dependent on the preferred fire-fighting option and therefore no MCA was completed for the electrical supply options.

3.4. Preferred Options

The preferred option for each bulk service upgrade is presented in Table 3-5.

Bulk Service	Preferred Option
Fire-fighting	**Option 1:** Deluge system supplied from a new seawater pump station on shore adjacent to existing pump station. Foam supplied by the existing foam pump station.
Electrical Supply	**Option 1:** Small power requirements and general lighting to the berth supplied directly from Berth 209 Substation at 400 V. The sea water pumps will be supplied directly from the Berth 209 substation.
Sewage	*No bulk services upgrade required.*
Potable Water	**Option 1:** Install a second supply line from the M14 "Chemical Berth" take off.
Storm water	*No bulk services upgrade required.*

Table 3-5: Preferred options

The preferred options were carried through to the preliminary engineering phase to advance the concepts to an FEL2 level of development.

4. PRE-FEASIBILITY DESIGN FOR THE PREFERRED OPTIONS

This section of the report summarises the design outcomes for the bulk services upgrades that are required for the new Berth 207. Full details of the engineering development, as well as the associated drawings, are provided in the Bulk Services Upgrade Design technical note, included as Appendix C of this report.

4.1. Fire-fighting

A seawater pump station and a foam pump station are required to supply the new berth with sea water and foam water. The design of the fire-fighting system was based on the duty flow rates for the existing Berth 208 fire-fighting system.

It is noted that both the Options Identification Report (PRDW, 2018a) and the Options Evaluation Report (PRDW, 2018b) assumed that the additional foam requirements could be accommodated at the existing foam pump station. Further engineering development during this pre-feasibility design phase has indicated that the existing foam pump station cannot accommodate the additional requirements and that a new foam pump station building will be required. The optimum location for this pump station is adjacent to the existing facility as a large holding tank is required.

The requirement for the additional foam pump station building further reinforces the outcome of the options assessment (PRDW, 2018a). The alternative option would involve constructing this foam pump station on the access trestle which is not considered to practical or cost effective.

The new pump stations are to be located near the existing pump stations with the sea water and foam water pipelines routed along the access trestle to Berth 207. Similar to the existing seawater pump installation, it is envisaged that the new firewater pumps will be large vertical turbine multi-stage pumps: one electrically driven duty pump and one diesel driven standby pump. The diesel standby pump will allow for operation should the main electrical supply to the pump station be faulty or when maintenance of the duty pump is in progress. A similar duty/standby pump configuration is required for the smaller foam pump installation.

To address the high maintenance costs associated with the existing Berth 208 fire-fighting pump installation, it is recommended that opportunities for efficiently managing maintenance costs be specifically addressed in the FEL3 engineering stage.

It is noted that the new fire-fighting supply system could possibly be connected to the existing fire-fighting system to also supply Berths 208 and 209, if considered to be a worthwhile additional risk mitigation measure. The technicalities of this possibility have not been assessed in this study but could be addressed in the next engineering stage, if required.

The following berth fire-fighting equipment, based on the existing equipment installed for Berth 208, is envisaged for Berth 207:

- 12 No. Seawater Fire Hydrants;
  - 10 No. Hydrants along the access trestle (1 No. every 50 m);
  - 2 No. Hydrants on the berth platform;
- 2 No. Oscillating Monitors;

- 2 No. Remote Control Monitors;
- 3 No. Bund Pourers; and
- 3 No. Quay Pourers.

4.2. Electrical Supply

The electrical supply requirements are based on a power demand of up to 60 kVA for small quayside power requirements and general lighting at LNG Berth 207. It is envisaged that this power will be provided at 400 volts from the existing Berth 208 substation along a cable installed on cable trays fixed to the underside of the quay structure and typically feeding two distribution kiosks. All small power (including quick release hooks) and lighting requirements for the berth will be supplied from these distribution kiosks.

Power to the sea water and foam pump stations (estimated to be 1 200 kW) will also be provided from the existing Berth 208 substation along an underground cable to the proposed new pump station location adjacent to the existing pump station building.

The following electrical equipment is envisaged for the bulk electrical supply upgrade:

- 27 No. Light Pole with 250 W HPS Fitting;
- 2 No. Light Mast Equipped with 400 W HPS Floodlight; and
- 1 No. Distribution Kiosk.

4.3. Potable Water

The preferred installation of a second uPVC supply pipeline from the M14 "Chemical Berth" take-off to the proposed Berth 207 requires that a new supply line is buried in a trench for approximately 265 m, parallel to the existing supply line, before routing the pipeline an additional 600 m along the new access trestle to the proposed Berth 207.

The following berth potable water fire-fighting equipment, based on the existing equipment provided for Berth 208, is envisaged for Berth 208:

- 12 No. Potable Water Fire Hydrants
  - 10 No. Hydrants along the access trestle (1 No. every 50 m); and
  - 2 No. Hydrants on the berth platform.

5. COST ESTIMATE

5.1. Capital Cost Estimate

5.1.1. Capital Cost Basis

The capital cost estimate for the upgrading the bulk services (fire-fighting, potable water and electrical infrastructure) within the Richards bay Port to provide facilities to the new LNG, have been prepared considering the layouts and basic engineering information presented in this report. Additional considerations include:

- The Estimate Class: The estimate is set at an AACE Class 4 / FEL2 level with an agreed level of accuracy of -20 % to +30 %
- The estimate has been derived using a combination of measured preliminary quantities and corresponding current or escalated unit rates largely based upon PRDW's internal rates database supported by indicative market related pricing information received from specialist contractors and suppliers. Built-up rates and prices have been used where no relevant rates or prices were available.

The estimate is subject to the following assumptions and exclusions:

Assumptions:

- Cost base dated as at January 2018
- Exchange Rate (Dollar) – $ 1.00 : R 12.20
- Exchange Rate (Euro) – 1.00 € : R 14.90

Exclusions:

- Upgrading of the storm water and bulk sewage system
- Purchase/lease of land and/or relocation, restitution costs
- 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
- Environmental, EIA and EMP costs
- Allowance in respect of post contract contingencies (10% recommended)
- Allowance in respect of pre-and post-contract escalation
- Rate of exchange adjustments
- Owners costs and Construction supervision costs
- Value Added Tax or other foreign or South African taxes, royalties and dues

5.1.2. Preliminary and General Cost Allowance

An allowance for the contractor's Preliminary and General (P&G) costs has been included as part of the base capital cost estimate for each cost element. The P&G allowance is dependent on the nature

of the works a P&G allowance of 20% been included as a percentage of the total value of construction work.

5.1.3. Design Development Allowance

A design development allowance of 15%, has been included to cover design and pricing uncertainties due to the level of design information available at this FEL 2 stage of the project. The design development allowance is included in the base capital cost estimate as a percentage of the total value of construction work, including P&G's.

5.1.4. Professional Fee Allowance

In addition to the P&G's and design development allowances, a professional fee allowance of 8% has been included to cover engineering fees.

5.1.5. Capital Cost Summary

The estimated capital costs for the upgrading the LNG Terminal bulk services, subject to the assumptions and exclusions as listed above, as summarised in Table 5-1 below. The detailed capital cost estimate is included as Appendix D of this report.

Description	Fire-fighting Infrastructure	Potable Water Infrastructure	Electrical Infrastructure
Base Capital Cost	R 34 030 000	R 810 000	R 1 920 000
Preliminary and General costs	R 6 800 000	R 160 000	R 390 000
Design Development Allowance	R 6 130 000	R 150 000	R 340 000
Professional Design Fees	R 3 750 000	R 90 000	R 220 000
ESTIMATED CAPITAL COSTS	**R 50 710 000**	**R 1 210 000**	**R 2 870 000**

Table 5-1: Capital cost estimate summary

5.2. Annual Operational Cost Estimate

5.2.1. Operational Cost Basis

The operational cost estimate has been prepared considering the layouts and basic engineering information presented in this report. The basis of the operational cost estimate is as follows:

- The estimate is set at an AACE Class 4 / FEL 2 level with an agreed level of accuracy of -30 % to +50 %.
- The estimate for the annual maintenance of the infrastructure is based on PRDW's internal rates database. The infrastructure requires regular maintenance checks to ensure that these items remain fit for purpose.

The operational cost estimate is subject to the following main assumptions and exclusions:

Assumptions:

- Cost base and exchange rates as per the capital cost estimate (Section 5.1.1)

Exclusions:

- Storm water and sewage bulk services operational costs
- Allowance for market adjustment due to local and international demand, availability of skills, resources and materials
- Environmental, EIA and EMP maintenance costs
- Insurances
- Utility costs, royalties and municipal fees
- Value Added Tax or other foreign or South African taxes, royalties and duties

A detailed list of assumptions and exclusions is included in the cost estimate summary sheets, included as Appendix D of this report.

5.2.2. Operational Cost Summary

The estimated annual operational and maintenance costs for the bulk services for the LNG terminal, subject to the assumptions and exclusions as listed above, are summarised in Table 5-2. The detailed operational and maintenance cost breakdown is included in Appendix D of this report.

Description	Fire-fighting Infrastructure	Potable Water Infrastructure	Electrical Infrastructure
Estimated Operational Costs	R 2 350 000	R 60 000	R 130 000

Table 5-2: Operational cost estimate summary

6. PROJECT SCHEDULE

The implementation schedule for the provision of the required bulk services is summarised in Figure 6-1 below. A detailed implementation schedule for the works in included as Appendix E of this report.

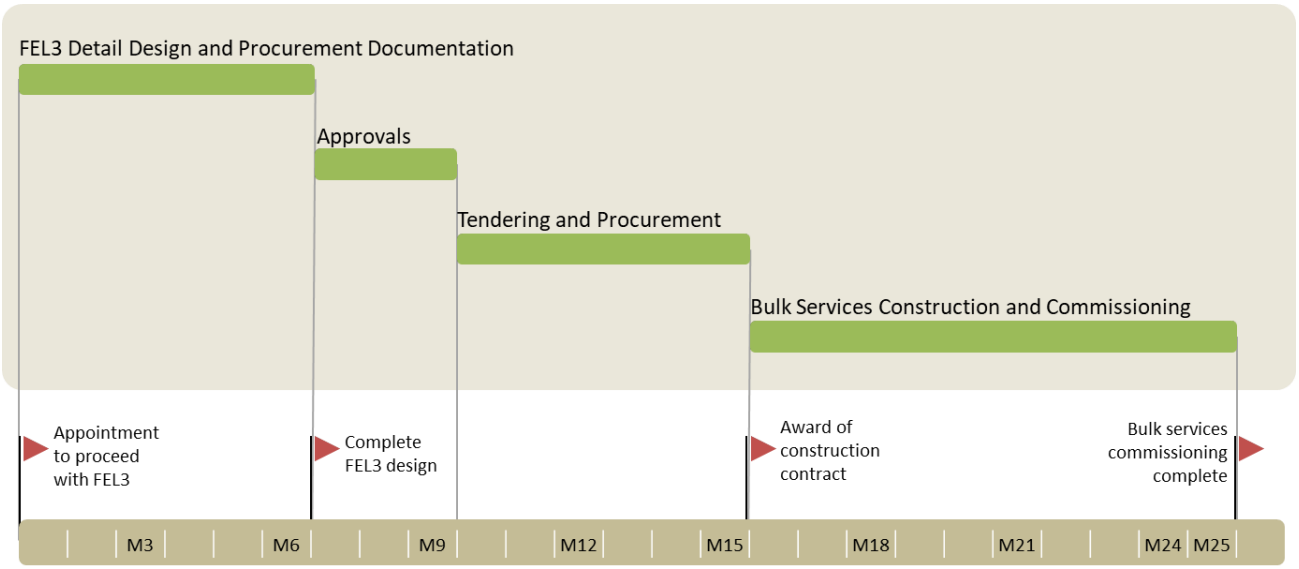

Figure 6-1: High-level implementation schedule

It is noted that a decision to proceed to FEL3 should only be taken once there is certainty over the Gas-to-Power Programme and preferably once the Terminal Operator, responsible for the design and build of the LNG import facility, is appointed so that the specific Terminal Operator requirements can be accommodated. Installation of the bulk services to the berth relies on the berth and access trestle being commissioned in parallel with the bulk services infrastructure.

7. HEALTH, SAFETY AND ENVIRONMENTAL DESIGN CONSIDERATIONS

7.1. Health and Safety Design Considerations

7.1.1. Access to services

Access to the services along the berth will be via the access trestle to be constructed as part of the proposed Berth 207 development. The proposed access trestle, developed as part of the pre-feasibility study for the LNG import infrastructure (PRDW, 2016), consists of a single lane roadway for vehicular and pedestrian access. A dedicated pedestrian access route has not been provided due to the low volume of traffic envisaged for the access route and the associated low risk to personnel.

7.1.2. Emergency Response

Under emergency situations, the access route is to be declared 'pedestrian only' to allow for personnel to evacuate. It is assumed that the emergency will be managed by emergency personnel on the berth or remotely until the berth is evacuated, after which emergency vehicles can be deployed to the berth. Emergency fire-fighting equipment will be controlled remotely.

While the development of the facility is outside of the scope of this study, it is prudent to note the fire-fighting response requirements for the facility. Owing to the nature of the proposed LNG import facility, coupled with the operations of the surrounding facilities within the South Dunes Precinct, the

development is likely to be classified as a Category A development (extremely high property and life risk) according to SANS 10090. In accordance with the requirements of SANS 10090, the required emergency response time to Category A development is less than 8 minutes.

Due to the distance from the port entrance to the South Dunes Precinct, it is recommended that the emergency response time, and the possibility of developing a satellite fire station within the South Dunes Precinct, be assessed during the Operator's detail design phase for the facility.

7.1.3. Redundancy

As per the Options Identification Report (PRDW, 2018a) it is noted that the existing seawater pumps are unable to supply both existing Berths 208 and 209 simultaneously. It is therefore recommended that the feasibility of providing redundancy by connecting the new Berth 207 fire-fighting supply system to the existing system be assessed as part of the FEL3 study.

7.1.4. Lighting

Provision has been made for lighting to provide sufficient light for safe operation of the facilities.

7.2. Environmental Design Considerations

SRK Consulting (South Africa) (Pty) Ltd (SRK) were appointed to undertake a high-level environmental assessment of the required bulk services for the proposed LNG Terminal.

The assessment indicates that in terms of the National Heritage Resources Act, 1999 (Act No. 25 of 1999) the South African Heritage Resource Agency (SAHRA) will need to be notified of the project due to the proposed construction of the potable water pipeline which will exceed 300m in length. Following the submission of an initial online application, SAHRA may require additional Heritage studies to be undertaken by a suitably qualified heritage consultant.

Barring the SAHRA requirements, no additional environmental authorisations, permits or approvals should be required.

Full details of the assessment are outlined in the environmental screening report, included as Appendix F of this report.

8. RISK ANALYSIS

8.1. Project Risks

A preliminary project-wide risk register was developed to identify risks which may impact on the implementation or feasibility of the project. The project risk register considered potential risks across the categories, and associated sub-categories, presented in Table 8-1 below.

Category	Sub-category
Business Environment	Legislation
	Taxation
	Economy
	Government Policy
Construction Industry	Workforce
	Market conditions
	Material suppliers
Client Risks	Business Plan
	Definition of need
	Business case
	Client delivery
	Land 'conditions'
Project Risks	User Requirements
	Project Team
	Site Investigations
	Design
	External approvals
	Design compliance
	Project Controls
	Procurement
	Construction

Table 8-1: Project-wide risk categories

Each identified risk was assigned a qualitative risk ranking to produce a project-wide risk profile. The resultant risk profile is shown in Table 8-2 below while the full details risk identification and ranking is presented in the FEL2 risk register, included as Appendix G of this report.

CONSEQUENCE RATING	LIKELIHOOD RATING: Almost Certain	Likely	Possible	Unlikely	Rare
1	0	0	0	0	0
2	0	0	0	0	0
3	0	0	1	0	1
4	0	0	2	0	0
5	0	2	6	0	0
6	0	1	0	1	0
7	0	4	0	0	0
TOTALS	0	1	12	5	0

Table 8-2: Project-wide risk profile

It is recommended that the project risk register be kept 'live' to capture and monitor all risks to the project during the FEL3 design and implementation phases. A full risk management strategy should be developed during the FEL3 design phase.

8.2. Risks During Construction and Operation

A Hazard and Operability (HAZOP) Study was completed in accordance with TNPA's HAZOP Study Methodology for each category of bulk services to identify potential hazards during construction and operation of the preferred options and to determine whether these hazards could be mitigated by practical design modifications.

It should be noted that the HAZOP study focused on the technical aspects of the design which were available at the FEL2 stage of project definition. The HAZOP study will need to be updated during the FEL3 study, once the Terminal Operator has been appointed, to identify any specific operational risks associated with the operator's proposed operational methodology.

A total of 13 hazards were identified during this study, two (2) of them being classified as 'High' risk. Specific actions have been assigned to the FEL3 Designer, Terminal Operator and Port Engineer to mitigate these risks during future design phases and during operation.

The risk ranking distribution of the identified hazards is summarised in Table 8-3 below while the full details of the assessment and the risks identified are provided in the HAZOP Study report, included as Appendix H of this report.

Risk Ranking	Number of Hazards Identified
High	2
Medium	7
Low	4

Table 8-3: Construction and operational risk ranking distribution

9. FRAMEWORK FOR FEL3

Based on the findings of this FEL2 study it is recommended that this project move into the FEL3 with the preferred options as identified in this report. It is however recommended that the FEL3 phase only proceeds once there is certainty over the Gas-to-Power Programme and preferably once the Terminal Operator, responsible for the design and build of the LNG import facility, is appointed so that the specific Terminal Operator requirements can be accommodated.

9.1. FEL3 Project Scope

It is envisaged that the FEL3 scope of work will consist of the primary activities described below:

- Project Management and Coordination
  - Meet the Client to develop and discuss the basis of design
  - Engage with the Terminal Operator to identify their specific requirements
  - Formalise scope of project and agreements with TNPA
  - Kick-off meeting, monthly progress meetings, workshops, gate review meeting
  - General project administration
- FEL 3 Engineering
  - Prepare a design basis for the Client's approval
  - Front end engineering design
    - Potable water
    - Fire-fighting
    - Electrical supply
  - Review available site information
  - Specify all mechanical and electrical equipment
  - Indicative method of construction;
  - Develop capital and operational cost estimate
  - Develop implementation schedule
- Environmental Assessment
  - Review possible deviations for FEL2 scoping study
  - Update scoping study as required and identify relevant authorities
- Tender Documentation and Procurement

  - Prepare the scope of works, specifications, bill of quantities, pricing instructions, tender drawings and site information for the tender documents.
  - Attend a tender clarification meeting, preparation of notices to tenders and evaluation of the tenders
  - Technical review input into the tender evaluation report
  - Input into the TNPA project execution plan (PEP)
  - Input into the Clients Procurement documentation including works information, tender data, returnable schedules and contract data
- FEL3 Gate review meeting
- Attend a risk assessment workshop
- FEL3 Deliverables
  - Design Basis
  - FEL3 Design Report
  - FEL 3 Design – 40% to 70% of total engineering
  - Capital and operational cost estimate (-10% to +15% level of accuracy)
  - Level 3 schedule
  - Tender Documentation (Works Information, Specifications, BOQ, Pricing Assumptions, Site Information, Tender Drawings)

9.2. FEL3 Schedule

It is envisioned that the FEL 3 Study duration will be 6 months.

10. CONCLUSION AND RECOMMENDATIONS

The study assessed the bulk services requirements for the proposed LNG facility and options for upgrading the bulk services infrastructure where required. A multi-criteria analysis (MCA) was used to select the preferred options. The following conclusions and recommendations are drawn from this study:

10.1. Conclusions

- Two options were identified for the required upgrades to the fire-fighting, electrical supply and potable water bulk services. No upgrades are required to the sewage and stormwater systems.
- The preferred options for the required upgrades are:
  - Fire-fighting: Deluge system supplied from a new seawater pump station and a new foam pump station on shore adjacent to existing pump station.
  - Electrical supply: Small power requirements and general lighting to the berth supplied directly from Berth 209 Substation at 400 V. The pumps will be supplied directly from the Berth 209 substation.
  - Potable water supply: Install a second supply line from the M14 "Chemical Berth" take off.
- The capital costs for the upgrades to the fire-fighting, electrical supply and potable water supply systems are estimated to be R50.7 million, R1.2 million and R2.9 million respectively.

- The annual operational costs for the upgrades to the fire-fighting, electrical supply and potable water supply systems are estimated to be R2.35 million, R0.06 million and R0.01 million respectively.
- The project schedule allows for a period of 25 months, after appointment of the FEL3 designer, for detail design, approvals, procurement, construction and commissioning of the bulk services upgrades.
- The results of the high-level environmental assessment indicate that, barring notifying the South African Heritage Resource Agency (SAHRA) of construction of the pipeline, no additional environmental authorisations, permits or approvals should be required.
- A preliminary project-wide risk register was developed to identify risks which may impact on the implementation or feasibility of the project. A total of 17 potential risks were identified.
- A preliminary Hazard and Operability (HAZOP) Study was completed which identified a total of 13 hazards, two (2) of them being classified as 'High' risk. Specific actions have been assigned to the FEL3 Designer, Terminal Operator and Port Engineer to mitigate these risks during future design phases and during operation.

10.2. Recommendations

- The FEL3 phase should only proceed once there is certainty over the Gas-to-Power Programme and preferably once the Terminal Operator, responsible for the design and build of the LNG import facility, is appointed so that the specific Terminal Operator requirements can be accommodated.
- The feasibility of connecting the new fire-fighting supply system to the existing fire-fighting system be investigated to provide redundancy to the fir-fighting systems for Berth 207, 208 and 209.
- Opportunities for efficiently managing maintenance costs ate to be specifically addressed in the FEL3 engineering stage.
- The emergency response time, and the possibility of developing a satellite fire station within the South Dunes Precinct, should be assessed during the Terminal Operator's detail design phase for the facility to ensure compliance with the requirements of SANS 10090.

11. REFERENCES

PRDW. (2016). SA Gas to Power Medium-term Programme: Richards Bay, Pre-feasibility Study Report. PRDW Report No. S2018-3-RP-GA-001. Cape Town: PRDW.

PRDW. (2018a). Richards Bay LNG *Terminal Bulk Services Study - Bulk Services Capacity Assessment, Demand Forecast and Options Identification. PRDW Study Report No. S2069-1-TN-GA-001-R1.* Cape Town: PRDW.

PRDW. (2018b). Richards Bay LNG Terminal Bulk Services Study - Bulk Services Options Evaluation. PRDW Study Report No. S2069-1-TN-GA-002-R1. Cape Town: PRDW.

Transnet. (2015). Transnet Long *Term Planning Framework 2015. Chapter 4, Port Development Plan.* Johannesburg: Transnet.

APPENDICES

Note: In all cases check against online version for the latest revision prior to use

The following appendices are included with this report:

APPENDIX A: BULK SERVICES OPTIONS IDENTIFICATION
APPENDIX B: BULK SERVICES OPTIONS EVALUATION
APPENDIX C: BULK SERVICES UPGRADE DESIGN – TECHNCIAL NOTE
APPENDIX D: CAPITAL AND OPERATIONAL COST ESTIMATE
APPENDIX E: IMPLEMENTATION SCHEDULE
APPENDIX F: ENVIRONMENTAL ASSESSMENT
APPENDIX G: RISK REGISTER
APPENDIX H: HAZARD AND OPERABILITY ANALYSIS (HAZOP)

Note: In all cases check against online version for the latest revision prior to use

APPENDIX A:
BULK SERVICES OPTIONS IDENTIFICATION

REPORT

Note: In all cases check against online version for the latest revision prior to use

BULK SERVICES CAPACITY ASSESSMENT,
DEMAND FORECAST AND OPTIONS IDENTIFICATION

For: Port of Richards Bay

Project Name: Richards Bay LNG Terminal Bulk Services Study
Project Number: TBA

Author:	PRDW
Owner:	Transnet
Client:	Basil Ngcobo
Project Sponsor:	Preston Khomo
Project Manager:	Ashveer Sathanund
Revision Number:	01
Approved by:	
Release Date:	08/02/2018
Print Date:	08/02/2018
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Document No:	S2069-1-TN-GA-001

Distribution	
Name	Location

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Approved by: _____
Basil Ngcobo Date

Approved by: _____
Preston Khomo Date

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1. INTRODUCTION

1.1. Background

As part of the Independent Power Producer (IPP) programme, a Gas to Power (G2P) project has been launched by the South African Department of Energy (DoE) to address the electricity supply shortages in South Africa. The aim of the project is to develop and operate Liquefied Natural Gas (LNG) fired power stations at key locations in South Africa.

The DoE, in collaboration with Transnet SOC Ltd, and specifically its operating division Transnet National Ports Authority (TNPA), has undertaken a Pre-feasibility (FEL2) Study for LNG import projects in the Ports of Richards Bay.

The pre-feasibility study for the Port of Richards Bay identified two preferred sites for the location of the LNG import facility, namely Berth 207 (layout 2) and the dig-out basin (layout 1) in the South Dunes area as seen in Figure 1-1 below. At the close-out workshop, held in the Port of Richards Bay on 20 September 2016, it was agreed that Berth 207 should be adopted as the single preferred site for the LNG import facility.

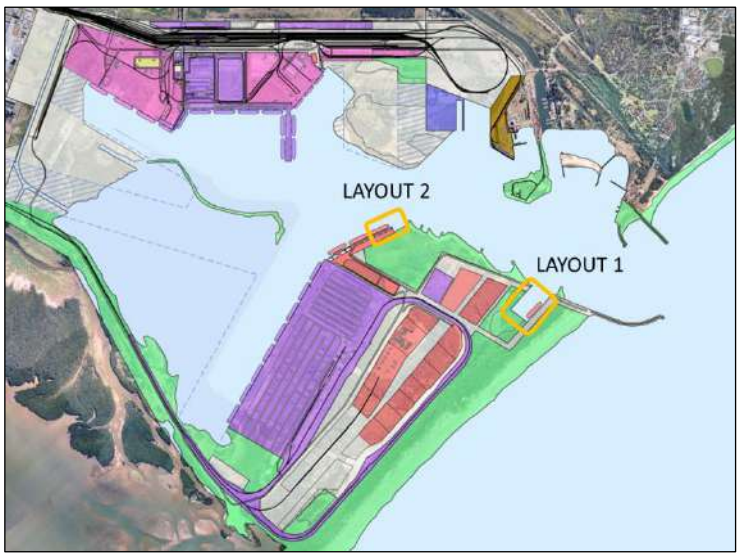


Figure 1-1: Pre-Feasibility Study Preferred Site Locations

The provision of bulk services was excluded from the FEL2 stage of the IPP project as it was identified as being the direct responsibility of TNPA. This study aims to assess the bulk services requirements at a pre-feasibility (FEL2) level of project development.

1.2. Bulk Services Study Introduction

A review of the bulk services required by the FSRU, as well as for the associated berth facility, has been undertaken in this study. The following services requirements have been considered:

- Power supply;
- Sewage;
- Potable water;
- Fire-fighting; and
- Storm water.

The upper and lower limits for the FSRU bulk services requirements have been estimated and the existing bulk service systems assessed to identify any associated bulk services capacity constraints.

2. FSRU BULK SERVICES REQUIREMENTS

Although Floating Storage Regasification Unit (FSRU) vessels are typically designed to be self-sufficient such that they can operate both within a port (at a berth) or offshore (berthed at either a single point mooring or a multi-buoy mooring), FSRU operators were contacted and requested to provide details of any bulk services required for the FSRU at the proposed berth in Richards Bay. Since no feedback was received from the FSRU operators, best practise was determined by reviewing available resources on the Internet.

This section outlines the bulk services requirements specific to the FSRU vessel.

2.1. Electrical Supply

The vessel is typically powered by an on-board power plant using fuel gas and oil (Songhurst, 2017). Therefore, an external electrical power supply is not deemed necessary.

Bunkering may be required to supply the vessel with fuel gas and oil.

2.2. Sewage

Sewage will most likely be treated on the vessel using an on-board plant, such as a membrane bioreactor. However, concentrated sludge will need to be removed periodically from the settling holding tank and disposed of at a suitable onshore sewage treatment plant.

2.3. Potable Water

A reverse osmosis plant on the vessel will typically provide the potable water requirements for the vessel. Therefore, an external potable water supply is not deemed necessary.

2.4. Fire-fighting

The vessel will be equipped with its own seawater intake for fighting fires on board the vessel. Therefore, it is anticipated that only fire-fighting requirements for the berth itself need to be considered.

2.5. Storm Water

Any storm water on the vessel is expected to be routed back to sea. Therefore, it is not expected that any onshore storm water handling will be required.

2.6. Summary

It is noted that the literature review did not identify any bulk services requirements for the FSRU and the project bulk services requirements will therefore be governed by the requirements for the berth and associated support infrastructure.

3. INSPECTION OF EXISTING BULK SERVICES INFRASTRUCTURE

3.1. Overview

PRDW visited the site on 11 October 2017. The purpose of the site visit was to inspect the existing services at Berths 208/209 and to gain a thorough understanding of the current status and operation of existing bulk services infrastructure from discussions with TNPA personnel.

Only two bulk services, namely electrical power supply and potable water, extend to the proposed location of the FSRU (Berth 207 at the South Dunes area of the port). Other services requirements on site are addressed as follows:

- Sewage from the existing control room is treated in a septic tank;
- Stormwater is routed via oil traps and then disposed of via soakaway pits on site; and
- Seawater is abstracted for fire-fighting purposes, the fire-fighting pump house is located between Berths 208 and 209. Electricity to the pump station is supplied from the Berth 209 substation.

3.2. Facility Inspections

3.2.1. Electrical Sub-Station

An 11 kV/400 V brick-built substation exists at Berth 209. This substation is fed from the TNPA Hydra Intake Substation via 2 x 240 mm^2 cables and has a firm capacity of 5 MVA.

TNPA confirmed that spare capacity available at the Berth 209 substation is 1.5 MVA.

Figure 3-1: MCC & electrical panels in berth sub-station

3.2.2. Fire-fighting Pump House

For the fire-fighting pump house, seawater is abstracted from a sump using vertical turbine multi stage pumps, namely one electrically driven duty pump and one diesel driven standby pump. A similar pump arrangement is provided for the foam pumps. A spare pump base is available in the foam pump room for additional foam concentrate capacity upgrades.

The electrically driven seawater pump has an 800 kW motor which is supplied at a voltage of 3.3 kV.

PRDW was informed by TNPA personnel that the existing seawater pumps are not able to supply both Berths 208 and 209 if fires were to take place at both berths simultaneously.

Figure 3-2: Foam pump station and spare base

Figure 3-3: Seawater pump station

Figure 3-4: Intake sump showing multistage pump

At the entrance to the fire-fighting pump house (refer to Figure 3-5 below), take-off manifolds from the Foam Water line (blue) as well as the Fresh Water line (Green) are above ground level. From this point to Berth 208, the pipelines run below ground level.

Figure 3-5: Pipe manifolds located outside of the foam pump station

3.2.3. Potable Water

Potable water is supplied from the M14 "Chemical Berth" take-off through a 160 mm diameter UPVC pipeline. The take-off manifold is located near the fire-fighting pump house (refer to Figure 3-5 above).

TNPA personnel noted that due to water saving initiatives within the port, the demand for water has decreased over the past few years, as seen in Figure 3-6 below. Notably in the South Dunes location, boreholes have been drilled to supply the coal berths which has reduced the demand on the water supply network in this area. The existing 160 mm diameter uPVC pipeline is only capable of simultaneously supplying 1200 l/min of water (at 3 bar as per S.A.N.S requirements) to the last fire hydrant on Berth 208, at the current municipal supply pressure to the chemical berth (4 bar) from the main reticulation network (Transnet Projects Design, 2007).

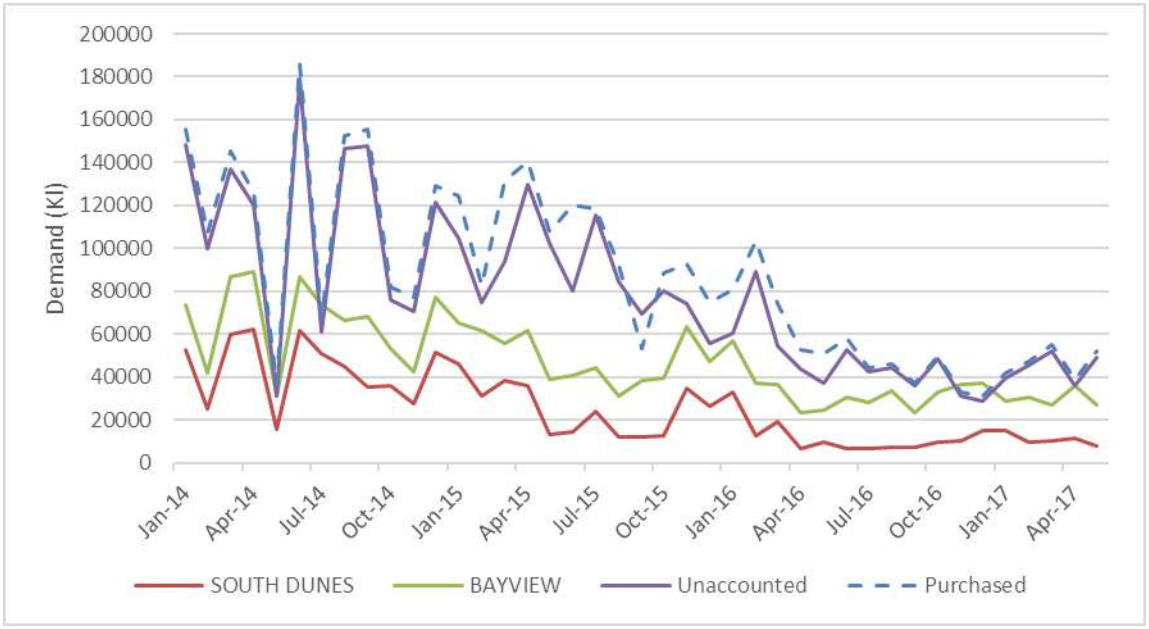


Figure 3-6: Water Demand for the Port of Richards Bay (Transnet Projects Design, 2007)

3.2.4. Stormwater Effluent and Oil Trap

Stormwater at Berth 208 is routed via an oil trap and is then disposed of via a soakaway pit.

The oil collection/skimming mechanism within the oil trap (refer to Figure 3-7 below) has been decommissioned since this mechanism was found to be ineffective. It is however presumed that the stormwater from the berth is still pumped to the trap and soak away pit.

During the site inspection, it was observed that the water within the oil trap sump contained little to no oil. The water level in the oil trap sump was at the level of the outlet, indicating that either the effluent discharge pipe was clear and that the soakaway pit was in operation, or that the stormwater pumps on the berth are not in operation. It should be noted that the area had received heavy rains the day before the site inspection and no notable ponding was seen on the deck of Berth 208.

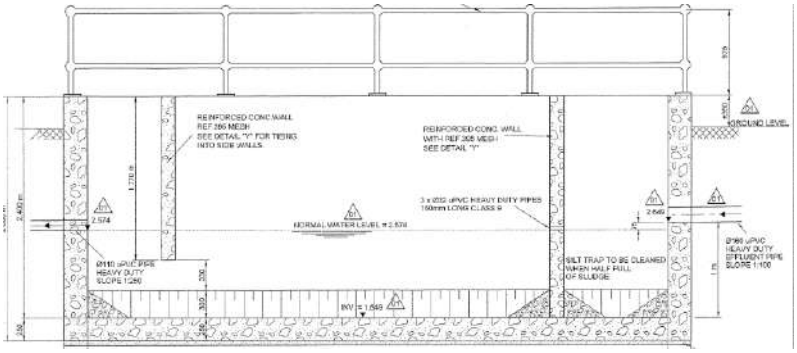


Figure 3-7: Section through Oil Trap

Figure 3-8: Oil Trap Sump and Collection/Skimming Mechanism

Figure 3-9: Water found within the Oil Trap

The stormwater inlet on Berth 208 appeared to be free from debris and the sump/deck did not show signs of excessive water pooling. However, the access manhole to the pump station sump chamber could not be opened on the day of the site inspection. TNPA was requested to arrange for the sump chamber to be opened, to take photographs of the sump and then send this information to PRDW. In addition, TNPA would check that the submerged pump is in working order.

Figure 3-10: State of deck on Berth 208

Figure 3-11: Stormwater Pump Sump

3.2.5. Pipe Rack and Access Walkway

An access walkway has been installed over the pipe rack between Berth 208 and the control tower. The services for the new berth will be required to run under the pipe rack similar to the existing services for Berth 208.

Figure 3-12: Access Walkway over Pipe Rack

3.2.6. Control Tower

The control panel in the existing control tower has one station available for an additional berth.

Figure 3-13: Existing Control Panel

The view to the proposed LNG berth, which is approximately 600 m away from the existing control room, is obscured by a tree as shown in Figure 3-14 below.

Figure 3-14: View of Berth 208 and proposed Berth 207 from control room

4. ADDITIONAL BULK SERVICES REQUIREMENTS

As noted in Section 2, no specific bulk service requirements were identified for the FSRU and the project bulk services requirements will therefore be governed by the requirements for the berth and associated support infrastructure. These requirements are presented below.

4.1. Electrical Supply

Electrical supply will be required for the seawater pumps (for fire-fighting purposes) and for small quayside power requirements and general lighting. Lighting on the access trestle and berth will generally replicate the existing Berth 208 mast mounted lighting installation.

Note that the electrical supply requirements are governed by the selection of the preferred fire-fighting option and the associated location of the seawater pumps.

4.2. Sewage

Since it is envisaged that sewage will be treated on-board the FSRU, no bulk sewage services requirements are anticipated for this vessel. Should the LNG berth facility require an additional control tower, the sewage flows from the toilet facilities in this building would be handled in a similar manner to that of the existing control tower facilities (i.e. installation of a septic tank and soakaway pit system).

4.3. Potable Water Supply

Since the FSRU would be equipped with its own desalination plant, potable water for the proposed LNG facility would arguably only be required if a new control tower were to be constructed.

The existing potable water supply could also be used for wash-down water for berth maintenance cleaning.

4.4. Fire-fighting

A deluge system is required to protect the manifold and piping on the deck of the new berth during a fire. This deluge system will be supplied from a seawater pump station using two pipelines, namely one pipeline for seawater only and a second pipeline for seawater with foam compound added. In addition, fire hydrants along the berth structure would also be installed off the three water supply pipelines, including the potable water line.

Figure 4-1: Automatic Oscillating Monitor at Berth 208

4.5. Stormwater

As stormwater is treated locally, there is no additional demand on existing bulk services.

5. PROPOSED UPGRADE OPTIONS FOR BULK SERVICES

5.1. Electrical Supply

The options identified for the required upgrades to the electrical supply are summarised below while the layout figures for the options are included as Appendix A of this report.

- Option 1:

  Option 1 is applicable if the seawater pumps for the fire-fighting system are installed adjacent to the existing seawater pump station. For this option the power demand at the berth is of the order of 60 kVA, only to cater for small quayside power requirements and general lighting. This option therefore considers a power supply at 400 V directly from the Berth 209 Substation along the access trestle to distribution kiosks located on the proposed Berth 207. All small power and lighting requirements for the berth will be supplied from these distribution kiosks.

  The power supply to the seawater pump station will be supplied by an 11 kV cable directly from the nearby Berth 209 Substation in a buried cable under the road.

  The total power demand for this option (i.e. catering for fire-fighting pumps adjacent to the existing seawater pump station as well as for small quayside power and lighting) will be larger than for Option 2, predominantly due to the increased pumping head requirements associated with a longer pipeline.

- Option 2:

  Option 2 is applicable if the seawater pumps for the fire-fighting system are installed on the access trestle to Berth 207. For this option the power demand cannot be supplied directly from the Berth 209 substation at 400 volts and therefore it is proposed that a suitably sized miniature substation (approximately 1 200 kVA, 11 kV/400 V) be installed at the new berth.

The miniature substation will be supplied at 11 kV, directly from the Berth 209 Substation along an 11 kV cable installed on cable trays fixed to the underside of the quay structure. The fire pumps and lighting and small power kiosks will then be supplied at 400 V, directly from the miniature substations.

5.2. Sewage

No upgrade to bulk services is required as sewage is treated locally. It is assumed that sufficient sludge handling vehicles are available to service the proposed facility.

It is noted that additional septic tanks will be required should an additional control tower or administration building be required to support the proposed facility.

5.3. Potable Water

The options identified for the required upgrades to the potable water supply system are summarised below while the layout figures for the options are included as Appendix B of this report.

- Option 1:

  Option 1 considers the installation of a second uPVC supply pipeline from the M14 "Chemical Berth" take-off to the proposed Berth 207. The new supply line would be trenched for approximately 265 m, parallel to the existing supply line, before routing along the new access trestle to the proposed Berth 207.

- Option 2:

  Option 2 involves the construction of a booster pump station on the existing supply line to provide the pressure required at the proposed LNG berth. A new supply line would then be installed along the new access trestle to the proposed Berth 207.

5.4. Fire-fighting

The existing seawater supply system is inadequate to supply both the proposed Berth 207 and the existing Berth 208 simultaneously and additional pumping capacity would therefore be required to service the new berth. The options for supplying the new pumping capacity are summarised below while the layout figures for the options are included as Appendix C of this report.

- Option 1:

  Option 1 considers housing the new pumps in a new seawater pump station, similar to that of the existing fire-fighting pump house. Foam would be supplied by the existing foam pump station. This option would reduce the power demand at the berth as the new pump station would be supplied directly from the existing Berth 209 substation.

- Option 2:

  Options 2 locates the pumps along the access trestle to the new berth. While this option would reduce the pumping distance to the berth, it results in an associated increase in the electrical

demand at the berth in order to supply the pump station (refer to Section 5.1). Bulky foam tanks would also have to be accommodated along the access trestle for this option.

5.5. Stormwater

As per Berth 208, any stormwater runoff from the deck of the proposed berth structure needs to be collected in sumps and pumped to shore where the flow is then passed through an oil trap prior to draining out through a soak-away pit.

5.6. Summary

A summary of the above-mentioned upgrade options is provided in Table 5-1 below.

Table 5-1: Upgrade Option Summary

Bulk Service	Option 1	Option 2
Fire-fighting	Deluge system supplied from a new seawater pump station on shore adjacent to existing pump station. Foam supplied by the existing foam pump station.	Deluge system supplied from pumps on the access trestle near the new berth. Foam tanks accommodated along the access trestle.
Electrical Supply*	Small power requirements and general lighting to the berth supplied directly from Berth 209 Substation at 400 V. The seawater pumps will be supplied directly from the Berth 209 substation.	Miniature substation provided at new berth to accommodate sea water pump requirements at 11 kV as well as the small power requirements and lighting at 400 V.
Sewage	No bulk services upgrade required.	
Potable Water	Install a second supply line from the M14 "Chemical Berth" take off.	Construct a booster pump station to provide the pressure required at the proposed LNG berth utilising the existing pipeline.
Storm water	No bulk services upgrade required.	

*depending on fire-fighting requirements.

6. REFERENCES

Angus Fire. (2008). *The Design and Construction of Fire Fighting Monitors.* OXFORDSHIRE,: Angus Fire.

BP International Limited. (2007). *LNG Fire Protection and Emergency Response.* Rugby: Institution of Chemical Engineers (IChemE).

PRDW. (2017a). *Richards Bay LNG Terminal Bulk Services Study - Bulk Services Capacity Assessment, Demand Forecast and Options Identification. PRDW Study Report No. S2069-1-TN-GA-001.* Cape Town: PRDW.

PRDW. (2017b). *Richards Bay LNG terminal Bulk Services Study, LNG Shipping Procedures. PRDW Study Report No. S2069-2-TD-NV-001.* Cape Town: TNPA.

Songhurst, B. (2017). *The Outlook for Floating Storage and Regasification Units (FSRUs).* Oxford: The Oxford Institute for Energy Studies.

TNPA. (2013). *TNPA Marine Craft Management Plan. Rev 6. .* Transnet.

TNPA. (2016). Richards Bay VTS FY15-16. TNPA.

TNPA. (2017, August). File name: Capacity Sheet All Ports - August 2017-LTPF Demand Volumes. File type: xlsx.

Transnet . (2016). Long Term Planning Framework.

Transnet Projects Design. (2007). *POTABLE WATER SUPPLY MASTER PLAN UPDATE.* Richards Bay: Transnet Ports Authority.

APPENDICES

Note: In all cases check against online version for the latest revision prior to use

The following appendices are included with this report:

APPENDIX A: Electrical Supply Layouts – Options 1 and 2

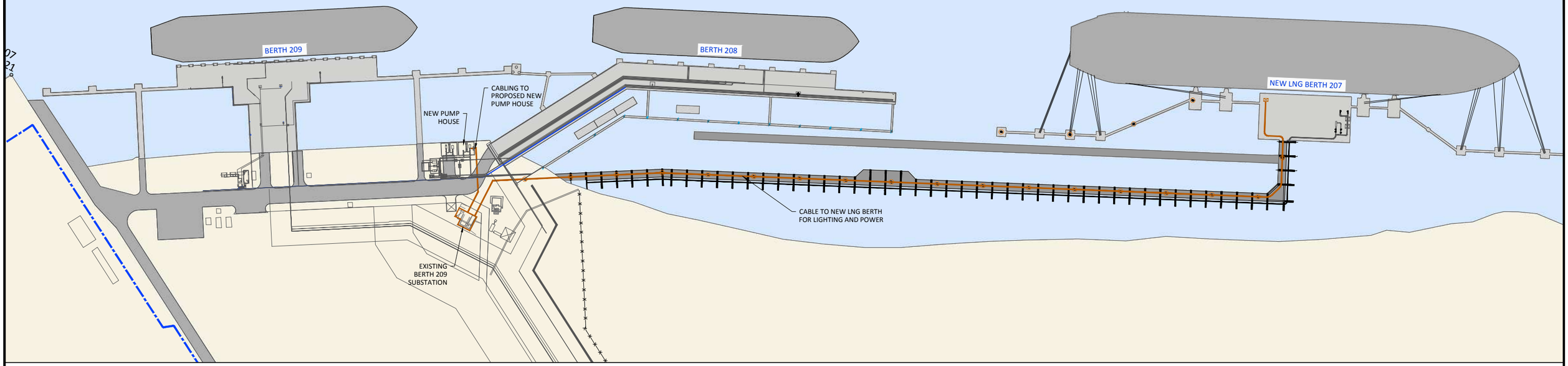
APPENDIX B: Potable Water Layouts – Options 1 and 2

APPENDIX C: Fire-fighting Layouts – Options 1 and 2

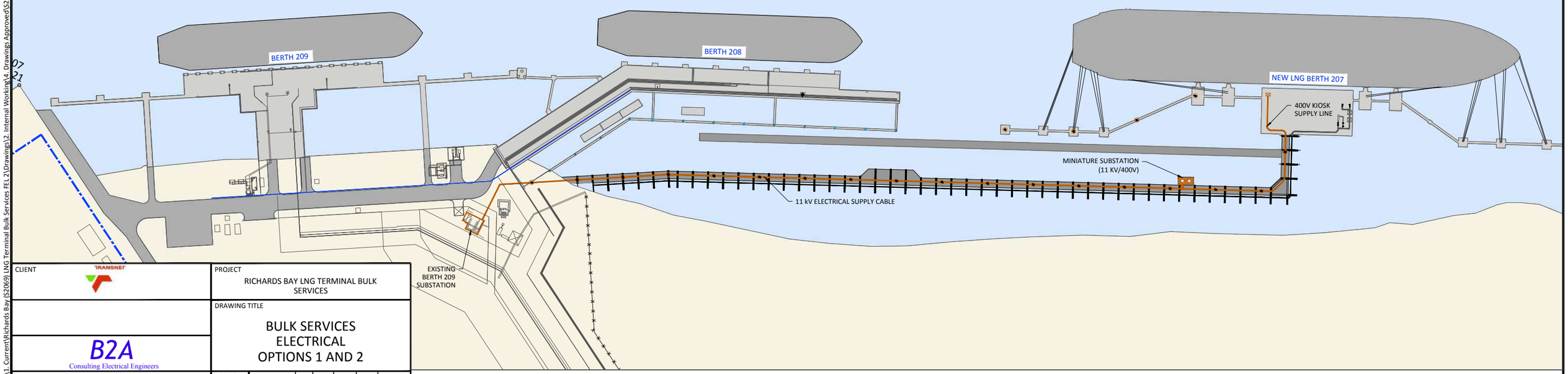
Note: In all cases check against online version for the latest revision prior to use

APPENDIX A: Electrical Supply Layouts – Options 1 and 2

A1 DO NOT SCALE - IF IN DOUBT ASK



OPTION 1



OPTION 2

CLIENT TRANSNET

PROJECT
RICHARDS BAY LNG TERMINAL BULK SERVICES

DRAWING TITLE
BULK SERVICES ELECTRICAL OPTIONS 1 AND 2

B2A
Consulting Electrical Engineers

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CLIENT NUMBER

X:\1. Projects\1. Current\Richards Bay (S2069) LNG Terminal Bulk Services FEL 2\Drawings\2. Internal Working\4. Drawings Approved\S2069-1-SK-EE-200-001 R1.dwg

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APPENDIX B: Potable Water Layouts – Options 1 and 2

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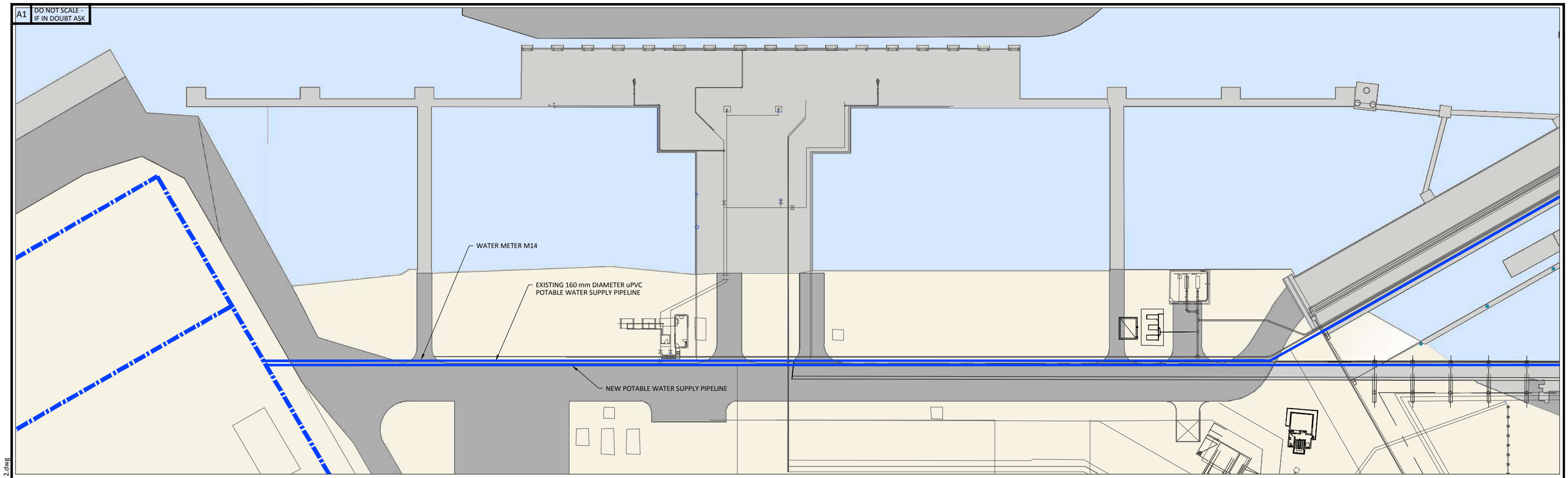
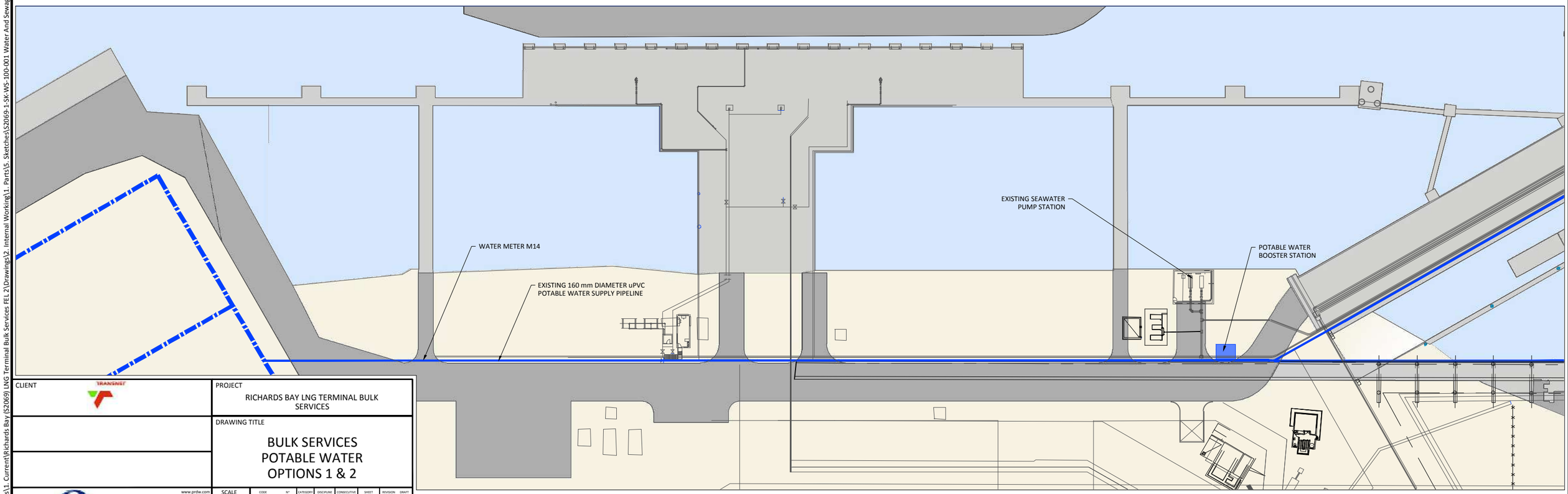


OPTION 1
INSTALL NEW SUPPLY LINE FROM RING MAIN



OPTION 2
WITH BOOSTER PUMP STATION

CLIENT: TRANSNET

PROJECT: RICHARDS BAY LNG TERMINAL BULK SERVICES

DRAWING TITLE: BULK SERVICES POTABLE WATER OPTIONS 1 & 2

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CLIENT NUMBER

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APPENDIX C: Fire-fighting Layouts – Options 1 and 2

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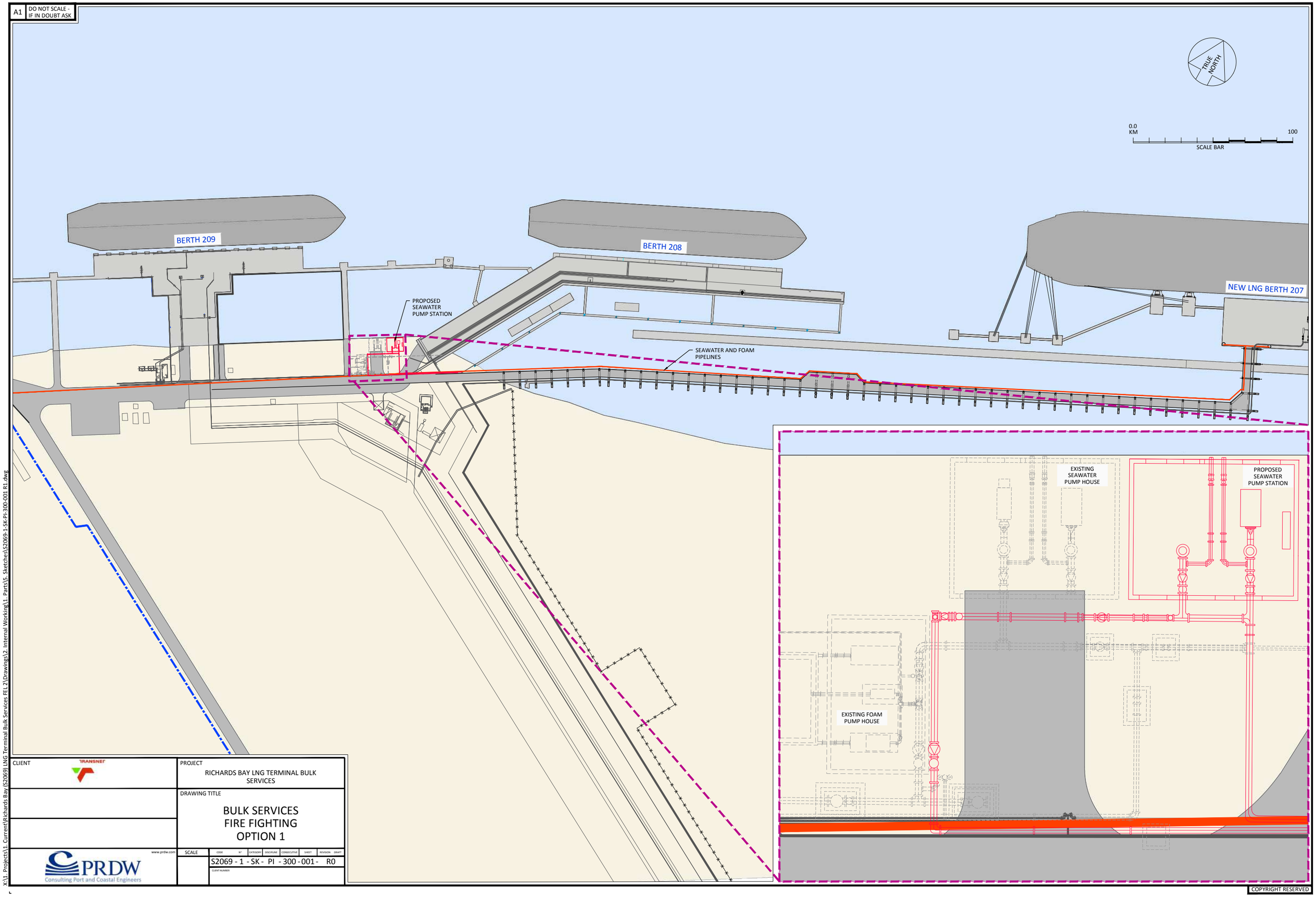

CLIENT: TRANSNET

PROJECT: RICHARDS BAY LNG TERMINAL BULK SERVICES

DRAWING TITLE:

BULK SERVICES FIRE FIGHTING OPTION 1

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SCALE

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CLIENT NUMBER

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A1 DO NOT SCALE - IF IN DOUBT ASK

TRUE NORTH

0.0 METRES — 100

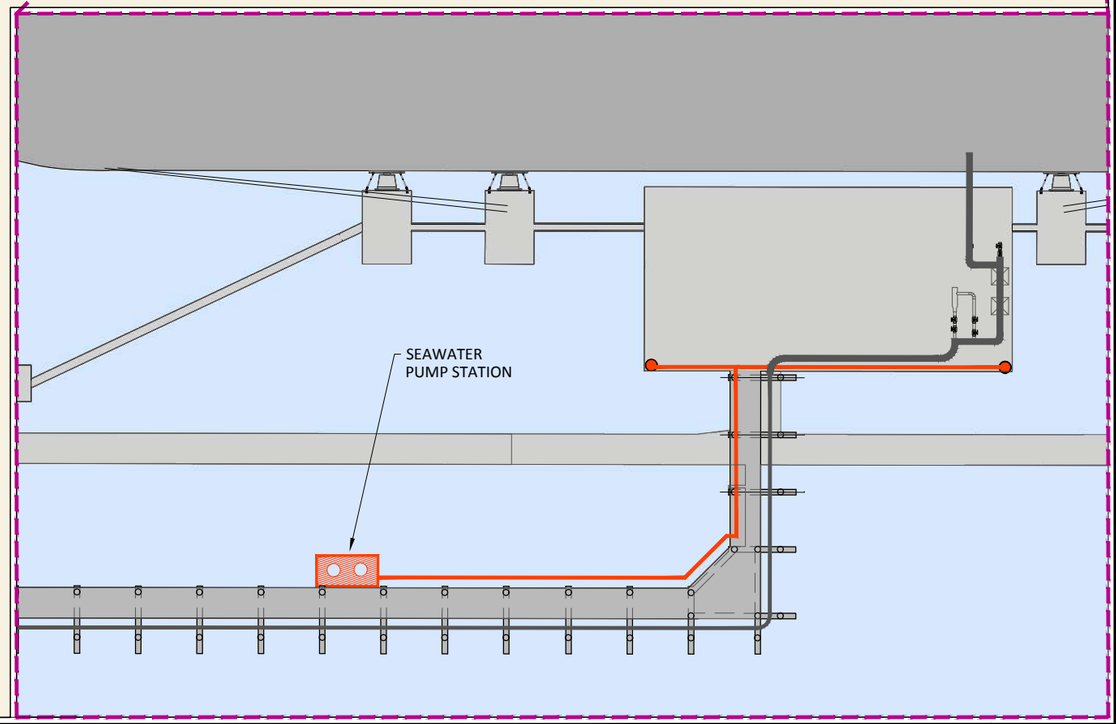
SCALE BAR

BERTH 209

BERTH 208

NEW LNG BERTH 207

SEAWATER PUMP STATION



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CLIENT TRANSNET

PROJECT
RICHARDS BAY LNG TERMINAL BULK SERVICES

DRAWING TITLE
BULK SERVICES
FIRE FIGHTING
OPTION 2

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CLIENT NUMBER

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APPENDIX B:
BULK SERVICES OPTIONS EVALUATION

REPORT

Note: In all cases check against online version for the latest revision prior to use

BULK SERVICES OPTIONS EVALUATION

For: Port of Richards Bay

Project Name: Richards Bay LNG Terminal Bulk Services Study
Project Number: TBA

Author:	PRDW
Owner:	Transnet
Client:	Basil Ngcobo
Project Sponsor:	Preston Khomo
Project Manager:	Ashveer Sathanund
Revision Number:	01
Approved by:	
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1. INTRODUCTION

1.1. Background

As part of the Independent Power Producer (IPP) Procurement Programme, a gas to power (G2P) project has been launched by the South African Department of Energy (DoE) to address the electricity supply shortages in South Africa. The aim of the project is to develop and operate Liquefied Natural Gas (LNG) fired power stations at key locations in South Africa.

The DoE, in collaboration with Transnet SOC Ltd, and specifically its operating division Transnet National Ports Authority (TNPA), has undertaken a Pre-feasibility (FEL2) Study for LNG import projects at the Ports of Richards Bay, Ngqura and Saldanha Bay. The provision of bulk services was excluded from the FEL2 stage of the IPP project as this work was identified as being the direct responsibility of TNPA.

The pre-feasibility study for the Port of Richards Bay identified two preferred sites for the location of the LNG import facility, namely Berth 207 and the dig-out basin in the South Dunes area. The pre-feasibility study presented two distinct phases for the development of the LNG import facility – Phase 1 which consists of a floating storage and regasification solution and Phase 2 which consist of a land-based storage and regasification solution.

At the close-out workshop, held in the Port of Richards Bay on 20 September 2016, it was agreed that Berth 207 should be adopted as the single preferred site. PRDW were subsequently appointed by TNPA to complete a pre-feasibility study for the supply of the required bulk services to the Phase 1 facility at Berth 207.

1.2. Options Identification and Evaluation

The Capacity Assessment, Demand Forecast and Options Identification report (PRDW, 2018) identified the following options for the required bulk services upgrades:

Bulk Service	Option 1	Option 2
Fire-fighting	Deluge system supplied from a new seawater pump station on shore adjacent to existing pump station. Foam supplied by the existing foam pump station.	Deluge system supplied from pumps on the access trestle near the new berth. Foam tanks accommodated along the access trestle.
Electrical Supply*	Small power requirements and general lighting to the berth supplied directly from Berth 209 Substation at 400 V. The seawater pumps will be supplied directly from the Berth 209 substation.	Miniature substation provided at new berth to accommodate sea water pump requirements at 11 kV as well as the small power requirements and lighting at 400 V.
Sewage	No bulk services upgrade required.	
Potable Water	Install a second supply line from the M14 "Chemical Berth" take off.	Construct a booster pump station to provide the pressure required at the proposed LNG berth utilising the existing pipeline.
Storm water	No bulk services upgrade required.	

*depending on fire-fighting requirements.

Table 1-1: Upgrade Options Summary

This technical note presents the assessment of the above-mentioned options and identifies the preferred option for each of the required upgrades to the fire-fighting, electrical supply and potable water systems.

2. METHODOLOGY

A Multi-criteria Assessment (MCA) was completed to select a single preferred option for the required system upgrades for each category of bulk services (fire-fighting, electrical supply and potable water systems). The criteria, the associated criteria weightings and the scoring approach for the MCA are presented in the following sections.

2.1. Criteria

The criteria considered in the MCA are described briefly in Table 2-1 below.

Main Criteria	Sub-criteria	Description
Inherent Safety	Safety of personnel	Safety of personnel during construction and operation and the inherent system redundancy.
	Redundancy implications for existing services	
Accessibility	Safe access for operation and maintenance	Ease of access for maintenance and operation of the facility.
Implementation	Availability of skills and materials	Ease of implementation or construction considering both the technical aspects during construction and the interface between the Port and the Private Terminal Operators during construction and operation.
	Speed of construction	
	Risk of delays during construction	
	Interface between port & terminal operators	
Maintainability	Localisation and repairability of damage	Ease of maintaining the infrastructure for the duration of its operational life.
	Special maintenance requirements (e.g. anodes, painting, etc.)	
Value and Cost	Capital cost	Relative quantitative assessment of the envisaged capital and operational costs associated with the facility.
	Operating and maintenance cost	
Environmental	Construction footprint and marine abstraction impacts as applicable	Relative assessment of the envisaged environmental impacts during construction or operation.

Table 2-1: Multi-criteria Assessment Criteria

2.2. Criteria Weightings

The base weightings for the MCA criteria, as used by PRDW for the options evaluation, are presented in

Main Criteria	Criteria Weighting
Inherent Safety	20%
Accessibility	15%
Implementation	10%
Maintainability	10%
Value and Cost	25%
Environmental	20%
TOTAL	**100%**

Table 2-2 below.

Main Criteria	Criteria Weighting
Inherent Safety	20%
Accessibility	15%
Implementation	10%
Maintainability	10%
Value and Cost	25%
Environmental	20%
TOTAL	**100%**

Table 2-2: Multi-criteria Assessment – Base Case Weightings

A sensitivity analysis was also completed to assess the sensitivity of the MCA to the criteria weightings. The criteria weightings for the various scenarios considered in the sensitivity analysis are presented in Table 2-3 below.

Main Criteria			Weighting Bias				
	Equal	Inherent Safety	Accessibility	Implementation	Maintainability	Value and Cost	Environmental
Inherent Safety	17%	50%	10%	10%	10%	10%	10%
Accessibility	17%	10%	50%	10%	10%	10%	10%
Implementation	16%	10%	10%	50%	10%	10%	10%
Maintainability	16%	10%	10%	10%	50%	10%	10%
Value and Cost	17%	10%	10%	10%	10%	50%	10%
Environmental	17%	10%	10%	10%	10%	10%	50%
TOTAL	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**

Table 2-3: Multi-criteria Assessment – Sensitivity Analysis Weightings

2.3. Scoring

For all criteria, other than value and cost, the options were assigned qualitative scores, relevant to the other options being considered, according to the scoring guideline outlined in Table 2-4.

Score	Comment
10	Good
5	Average
1	Bad

Table 2-4: Multi-criteria Assessment – Scoring Guideline

The value and cost criteria were assigned quantitative scores, based on the concept-level cost estimates presented in Section 3. The quantitative scores were assigned according to the following formula:

$$Assigned\ score = \frac{Minimum\ value\ for\ all\ options}{Value\ for\ the\ option\ considered} \times 10$$

3. CONCEPT-LEVEL COST ESTIMATE

3.1. Capital Cost Estimate

3.1.1. Basis of estimate

The capital cost estimate has been prepared considering the options presented in the Capacity Assessment, Demand Forecast and Options Identification report (PRDW, 2018). The basis of the capital cost estimate is as follows:

- The concept cost estimate targets a level of accuracy of +50% to -50%.
- The estimate has been derived using a combination of measured preliminary quantities and corresponding current or escalated unit rates largely based upon PRDW's internal rates database. Built-up rates and prices have been used where no relevant rates or prices were available.
- The capital cost estimate includes an allowance for the contractor's Preliminary and General (P&G) costs, a design development allowance to cover design and pricing uncertainties associated with the level of design information available at this stage of the project and a professional fee allowance to cover engineering and project management fees.
- The estimate excludes costs related to environmental, EIA and EMP costs, pre-tender and post contract escalation, project wide contingency (10% recommended) and construction site supervision costs.

3.1.2. Capital cost summary

The estimated capital costs for the options considered, excluding VAT, are summarised in Table 3-1 below.

Item No.	Description	Amount (ZAR)	
		Option 1	Option 2
1	**Fire fighting**		
1.1	Pump station superstructure	R 2 100 000	R 2 100 000
1.2	Pump station foundations	R 1 600 000	R 2 400 000
1.3	Pumps and pipework	R 21 900 000	R 21 900 000
1.4	Pressure pipeline from pump station to berth	R 11 400 000	R 3 000 000
1.5	Fire-fighting sundries (incl. valves and fittings)	R 3 600 000	R 2 600 000
	Total: Fire fighting	R 40 600 000	R 32 000 000
2	**Electrical Supply**		
2.1	Electrical work (incl. cabling, kiosks and lighting)	R 2 800 000	R 3 100 000
2.2	Mini sub station	R -	R 300 000
	Total: Electrical supply	R 2 800 000	R 3 400 000
3	**Potable Water**		
3.1	Potable water pipeline	R 1 200 000	R 800 000
3.2	Booster pump, pipework and valves	R -	R 1 000 000
3.3	Pump station	R -	R 200 000
	Total: Potable water	R 1 200 000	R 2 000 000

Table 3-1: Capital Cost Estimate (Excl. VAT)

3.2. Operational Cost Estimate

3.2.1. Basis of estimate

The operational cost estimate for the upgrade options has been calculated as a percentage of the capital cost estimate. The percentage, based on previous projects of a similar nature, is intended to illustrate the relative operational cost for the options and has been set at 5% of the capital cost estimate.

3.2.2. Operational cost summary

The estimated annual operational costs for the options considered, excluding VAT, are summarised in Table 3-2.

Item No.	Description	Amount (ZAR)	
		Option 1	Option 2
1	Fire fighting	R 2 030 000	R 1 600 000
2	Electrical Supply	R 140 000	R 170 000
3	Potable Water	R 60 000	R 100 000

Table 3-2: Annual Operational Cost Estimate (Excl. VAT)

4. MCA RESULTS – FIRE-FIGHTING

4.1. Base-case Weighting

The assigned scores for each criterion and the MCA outcome for the base weighting are presented in Table 4-1 below.

Total		**Option 1** - New onshore pump station adjacent to existing pump station; new seawater pipeline	**Option 2** - New pumps installed off access trestle at new berth
		91%	**64%**
Criteria	**Weighting**		
Inherent Safety	20%	20%	10%
Accessibility	15%	15%	8%
Implementation	10%	8%	6%
Maintainability	10%	9%	5%
Value and Cost	25%	20%	25%
Environmental	20%	20%	10%
Total	100%		
Criteria Breakdown	Weighting	Option 1	Option 2
Inherent Safety	100%	**10**	**5**
Safety of personnel	50%	10	5
		Option 2 scores lower than Option 1 due to the increased risks in working over water during the construction of the pump station on the trestle.	
Redundancy implications for existing services	50%	10	5
		Option 1 has the potential to integrate into the existing fire-fighting system for Berths 208 and 209 and could therefore provide redundancy for the existing system. Option 2 has no effect on the existing system, either positive or negative.	
Accessibility	100%	**10**	**5**
Safe access for operation and maintenance	100%	10	5
		Access to the pumps in a landside pump station is good and therefore Option 1 scores favourably. Option 2 scores lower due to the restricted access for pumps located on the trestle.	
Implementation	100%	**7.5**	**6**
Availability of skills and materials	30%	5	5
		No variation between options.	
Speed of construction	20%	5	10
		Option 1 scores lower than option 2 due to the addition time required to construct the pump station building.	
Risk of delays during construction	20%	10	5
		Option 2 scores lower than Option 1 due to the potential delays due to the interface between the construction of the trestle (operator responsibility) and the construction and installation of the pump facilities on the trestle (TNPA responsibility)	
Interface between port & terminal operators	30%	10	5
		As per Item 3.3, Option 2 scores lower than Option 1.	
Maintainability	100%	**9**	**5**
Localisation and repairability of damage	80%	10	5
		Option 2 scores lower than Option 1 due to the restricted access to pumps on the trestle and the potential for working over water during maintenance at the pump station.	
Special maintenance requirements	20%	5	5
		No variation between options - no special requirements for either option.	
Value and Cost	100%	**7.9**	**10**
Capital cost	75%	7.9	10.0
Concept-level capital cost estimate:		*R 40 600 000*	*R 32 000 000*
Operating and maintenance cost	25%	7.9	10.0
Concept-level annual operational cost estimate:		*R 2 030 000*	*R 1 600 000*
Environmental	100%	**10**	**5**
Marine abstraction impacts	100%	10	5
		Option 1 scores higher than Option 2 as the potential impacts of pumping water from the sea are already experienced at the existing pumping site.	

Table 4-1: MCA Base-case Scenario – Fire-fighting

The base-case scenario indicates that Option 1 scores higher than Option 2 due to the inherent safety, accessibility and maintainability practicalities that will be realised by constructing the required seawater and foam pump stations adjacent to the existing pump stations. From an environmental perspective, it is also preferable to combine the seawater extraction point with the existing pump station's extraction point.

4.2. Sensitivity Analysis on the Weightings

The sensitivity analysis on the criteria weighting is provided in Table 4-2.

Weighting Bias	Option 1	Option 2
Base Case	91%	64%
Equal	91%	60%
Inherent Safety	94%	56%
Accessibility	94%	56%
Implementation	84%	60%
Maintainability	90%	56%
Value and Cost	86%	76%
Environmental	94%	56%

Table 4-2: MCA Sensitivity Analysis – Fire-fighting

The sensitivity analysis indicates that the Option 1 scores consistently higher for all weighting scenarios.

4.3. Preferred Option

Based on the results on the MCA and the sensitivity analysis, Option 1 (the construction of a new onshore pump station adjacent to the existing pump station) was selected as the preferred option for meeting the fire-fighting requirements of the proposed berth.

5. MCA RESULTS – ELECTRICAL SUPPLY

As noted in The Capacity Assessment, Demand Forecast and Options Identification report (PRDW, 2018) and Table 1-1, the selection of the preferred option for the electrical supply to the proposed berth is dependent on the preferred fire-fighting option and therefore no MCA was required.

Based on the outcomes of the MCA for the fire-fighting supply (Section 4) Option 1, electrical supply directly from Berth 209 Substation, was selected as the preferred option for meeting the electrical requirements of the proposed berth.

6. MCA RESULTS – POTABLE WATER

6.1. Base-case Weighting

The assigned scores for each criterion and the MCA outcome for the base weighting is presented in Table 6-1 below.

Total		**Option 1** - Second pipeline from chemical berth take-off	**Option 2** - New booster station on existing supply pipeline
		77%	**68%**
Criteria	**Weighting**		
Inherent Safety	20%	15%	10%
Accessibility	15%	8%	8%
Implementation	10%	9%	7%
Maintainability	10%	10%	9%
Value and Cost	25%	25%	15%
Environmental	20%	10%	20%
Total	100%		
Criteria Breakdown	Weighting	Option 1	Option 2
Inherent Safety	100%	**7.5**	**5**
Safety of personnel	50%	10	5
		Option 1 scores higher than Option 2 due to the simplified nature of the construction and the limited maintenance required post construction.	
Redundancy implications for existing services	50%	5	5
		Neither option has any effect on the existing services, either positive or negative. Therefore both options are allocated a score of 5.	
Accessibility	100%	**5**	**5**
Safe access for operation and maintenance	100%	5	5
		No variation between options.	
Implementation	100%	**9**	**6.5**
Availability of skills and materials	30%	10	5
		Option 2 scores lower than Option 1 due to the additional procurement of the pumps and more complex nature of construction.	
Speed of construction	20%	5	5
		No variation between options.	
Risk of delays during construction	20%	10	5
		Option 2 scores lower than Option 1 due to the additional time required to install the booster station.	
Interface between port & terminal operators	30%	10	10
		Neither option interfaces directly with the construction of the berth and access trestle and therefore both options are assigned a score of 10.	
Maintainability	100%	**10**	**9**
Localisation and repairability of damage	80%	10	10
		No variation between options.	
Special maintenance requirements	20%	10	5
		Option 2 scores lower than Option 1 due to the additional maintenance associated with the booster pumps.	
Value and Cost	100%	**10**	**6.0**
Capital cost	75%	10.0	6.0
Concept-level capital cost estimate:		*R 1 200 000*	*R 2 000 000*
Operating and maintenance cost	25%	10.0	6.0
Concept-level annual operational cost estimate:		*R 60 000*	*R 100 000*
Environmental	100%	**5**	**10**
Construction Impacts	100%	5	10
		Option 1 scores lower than Option 2 due to the trenching required along the full length of the pipeline as opposed to the localised nature of the trenching required for the booster station for Option 2.	

Table 6-1: MCA Base-case Scenario – Potable Water

The base-case scenario indicates that Option 1 scores higher than Option 2 for all criteria except for the environmental criteria. Option 1 scores favourably primarily due to the simplicity of installing an

additional pipeline and the associated safety, implementation, maintenance and cost benefits when compared to installing a booster pump station.

From an environmental perspective, Option 1 scores relatively poorly due to the length of trenching required to install the additional pipeline. It is however noted that the entire area affected by the excavations is already disturbed from its natural state and therefore the potential environmental impacts should be marginal.

6.2. Sensitivity Analysis on the Weightings

The sensitivity analysis on the criteria weighting is provided in Table 6-2.

Weighting Bias	Option 1	Option 2
Base Case	77%	68%
Equal	77%	69%
Inherent Safety	77%	62%
Accessibility	67%	62%
Implementation	83%	68%
Maintainability	87%	78%
Value and Cost	87%	66%
Environmental	67%	82%

Table 6-2: MCA Sensitivity Analysis – Potable Water

The sensitivity analysis indicates that Option 1 scores consistently well for all weighting scenarios with Option 2 only being the preferred option when the weighting bias is towards environmental considerations.

6.3. Preferred Option

Based on the results of the MCA and the sensitivity analysis, Option 1 (the construction of an additional pipeline) was selected as the preferred option for meeting the potable requirements of the proposed berth.

7. CONCLUSIONS

This technical note has documented the outcomes of the multi-criteria assessment for the required bulk services upgrades. The preferred option for each bulk service is presented in Table 7-1.

Bulk Service	Preferred Option
Fire-fighting	**Option 1:** Deluge system supplied from a new seawater pump station on shore adjacent to existing pump station. Foam supplied by the existing foam pump station.
Electrical Supply	**Option 1:** Small power requirements and general lighting to the berth supplied directly from Berth 209 Substation at 400 V. The sea water pumps will be supplied directly from the Berth 209 substation.
Sewage	*No bulk services upgrade required.*
Potable Water	**Option 1:** Install a second supply line from the M14 "Chemical Berth" take off.
Storm water	*No bulk services upgrade required.*

Table 7-1: Preferred Options

8. REFERENCES

PRDW. (2018). Richards Bay LNG Terminal Bulk Services Study - Bulk Services Capacity Assessment, Demand Forecast and Options Identification. PRDW Study Report No. S2069-1-TN-GA-001-R1. Cape Town: PRDW.

Note: In all cases check against online version for the latest revision prior to use

APPENDIX C:
BULK SERVICES UPGRADE DESIGN – TECHNCIAL NOTE

REPORT

Note: In all cases check against online version for the latest revision prior to use

Richards Bay LNG Terminal Bulk Services Study
Bulk Services FEL-2 Technical Note

For: Port of Richards Bay

Project Name: Richards Bay LNG Terminal Bulk Services Study
Project Number: TBA

Author:	PRDW
Owner:	Transnet
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Project Sponsor:	Preston Khomo
Project Manager:	Ashveer Sathanund
Revision Number:	00
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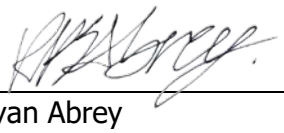
Prepared by:  09 / 02 / 2018
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1. INTRODUCTION

1.1. General

As part of the Independent Power Producer (IPP) programme, a Gas to Power (G2P) project has been launched by the South African Department of Energy (DoE) to address the electricity supply shortages in South Africa. The aim of the project is to develop and operate Liquefied Natural Gas (LNG) fired power stations at key locations in South Africa.

The DoE, in collaboration with Transnet SOC Ltd, and specifically its operating division Transnet National Ports Authority (TNPA), has undertaken a Pre-feasibility (FEL2) Study for LNG import projects in the Ports of Richards Bay.

The pre-feasibility study for the Port of Richards Bay identified two preferred sites for the location of the LNG import facility, namely Berth 207 (Layout 2) and the dig-out basin (Layout 1) in the South Dunes area as seen in Figure 1-1 below. At the close-out workshop, held in the Port of Richards Bay on 20 September 2016, it was agreed that Berth 207 should be adopted as the single preferred site for the LNG import facility.

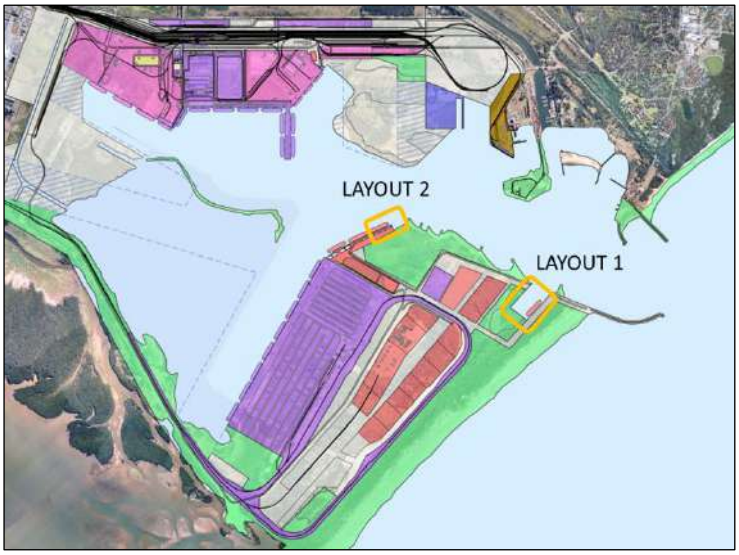

Figure 1-1: Pre-Feasibility Study Preferred Site Locations

The provision of bulk services was excluded from the FEL2 stage of the IPP project as it was identified as being the direct responsibility of TNPA. This study aims to assess the bulk services requirements at a pre-feasibility (FEL2) level of project development.

1.2. Bulk Services Study Introduction

The requirements for upgrading the bulk services infrastructure, and the associated alternatives for doing so, were determined through an assessment of the existing bulk services infrastructure and the bulk services demand for the proposed LNG facility (PRDW, 2018a). The following services requirements have been considered:

- Power supply;
- Sewage;
- Potable water;
- Fire-fighting; and
- Storm water.

A Multi-criteria Assessment (MCA) was subsequently completed to select the preferred options to be considered in the pre-feasibility design (PRDW, 2018b). The preferred option for each bulk service upgrade is presented in Table 1-1.

Bulk Service	Preferred Option
Fire-fighting	**Option 1:** Deluge system supplied from a new seawater pump station on shore adjacent to existing pump station.
Electrical Supply	**Option 1:** Small power requirements and general lighting to the berth supplied directly from Berth 208 Substation at 400 V. The sea water pumps will be supplied directly from the Berth 208 substation.
Sewage	*No bulk services upgrade required.*
Potable Water	**Option 1:** Install a second supply line from the M14 "Chemical Berth" take off.
Storm water	*No bulk services upgrade required.*

Table 1-1: Preferred Options

This technical note presents the outcomes of the pre-feasibility design of the preferred options.

2. BULK SERVICES REQUIREMENTS

The bulk service requirements to be used in this study are as follows:

2.1. Fire-fighting

Based on the duty flow rates for the existing Berth 208 fire-fighting system (Transnet Capital Projects, 2008), the seawater intake for the new pump station needs to be designed to supply approximately 26 300 l/min (437 l/s) which is then divided between the seawater pipeline and the foam pipeline (i.e. 7 200 l/min (118 l/s) for the firewater line and 19 100 l/min (318 l/s) for the foam line). These flow rates would need to be confirmed once the berth area and process requirements have been finalised to the Berth 207 Operator requirements as well as possible fire-fighting specialist inputs.

A foam pump station is required to inject the foam compound into the sea water to generate foam. It is noted that both the Options Identification Report (PRDW, 2018a) and the Options Evaluation Report (PRDW, 2018b) assumed that the additional foam requirements could be accommodated at the existing foam pump station. Further engineering development during this pre-feasibility design phase has indicated that the existing foam pump station cannot accommodate the additional

requirements and that a new foam pump station building will be required. The optimum location for this pump station is adjacent to the existing facility as a large holding tank is required.

The requirement for the additional foam pump station building further reinforces the outcome of the options assessment (PRDW, 2018a). The alternative option would involve constructing this foam pump station on the access trestle which is not considered to practical or cost effective.

The pressure required for the fire-fighting monitors at the end of the discharge pipeline is assumed to be 7 Bar in order to provide the required range and flow (Transnet Capital Projects, 2008).

2.2. Electrical Supply

No bulk electrical supply upgrades are required as there is 1.5 MVA available at the existing Berth 209 Substation which can supply electricity to the new sea water and foam pump stations as well as the small power and lighting requirements at the new berth.

2.3. Sewage System

No sewage requirements are considered at this stage.

It is noted that an additional septic tank may be required if an additional control tower or administration building is required to support the proposed facility.

2.4. Potable Water

The potable water system is to be able to supply 1 200 l/min of water (at 3 bar as per S.A.N.S requirements) to the furthest fire hydrant on the new Berth 207 (SABS, 2012).

2.5. Storm Water

As per Berth 208, any storm water runoff from the deck of the proposed berth structure needs to be collected in sumps and pumped to shore where the flow is then passed through an oil trap prior to draining out through a soak-away pit. A bulk services storm water upgrade is therefore not required.

As noted in the description of the existing system (PRDW, 2018a), the current oil trap is not currently in operation and an assessment of the oil trap requirements, including provision for storm water runoff from the deck of the berth, will be required as part of the design for the new Berth 207.

3. SYSTEM PARAMETERS

3.1. Water Characteristics

A maximum sea water density of 1 025 kg/m³ has been assumed.

3.2. Water Levels

For the purpose of hydraulic calculations, the following water levels have been used:

- High Water Level 2.10m CD (MHWS)
- Low Water Level 0.00m CD (LAT)

A summary of the full tidal range in the port of Richards Bay is provided in the table below:

Description	Level (m CD)
Highest Astronomical Tide (HAT)	2.47
Mean High Water Springs (MHWS)	2.11
Mean High Water Neaps (MHWN)	1.48
Mean Level (ML)	1.20
Land Levelling Datum (LLD)	1.015
Mean Low Water Springs (MLWS)	0.27
Mean Low Water Neaps (MLWN)	0.97
Lowest Astronomical Tide (LAT)	0.00

Table 3-1: Tidal characteristics Richards Bay (SANHO, 2018)

3.3. Pipe Roughness

Pipe friction losses have been calculated by using the following pipe wall roughness (K_0) characteristics for new and deteriorated pipes:

- New, smooth walled pipe: 0.003 mm
- Old, deteriorated pipe (worst case): 0.12 mm for uPVC (potable water system) and 0.15 mm for steel (fire-water pipeline).

4. ENGINEERING DEVELOPMENT

4.1. Fire-fighting

The existing seawater supply system does not have adequate capacity available to supply both the proposed Berth 207 and the existing Berth 208 simultaneously; therefore, additional pumping capacity is required to service the new berth with seawater for fire-fighting purposes.

The preferred option is to provide a new seawater pump station, similar to that of the existing fire-fighting pump house – refer to Figure 4-1 below.

In order to generate foam for the berth, a proportioner introduces a "foaming agent" from the storage tanks into the seawater at a required ratio. The proportioner is located just downstream of the seawater abstraction pumps where the foam water supply line splits from the seawater supply line. A new foam pump station and associated storage tank is required for the new Berth 207.

Similar to the existing seawater pump installation, it is envisaged that the new firewater pumps will be large vertical turbine multi stage pumps: one electrically driven duty pump and one diesel driven standby pump. The diesel standby pump will allow for operation should the main electrical supply to the pump station be faulty or when maintenance of the duty pump is in progress. A similar duty/standby pump configuration is required for the smaller foam pump installation.

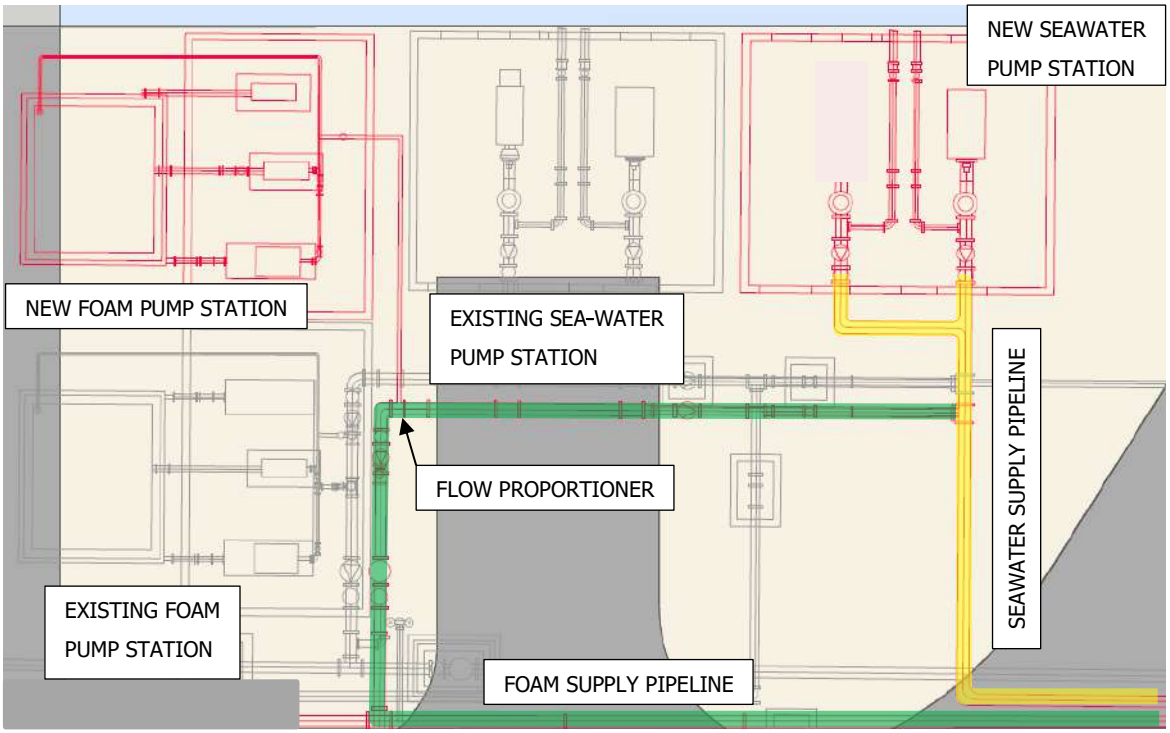

Figure 4-1: Existing and Proposed New Seawater and Foam Pump Facilities

To address the high maintenance costs associated with the existing Berth 208 fire-fighting pump installation, it is recommended that opportunities for efficiently managing maintenance costs be specifically addressed in the FEL-3 engineering stage. Such opportunities would possibly include the following:

- Selection and specification of materials suitable for the seawater application, for all mechanical and electrical components housed in the pump stations;
- Suitable design of HVAC system to minimize corrosive environment inside pump stations;
- Selection of a reputable pump manufacturer/supplier with a proven track record in similar marine installations;

- Ensuring that service and maintenance requirements recommended by the original equipment manufacturers (OEM), for pumps, motors, etc., are carried out at the recommended intervals;
- Consideration given to entering into a service agreement with the OEMs for servicing and maintenance of equipment.

For the purpose of this study, the following duty points have been used:

- Sea water pumps: 438 l/s at 140 m duty head; and
- Foam concentrate injection pumps: 20 l/s at 125 m head.

It is noted that the new fire-fighting supply system could possibly be connected to the existing fire-fighting system to also supply Berths 208 and 209, if considered to be a worthwhile additional risk mitigation measure. The technicalities of this possibility have not been assessed in this study but could be addressed in the next engineering stage, if required.

For the purpose of this study it is assumed that the pump installation will have a similar arrangement to that of the existing pump station; refer to Figure 4-2 below. Envisaged pipeline fittings and components such as bends, flow control valves, oscillating monitors, remote monitors and quay bund pourers, are shown in the drawings presented in Appendix A.

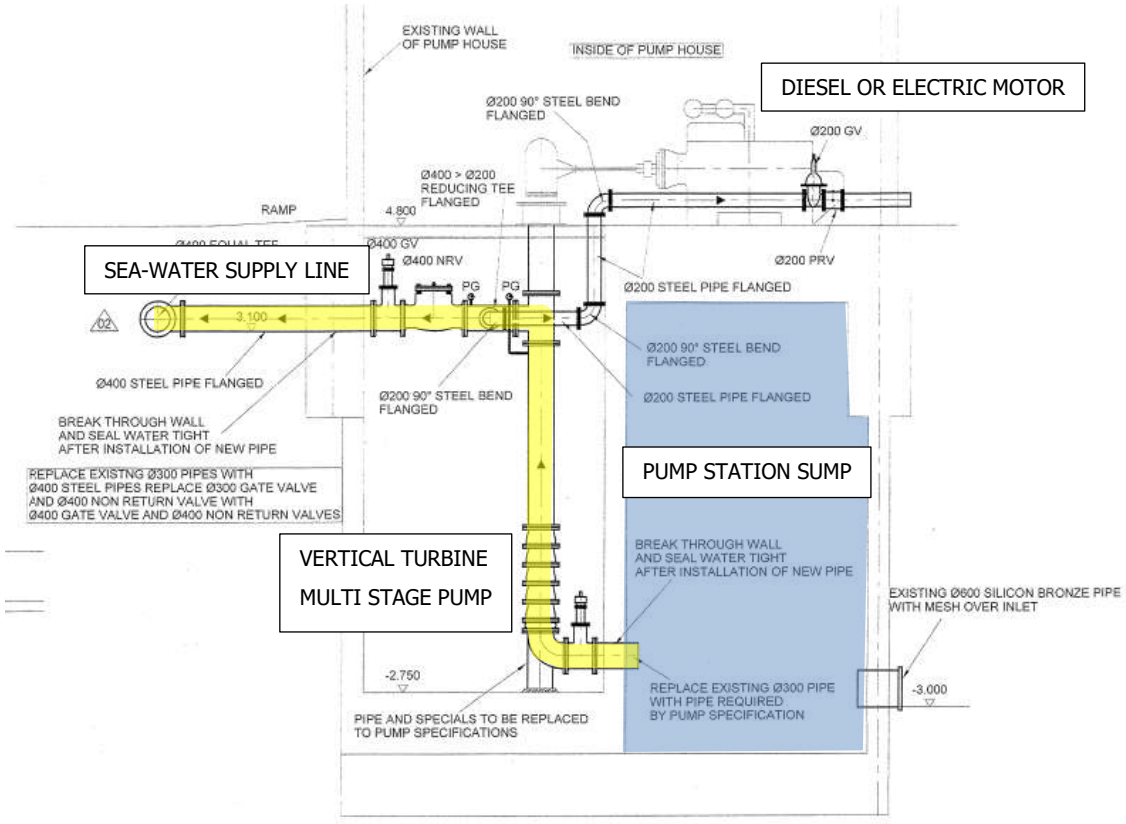

Figure 4-2: Section Through Existing Pump Station (Transnet Capital Projects, 2008)

The following berth fire-fighting equipment, based on the existing equipment installed for Berth 208, is envisaged for Berth 207:

- 12 No. Seawater Fire Hydrants;
  - 10 No. Hydrants along the access trestle (1 No. every 50 m);
  - 2 No. Hydrants on the berth platform;
- 2 No. Oscillating Monitors;
- 2 No. Remote Control Monitors;
- 3 No. Bund Pourers; and
- 3 No. Quay Pourers.

4.2. Electrical Supply

The electrical supply requirements are based on a power demand of up to 60 kVA for small quayside power requirements and general lighting at LNG Berth 207. It is envisaged that this power will be provided at 400 volts from the existing Berth 208 substation along a cable installed on cable trays fixed to the underside of the quay structure and typically feeding two distribution kiosks. All small power (including quick release hooks) and lighting requirements for the berth will be supplied from these distribution kiosks.

Power to the sea water and foam pump stations (estimated to be 1 200 kW) will also be provided from the existing Berth 208 substation along an underground cable to the proposed new pump station location adjacent to the existing pump station building.

The following electrical equipment is envisaged for the bulk electrical supply upgrade:

- 27 No. Light Pole with 250W HPS Fitting;
- 2 No. Light Mast Equipped with 400W HPS Floodlight; and
- 1 No. Distribution Kiosk.

4.3. Potable Water

The preferred installation of a second uPVC supply pipeline from the M14 "Chemical Berth" take-off to the proposed Berth 207 requires that a new supply line is buried in a trench for approximately 265 m, parallel to the existing supply line, before routing the pipeline an additional 600 m along the new access trestle to the proposed Berth 207.

The supply pressure at the connection point to the main reticulation network is 4 bar (Transnet Projects Design, 2007). Therefore, in order to ensure that the required 3 bar pressure is achieved at the furthest point in the extended potable water system, the head losses along this new pipeline will need to be less than 10 m (1 bar) when operating any of the fire hydrants (on its own) at its design flow rate.

A 160 mm diameter uPVC Class 16 pipeline (i.e. the same as the existing, shorter potable water pipeline to berth 208) would result in a worst-case head loss (for an old/deteriorated pipe, see section 3.3 above) of approximately 12.6 m; hence, a larger 200 mm diameter uPVC Class 16 pipe has been selected. The worst-case head loss for this pipe diameter is approximately 5.8 m. Refer to Figure 4-3 below.

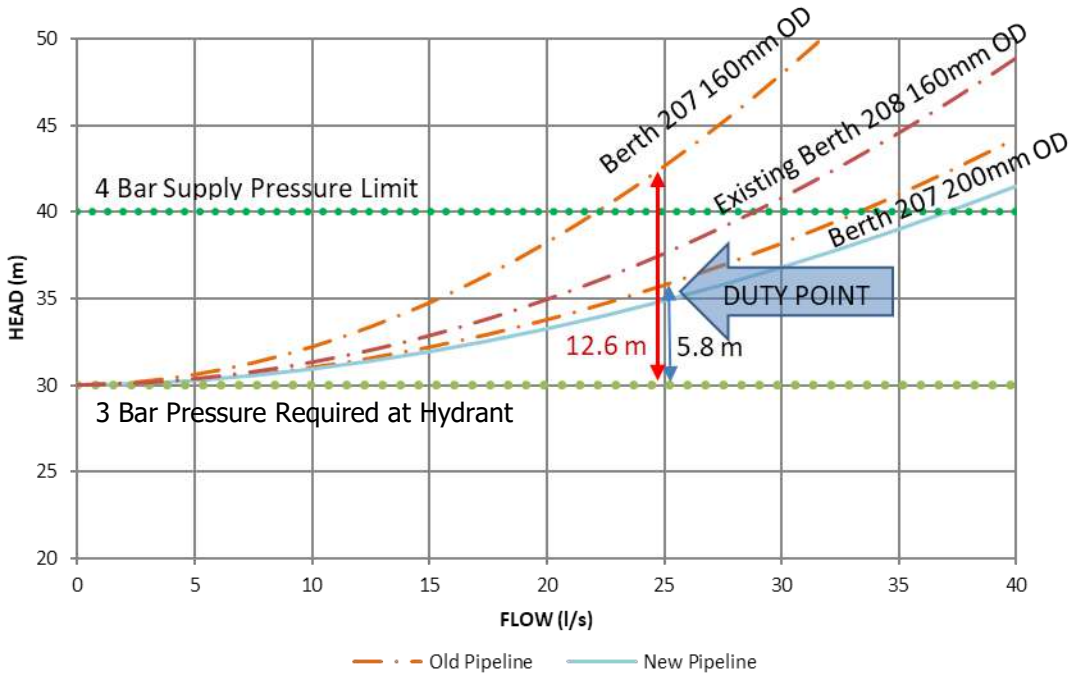

Figure 4-3: Potable Water System Curves

The following berth potable water fire-fighting equipment, based on the existing equipment provided for Berth 208, is envisaged for Berth 207:

- 12 No. Potable Water Fire Hydrants
  - 10 No. Hydrants along the access trestle (1 No. every 50 m); and
  - 2 No. Hydrants on the berth platform.

5. CONCLUSIONS

This study has concluded that the following bulk services are required for the new berth 207:

- A new seawater pump station, a new foam pump station and a new supply tank, similar to the existing fire-fighting installation, is required to supply the new berth with sea water and foam water.
- A new 200 mm diameter uPVC PN16 potable water pipeline, buried adjacent to the existing potable water supply pipeline which services berth 208. The new pipeline will connect to the existing water reticulation system at the M14 "Chemical Berth" take-off.

No upgrades are required for the electrical supply; the new sea water and foam pump stations can be supplied directly from the Berth 208 substation which currently has additional capacity available. Power supply from the existing substation would be via an 11 kV underground cable. Small power for the berth will also be supplied from this substation via a 400 V cable.

No upgrades to the bulk storm water or sewage systems are envisaged at this stage and any requirements, should these arise, will be handled locally at the berth.

6. RECOMMENDATIONS

It is recommended that the bulk services upgrade described in Section 5 above are carried forward to the next engineering stage (FEL-3).

In addition, it is recommended that the following tasks/studies are carried out prior to or as part of the FEL3 study:

- Assess the effectiveness of the existing storm water pump system and oil trap for Berth 208;
- Coordinate the fire-fighting system and electricity supply requirements to the new berth with the Berth 207 Operator's requirements;
- Specifically identify and address opportunities for efficiently managing maintenance costs in the detail design and specification of the fire-fighting system; and
- Assess the feasibility of connecting the new fire-fighting supply system to the existing system to provide redundancy.

7. REFERENCES

PRDW. (2018a). *Richards Bay LNG Terminal Bulk Services Study - Bulk Services Capacity Assessment, Demand Forecast and Options Identification. PRDW Study Report No. S2069-1-TN-GA-001-R1.* Cape Town: PRDW.

PRDW. (2018b). Richards Bay LNG Terminal Bulk Services Study - Bulk Services Options Evaluation. PRDW Study Report No. *S2069-1-TN-GA-002-R1. Cape* Town: PRDW.

SABS. (2012). 10252-1:2012 *Part 1: Water supply installations for buildings Ed3.* Pretoria: SABS Standards Division.

SANHO. (2018). Retrieved from South *African Navy Hydrographic Office: http://www.sanho.co.za.htm*

Transnet Capital Projects. (2008). Fire Fighting - Pump House Pipe Layout (Drawing No. WDB043C-H3 rev 02. Johannesburg: Transnet.

Transnet Projects Design. (2007). *Potable Water Supply Master Plan Update. Richards Bay*: Transnet Ports Authority.

APPENDICES

Note: In all cases check against online version for the latest revision prior to use

The following appendix is included with this report:

APPENDIX A: DRAWINGS

Note: In all cases check against online version for the latest revision prior to use

APPENDIX A: DRAWINGS

S2069-1-SK-WS-100-002	Bulk Services – Potable Water – General Arrangement
S2069-1-SK-PI-200-002	Bulk Services – Electrical – General Arrangement
S2069-1-SK-PI-300-003	Bulk Services – Fire Water – Pump Houses
S2069-1-SK-PI-300-004	Bulk Services – Fire Water – Quayside Details

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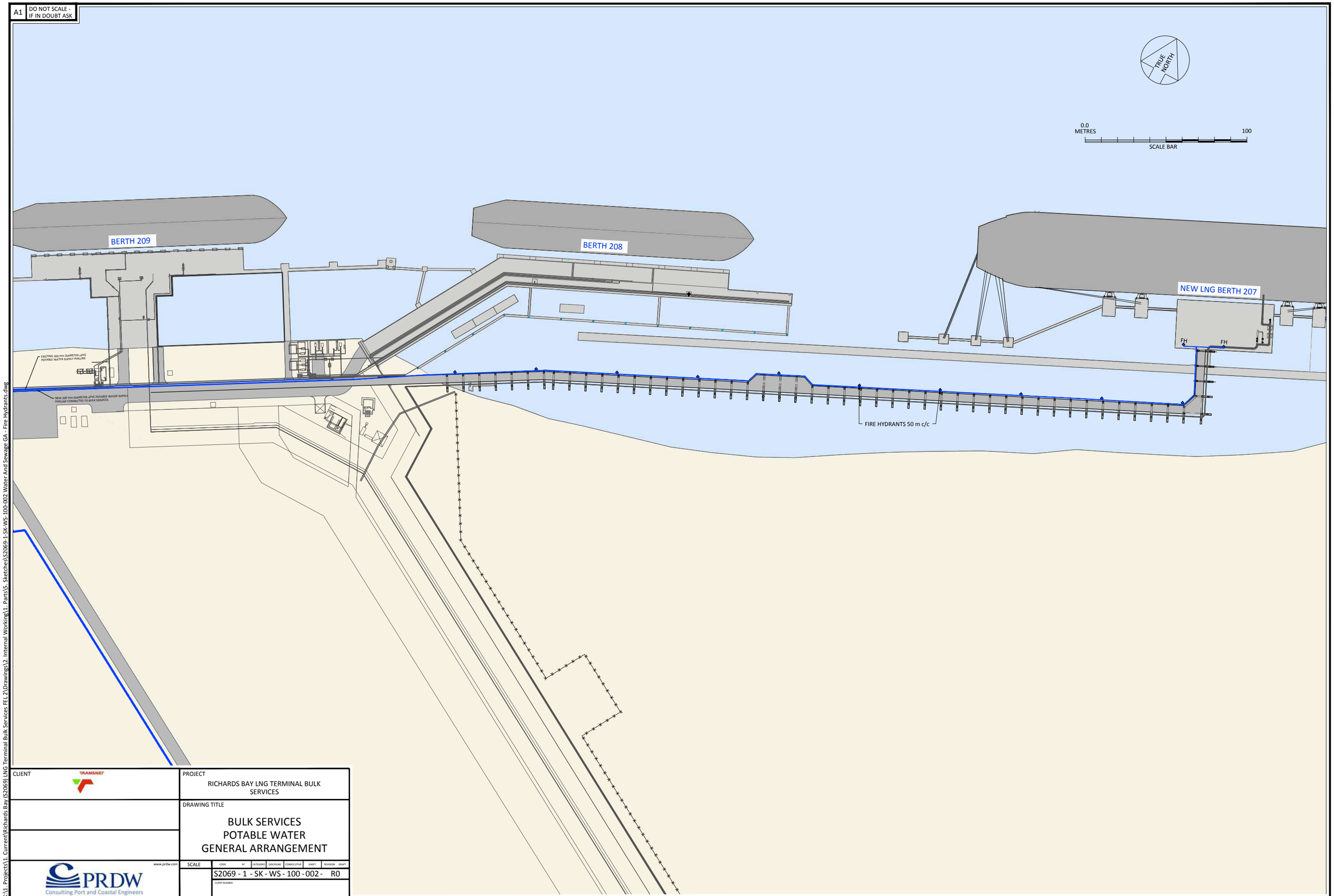

CLIENT TRANSNET

PROJECT
RICHARDS BAY LNG TERMINAL BULK SERVICES

DRAWING TITLE
BULK SERVICES
POTABLE WATER
GENERAL ARRANGEMENT

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SCALE

CODE	N°	CATEGORY	DISCIPLINE	CONSECUTIVE	SHEET	REVISION	DRAFT
S2069	- 1 -	SK	- WS -	100	- 002 -	R0	

CLIENT NUMBER

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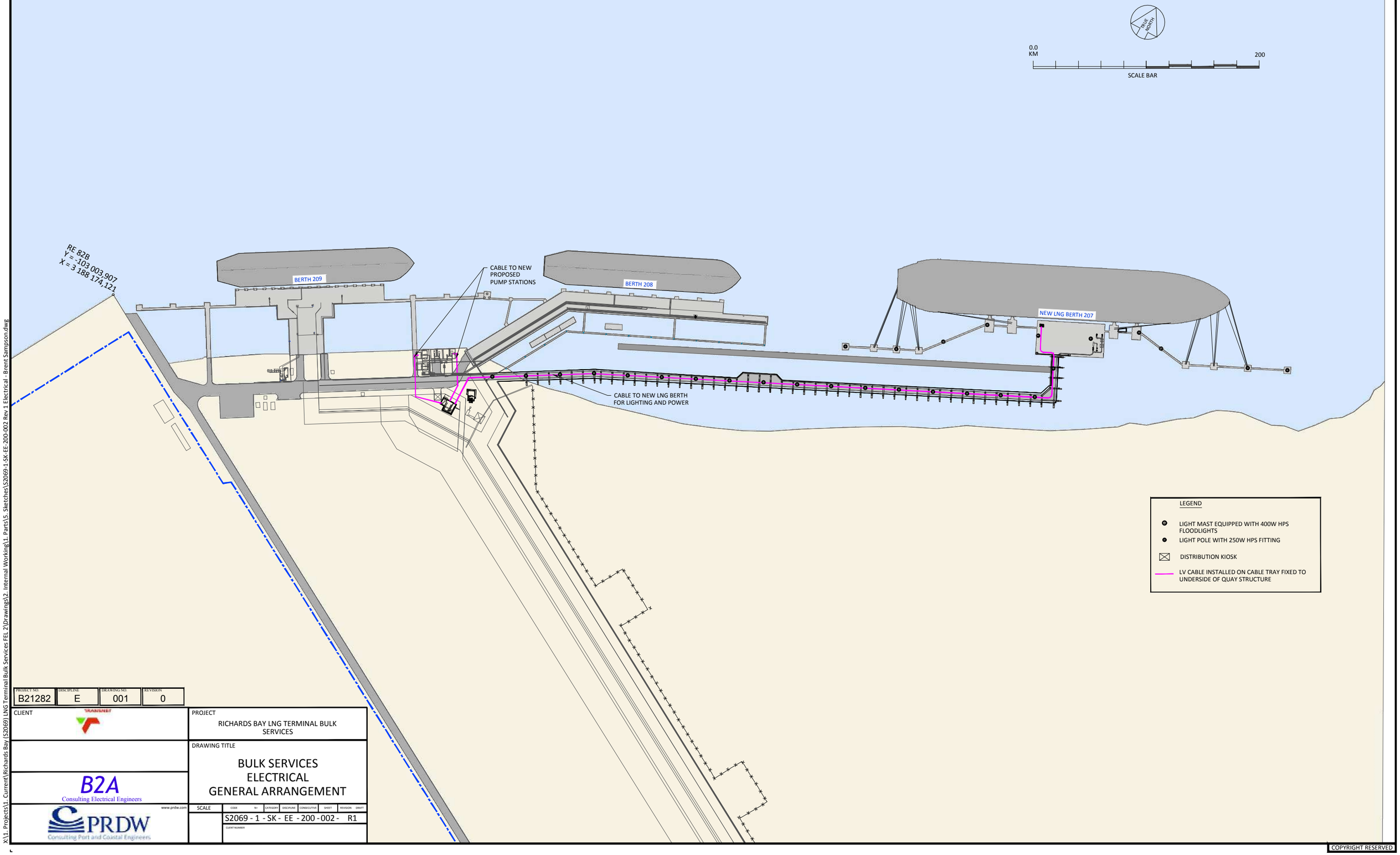

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PROJECT NO	DISCIPLINE	DRAWING NO	REVISION
B21282	E	001	0

CLIENT: TRANSNET

PROJECT: RICHARDS BAY LNG TERMINAL BULK SERVICES

DRAWING TITLE: BULK SERVICES ELECTRICAL GENERAL ARRANGEMENT

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SCALE

CODE	No	CATEGORY	DISCIPLINE	CONSECUTIVE	SHEET	REVISION	DRAFT
S2069	1	SK	EE	200	002	R1	

CLIENT NUMBER

A1 DO NOT SCALE - IF IN DOUBT ASK

TRUE NORTH

0.0 KM — 10

SCALE BAR

LEGEND	
BV	BUTTERFLY VALVE
DM	DIESEL MOTOR
BPFP	BALANCE VALVE WITH VARIABLE FLOW PROPORTIONER
PRV	PRESSURE-RELIEF VALVE
EM	ELECTRIC MOTOR
GV	GATE VALVE
PG	PRESSURE GAUGE
NRV	NON RETURN VALVE
STR	STRAINER
RCV	REMOTE CONTROL VALVE

PROPOSED FOAM PUMP HOUSE

FOAM TANK

BV STR

EM

BV

BV STR

DM

NRV

BV

NRV

GV

BPFP

EXISTING SEAWATER PUMP HOUSE

EXISTING SEAWATER PUMP HOUSE

NRV

GV

EXISTING SEAWATER PUMP HOUSE

PRV

GV

PROPOSED SEAWATER PUMP HOUSE

DIESEL-POWERED STANDBY PUMP

DM

MOTOR CONTROL CENTRE

ELECTRICALLY POWERED DUTY PUMP

EM

PG

NRV

GV

NRV

GV

GV

11 kV ELECTRICAL SUPPLY LINE (BURIED)

NRV

250 NB STEEL PIPELINE (SEAWATER)

EXISTING BERTH 208

NEW BERTH 207

400 NB STEEL PIPELINE (SEAWATER)

LAYDOWN AREA

EDGE ROAD

CLIENT: TRANSNET	PROJECT: RICHARDS BAY LNG TERMINAL BULK SERVICES
	DRAWING TITLE: BULK SERVICES FIRE FIGHTING PUMP HOUSES
www.prdw.com PRDW Consulting Port and Coastal Engineers	SCALE

CODE	Nº	CATEGORY	DISCIPLINE	CONSECUTIVE	SHEET	REVISION	DRAFT
S2069	1	SK	PI	300	003	R0	

CLIENT NUMBER

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A1 DO NOT SCALE - IF IN DOUBT ASK

TRUE NORTH

0.0 KM

100

SCALE BAR

NEW LNG BERTH 207

QUAY POURER

300 NB FOAM

BUND POURER

FH

FH

REMOTE MONITOR

REMOTE MONITOR

400 NB FOAM PIPELINE

250 NB SEAWATER PIPELINE

FIRE HYDRANTS 50 m c/c

OSCILLATING MONITOR

250 NB SEAWATER PIPELINE

OSCILLATING MONITOR

X:\1. Projects\1. Current\Richards Bay (S2069) LNG Terminal Bulk Services FEL 2\Drawings\2. Internal Working\1. Parts\5. Sketches\S2069-1-SK-PI-300-004 Fire Fighting - Quayside Details.dwg

CLIENT TRANSNET	PROJECT RICHARDS BAY LNG TERMINAL BULK SERVICES
	DRAWING TITLE BULK SERVICES FIRE FIGHTING QUAYSIDE DETAILS
www.prdw.com PRDW Consulting Port and Coastal Engineers	SCALE

CODE	N°	CATEGORY	DISCIPLINE	CONSECUTIVE	SHEET	REVISION	DRAFT
S2069 - 1 - SK - PI - 300 - 004 - R0							

CLIENT NUMBER

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APPENDIX D:
CAPITAL AND OPERATIONAL COST ESTIMATE

PRDW
Consulting Port and Coastal Engineers

TRANSNET

1 **PROJECT NO.**
S2069

2 **TITLE**
Richards Bay Terminal Bulk Services

3 **ESTIMATE PREPARED BY:** **DATE:**
PRDW **Jan-18**

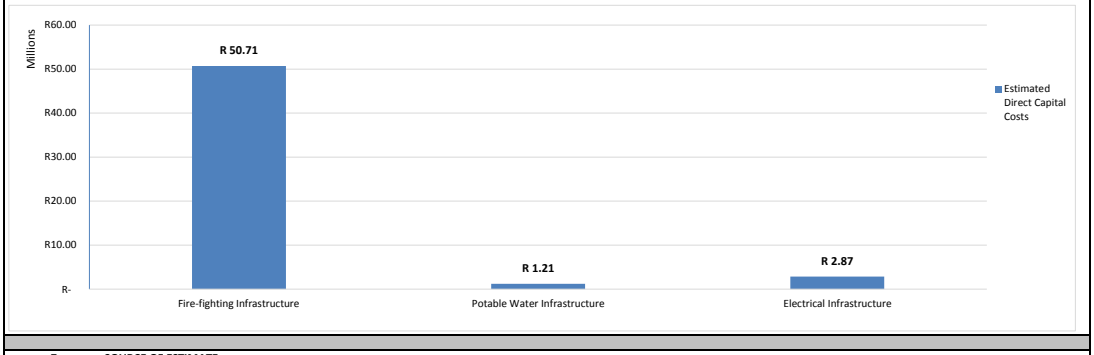
4 **SCOPE**
Scope Items & Description
Capital cost estimate for bulk services required for the LNG Berth include:
- Fire-fighting infrastructure - Sea water supplied from a new pump station
- Electrical infrastructure -Small power requirements and general lighting supplied directly from Berth 209 Substation at 400 V.
- Potable water infrastructure -A secondary pipeline installed from the M14 Chemical berth take off to the proposed LNG berth

5 **ASSUMPTIONS AND EXCLUSIONS**
Assumptions
Cost base as at Jan 2018
Exchange Rate (Dollar) - $ 1.00 R 12.20
Exchange Rate (Euro) - € 1.00 R 14.90

Exclusions
Upgrading of the storm water and sewage bulk services
Purchase/lease of land and/or relocation, restitution costs
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
Environmental, EIA and EMP costs
Pre-tender and post contract escalation
Project wide contingency (10% recommended)
Rate of exchange adjustment
Owners costs and Construction Site Supervision Costs
Value Added Tax or other foreign or South African taxes, royalties and duties

6 **CAPEX (Including P&G's, Design Development Allowance and Professional Fees)**

Item	Description	Fire-fighting Infrastructure	Potable Water Infrastructure	Electrical Infrastructure
	Base Capital Cost	R 34 030 000	R 810 000	R 1 920 000
	Preliminary and General costs	R 6 800 000	R 160 000	R 390 000
	Design Development Allowance	R 6 130 000	R 150 000	R 340 000
	Professional Design Fees	R 3 750 000	R 90 000	R 220 000
ESTIMATED CAPITAL COSTS		**R 50 710 000**	**R 1 210 000**	**R 2 870 000**



7 **SOURCE OF ESTIMATE**
Rates are largely based upon PRDW's internal rates data base

8 **LEVEL OF ACCURACY**

Rough Order of Magnitude FEL 1		Pre-feasibility /Conceptual FEL 2		Feasibility / Budget FEL 3		Definitive Control Budget FEL 4		Definitive Control Budget FEL 5	
Accuracy -30% to +50%		Accuracy -25% to +30%	✓	Accuracy -15% to +20%		Accuracy -10% to +15%		Accuracy -5% to +15%	
(No Dwg, No BoM), Thumb suck		Basis Captured on GA Dwgs		Detailed Design Dwgs 30%, Construction Dwgs, Site investigations		Construction Started		Construction Started	

9 **RISKS IDENTIFIED AND COMMENTS**

Project:	**Richards Bay Terminal Bulk Services**		**Jan-18**
Project No.:	**S2069**		
Title:	**Capital cost estimate for bulk services required for the LNG Berth include:**		
Element:	**Richards Bay Terminal Bulk Services**		

ITEM	REF	DESCRIPTION	UNIT	QTY	RATE	AMOUNT	COMMENTS
		Richards Bay Terminal Bulk Services					
1		Fire-fighting Infrastructure					
1.1		Pumps	sum	1	17 580 000	R 17 580 000.00	
1.2		Pump Stations	sum	1	7 240 000	R 7 240 000.00	
1.3		Pipework and pipe sundries	sum	1	9 210 000	R 9 210 000.00	
2		Potable Water Infrastructure	sum	1	810 000	R 810 000.00	
3		Electrical Infrastructure	sum	1	1 920 000	R 1 920 000.00	
		SUB-TOTAL:				**R 36 760 000.00**	
		P&G Allowance	20%			R 7 350 000.00	
		Design Development Allowance	15%			R 6 620 000.00	
		Professional Fee Allowance	8%			R 4 060 000.00	
		SUB-TOTAL CARRIED FORWARD TO SUMMARY:	Rounded			**R 54 790 000.00**	

PRDW
Consulting Port and Coastal Engineers

TRANSNET

1 PROJECT NO.
S2069

2 TITLE
Richards Bay Terminal Bulk Services

3 ESTIMATE PREPARED BY: **PRDW** **DATE:** **Jan-18**

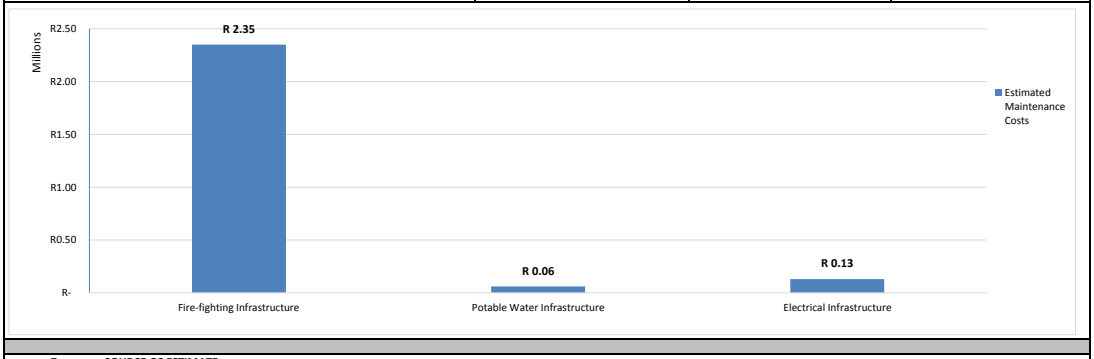
4 SCOPE
Scope Items & Description
Annual infrastructure maintenance and repairs cost estimate for bulk services required for the LNG Berth include:
- Fire-fighting infrastructure - Sea water supplied from a new pump station
- Electrical infrastructure -Small power requirements and general lighting supplied directly from Berth 209 Substation at 400 V.
- Potable water infrastructure -A secondary pipeline installed from the M14 Chemical berth take off to the proposed LNG berth

5 ASSUMPTIONS AND EXCLUSIONS
Assumptions
Cost base as at Jan 2018
Exchange Rate (Dollar) - $ 1.00 R 12.20
Exchange Rate (Euro) - € 1.00 R 14.90

Exclusions
Storm water and sewage bulk services operational costs
Allowance for market adjustment due to local and international demand, availability of skills, resources and materials
Environmental, EIA and EMP maintenance costs
Insurances
Utility costs, royalties and municipal fees
Value Added Tax or other foreign or South African taxes, royalties and duties

6 OPEX

Item	Description	Fire-fighting Infrastructure	Potable Water Infrastructure	Electrical Infrastructure
	Infrastructure maintenance and repairs	R 2 350 000	R 60 000	R 130 000
ESTIMATED CAPITAL COSTS		**R 2 350 000**	**R 60 000**	**R 130 000**



7 SOURCE OF ESTIMATE
Rates are largely based upon PRDW's internal rates data base

8 LEVEL OF ACCURACY

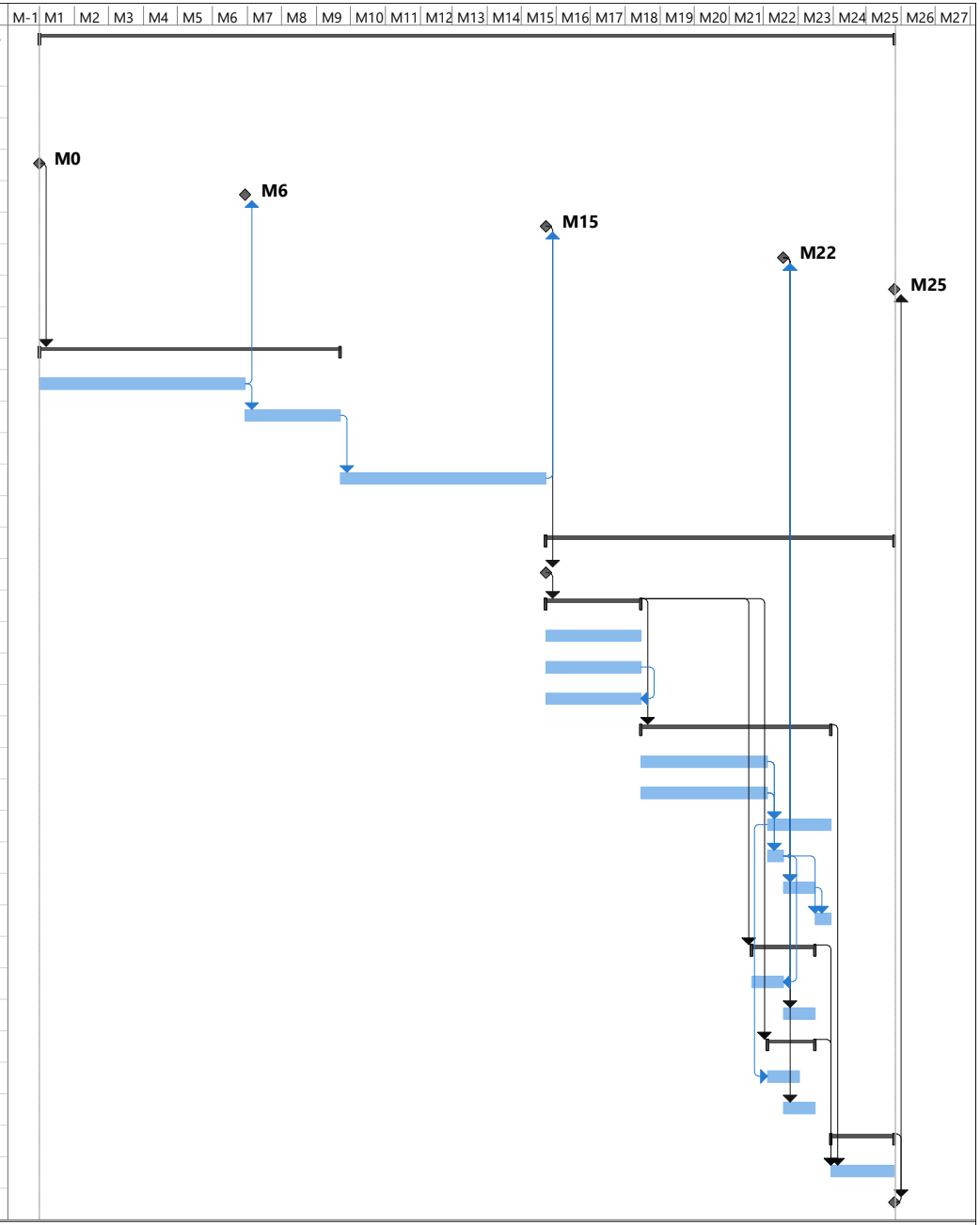
Rough Order of Magnitude FEL 1		Pre-feasibility /Conceptual FEL 2		Feasibility / Budget FEL 3		Definitive Control Budget FEL 4		Definitive Control Budget FEL 5	
Accuracy -30% to +50%	✓	Accuracy -25% to +30%		Accuracy -15% to +20%		Accuracy -10% to +15%		Accuracy -5% to +15%	
(No Dwg, No BoM), Thumb suck		Basis Captured on GA Dwgs		Detailed Design Dwgs 30%, Construction Dwgs, Site investigations		Construction Started		Construction Started	

9 RISKS IDENTIFIED AND COMMENTS

Note: In all cases check against online version for the latest revision prior to use

APPENDIX E:
IMPLEMENTATION SCHEDULE

ID	Task Name	Duration
1	**RICHARDS BAY LNG TERMINAL BULK SERVICES: HIGH-LEVEL IMPLEMENTATION SCHEDULE**	**108.05 wks**
2		
3	**MILESTONES**	
4	Decision to proceed with FEL3 & Appointment of Terminal Operator	0 wks
5	Complete FEL3 design	0 wks
6	Award of construction contract	0 wks
7	Terminal Operator provides access to trestle and berth for installation of services	0 wks
8	Bulk services commissioning complete	0 wks
9		
10	**DESIGN ACTIVITIES & APPROVALS**	**38 wks**
11	FEL 3: Detailed Design & Procurement Documentation	26 wks
12	Financial and economic assessment and approvals	12 wks
13		
14	**TENDERING AND PROCUREMENT**	**26 wks**
15		
16	**BULK SERVICES CONSTRUCTION**	**44 wks**
17	Award of construction contract	0 days
18	**Establishment & Site Facilities**	**12 wks**
19	Site establishment	12 wks
20	Procurement of long lead items: pumps and fire-fighting equipment	12 wks
21	Procurement of long lead items: pipelines	12 wks
22	**Fire-fighting**	**24 wks**
23	Construct seawater intake pump station and pipeline	16 wks
24	Construction foam pump station	16 wks
25	Installation of pumps and equipment	8 wks
26	Pipeline to root of access trestle	2 wks
27	Pipeline from root of access trestle to berth	4 wks
28	Installation of fire-fighting equipment	2 wks
29	**Potable Water**	**8 wks**
30	Pipeline from take-off to root of access trestle	4 wks
31	Pipeline from root of access trestle to berth	4 wks
32	**Electrical Supply**	**6 wks**
33	Supply from existing substation to pump stations	4 wks
34	Supply from existing substation to berth and trestle	4 wks
35	**Commissioning**	**8 wks**
36	Testing and comissioning of bulk services and equipment	8 wks
37	**Bulk Services Commissioning Complete**	0 days



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APPENDIX F:
ENVIRONMENTAL ASSESSMENT

Screening Report:

High-level Environmental Assessment of Bulk Services for the Liquefied Natural Gas Terminal, Port of Richards Bay

Report Prepared for

PRDW Consulting Port and Coastal Engineers

Report Number 525451/SR-02

Report Prepared by

srk consulting

January 2018

Screening Report:

High-level Environmental Assessment of Bulk Services for the Liquefied Natural Gas Terminal, Port of Richards Bay

PRDW Consulting Port and Coastal Engineers

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SRK Project Number 525451

January 2018

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Partner

Authors:

Philippa Burmeister, Tamaryn Hale

Executive Summary

Background

As part of the Independent Power Producer (IPP) programme, a Gas to Power (G2P) project has been launched by the South African Department of Energy (DoE) to address the electricity supply shortages in South Africa. The aim of the project is to develop and operate Liquefied Natural Gas (LNG) fired power stations at key locations in South Africa.

A Pre-Feasibility (FEL2) Study for LNG import projects in the Port of Richards Bay was undertaken in which two preferred sites for the location of the LNG import facility were identified. At a close-out workshop for the study it was agreed that Berth 207 would be the preferred site for the LNG import facility.

The provision of bulk services for the Floating Storage Regasification Unit (FSRU) was excluded from the FEL2 stage of the IPP project. A review of the existing bulk services and those required by the FSRU, as well as the associated Berth 207 facility, was undertaken by PRDW in November 2017. PRDW thereafter estimated the upper and lower limits for the FSRU bulk services requirements and assessed the existing bulk service systems to identify any associated bulk services capacity constraints.

SRK Consulting (South Africa) (Pty) Ltd (SRK) has been appointed by PRDW Consulting Port and Coastal Engineers (PRDW) to assist with a high-level environmental assessment of the required bulk services for the LNG Terminal. SRK's scope includes the preparation of an environmental screening report (this report) to identify all environmental permitting, approval and regulatory requirements.

Summary of findings

The following upgrades were identified by PRDW:

- **Fire-fighting** – Sea water will be supplied from a new pump station onshore. The pump station will be located adjacent to the existing pump station and will run an approximately 615m long pipeline along the trestle to the new LNG Berth 207.
- **Electrical Supply** – Because the new water pump station for fire-fighting is to be located adjacent to the existing pump station, there will be small power requirements and general lighting needs. The 400V of power required will be sourced directly from the Berth 209 Substation.
- **Potable Water** – A second uPVC supply pipeline will be constructed from the M14 "Chemical Berth" take-off.

To determine whether the site includes sensitive terrestrial and aquatic habitats, three data sets (refer to Table ES-1) where considered.

Table ES-1: Presence of sensitive terrestrial and aquatic habitats

Dataset	Study Area
Ezemvelo KZN Wildlife Terrestrial Systematic Conservation Plan (TSCP)	100% transformed
South African National Biodiversity Institute (SANBI) National Biodiversity Assessment: Terrestrial Habitats	Entire Port of Richards Bay and surrounding area classified as Least Threatened
National Freshwater Ecosystem Priority Area (NFEPA)	Entire Port of Richards Bay classified as a National Freshwater Ecosystem Priority Area Estuary

Legal Review

The review of environmental legislation identified the following legislation as relevant to the proposed upgrades:

- National Environmental Management Act, 1998 (Act No. 107 of 1998) (NEMA) and the Environmental Impact Assessment (EIA) Regulations (2014) promulgated in terms of the NEMA; and
- National Heritage Resources Act, 1999 (Act No. 25 of 1999) (NHRA).

Conclusions

Based on SRK's understanding of the project and the screening assessment undertaken, SAHRA will need to be notified of the project and provided with information. Thereafter SAHRA will indicate their requirements in terms of compliance with the NHRA.

Barring the SAHRA requirements, no additional environmental authorisations, permits or approvals have been identified.

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Disclaimer

The opinions expressed in this Report have been based on the information supplied to SRK Consulting (South Africa) (Pty) Ltd (SRK) by PRDW Consulting Port and Coastal Engineers (PRDW). The opinions in this Report are provided in response to a specific request from PRDW to do so. SRK has exercised all due care in reviewing the supplied information. Whilst SRK has compared key supplied data with expected values, the accuracy of the results and conclusions from the review are entirely reliant on the accuracy and completeness of the supplied data. SRK does not accept responsibility for any errors or omissions in the supplied information and does not accept any consequential liability arising from commercial decisions or actions resulting from them. Opinions presented in this report apply to the site conditions and features as they existed at the time of SRK's investigations, and those reasonably foreseeable. These opinions do not necessarily apply to conditions and features that may arise after the date of this Report, about which SRK had no prior knowledge nor had the opportunity to evaluate.

1 Introduction and Background

1.1 Port of Richards Bay

The Port of Richards Bay is South Africa's largest port. It occupies 2,157 ha of land area and 1,495 ha of water area. It was built in 1976 for the export of coal from South Africa to international markets. Prior to the construction of the harbour the area was a natural lagoon. Since its construction the Port has grown to include the following infrastructure:

- **Liquid Bulk Terminal** – this terminal consists of two berths that service two bulk liquid storage companies, namely Island View Storage (IVS) and Joint Bunker Services (JBS). The terminal has a current throughput of 1.4 million tonnes per year and a future throughput capacity of 2.7 million tonnes per year. Island View Storage, Bidvest Company, handles a wide range of bulk liquids, mainly chemicals and specialised liquefied gases. The terminal has a total storage capacity of 260 000 m^3. Joint Bunker Services operates what is referred to as the Bunker Terminal which also operates from the berths included in the Liquid Bulk Terminal. The capacity of the terminal for the storage of fuel is increased by the use of two bunker barges also operating in the Port. The proposed project lies within the liquid bulk terminal area of the Port.
- **Multipurpose Terminal** – this terminal resulted from merging the Bulk Metal and Combi Terminals. The terminal is now able to handle break bulk, neo-bulk and containers. The terminals covered storage has a capacity of 22 500 m^2 and open storage of 530 000m^2. It has 6 berths with and annual throughput of 7.2 million tonnes and a throughput capacity of 8.2 million tonnes for break bulk cargo. The terminal is operated by Transnet Port Terminals.
- **Dry Bulk Terminal** – this terminal handles various products via a conveyor system. No one part of the conveyor system is dedicated to a particular commodity and therefore to prevent contamination the belts, transfer points, rail trucks and vessel loaders/unloaders need to be thoroughly washed between handling of different commodities. The Dry Bulk Terminal has 7 berths that have varying depths ranging between 14.5 and 19m. The Dry Bulk Terminal currently handles in excess of 20 million tonnes of cargo annually and is operated by Transnet Port Terminals.
- **Coal Terminal** – The Port of Richards Bay was originally designed to export coal. When it opened on 1976 it had a capacity of 12 million tons per annum. This has grown to a current design capacity of 91 million tons per annum and an annual throughput of 70 million tonnes. This makes the coal terminal the largest export coal terminal in the world. The coal terminal is 276 ha in extent. It has 6 berths and four ship loaders. The coal terminal stockyard has a capacity of 8.2 million tons. The Coal terminal is privately operated by Richards Bay Coal Terminal Company Limited.
- **Support Infrastructure** – The Port has a dedicated railway line that connects the port to Gauteng and Mpumalanga. The line was designed specifically for coal handling. The port is also connected to Durban and Swaziland via rail networks. Trains of up to 200 wagons deliver coal to the Coal Terminal on a daily basis. Each payload averages 16,800 tonnes. The port is also supported by road networks.

Refer to Figure 1-1 for the location of the various components of the Port of Richards Bay.

N

Legend

- TNPA Boundary

Richards Bay

- Dry Bulk
- Liquid Bulk
- MPT
- Open Space
- Richards Bay Coal Terminal
- TNPA Other

Data Source:	
Scale 1:65 000	
Projection:	Datum: HH94
Central Meridian/Zone:	

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SCREENING REPORT - BULK SERVICES FOR THE LNG TERMINAL, PORT OF RICHARDS BAY

LOCATION OF THE PORT OF RICHARDS BAY COMPONENTS

Date: 19/11/2012	Compiled by: REEL
Project No. 525451	Fig No. 1-1

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Revision: B Date: 27 11 2017

1.2 Project background

As part of the Independent Power Producer (IPP) programme, a Gas to Power (G2P) project has been launched by the South African Department of Energy (DoE) to address the electricity supply shortages in South Africa. The aim of the project is to develop and operate Liquefied Natural Gas (LNG) fired power stations at key locations in South Africa.

A Pre-feasibility (FEL2) Study for LNG import projects in the Port of Richards Bay was undertaken in which two preferred sites for the location of the LNG import facility were identified. At the close-out workshop (held on 20 September 2016) it was agreed that Berth 207 would be the preferred site for the LNG import facility.

The provision of bulk services for the Floating Storage Regasification Unit (FSRU) was excluded from the FEL2 stage of the IPP project. This study aims to assess the bulk services requirements at a pre-feasibility (FEL2) level of project development.

SRK Consulting (South Africa) (Pty) Ltd (SRK) has been appointed by PRDW Consulting Port and Coastal Engineers (PRDW) to assist with a high-level environmental assessment of the required bulk services for the LNG Terminal. SRK's scope includes the preparation of a screening report (this report) to identify all environmental permitting, approval and regulatory requirements.

1.3 Assumptions and limitations to the report

SRK's screening assessment is subject to the following assumptions and limitations:

- The required approvals for the construction and fixing of the trestle and associated new LNG Berth 207 have been obtained in a separate process and therefore fall outside of the scope of this environmental screening assessment.
- No bulk services providing an interaction between the FSRU and the berth have been identified and therefore have been excluded from the scope of this environmental screening assessment.
- Any infrastructure and service requirements falling outside of the bulk service provision are excluded from the scope of this environmental screening assessment.

2 Approach

SRK undertook the following steps in determining the environmental permits, approvals and regulatory requirements for the project:

- Develop an understanding of the project, which included:
  - Initiation meeting with PRDW;
  - Review of the Bulk Services Capacity Assessment, Demand Forecast and Options Identification report prepared by PRDW; and
  - Review of the options identified for each bulk service.
- Develop an understanding of baseline environment through review of existing maps to identify sensitive environmental features on site and surrounding the site. This included a review of available information and historical reports available for the site;
- Undertake an environmental legal review to determine potential authorisations, permits and licenses required; and
- Compile a Screening Report, this report, that provides:
  - An overview of SRK's understanding of the proposed project;
  - An understanding of what potential environmental permits and/or licences will be required for the site; and
  - A description of the site baseline that underpins the legal requirements, based on existing information.

3 Understanding of the project

3.1 Review of existing bulk services and future requirements

A review of the existing bulk services and those required by the FSRU, as well as the associated Berth 207 facility, was undertaken by PRDW in November 2017. The existing services and the required services for the operation of the LNG berth are detailed in the sub-sections that follow.

3.1.1 Fire-fighting

The FSRU will be equipped with its own seawater intake for fighting fires on board the vessel. Therefore, it is anticipated that only fire-fighting requirements for the berth itself need to be considered.

3.1.2 Potable water

A bulk water pipeline currently extends to the proposed location of the FSRU at Berth 207 and a reverse osmosis plant on the vessel will typically provide the potable water requirements for the vessel. An additional potable water pipeline will be needed to supply the fire hydrants at Berth 207 as described in Section 3.1.1 above.

3.1.3 Power supply

The FSRU is typically powered by an on-board power plant using fuel gas and oil and therefore, an external electrical power supply for the FSRU is not deemed necessary. For the purposes of this assessment it has been assumed that no bunkering to supply the vessel with fuel gas and oil will be required.

Bulk electrical power supply currently extends to the Berth 209 substation. Additional bulk electrical power supply will be required from the substation to the fire-fighting pump station and along the new Berth 207 trestle to the berth for lighting etc.

The only bulk electrical power required is for the fire-fighting pump station.

3.1.4 Sewage

Sewage will most likely be treated on the vessel using an on-board plant, such as a membrane bioreactor. Therefore, no bulk sewage services requirements are anticipated for the vessel. However, concentrated sludge will need to be removed periodically from the settling holding tank and disposed of at a suitable onshore sewage treatment plant. For the purposes of this assessment it has been assumed that the current process undertaken at the other Berths (i.e. use of sludge handling vehicles to remove sludge from the quayside) will be implemented and as such no additional bulk sewage services will be required.

In terms of the Berth 207 requirements, should an additional control tower be required the sewage flows from the toilet facilities in this building would be handled in a similar manner to that of the existing control tower facilities (i.e. installation of a septic tank and soakaway pit system). The need for an additional control tower is, however, unlikely as the existing tower has capacity for an additional berth. As such, for the purposes of this assessment it has been assumed that no additional bulk sewage services will be required for the Berth.

3.1.5 Storm water

Any storm water on the vessel is expected to be routed back to sea. Therefore, it is not expected that any onshore storm water handling will be required for the FSRU.

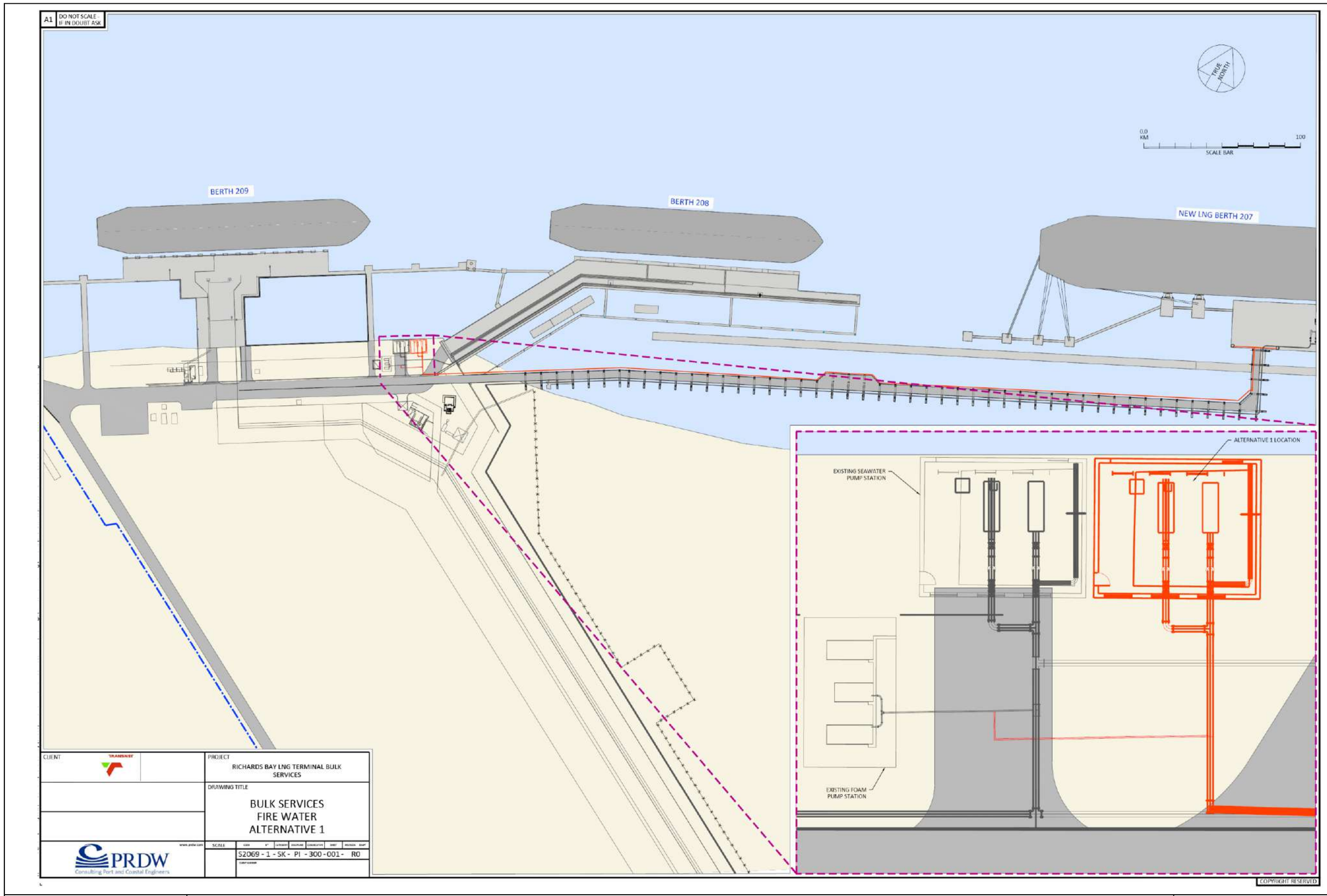
As is done for Berth 208, any storm water runoff from the deck of the proposed berth structure will need to be collected in sumps and pumped to shore where the flow is then passed through an oil trap prior to draining out through a soak-away pit. Therefore in terms of the storm water for the berth, this is treated locally and as such there is no additional demand on existing bulk services.

3.2 Proposed upgrades to bulk services

PRDW estimated the upper and lower limits for the FSRU bulk services requirements and assessed the existing bulk service systems to identify any associated bulk services capacity constraints. PRDW identified the need to upgrade the fire-fighting, electrical supply and potable water supply services. PRDW identified options to meet the bulk service requirements. SRK reviewed the options and provided environmental input. Once the input was received PRDW presented the options to Transnet National Ports Authority (TNPA) and Option 1 was selected as the preferred option for all three bulk services. The proposed upgrade options and SRK's environmental are detailed in Table 3-1.

Table 3-1: Upgrade options summary

Bulk Service	Option 1	Option 2
Fire Fighting	Sea water will be supplied from a new pump station onshore. The pump station will be located adjacent to the existing pump station and will run an approximately 615m long pipeline along the trestle to the new LNG Berth 207 (refer to Figure 3-1). In terms of potential environmental impact, this is the marginally preferred option as the potential impacts of pumping water from the sea are already experienced at the existing pumping site and it is assumed the required scour protection is in place. Option 1 has been confirmed in the PRDW *Bulk Services Options Evaluation Report* as the final upgrade option.	Sea water will be supplied from a new pump station located on the access trestle near the new LNG Berth 207. An approximately 100m long pipeline will be installed along the underside of the trestle (refer to Figure 3-2). This option will require the installation of a pump within the sea. There is some uncertainty at this stage as to how far down the pump will go and the depth of the sea floor. Should the sea floor be close to the abstraction point then this could potentially impact the benthos of the sea floor.
Electrical Supply [NOTE: the electrical supply options are dependent on the fire fighting options]	Should the new water pump station for fire-fighting be located adjacent to the existing pump station then there will be small power requirements and general lighting needs. The 400V of power required will be sourced directly from the Berth 209 substation. Option 1 has been confirmed in the PRDW *Bulk Services Options Evaluation Report* as the final upgrade option.	Should the new pump station for fire-fighting be located near the new LNG Berth 207 then a miniature substation will need to be installed at the new LNG Berth 207 to accommodate sea water pump requirements of 11kV. This option will also include small power requirements and lighting of 400V, however, an 11kV powerline will be required from the miniature substation to the pump station. Additional infrastructure will be required, albeit with a negligible environmental impact, and as such Option 1 is marginally preferred.
Potable Water	A second uPVC supply pipeline would need to be constructed from the M14 "Chemical Berth" take-off (refer to Figure 3-3). This option will involve trenching along a stretch of land to the west of the water pump station and therefore may have more construction phase impacts than that of Option 2. Option 1 has been confirmed in the PRDW *Bulk Services Options Evaluation Report* as the final upgrade option.	The existing pump station does not have sufficient pressure for the additional water requirements and as such a new booster pump station will be constructed in order to provide the required pressure at the proposed new LNG Berth 207 (refer to Figure 3-3). This option involves excavations that will be localised to the pump station site as opposed to extending over a stretch of land. As such, this is marginally the preferred option in terms of environmental impact.



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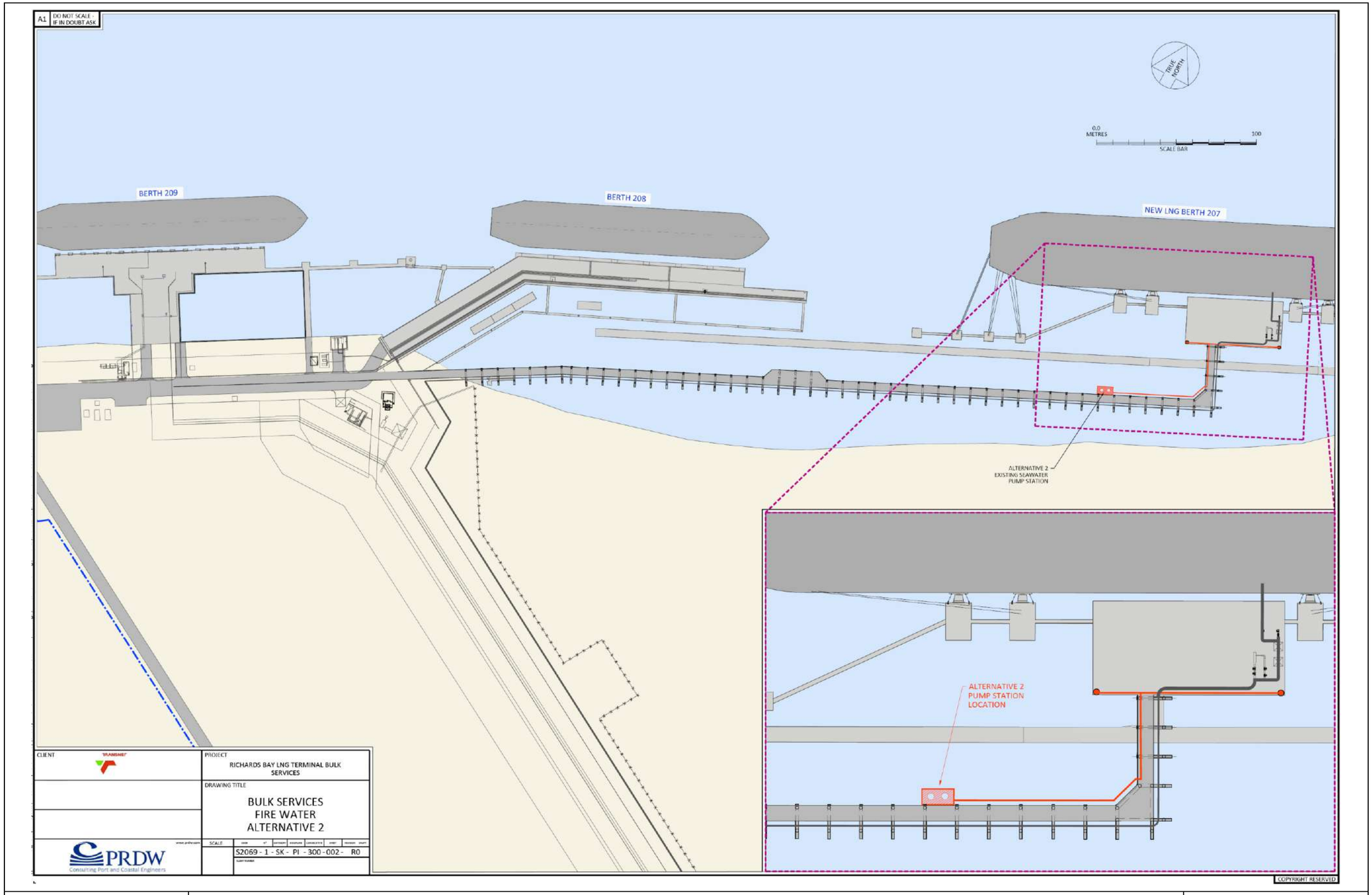
SCREENING REPORT: HIGH-LEVEL ENVIRONMENTAL ASSESSMENT OF BULK SERVICES FOR THE LNG TERMINAL, PORT OF RICHARDS BAY

PROVISION OF FIRE WATER – OPTION 1

Project No. 525451

Figure 3-1: Provision of fire water – Option 1 (Note: the red indicates the proposed new infrastructure)



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SCREENING REPORT: HIGH-LEVEL ENVIRONMENTAL ASSESSMENT OF BULK SERVICES FOR THE LNG TERMINAL, PORT OF RICHARDS BAY
PROVISION OF FIRE WATER – OPTION 2

Project No. 525451

Figure 3-2: Provision of fire water – Option 2 (Note: the red indicates the proposed new infrastructure)

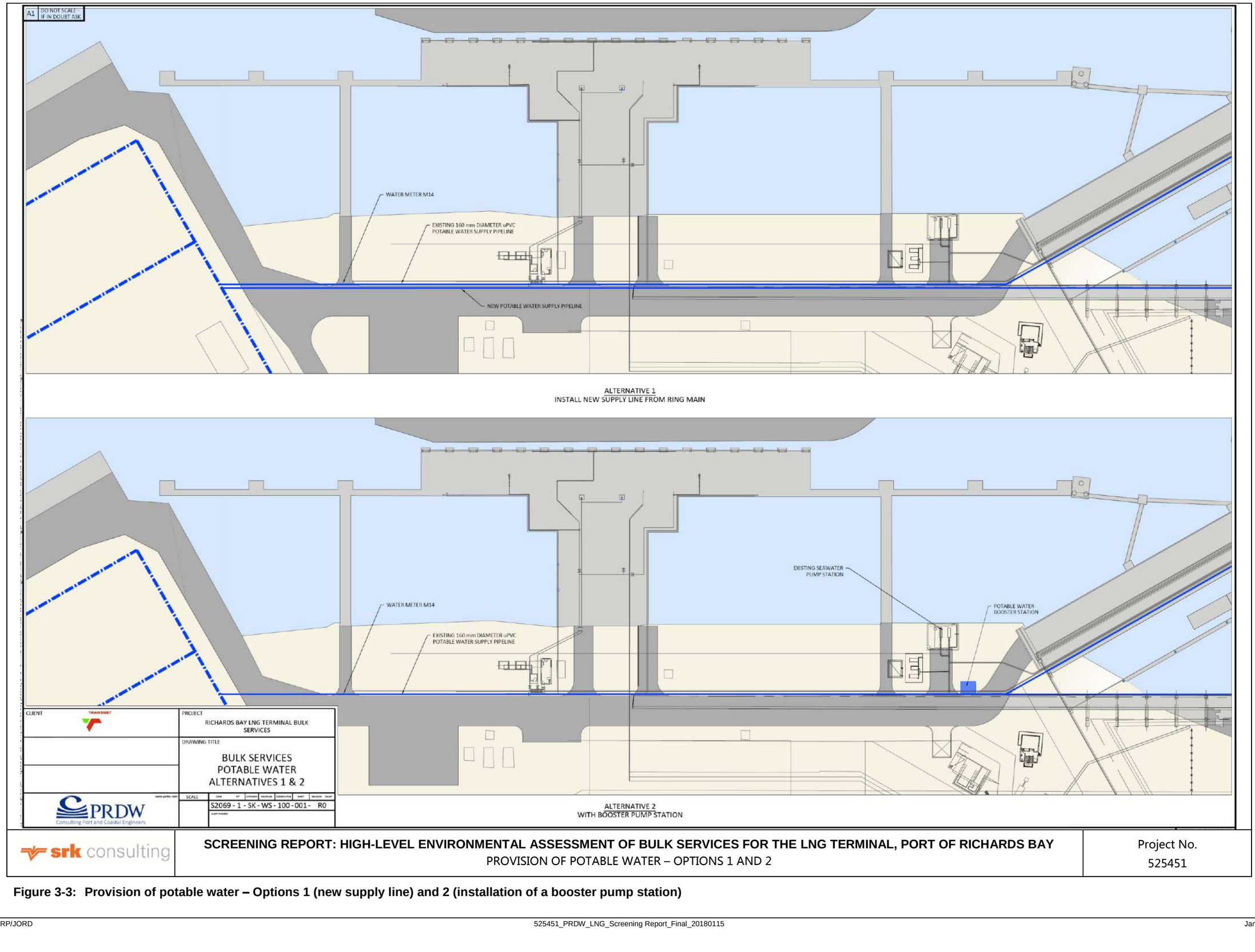

Figure 3-3: Provision of potable water – Options 1 (new supply line) and 2 (installation of a booster pump station)

N

0 62.5 125 250 Meters

Legend

Bulk Services Upgrade

- Potable Water
- Fire Fighting
- Roads
- TNPA Port Boundary
- Project Study Area

Data Source:	
Scale: 1:5 000	
Projection: TM	Datum: HH94
Central Meridian/Zone: Lo31	
Date: 09/11/2017	Compiled by: STBOD
Project No: 525451	Fig No: 3-4

Revision: A Date: 09 11 2017

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SCREENING ASSESSMENT: BULK SERVICES LNG BERTH

PROPOSED BULK SERVICE UPGRADES

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4 Baseline description of the project area

According to the National Ports Plan 2016 Update, the Port of Richards Bay is divided into three Precincts, namely the Bayvue Precinct, Newark Precinct and South Dunes Precinct. The proposed project falls within the South Dunes Precinct (Figure 4-1).

Figure 4-1: Precincts and berth layout of the Port of Richards Bay (extracted from the National Ports Plan 2016 Update)

To determine whether the site includes sensitive terrestrial and aquatic habitats, the following data sets where considered:

- **Ezemvelo KwaZulu-Natal Wildlife (EKZNW) (2011) KZN Terrestrial Systematic Conservation Plan (TSCP) database of priority conservation areas (also referred to as C-Plan):** EKZNW uses the C-Plan programme as part of its TSCP to identify a provincial reserve system for KZN that satisfies specified conservation targets for biodiversity features. The C-Plan is an effective conservation tool when determining priority areas at a regional level and is used in KZN to identify areas of high conservation value. As indicated in Figure 4-2, large sections of the South Dunes Precinct lies within the area classified as '100% Transformed'. In spite of this, ground truth surveys indicate that certain ecosystems have recovered sufficiently to be regarded as highly valuable assets to conservation of plant communities and suitable habitat for faunal species of conservation concern. This is evident with Red Data species and plants specially protected under provincial legislation having been recorded in the South Dunes Precinct (SAS *et. al.,* 2017). The project study area, however, occurs within a completely transformed site and all proposed infrastructure will be within the confines of existing infrastructure.
- South African National Biodiversity Institute (SANBI) (2011) National Biodiversity Assessment Terrestrial Habitats: The National Biodiversity Assessment (NBA), led by SANBI (2011) assigned 4 categories of sensitivity to various habitat types, namely: Critically Endangered, Endangered,

Vulnerable and Least Threatened. As indicated Figure 4-3, the project study area lies within the Least Threatened category.

- National Freshwater Ecosystem Priority Areas (NFEPA) wetlands and estuaries (2011): The NFEPA project aims to: Identify Freshwater Ecosystem Priority Areas (FEPAs) to meet national biodiversity goals for freshwater ecosystems; and develop a basis for enabling effective implementation of measures to protect FEPAs, including free flowing rivers. The NFEPA project responds to the high levels of threat prevalent in river, wetland and estuary ecosystems of South Africa (Driver et al. 2005) and provides strategic spatial priorities for conserving the country's freshwater ecosystems and supporting sustainable use of water resources. As indicated in Figure 4-4, the entire Port is considered to be a NFEPA estuary.

Legend

Bulk Services Upgrade

- Potable Water
- Fire Fighting
- Roads
- Project Study Area

eKZNW Priority Conservation Areas

- Conservation Areas
- 100% Transformed

Data Source: eKZNW C-Plan 2010	
Scale: 1:12 000	
Projection: TM	Datum: HH94
Central Meridian/Zone: Lo31	
Date: 09/11/2017	Compiled by: STBOD
Project No: 525451	Fig No: 4-2

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SCREENING ASSESSMENT: BULK SERVICES LNG BERTH

MAP SHOWING EKZNW PRIORITY CONSERVATION AREAS

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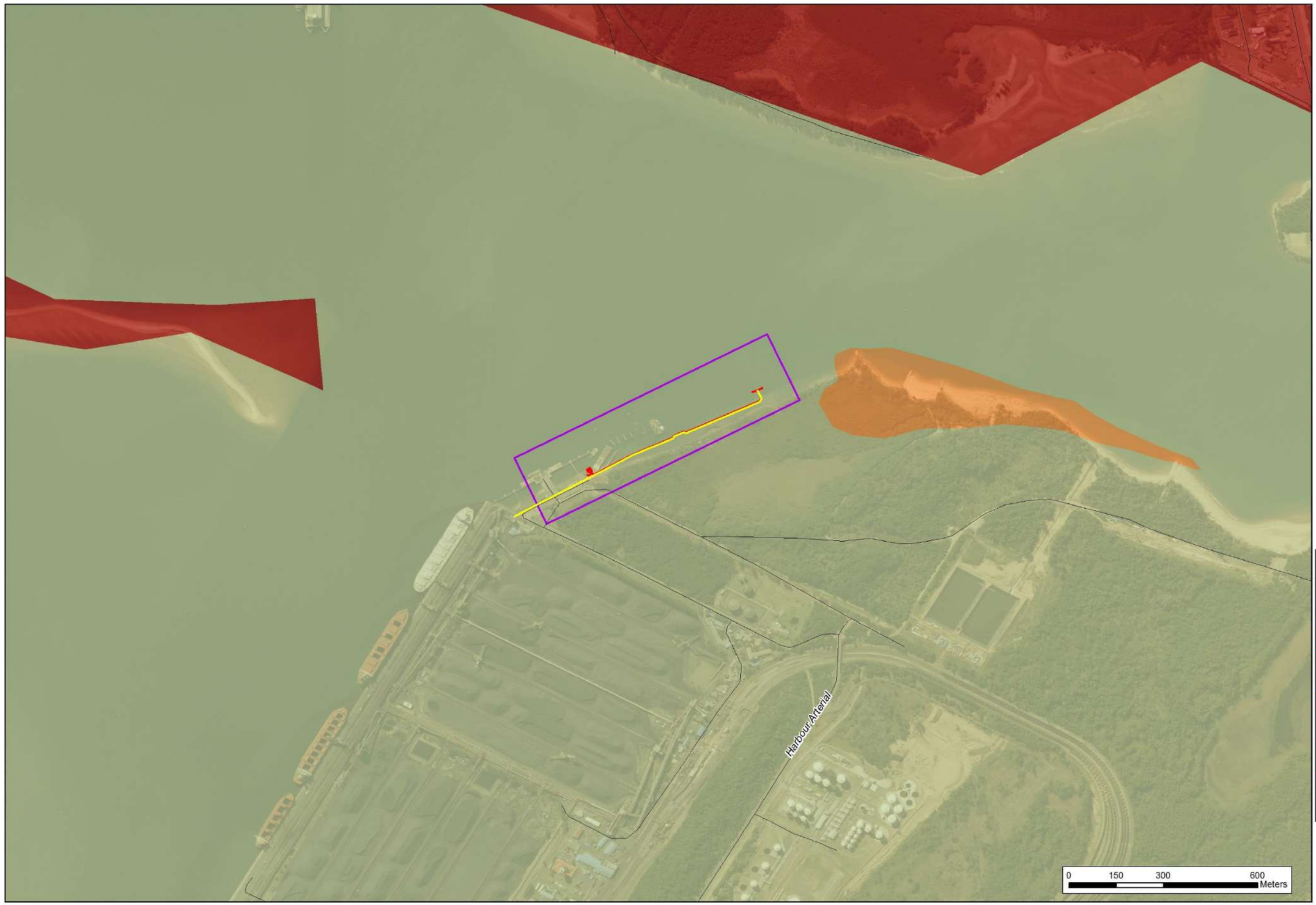
Revision: A Date: 09 11 2017



Data Source: NBA 2011: Vegetation Map
Scale: 1:12 000
Projection: TM | Datum: HH94
Central Meridian/Zone: Lo31

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SCREENING ASSESSMENT: BULK SERVICES LNG BERTH

MAP SHOWING SANBI NBA TERRESTRIAL HABITATS

Date: 09/11/2017 | Compiled by: STBOD
Project No: 525451 | Fig No: 4-3
Revision: A Date: 09 11 2017

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N

Harbour Arterial

0 150 300 600 Meters

Legend

Bulk Services Upgrade

- Potable Water
- Fire Fighting
- Roads
- Project Study Area
- NFEPA Wetlands and Estuaries

Data Source: NFEPA Wetlands 2011	
Scale: 1:12 000	
Projection: TM	Datum: HH94
Central Meridian/Zone: Lo31	
Date: 09/11/2017	Compiled by: STBOD
Project No: 525451	Fig No: 4-4

Revision: A Date: 09 11 2017

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SCREENING ASSESSMENT: BULK SERVICES LNG BERTH

MAP SHOWING NFEPA WETLANDS AND ESTUARIES

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5 Legal review

Key legislation that regulates environmental matters in relation to development projects (i.e. where environmental authorisations, permits or licences may be required) are discussed in terms of their applicability to the proposed project below.

5.1 National Environmental Management Act

The National Environmental Management Act, 1998 (Act No. 107 of 1998) (NEMA) provides for co-operative governance by establishing decision-making principles on matters affecting the environment including:

a) Sustainable development;
b) Integrated environmental management;
c) Polluter pays principle;
d) Cradle-to-grave responsibility;
e) Precautionary principle;
f) Involvement of stakeholders in decision making.

NEMA provides for the management and protection of environmental resources through *inter alia* the imposition of Environmental Authorisation requirements. Section 49 of NEMA outlines offences in terms of NEMA that include commencing with an activity without first having obtained Environmental Authorisation as detailed below. Section 49 of NEMA also details the penalties associated with offences that include fines, imprisonment or both.

The Competent Authority responsible for the administration and enforcement of the NEMA for Parastals such as TNPA is the National Department of Environmental Affairs (DEA).

5.1.1 Environmental Impact Assessment Regulations

NEMA identifies activities that require Environmental Authorisation. Activities listed in Listing Notice 1[1] and Listing Notice 3[2] require a Basic Assessment (BA) process, while activities listed in Listing Notice 2[3] require Scoping and Environmental Impact Reporting (S&EIR, interchangeably referred to as a "full" EIA). The Listing Notices were reviewed in order to identify potential listed activities triggered and it was established that no listed activities will be triggered. As such, no environmental authorisation will be required for this project.

A review of the listed activities potentially triggered by this project, together with an explanation of whether SRK believe these activities to be applicable or not is provided in Table 1 of Appendix A.

5.2 National Heritage Resources Act

The National Heritage Resources Act, 1999 (Act No. 25 of 1999) (NHRA) requires that for certain categories of development, including "*The construction of a road, wall, powerline, pipeline, canal or other similar form of linear development or barrier exceeding 300m in length*" (Section 38(1)(a)), the responsible heritage resources authority must be notified as early as possible and provided with information about the location, nature and extent of the proposed development. The responsible authority may require that a Heritage Impact Assessment (including archaeology and palaeontology) must be conducted prior to providing approval in terms of the NHRA.

[1] Government Notice (GN) R983 of 2014, as amended by GN 327 of 2017
[2] GN R985 of 2014, as amended by GN 325 of 2017
[3] GN R984 of 2014, as amended by GN 324 of 2017

The construction of the additional water pipeline for the fire-fighting equipment will exceed 300m in length and as such the responsible heritage resources authority, namely the South African Heritage Resource Agency (SAHRA), will need to be notified and provided with information on the project. Following the submission of an initial online application, SAHRA may require additional Heritage studies to be undertaken by a suitably qualified heritage consultant.

5.3 Additional applicable legislation

The following additional legislation was reviewed to determine whether it may be applicable to the project:

- National Environmental Management: Waste Act, 2008 (Act No. 59 of 2008) (NEM: WA);
- National Environmental Management: Air Quality Act, 2004 (Act. No. No 39 of 2004) (NEM: AQA);
- National Environmental Management: Biodiversity Act, 2004 (Act No. 10 of 2004) (NEM: BA);
- National Environmental Management: Integrated Coastal Management Act, 2008 (Act No. 24 of 2008) (NEM: ICMA);
- National Water Act, 1998 (Act No. 36 of 1998) (NWA);
- Mineral and Petroleum Resources Development Act, 2002 (Act No. 28 of 2002) (MPRDA); and
- KwaZulu-Natal Heritage Act, 1997 (Act No. 10 of 1997) (KZNHA).

No additional permits and/or licenses were identified as being required.

A brief summary of additional legislation reviewed is provided in Table 2 in Appendix A. Please note that this is not intended to be definitive or exhaustive, and serves to highlight key environmental legislation and requirements only. Although other legislation may be applicable to the proposed development, the list provided has been limited to those laws which require application processes that can be included in the scope of works covered in this proposal.

6 Conclusions and recommendations

Based on SRK's understanding of the project and the screening assessment undertaken, SAHRA will need to be notified of the project and provided with information. Thereafter SAHRA will indicate their requirements in terms of compliance with the NHRA.

Barring the SAHRA requirements, no additional environmental authorisations, permits or approvals should be required. In addition to legal requirements, the TNPA Policy requires adherence to certain Environmental Management documents. The conditions and requirements of these documents will need to be factored into the construction phase of the project. Based on SRK's experience, it is anticipated that the requirements will include the preparation of an EMPr based on the TNPA generic EMPr and the implementation thereof. Further some auditing of compliance with the EMPr is usually required by TNPA. SRK recommends that these requirements be confirmed with TNPA.

Prepared by

SRK Consulting - Certified Electronic Signature
srk consulting
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2841-4583-9255-HALT
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Partner

All data used as source material plus the text, tables, figures, and attachments of this document have been reviewed and prepared in accordance with generally accepted professional engineering and environmental practices.

7 References

SAS and SRK Consulting (2017), *Terrestrial and Wetland Ecosystem Trade Off Definition and Implementation Plan as well as Biodiversity Management Framework for the Transnet Port of Richards Bay South Dunes Precinct, Richards Bay, Kwazulu-Natal, South Africa*, prepared for Transnet National Ports Authority.

PRDW (2017), *Bulk Services Capacity Assessment, Demand Forecast and Options Identification,* prepared for Transnet National Ports Authority.

SRK (2013), *Strategic Environmental Assessment of the Transnet Long Term Planning Framework*, prepared for Transnet Capital Projects.

Appendices

Appendix A: Detailed Legal Review

Table 1: Listed Activities potentially triggered by the project

No.	Listed Activity	Comment
Listing Notice 1 (GN R983)		
9	The development of infrastructure exceeding 1 000m in length for the bulk transportation of water or storm water— (i) with an internal diameter of 0,36m or more; or (ii) with a peak throughput of 120L per second or more; excluding where— (a) such infrastructure is for bulk transportation of water or storm water or storm water drainage inside a road reserve or railway line reserve; or (b) where such development will occur within an urban area.	The installation of a new bulk water pipeline to supply the fire-fighting equipment at the Berth will be required. This Listing Activity is, however, not applicable as the length of the pipeline is approximately 615m, which will not exceed 1 000m. ***Finding: Not applicable***
11	The development of facilities or infrastructure for the transmission and distribution of electricity— (i) outside urban areas or industrial complexes with a capacity of more than 33 but less than 275 kilovolts; or (ii) inside urban areas or industrial complexes with a capacity of 275 kilovolts or more; excluding the development of bypass infrastructure for the transmission and distribution of electricity where such bypass infrastructure is — (a) temporarily required to allow for maintenance of existing infrastructure; (b) 2 kilometres or shorter in length; (c) within an existing transmission line servitude; and (d) will be removed within 18 months of the commencement of development.	Power supply from the substation at Berth 209 to the new pump station situated adjacent to the existing pump station will be required. This Listing Activity is, however, not applicable as only 400V will be required which falls well below the threshold. ***Finding: Not applicable***
12	The development of— (ii) infrastructure or structures with a physical footprint of 100m^2 or more; where such development occurs— (a) within a watercourse; (b) in front of a development setback; or (c) if no development setback exists, within 32 metres of a watercourse, measured from the edge of a watercourse; — excluding—	The combined footprint area of the proposed project will exceed 100m^2. This Listed Activity is, however, not applicable as the development will not occur within a watercourse and falls behind the development setback line. Furthermore, the infrastructure will be constructed within an existing port and will not result in an increase in the development footprint of the Port. ***Finding: Not applicable***

No.	Listed Activity	Comment
	(aa) the development of infrastructure or structures within existing ports or harbours that will not increase the development footprint of the port or harbour; (bb) where such development activities are related to the development of a port or harbour, in which case activity 26 in Listing Notice 2 of 2014 applies; (cc) activities listed in activity 14 in Listing Notice 2 of 2014 or activity 14 in Listing Notice 3 of 2014, in which case that activity applies; (dd) where such development occurs within an urban area; (ee) where such development occurs within existing roads, road reserves or railway line reserves; or (ff) the development of temporary infrastructure or structures where such infrastructure or structures will be removed within 6 weeks of the commencement of development and where indigenous vegetation will not be cleared.	
15	The development of structures in the coastal public property where the development footprint is bigger than 50m^2, excluding— (i) the development of structures within existing ports or harbours that will not increase the development footprint of the port or harbour; (ii) the development of a port or harbour, in which case activity 26 in Listing Notice 2 of 2014 applies; (iv) activities listed in activity 14 in Listing Notice 2 of 2014, in which case that activity applies.	The combined footprint area of the proposed project will exceed 50m^2. This Listed Activity is, however, not applicable as the Port is not considered Coastal Public Property. ***Finding: Not applicable***
17	Development— (ii) in an estuary; in respect of— (e) infrastructure or structures with a development footprint of 50m^2 or more— but excluding— (aa) the development of infrastructure and structures within existing ports or harbours that will not increase the development footprint of the port or harbour; (bb) where such development is related to the development of a port or harbour, in which case activity 26 in Listing Notice 2 of 2014 applies; (cc) the development of temporary infrastructure or structures where such structures will be removed within 6 weeks of the commencement of	According to NFEPA the site is considered to be an estuary and the proposed infrastructure will exceed 50m^2 in extent. This Listed Activity is, however, not applicable as the development occurs within an existing Port and the development footprint of the Port will not be increased. ***Finding: Not applicable***

No.	Listed Activity	Comment
	development and where coral or indigenous vegetation will not be cleared; or (dd) where such development occurs within an urban area.	
48	The expansion of— (i) infrastructure or structures where the physical footprint is expanded by 100m^2 or more where such expansion occurs— (a) within a watercourse; (b) in front of a development setback; or (c) if no development setback exists, within 32 metres of a watercourse, measured from the edge of a watercourse; excluding— (aa) the expansion of infrastructure or structures within existing ports or harbours that will not increase the development footprint of the port or harbour; (bb) where such expansion activities are related to the development of a port or harbour, in which case activity 26 in Listing Notice 2 of 2014 applies; (cc) activities listed in activity 14 in Listing Notice 2 of 2014 or activity 14 in Listing Notice 3 of 2014, in which case that activity applies; (dd) where such expansion occurs within an urban area; or (ee) where such expansion occurs within existing roads, road reserves or railway line reserves.	The combined footprint area of the proposed project will exceed 100m^2. This Listed Activity is, however, not applicable as the development will not occur within a watercourse and falls behind the development setback line. Furthermore, the infrastructure will be constructed within an existing port and will not result in an increase in the development footprint of the Port. ***Finding: Not applicable***
52	The expansion of structures in the coastal public property where the development footprint will be increased by more than 50m^2, excluding such expansions within existing ports or harbours where there will be no increase in the development footprint of the port or harbour and excluding activities listed in activity 23 in Listing Notice 3 of 2014, in which case that activity applies.	The combined footprint area of the proposed project will exceed 50m^2. This Listed Activity is, however, not applicable as the Port is not considered Coastal Public Property. ***Finding: Not applicable***
54	The expansion of facilities— (ii) in an estuary; in respect of— (e) infrastructure or structures where the development footprint is expanded by 50m^2 or more,	According to NFEPA the site is considered to be an estuary and the proposed infrastructure will exceed 50m^2 in extent. This Listed Activity is, however, not applicable as the development occurs within an existing Port and the development footprint of the Port will not be increased. ***Finding: Not applicable***

No.	Listed Activity	Comment
	but excluding— (aa) the expansion of infrastructure or structures within existing ports or harbours that will not increase the development footprint of the port or harbour; or (bb) where such expansion occurs within an urban area.	
Listing Notice 2		
No potential Listed Activities were identified.		
Listing Notice 3		
No potential Listed Activities were identified.		

Table 2: Additional legislation and requirements

Legislation	Overview and Requirements
National Environmental Management: Waste Act, 2008 (Act No. 59 of 2008) **(NEM: WA)**	Section 20(b): A Waste Management Licence (WML) must be obtained from the competent authority for projects that trigger activities listed in GN 921 of 2013. All applications must conform to the requirements of NEMA, with additional requirements with respect to stakeholder engagement (advertising) and the application must be accompanied by "such documentation and information as may be required by the licensing authority". Waste management activities listed in Category A require a BA process, while Category B activities require an S&EIR process conducted in terms of NEMA. A separate application form must be submitted with the application for EA, and additional stakeholder engagement (advertising) applies to an EIA process for a WML application. The competent authority for WML applications is the National DEA for applications involving Parastatals. **Requirements for this project:** A WML is not required for this project as any material to be disposed of will be temporarily stored on site during construction then disposed of at a registered landfill site.
National Environmental Management: Air Quality Act, 2004 (Act. No. No 39 of 2004) **(NEM: AQA)**	Section 21: Provides for the listing of activities that result in atmospheric emissions that have or may have a significant detrimental effect on the environment. An Atmospheric Emission License (AEL) from the licensing authority is required for these activities, which are listed in GN 893 of 2013 and include a range of combustion, manufacturing, petrochemical, carbonisation, metallurgical, mineral processing/handling, chemical, thermal treatment and pulp processes. All applications must conform to the requirements of NEMA and the application must be accompanied by "such documentation and information as may be required by the licensing authority". A separate application form must be submitted at the beginning of the EIA process, and an Air Quality specialist study is likely to be required as part of the EIA. The licencing authority for AELs has an additional 60 days for decision making following the issue of the Environmental Authorisation. **Requirements for this project:** The project will not trigger any Listed Activities in terms of the NEM: AQA and will therefore not require an AEL.
National Environmental Management: Biodiversity Act, 2004 (Act No. 10 of 2004) **(NEM: BA)**	The purpose of NEM: BA is to provide for the management and conservation of South Africa's biodiversity and the protection of species and ecosystems that warrant national protection. Threatened or Protected Species (TOPS) Regulations (2007) and a National List of Ecosystems that are Threatened and in Need of Protection (2011) have been promulgated in terms of NEM: BA. **Requirements for this project:** The proposed upgrades are limited to highly transformed areas and will not involve the removal or disturbance of protected species or ecosystems and will therefore not require a permit or license.
National Environmental Management: Integrated Coastal Management Act, 2008 (Act No. 24 of 2008) **(NEM: ICMA)**	The NEM: ICMA provides for the integrated management of the coastal zone, including the promotion of social equity and best economic use, while protecting the coastal environment. The enforcing authority is the Department of Environmental Affairs: Oceans and Coasts (DEA: O&C). **Requirements for this project:** The proposed upgrades will not trigger the NEM: ICMA.
National Water Act 36 of 1998 **(NWA)**	Section 21: Specifies a number of water uses that require Water Use Authorisation (WUA) – either via a Water Use Licence (WUL) or General Authorisation (GA) (issued in terms of Section 39 of the NWA) through a registration and application process – in terms of Section 22(1) of the Act. A WUA process must be conducted to obtain authorisation for any of these activities, unless the specific use is listed in Schedule 1 of the NWA or is an existing lawful use. The competent authority for WUAs is the Department of Water and Sanitation (DWS). For a WUL, DWS require an application, registration as a water user and the completion of a Technical Report which addresses all water uses in accordance with the requirements of Section 28 and Section 29 of the NWA, including a Section 27 motivation for the water uses. For GA, DWS require an application, registration as a water user and may require the completion of a Technical Report depending on the nature of the water use. In March 2017, DWS gazetted regulations stipulating the WULA process and timeframes. A pre-application enquiry meeting with DWS is required, and DWS must take a decision within

Legislation	Overview and Requirements
	300 days of application. Similar to the EIA process, a considerable quantum of work will be required before formal submission of an application. **Requirements for this project:** The proposed project will be undertaken in an estuary, however, because the site is within a Port it falls outside of the jurisdiction of the NWA and therefore a WULA is not required.
Mineral and Petroleum Resources Development Act, 2002 (Act No. 28 of 2002) (MPRDA)	The MPRDA makes provision for equitable access to and sustainable development of South Africa's mineral and petroleum resources and aims to, *inter alia*, provide for security of tenure in respect of prospecting, exploration, mining and production operations. The fundamental principles of the MPRDA are: • Petroleum resources are non-renewable; • Petroleum resources belong to the nation and the State is the custodian; • Protection of the environment for present and future generations to ensure sustainable development of the resources by promoting economic and social development; • Promotion of local and rural development of affected communities; • Reformation of the industry to bring about equitable access to the resources and eradicating discriminatory practices; and • Guaranteed security of tenure. **Requirements for this project:** The proposed upgrades will not trigger the MPRDA.
KwaZulu-Natal Heritage Act, 1997 (Act No. 10 of 1997) **(KZNHA)**	The aim of the KZNHA is "*To provide for the conservation, protection and administration of both the physical and the living or intangible heritage resources of the Province of KwaZulu-Natal; to establish a statutory Council to administer heritage conservation in the Province; to determine the objects, powers, duties and functions of the Council; to determine the manner in which the Council is to be managed, governed, staffed and financed; to establish Metro and District Heritage Forums to assist the Council in facilitating and ensuring the involvement of local communities in the administration and conservation of heritage in the Province; and to provide for matters connected therewith*". This Act is implemented by Amafa aKwaZulu-Natali/Heritage KwaZulu-Natal, the provincial heritage resources authority charged to provide for the conservation, protection and administration of both the physical and the living or intangible heritage resources of the province; along with a statutory Council to administer heritage conservation in the Province. Permission from the heritage authority, (national and/or provincial), will be required in appropriate circumstances, which may include the issue of the heritage resources identified and whether any formal protections under the statutes have been assigned to any resources which are located in the project area. **Requirements for this project:** This Act will only apply should the National HRA not apply.

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APPENDIX G:
RISK REGISTER

PROJECT INFORMATION

Project: Richards Bay LNG Terminal Bulk Services Study

Owner: Transnet

Client: Basil Ngcobo

Project Sponsor: Preston Khomo

Project Manager: Ashveer Sathanund

Document No.: S2069-1-TN-HS-001

Revision No.: 0

Release Date: 2018/02/09

Print Date: 2018/02/09

Revision	Date	Distribution / Revision
0	2018/02/09	Initial Set-up

1. INTRODUCTION

OBJECTIVES

Risk management objectives	
1	Conduct suitably rigorous analysis of the risks associated with the project
2	Develop a risk register
3	Assign risk owners

RISK OWNERS

Assign potential risk owners	
1	All
2	Client
3	Project Management Team
4	Designer
5	Contractor
6	Environmental Consultant

ASSUMPTIONS

Risk management assumptions	
1	Pre-feasibility level study - FEL2
2	The proposed mitigation measures will be followed up by the risk owners in subsequent stages of the project

2. PROJECT RISK ASSESSMENT CRITERIA

LIKELIHOOD RATING

CONSEQUENCE RATING	Almost Certain	Likely	Possible	Unlikely	Rare
1	I	I	I	II	II
2	I	I	II	II	III
3	I	II	II	III	III
4	II	II	III	III	IV
5	II	III	III	IV	IV
6	III	III	IV	IV	V
7	III	IV	IV	V	V

Extreme	High	Medium	Medium - Low	Low

DEFINITION: RISK LIKELIHOOD RATING

Almost Certain	Very high probability of occurrence could occur several times per year. Has occurred several times on similar projects at this location.
Likely	High probability, likely to approximately once per year. Similar event has occurred several times per year on similar projects for this organisation.
Possible	Possible, reasonable probability that it may occur at least once in a 1 to 10 year period. A similar event has occurred at some time on other similar projects for this organisation
Unlikely	Plausible, unlikely to occur during the project, could occur over the next 10 to 40 years. A similar event has occurred on other similar projects in this industry
Rare	Very low likelihood but not impossible, unlikely to occur during the next 40 years. A similar event has occurred elsewhere in the world in this industry.

2. PROJECT RISK ASSESSMENT CRITERIA

DEFINITION: RISK CONSEQUENCE RATING

	Project Cost (ZAR)	*Project Schedule*	*Human Health & Safety*	*Environment and Community*	*Reputation and Brand*	*Compliance and Legal*
1	> 5 billion	Serious multi-year delays to the overall project schedule (2+ years). Likely with significant cost implications and reputational damage.	Multiple fatalities and/or very serious irreversible injury to > 100 people	Irreversible long-term environmental damage to a highly valued species or location. Large-scale prolonged class action.	Prolonged international condemnation. Transnet CE and/or Operating Divisions CEO departs and board is restructured. Public reprimand from Government. Transnet loses operating licence for an extended period.	Major litigation or prosecution with damages of R100m+ plus significant costs. Custodial sentence for company Executive. Long term closure of operations by authorities.
2	500 million - 4,9 billion	Major delay with to overall schedule with significant cost implications (1 - 2 years)	Multiple fatalities, and/or Significant irreversible injuries to up to 10 people	Irreversible long term environmental damage. Community outrage- potential for large-scale class action.	Prominent negative International and South African press reporting over many days Non-public reprimand by Government Senior executive departs and/or board is restructured. Operating licence is threatened	Major litigation or prosecution with damages of R50m+ plus significant costs. Custodial sentence for Manager Medium term closure of operations by authorities.
3	50 million - 499 million	Major delay with to overall schedule potentially significant cost implications (6 - 12 months)	Single fatality and/or severe irreversible effects to one or more people	Prolonged environmental impact. High-profile community concerns raised – requiring significant remediation measures and management attention	National press reporting over several days. Government caution. Pressure on Executives to leave. Implications for operating licence.	Major litigation costing R10m+. Investigation by regulatory body resulting in long term interruption to operations. Possibility of custodial sentence.
4	5 million - 49 million	Moderate delay to overall schedule (3 - 6 months).	Moderate irreversible disability or impairment to one or more people	Major spill or release leading to off-site impact. High potential for complaints from interested parties.	Local press reporting – over several days. Manager may be asked to leave. Government may be interested.	Major breach of regulation with punitive fine. Significant litigation involving many weeks of management time.
5	500 000 - 4.9 million	Small delay in construction (1 - 3 months). Likely to delay overall completion.	Objective but reversible disability requiring hospitalisation to several people	Medium term effect on environment / community. Required to inform environmental agencies.	Local press reporting. Disciplinary action likely.	Breach of regulation with investigation or report to authority with prosecution and/or moderate fine possible.
6	50 000 - 499 000	Small delay during construction (< 1 month). May be recoverable in overall schedule.	Objective but reversible disability requiring the medical treatment of one person	Small, unconfined spill or release. Short term transient environmental or community impact, remedial action needed.	No press reporting. Disciplinary action may be taken.	Minor legal issues, non-compliances and breaches of regulation.
7	< 50 000	Minor delay during implementation	Minor injury	Minor impact	No reputational impact	Minor breach only

3. RISK IDENTIFICATION

INITIAL RISK IDENTIFICATION TOOL

The objective of this risk identification tool is to act as a prompt for identifying potential project risks. A comprehensive list of potential risk areas has been developed and grouped under the following identifiers:

Category	*Reference*	*Risk Area Identifier*
Business Environment	1.1	Legislation
	1.2	Taxation
	1.3	Economy
	1.4	Government Policy
Construction Industry	2.1	Workforce
	2.2	Market conditions
	2.3	Material suppliers
Client Risks	3.1	Business Plan
	3.2	Definition of need
	3.3	Business case
	3.4	Client delivery
	3.5	Land 'conditions'
Project Risks	4.1	User Requirements
	4.2	Project Team
	4.3	Site Investigations
	4.4	Design
	4.5	External approvals
	4.6	Design compliance
	4.7	Project Controls
	4.8	Procurement
	4.9	Construction

3. RISK IDENTIFICATION

All potential project risks are evaluated for applicability as follows:

FEL2 Project Risk
Not a FEL2 Risk - Review at FEL3
Not a Project Risk

The risk areas identified using this tool are taken through to a risk assessment phase. In the risk assessment phase the identified risks will undergo a risk rating, mitigation assessment and impact assessment

3. RISK IDENTIFICATION

The outcomes of the initial risk identification are as follows:

REF	DESCRIPTION	APPLICABILITY	COMMENT
1	BUSINESS ENVIRONMENT		
1.1	**Legislation**		
1.1.1	SA National Building Reg's	Not a FEL2 Risk - Review at FEL3	No legislation change risks within project timeframe. Review during FEL3.
1.1.2	Environment	Not a FEL2 Risk - Review at FEL3	No legislation change risks within project timeframe. Review during FEL3.
1.1.3	SA National Building Standards	Not a FEL2 Risk - Review at FEL3	No legislation change risks within project timeframe. Review during FEL3.
1.1.4	Occupational and Safety Act (OHSA) 1993	Not a FEL2 Risk - Review at FEL3	No legislation change risks within project timeframe. Review during FEL3.
1.1.5	The Construction Regulations 2014	Not a FEL2 Risk - Review at FEL3	No legislation change risks within project timeframe. Review during FEL3.
1.2	**Taxation**		
1.2.1	Corporation Tax	Not a FEL2 Risk - Review at FEL3	No legislation change risks within project timeframe. Review during FEL3.
1.2.2	VAT	Not a FEL2 Risk - Review at FEL3	No legislation change risks within project timeframe. Review during FEL3.
1.2.3	PAYE	Not a FEL2 Risk - Review at FEL3	No legislation change risks within project timeframe. Review during FEL3.
1.2.4	Capital Gains	Not a FEL2 Risk - Review at FEL3	No legislation change risks within project timeframe. Review during FEL3.
1.2.5	Import duties	Not a FEL2 Risk - Review at FEL3	No legislation change risks within project timeframe. Review during FEL3.
1.3	**Economy**		
1.3.1	Inflation	FEL2 Project Risk	TNPA to allow for inflation in business case.
1.3.2	Interest Rates	Not a FEL2 Risk - Review at FEL3	Review interest rate environment during FEL3.
1.3.3	Exchange rates	Not a FEL2 Risk - Review at FEL3	Limited foreign currency exposure on materials - review at FEL3.
1.3.4	Government fiscal policy	Not a FEL2 Risk - Review at FEL3	

3. RISK IDENTIFICATION

The outcomes of the initial risk identification are as follows:

REF	DESCRIPTION	APPLICABILITY	COMMENT
1.3.5	Bank lending rate	Not a FEL2 Risk - Review at FEL3	
1.4	**Government Policy**		
1.4.1	Exports	Not a Project Risk	
1.4.2	Transportation	Not a Project Risk	
1.4.3	Employment - Suppler development	Not a FEL2 Risk - Review at FEL3	
1.4.4	Land	Not a Project Risk	All project land is owned by TNPA.
2	**CONSTRUCTION INDUSTRY**		
2.1	**Workforce**		
2.1.1	Trade Unions	Not a FEL2 Risk - Review at FEL3	Risk of delays due to industrial action to be reviewed during FEL3.
2.1.2	Skills base - availability / shortage	Not a FEL2 Risk - Review at FEL3	Suitable contractors available - similar work has been undertaken in the Port.
2.1.3	BBBEE	Not a FEL2 Risk - Review at FEL3	
2.1.4	Industrial Relations	Not a FEL2 Risk - Review at FEL3	
2.1.5	Skills Base	Not a FEL2 Risk - Review at FEL3	
2.1.6	Training	Not a FEL2 Risk - Review at FEL3	
2.2	**Market conditions**		
2.2.1	Degree of competition	Not a FEL2 Risk - Review at FEL3	Competitive tendering environment for civils works.
2.2.2	Available appropriate contractors	Not a FEL2 Risk - Review at FEL3	Suitable contractors available - similar work has been undertaken in the Port.
2.2.3	Volume of work in the market place (Contractor demand)	Not a FEL2 Risk - Review at FEL3	Relatively small civils project - numerous suitable contractors.

3. RISK IDENTIFICATION

The outcomes of the initial risk identification are as follows:

REF	DESCRIPTION	APPLICABILITY	COMMENT
2.2.4	Volume of work in the market place (Material demand)	Not a FEL2 Risk - Review at FEL3	Material volumes are low - review during FEL3.
2.2.5	Number of contractors in the market place	Not a Project Risk	Market players have been stable, no changes expected
2.2.6	Capacity of contractors	Not a FEL2 Risk - Review at FEL3	Relatively small civils project - numerous suitable contractors.
2.2.7	Number of contractors in sector	Not a Project Risk	Market players have been stable, no changes expected
2.3	**Material suppliers**		
2.3.1	Capacity	Not a Project Risk	Material volumes are low
2.3.2	Location / Transportation	Not a Project Risk	Transport routes to port well established.
2.3.3	Reliability / Experience	Not a Project Risk	Suppliers are capable - similar work has been undertaken in the Port
2.3.4	Management capability	Not a Project Risk	Suppliers are capable - similar work has been undertaken in the Port
2.3.5	Quality of products	Not a Project Risk	Suppliers are capable - similar work has been undertaken in the Port
2.3.6	Number of suppliers in sector	Not a Project Risk	Suppliers are capable - similar work has been undertaken in the Port
3	**CLIENT**		
3.1	**Business Plan**		
3.1.1	Mission	Not a FEL2 Risk - Review at FEL3	
3.1.2	Objectives	Not a FEL2 Risk - Review at FEL3	
3.1.3	Strategy	Not a FEL2 Risk - Review at FEL3	
3.1.4	Delivery plan	FEL2 Project Risk	Uncertainty over the Gas-to-Power Programme which is driving the delivery.
3.1.5	Delivery implementation	Not a FEL2 Risk - Review at FEL3	

3. RISK IDENTIFICATION

The outcomes of the initial risk identification are as follows:

REF	DESCRIPTION	APPLICABILITY	COMMENT
3.1.6	Monitoring of delivery	Not a FEL2 Risk - Review at FEL3	
3.2	**Definition of need**		
3.2.1	Clarity of objectives	Not a FEL2 Risk - Review at FEL3	
3.2.2	Objectives prioritised	Not a FEL2 Risk - Review at FEL3	
3.2.3	Consensus of need among business units	Not a FEL2 Risk - Review at FEL3	
3.2.4	Degree of completeness	Not a FEL2 Risk - Review at FEL3	
3.2.5	Recognition of stakeholder expectations	Not a FEL2 Risk - Review at FEL3	
3.3	**Business case**		
3.3.1	Revenue	Not a FEL2 Risk - Review at FEL3	
3.3.2	Capital Costs (CAPEX)	Not a FEL2 Risk - Review at FEL3	
3.3.3	Operating Costs (OPEX)	Not a FEL2 Risk - Review at FEL3	
3.3.4	Benefits / Disbenefits	Not a FEL2 Risk - Review at FEL3	
3.3.5	Tariff Agreements (funding and penalties)	Not a FEL2 Risk - Review at FEL3	
3.3.6	Taxation	Not a FEL2 Risk - Review at FEL3	
3.3.7	Price changes	Not a FEL2 Risk - Review at FEL3	
3.3.8	Inflation	Not a FEL2 Risk - Review at FEL3	
3.3.9	Demand	FEL2 Project Risk	Uncertainty over the Gas-to-Power Programme which is driving the demand for the project.
3.3.10	Potential operational constraints	Not a FEL2 Risk - Review at FEL3	

3. RISK IDENTIFICATION

The outcomes of the initial risk identification are as follows:

REF	DESCRIPTION	APPLICABILITY	COMMENT
3.4	**Client delivery**		
3.4.1	Funding	FEL2 Project Risk	Uncertainty over the Gas-to-Power Programme which is driving the project.
3.4.2	Appointment of Project Directors	Not a Project Risk	
3.4.3	Decision making - general client delivery	FEL2 Project Risk	Uncertainty over the Gas-to-Power Programme which is driving the project.
3.4.4	Land ownership / lease	Not a Project Risk	All project land is owned by TNPA.
3.4.5	Official / unofficial tenants	Not a Project Risk	
3.4.6	SLAs between Transnet Business Units	Not a Project Risk	No other Transnet Business Units involved.
3.4.7	Work Orders for internal appointments	Not a Project Risk	
3.4.8	Approvals	FEL2 Project Risk	Uncertainty over the Gas-to-Power Programme which is driving the project.
3.4.9	Contracts (Procurement strategy requirements)	Not a FEL2 Risk - Review at FEL3	
3.4.10	Public Relations	Not a FEL2 Risk - Review at FEL3	Minor civils project.
3.4.11	Stakeholder Management	Not a FEL2 Risk - Review at FEL3	Minor civils project.
3.4.12	Staff continuity	Not a FEL2 Risk - Review at FEL3	
3.4.13	Reputation	Not a FEL2 Risk - Review at FEL3	Delays in project may delay terminal operator commissioning.
3.5	**Land 'conditions'**		
3.5.1	Titles	Not a Project Risk	All project land is owned by TNPA.
3.5.2	Deeds	Not a Project Risk	All project land is owned by TNPA.
3.5.3	Easements	Not a Project Risk	All project land is owned by TNPA.

3. RISK IDENTIFICATION

The outcomes of the initial risk identification are as follows:

REF	DESCRIPTION	APPLICABILITY	COMMENT
3.5.4	Covenants	Not a Project Risk	All project land is owned by TNPA.
3.5.5	Way leaves	Not a Project Risk	All project land is owned by TNPA.
3.5.6	Air Rights	Not a Project Risk	All project land is owned by TNPA.
3.5.7	Rights of Way	Not a Project Risk	All project land is owned by TNPA.
3.5.8	Freehold and lease agreements	Not a Project Risk	All project land is owned by TNPA.
4	**PROJECTS**		
4.1	**User Requirements**		
4.1.1	Dissemination	Not a FEL2 Risk - Review at FEL3	
4.1.2	Degree of completeness (e.g. reflect Tariff Agreement)	Not a FEL2 Risk - Review at FEL3	
4.1.3	Alignment with objectives	FEL2 Project Risk	User requirements can only be confirmed with certainty on the Gas-to-Power Programme.
4.1.4	Comprehension / Clarity	Not a FEL2 Risk - Review at FEL3	
4.1.5	Stakeholder requirements (post capture, dissemination, debate and alignment)	Not a FEL2 Risk - Review at FEL3	
4.1.6	Timelines	Not a FEL2 Risk - Review at FEL3	
4.1.7	Budget parameters	Not a FEL2 Risk - Review at FEL3	
4.1.8	Scope creep	Not a FEL2 Risk - Review at FEL3	
4.2	**Project Team**		
4.2.1	Culture of the team (working practices)	Not a FEL2 Risk - Review at FEL3	Not a risk at FEL2 level
4.2.2	Completeness of appointments	Not a FEL2 Risk - Review at FEL3	Not a risk at FEL2 level

3. RISK IDENTIFICATION

The outcomes of the initial risk identification are as follows:

REF	DESCRIPTION	APPLICABILITY	COMMENT
4.2.3	Communication	Not a FEL2 Risk - Review at FEL3	Not a risk at FEL2 level
4.2.4	Experience of team members	Not a FEL2 Risk - Review at FEL3	Not a risk at FEL2 level
4.2.5	Timing of appointments	Not a FEL2 Risk - Review at FEL3	Not a risk at FEL2 level
4.2.6	Rapport with Project Coordinator	Not a FEL2 Risk - Review at FEL3	Not a risk at FEL2 level
4.2.7	Staff continuity	Not a FEL2 Risk - Review at FEL3	Not a risk at FEL2 level
4.2.8	Adequacy of fees	Not a FEL2 Risk - Review at FEL3	Not a risk at FEL2 level
4.2.9	Clarity of appointments	Not a FEL2 Risk - Review at FEL3	Not a risk at FEL2 level
4.2.10	Co-ordination and compatibility of appointments	Not a FEL2 Risk - Review at FEL3	Not a risk at FEL2 level
4.2.11	Project Assurance processes	Not a FEL2 Risk - Review at FEL3	Not a risk at FEL2 level
4.2.12	Warranties and assignment	Not a FEL2 Risk - Review at FEL3	Not a risk at FEL2 level
4.2.13	Skills shortages	Not a FEL2 Risk - Review at FEL3	Not a risk at FEL2 level
4.3	**Site Investigations**		
4.3.1	Timing of site investigations	Not a Project Risk	No site investigations recommended.
4.3.2	Adequacy of information requested	Not a Project Risk	No site investigations recommended.
4.3.3	Budget availability	Not a Project Risk	No site investigations recommended.
4.3.4	Reliability / Accuracy	Not a Project Risk	No site investigations recommended.
4.3.5	Availability of resources to undertake site investigations	Not a Project Risk	No site investigations recommended.
4.3.6	Identification of requirements	Not a Project Risk	No site investigations recommended.

3. RISK IDENTIFICATION

The outcomes of the initial risk identification are as follows:

REF	DESCRIPTION	APPLICABILITY	COMMENT
4.4	**Design**		
4.4.1	Design freeze / optioneering	Not a FEL2 Risk - Review at FEL3	
4.4.2	Completeness (inclusion of stakeholder requirements including Operations)	FEL2 Project Risk	Uncertainty over IPP Office procurement and end-user specific requirements.
4.4.3	Undiscovered rework	FEL2 Project Risk	Interface with existing services. Possible presence of undocumented services.
4.4.4	Productivity rate	Not a FEL2 Risk - Review at FEL3	
4.4.5	Rapport with Client / Business Units	Not a FEL2 Risk - Review at FEL3	
4.4.6	Drivers (e.g. execution driven)	Not a FEL2 Risk - Review at FEL3	
4.4.7	Integration of sub-contractors designs	Not a Project Risk	
4.4.8	In-house capabilities / competencies	Not a Project Risk	
4.4.9	Recognition of Environment requirements	Not a FEL2 Risk - Review at FEL3	Minimum environmental requirements as per scoping report.
4.4.10	Design coordination	Not a FEL2 Risk - Review at FEL3	
4.4.11	Technical Assurance	Not a FEL2 Risk - Review at FEL3	
4.4.12	Direction / control of the Project Team	Not a FEL2 Risk - Review at FEL3	
4.4.13	Revisions due to new surveys or geotechnical information	Not a Project Risk	
4.5	**External approvals**		
4.5.1	SA Building Regulations	Not a Project Risk	
4.5.2	The Construction Regulations 2014	Not a Project Risk	
4.5.3	Occupational Safety Act 2003	Not a Project Risk	

3. RISK IDENTIFICATION

The outcomes of the initial risk identification are as follows:

REF	DESCRIPTION	APPLICABILITY	COMMENT
4.5.4	National Railway Safety Regulations 2002	Not a Project Risk	
4.5.5	Environmental legislation	Not a FEL2 Risk - Review at FEL3	
4.5.6	Opposition groups	Not a FEL2 Risk - Review at FEL3	
4.5.7	Statutory permits	Not a Project Risk	
4.5.8	Municipal approvals	Not a Project Risk	
4.6	**Design compliance**		
4.6.1	Adherence to User Requirements	Not a FEL2 Risk - Review at FEL3	To be reviewed during FEL3 once terminal operator is defined.
4.6.2	Adherence to budget	Not a FEL2 Risk - Review at FEL3	FEL3 consideration.
4.6.3	Adherence to planning approval	Not a FEL2 Risk - Review at FEL3	FEL3 consideration.
4.6.4	Adherence to legislation	Not a FEL2 Risk - Review at FEL3	FEL3 consideration.
4.6.5	Adherence to survey information	Not a FEL2 Risk - Review at FEL3	FEL3 consideration.
4.6.6	Adherence to Transnet Business Unit standards and updates	Not a FEL2 Risk - Review at FEL3	FEL3 consideration.
4.6.7	Adherence to standards / codes of practice	Not a FEL2 Risk - Review at FEL3	FEL3 consideration.
4.6.8	Adequacy of reviews	Not a FEL2 Risk - Review at FEL3	FEL3 consideration.
4.7	**Project Controls**		
4.7.1	Estimating	FEL2 Project Risk	Estimating accuracy.
4.7.2	Scheduling	FEL2 Project Risk	Schedule to be integrated with IPP Office Procurement Schedule.
4.7.3	Quality Management	Not a FEL2 Risk - Review at FEL3	

3. RISK IDENTIFICATION

The outcomes of the initial risk identification are as follows:

REF	DESCRIPTION	APPLICABILITY	COMMENT
4.7.4	Change control	Not a FEL2 Risk - Review at FEL3	
4.7.5	Risk Management	Not a FEL2 Risk - Review at FEL3	Risk process to continue through FEL3.
4.7.6	Value Management	Not a FEL2 Risk - Review at FEL3	
4.7.7	Earned Value	Not a FEL2 Risk - Review at FEL3	
4.7.8	Reporting	Not a FEL2 Risk - Review at FEL3	
4.7.9	Trend Management	Not a FEL2 Risk - Review at FEL3	
4.7.10	Life Cycle Management / Toll Gates	Not a FEL2 Risk - Review at FEL3	
4.7.11	Hierarchy of meetings	Not a FEL2 Risk - Review at FEL3	
4.7.12	Document control	Not a FEL2 Risk - Review at FEL3	
4.8	**Procurement**		
4.8.1	Clarity of risk attitude	Not a FEL2 Risk - Review at FEL3	FEL3 consideration.
4.8.2	Clarity of objectives	Not a FEL2 Risk - Review at FEL3	FEL3 consideration.
4.8.3	Understanding of alternative routes	Not a FEL2 Risk - Review at FEL3	FEL3 consideration.
4.8.4	Degree of contractor design	Not a FEL2 Risk - Review at FEL3	FEL3 consideration.
4.8.5	Package integration	Not a FEL2 Risk - Review at FEL3	FEL3 consideration.
4.8.6	Order of release of information	Not a FEL2 Risk - Review at FEL3	FEL3 consideration.
4.8.7	Overlap of design and construction	Not a FEL2 Risk - Review at FEL3	FEL3 consideration.
4.8.8	Tailoring of design information to suit procurement route / form of contract	Not a FEL2 Risk - Review at FEL3	FEL3 consideration.

3. RISK IDENTIFICATION

The outcomes of the initial risk identification are as follows:

REF	DESCRIPTION	APPLICABILITY	COMMENT
4.8.9	Familiarity with chosen contract	Not a FEL2 Risk - Review at FEL3	FEL3 consideration.
4.8.10	Packaging of information	Not a FEL2 Risk - Review at FEL3	FEL3 consideration.
4.8.11	Clarity of benefits of risk ownership vs. risk transfer	Not a FEL2 Risk - Review at FEL3	FEL3 consideration.
4.8.12	Design information completeness / coordination	Not a FEL2 Risk - Review at FEL3	FEL3 consideration.
4.8.13	Framework agreements	Not a FEL2 Risk - Review at FEL3	FEL3 consideration.
4.8.14	Familiarity of contractors with procurement route / form of contract	Not a FEL2 Risk - Review at FEL3	FEL3 consideration.
4.9	**Construction**		
4.9.1	Material, plant and or labour sourcing / availability	Not a Project Risk	Covered above.
4.9.2	Free supply of materials (maintenance / capacity / default)	Not a Project Risk	No free supply of materials.
4.9.3	Site access	FEL2 Project Risk	Restricted access due to existing operations.
4.9.4	Interruption to services	Not a FEL2 Risk - Review at FEL3	Potential disruption to Berth 208 operations (interruption or services).
4.9.5	Accident / Fatality	FEL2 Project Risk	Risks amplified during trenching and working over and near water.
4.9.6	Ground conditions	Not a FEL2 Risk - Review at FEL3	
4.9.7	Ground obstructions (when piling)	Not a Project Risk	No piling envisaged.
4.9.8	Contamination of dredge material	Not a Project Risk	No dredging.
4.9.9	Archaeological finds	Not a Project Risk	
4.9.10	Design changes	Not a FEL2 Risk - Review at FEL3	To be reviewed during FEL3 once terminal operator is defined.
4.9.11	Workmanship / performance of Contractor and Subcontractors	Not a FEL2 Risk - Review at FEL3	

3. RISK IDENTIFICATION

The outcomes of the initial risk identification are as follows:

REF	DESCRIPTION	APPLICABILITY	COMMENT
4.9.12	Force Majeure	FEL2 Project Risk	Weather, fire, mass action, etc.
4.9.13	Supply chain	Not a FEL2 Risk - Review at FEL3	
4.9.14	Damage to existing buildings, services, plant and or machinery	FEL2 Project Risk	Existing services and operations - may be impact due to Construction.
4.9.15	Compensation events	FEL2 Project Risk	Delays of extra work due to undocumented services.
4.9.16	Adherence to the design	Not a FEL2 Risk - Review at FEL3	
4.9.17	Site constraints	FEL2 Project Risk	Schedule of work to accommodate existing operations.
4.9.18	Commissioning and Handover	Not a FEL2 Risk - Review at FEL3	
4.9.19	Labour relations	Not a FEL2 Risk - Review at FEL3	Covered above.
4.9.20	Removal/Demolish of Existing Structures	Not a Project Risk	

4. RISK ASSESSMENT

The identified risks have been assessed as follows:

DESCRIPTION			RISK ASSESSMENT				
Risk ID	**Category**	**Risk Name**	**Consequence**	**Likelihood**	**Risk Rating**	**Comment**	**Risk Owner**
001	Economy	Inflation	**5**	**Likely**	**III**	Impact on project cost. To be included in business plan.	Client
002	Business Plan	Delivery plan	**7**	**Likely**	**IV**	Potential delays due to uncertainty over Gas-to-Power Programme. This will affect project viability but will have limited schedule impact during implementation (decision to proceed will only be taken on finalisation of the Gas-to-Power Programme)	Client
003	Business case	Demand	**5**	**Possible**	**III**	Demand is driven by the requirements of the Gas-to-Power Programme. Should this not materialise the project may not proceed at all.	Client
004	Client delivery	Funding	**7**	**Likely**	**IV**	Uncertainty over Gas-to-Power Programme may delay funding and implementation. Limited impact post decision to proceed.	Client
005	Client delivery	Decision making - general client delivery	**7**	**Likely**	**IV**	Uncertainty over Gas-to-Power Programme may delay funding and implementation. Limited impact post decision to proceed.	Client
006	Client delivery	Approvals	**7**	**Likely**	**IV**	Uncertainty over Gas-to-Power Programme may delay funding and implementation. Limited impact post decision to proceed.	Client
007	User Requirements	Alignment with objectives	**5**	**Possible**	**III**	User requirements can only be defined once the terminal operator is appointed. Any additional requirements, not accounted for in the design, will have a cost and schedule implication.	Client
008	Design	Completeness (inclusion of stakeholder requirements including Operations)	**5**	**Possible**	**III**	Terminal operator requirements based on existing facilities. Specific terminal operator requirements may differ.	Client
009	Design	Undiscovered rework	**6**	**Likely**	**III**	Possible delays or cost implications due to undocumented or histroical services and pipelines.	All
010	Project Controls	Estimating	**5**	**Possible**	**III**	Poor estimating accuracy due to inexperienced FEL3 design team leading to increase in capital cost.	Project Management Team

4. RISK ASSESSMENT

The identified risks have been assessed as follows:

DESCRIPTION			RISK ASSESSMENT				
Risk ID	**Category**	**Risk Name**	**Consequence**	**Likelihood**	**Risk Rating**	**Comment**	**Risk Owner**
011	Project Controls	Scheduling	**5**	**Possible**	**III**	Poor scheduling accuracy due to inexperienced FEL3 design team leading to increase in schedule duration.	Project Management Team
012	Construction	Site access	**4**	**Possible**	**III**	Restricted access due to existing operations which may delay the implementation.	Project Management Team
013	Construction	Accident / Fatality	**3**	**Possible**	**II**	Risk of accident or fatality is amplified during trenching and working over and near to water. Proper H&S procedures to be in place during construction.	All
014	Construction	Force Majeure	**3**	**Rare**	**III**	Delays due to weather, fire, local disaster in the South Dunes area.	All
015	Construction	Damage to existing buildings, services, plant and or machinery	**4**	**Possible**	**III**	Damage to existing pipelines or services during trenching and construction.	All
016	Construction	Compensation events	**5**	**Possible**	**III**	Contractor or third party compenstation due to unforseen circumstances.	Project Management Team
017	Construction	Site constraints	**5**	**Likely**	**III**	Constraints imposed on construction activities due to existing facilities requiring uninterupted services and access.	Project Management Team

5. PROJECT QUALITATIVE RISK PROFILE

The risk profile for the identified risks, as assessed in Section 4, is summarised as follows:

CONSEQUENCE RATING	LIKELIHOOD RATING: Almost Certain	Likely	Possible	Unlikely	Rare
1	0	0	0	0	0
2	0	0	0	0	0
3	0	0	1	0	1
4	0	0	2	0	0
5	0	2	6	0	0
6	0	1	0	1	0
7	0	4	0	0	0
	0	1	12	5	0

Total number of risks: 18

Note: In all cases check against online version for the latest revision prior to use

APPENDIX H:
HAZARD AND OPERABILITY ANALYSIS (HAZOP)

REPORT

Note: In all cases check against online version for the latest revision prior to use

BULK SERVICES HAZARD AND OPERABILITY (HAZOP) STUDY

For: Port of Richards Bay

Project Name: Richards Bay LNG Terminal Bulk Services Study
Project Number: TBA

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Project Sponsor:	Preston Khomo
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Approved by:	
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Name	Location

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1. INTRODUCTION

1.1. Background

As part of the Independent Power Producer (IPP) Procurement Programme, a gas to power (G2P) project has been launched by the South African Department of Energy (DoE) to address the electricity supply shortages in South Africa. The aim of the project is to develop and operate Liquefied Natural Gas (LNG) fired power stations at key locations in South Africa.

The DoE, in collaboration with Transnet SOC Ltd, and specifically its operating division Transnet National Ports Authority (TNPA), has undertaken a Pre-feasibility (FEL2) Study for LNG import projects at the Ports of Richards Bay, Ngqura and Saldanha Bay. The provision of bulk services was excluded from the FEL2 stage of the IPP project as this work was identified as being the direct responsibility of TNPA

The pre-feasibility study for the Port of Richards Bay identified two preferred sites for the location of the LNG import facility, namely Berth 207 and the dig-out basin in the South Dunes area. The pre-feasibility study presented two distinct phases for the development of the LNG import facility – Phase 1 which consists of a floating storage and regasification solution and Phase 2 which consist of a land-based storage and regasification solution.

At the close-out workshop, held in the Port of Richards Bay on 20 September 2016, it was agreed that Berth 207 should be adopted as the single preferred site. PRDW were subsequently appointed by TNPA to complete a pre-feasibility study for the supply of the required bulk services to the Phase 1 facility at Berth 207.

1.2. Hazard and Operability Study

The Bulk Services Options Evaluation report (PRDW, 2018) identified the following preferred development alternatives for the required bulk services upgrades:

Bulk Service	Preferred Option
Fire-fighting	Deluge system supplied from a new seawater pump station on shore adjacent to existing pump station.
Electrical Supply	Small power requirements and general lighting to the berth supplied directly from Berth 209 Substation at 400 V. The sea water pumps will be supplied directly from the Berth 209 substation.
Sewage	*No bulk services upgrade required.*
Potable Water	Install a second supply line from the M14 "Chemical Berth" take off.
Storm water	*No bulk services upgrade required.*

Table 1-1: Preferred Options

A preliminary Hazard and Operability (HAZOP) Study was carried out to identify potential hazards during construction and operation of the preferred options and to determine whether these hazards could be mitigated by practical design modifications. The focus of the HAZOP is related to the technical aspects of the design.

This report documents the methodology followed and the results of the study.

2. METHODOLOGY

A Hazard and Operability (HAZOP) Study was completed in accordance with TNPA's HAZOP Study Methodology for each category of bulk services (fire-fighting, electrical supply and potable water systems). TNPA's HAZOP Study Methodology is outlined in Figure 2-1 below.

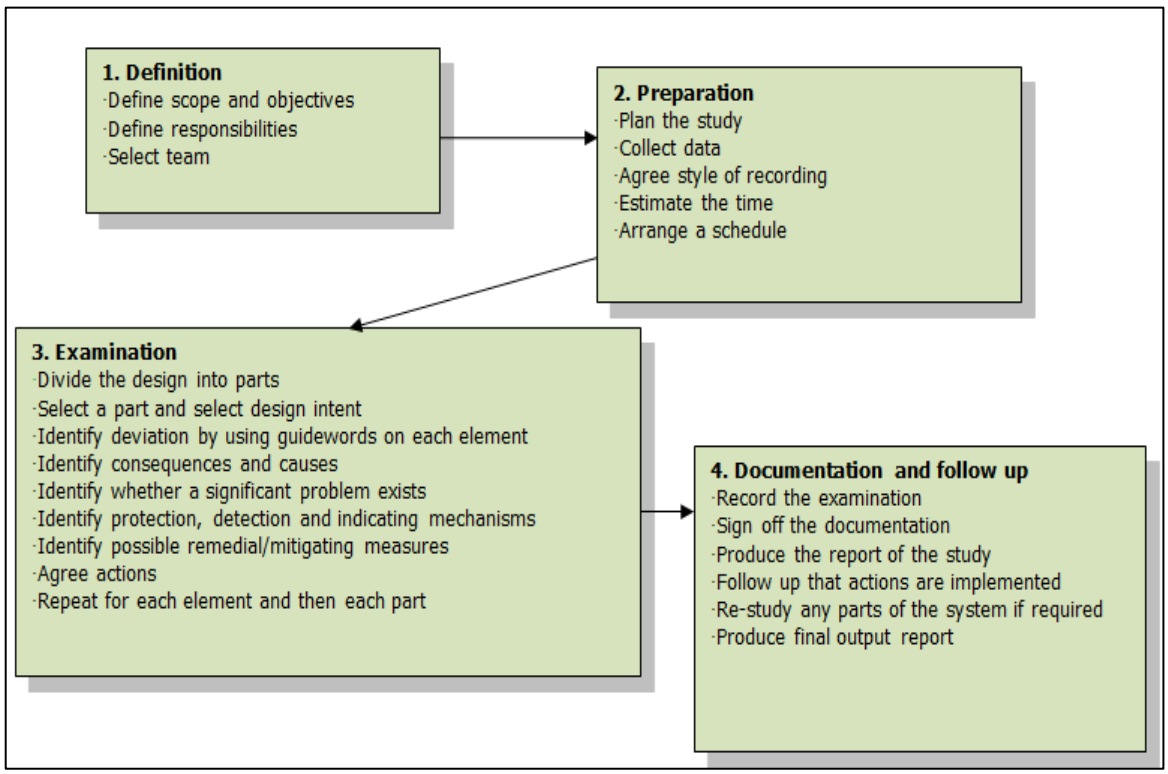

Figure 2-1: TNPA's HAZOP Study Methodology

The following steps were followed as part of the Hazard Study process:

1. The different aspects involved in the project where the split into 'Hazard Nodes' based on logical risk interfaces and consolidated functions of each system.

2. Each node was evaluated for possible deviations (hazards) which may occur during construction and/or operation. The identification of potential deviations was facilitated using guide words for each node.

3. The priority of each potential deviation (hazard) was then defined, based on the potential impact and likelihood of occurrence. The hazards were then analysed further to determine whether any preventative measures that could be put in place, to mitigate the likelihood or impact of the risk.

The hazard nodes and risk definition matrix are presented in the following sections.

2.1. Hazard Nodes

The following hazard nodes were identified:

Bulk Service	Hazard Node
Fire-fighting	Seawater pump station
	Foam pump station
	Pipelines and equipment
Electrical Supply	Electrical supply to pump stations
	Electrical supply to berth
Potable Water	Potable water supply line

Table 2-1: Hazard Nodes

2.2. Risk Definition

Risks were assigned a probability and severity as per the definitions presented in Table 2-2 in order to quantify each identified risk. Risk is defined as the product of the probability and severity.

Probability / Likelihood (P)		Severity / Impact (S)	
Rating	Description	Rating	Description
2	Rare, unlikely to happen in long term (>3years)	2	If risk occurs, there will be **no impact** on strategic, business/operational and process objectives.
4	Unlikely to happen in medium term (1-3years)	4	If risk occurs, there will be **low impact** on strategic, business/operational and process objectives. Minor inury.
6	Possible, risk could occur medium term (1- 3years)	6	If risk occurs, there will be **medium impact** on strategic, business/operational and process objectives. Risk of serious but reversible injury.
8	Probable, risk sure to occur short term (<1 year)	8	If risk occurs, there will be **high impact** on strategic, business/operational and process objectives. Risk of serious and/or irreversible injury.
10	Almost certain, pervasive and occurring regularly	10	**Catastrophic** If risk occurs, strategic, business / operational and process objectives will Not be achieved. Potential loss of life.

Risk Ranking (P x S)	
High	41 to 100
Medium	16 to 40
Low	1 to 15

Table 2-2: Risk Probability and Severity Rating

3. HAZOP RESULTS

A total of 13 hazards were identified during this study. The risk ranking distribution of the identified hazards is summarised in Table 3-1 below.

Risk Ranking	Number of Hazards Identified
High	2
Medium	7
Low	4

Table 3-1: Risk Ranking Distribution

A total of 13 hazards were identified during this study, two (2) of them being classified as 'High' risk. Specific actions have been assigned to the FEL3 Designer, Terminal Operator and Port Engineer to mitigate these risks during future design phases and during operation.

Refer to Appendix A for the full risk register and the recommendations for mitigating the potential risks.

4. CONCLUSIONS AND RECOMMENDATIONS

This HAZOP study has identified potential hazards associated with the preferred alternatives and suggests mitigation measures to reduce the risks associated with these hazards. The focus of this HAZOP study is limited to the technical aspects of the design and it is recommended to obtain the future Terminal Operator's inputs early on during the development of detail designs.

It is further recommended that the hazard scenarios be re-evaluated during the FEL3 phase of development to ensure that the risks are mitigated where possible and to determine the residual risk based on the additional mitigations.

5. REFERENCES

PRDW. (2018). Richards Bay LNG Terminal Bulk Services Study - Bulk Services Options Evaluation. PRDW Study Report No. S2069-1-TN-GA-002-R1. Cape Town: PRDW.

Note: In all cases check against online version for the latest revision prior to use

APPENDIX A:
HAZOP STUDY RISK REGISTER

REPORTS

Note: In all cases check against online version for the latest revision prior to use

Hazard & Operability Analysis (HAZOP)

Project: Richards Bay LNG Terminal Bulk Services Study **Revision:** 0 **Date:** 2018/02/09

Bulk Service	Node	Hazard No.	Guide Word	Element	Deviation	Possible Causes	Consequences	Safeguards	Type	Probability	Severity	Priority	Comments	Actions Required	Actions Assigned to
Fire fighting	Seawater pump station	H-01	Low Flow	Intake screen / intake pumps	Low flow due to fouling of the intake screen / pump not maintained	1. Inadequate maintenance	1. Reduced flow or no flow to fire-fighting equipment 2. Damage to equipment 3. Potential injury or fatality if equipment is non-functional during emergency	None	N/A	6	10	H		1. Regular maintenance cleaning (screen) and maintenance/ servicing (pump system) 2. Consider connection of fire fighting pressure pipeline to Berth 208 and 209 pump stations for redundancy	FEL3 designer, Terminal Operator and Port Authority
	Seawater pump station	H-02	Slow Response	Overall system	Delayed response or slow to act in case of fire	1. Unmanned station 2. Lack of visibility from control tower	1. Damage to equipment 2. Potential injury or fatality	None	N/A	4	10	M		1. Ensure visibility to berth at all times - control vegetation 2. Address responsibilities in emergency response plan 3. Regular fire drills	FEL3 designer, Terminal Operator and Port Authority
	Seawater pump station	H-03	Over pressurisation	Pump control system	Over pressurisation of system due to starting up too fast	1. Manual operation (overriding safety features) 2. Failure of control system components	1. Potential damage to equipment and pipeline 2. Potential injury or fatality if the system cannot function during emergency due to over pressurisation	Control system with redundancy	N/A	2	10	M		1. Regular fire drills 2. Design system so that safety features cannot be overridden	FEL3 designer, Terminal Operator and Port Authority
	Seawater pump station	H-04	Start-up / Operation	Standby diesel pump	No fuel leading to failure in start-up or during operation	1. Theft 2. Inadequate maintenance 3. Leaks 4. Unavailability of fuel supply	1. Loss of redundancy	Regular checking and recording of fuel level in diesel tank (e.g. fuel level sensor)	N/A	2	4	L		1. Maintenance manuals and schedules to be implemented 2. Maintain full back-up fuel supply at all times	FEL3 designer and Terminal Operator
	Foam pump station	H-05	Low level (foam)	Foam tank	Foam tank runs empty leading to inadequate fire-fighting capability (no foam supply)	1. Leak in tank 2. Inadequate maintenance	1. Damage to equipment	Level sensor and warning alarm	N/A	2	8	M	Seawater will still be discharged to fight fire but without the foam compound.	1. Maintenance manuals and schedules to be implemented 2. Link system to Berth 208 and 209 pump stations for redundancy	FEL3 designer, Terminal Operator and port authority
	Foam pump station	H-06	Low Flow	Foam pumps and injection fittings	No foam to fire-fighting equipment	1. Inadequate maintenance	1. Damage to equipment	None	N/A	2	8	M	Seawater will still be discharged to fight fire but without the foam compound.	1. Maintenance manuals and schedules to be implemented 2. Consider connection of fire fighting pressure pipeline to Berth 208 and 209 pump stations for redundancy	FEL3 designer, Terminal Operator and Port Authority

REPORTS

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Hazard & Operability Analysis (HAZOP)

Project: Richards Bay LNG Terminal Bulk Services Study **Revision:** 0 **Date:** 2018/02/09

Bulk Service	Node	Hazard No.	Guide Word	Element	Deviation	Possible Causes	Consequences	Safeguards	Type	Probability	Severity	Priority	Comments	Actions Required	Actions Assigned to
	Foam pump station	H-07	Start-up / Operation	Standby diesel pump	No fuel leading to failure in start-up or during operation	1. Theft 2. Inadequate maintenance 3. Leaks 4. Unavailability of fuel supply	1. Loss of redundancy	Fuel level sensor	N/A	2	4	L		1. Maintenance manuals and schedules to be implemented 2. Maintain full back-up fuel supply at all times	FEL3 designer, Terminal Operator and Port Authority
	Pipelines and equipment	H-08	Low pressure / Low flow	Pipeline	Low pressure / no flow due to leaks in pipeline	1. Infrequent maintenance 2. Impact damage 3. Failure of pipe	1. Damage to equipment 2. Potential injury or fatality	None	N/A	6	10	H	Risk can be mitigated during FEL3 - to be incorporated into Terminal Operator's design of the trestle and berth	1. Regular fire drills 2. Impact barriers 3. Competent design	FEL3 designer, Terminal Operator and Port Authority
	Pipelines and equipment	H-09	Limited / Incorrect Operation	Monitors and valves	Limited functionality (i.e. monitors stuck in position, valves not opening)	1. Infrequent maintenance	1. Damage to equipment 2. Potential injury or fatality	Regular fire drills, maintenance	N/A	6	6	M		1. Maintenance manuals and schedules to be implemented 2. Regular fire drills	FEL3 designer, Terminal Operator and Port Authority
Electrical supply	Supply to pump stations	H-10	No or inadequate power supply	Bulk electrical supply	No or inadequate power supply	1. Failure or damage to supply network	1. Duty pump cannot operate	Standby diesel pump	N/A	6	4	M		1. Standby diesel pump to be maintained in an operation ready state	Port Authority
	Supply to pump stations	H-11	Electrocution	Electrical equipment	Electrocution	1. Working on equipment without proper lock-out procedure and or inadequate training	1. Serious injury or fatality	None	N/A	2	10	M		1. Maintenance manuals and schedules to be implemented 2. Adequate operator training 3. Lock-out procedure	FEL3 designer, Terminal Operator and Port Authority
	Supply to berth	H-12	No or inadequate power supply	Kiosks and lighting	No or inadequate power supply leading to inadequate visibility	1. Failure or damage to supply network	1. Potential limits to operation	Alternative lighting from FSRU	N/A	6	2	L		None	Terminal Operator
Potable water	Supply line	H-13	Low pressure / Low flow	Bulk water supply pipeline	Low pressure / no flow	Shutdown in bulk supply network Leaks/Breaks in pipeline	No potable water supply to berth	None	N/A	2	2	L	Foam and seawater supply lines will remain operational; therefore limited impact on fire-fighting ability	None	None

REPORT

Note: In all cases check against online version for the latest revision prior to use

LNG SHIPPING PROCEDURES

For: Port of Richards Bay

Project Name: Richards Bay LNG Terminal Bulk Services Study
Project Number: TBA

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Project Manager:	Ashveer Sathanund
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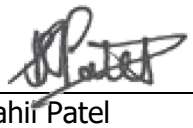
Approved by:  08/12/2017
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Date

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1. INTRODUCTION

The key objective in managing LNG shipping operations in a port area is the elimination of any credible risk of an LNG tankers containment system being breached.

The objective of this document is to define the standard operating procedures governing LNG carriers' arrival at, dwelling and departing the Port of Richards Bay.

1.1. PURPOSE

This standard operating procedure (SOP) has been developed for LNG vessels calling at the port. This SOP is to be read in conjunction with the Port Rules, included as Appendix A, and are to be incorporated into the comprehensive Terminal Operations Manual which is to be developed by the terminal operator. The objectives of the manual include the following:

- Provide standard operating procedures for the operational aspects carried out by TNPA in terms of pilotage, navigation, berthing and sailing and associated marine services; and
- Provide technical information for emergency procedures.

1.2. SCOPE

This operating procedure has been developed based on navigation simulations with LNG vessel capacities up to 210 000 m^3 (i.e. Q-Flex). The dimensions of the design vessel simulated in the navigation studies (PRDW, 2016) are provided in Table 1-1 below.

Table 1-1: Maximum design vessel dimensions

Parameters	Value
Cargo Capacity (m^3)	210 000
Deadweight (t)	97 000
Displacement (t)	141 000
Length Overall (m)	315
Length Between Perpendiculars (m)	303
Beam (m)	50
Laden Draft (m)	12.0

Operating parameters concerning the LNG design vessel e.g. draft/daylight hour, operation/weather conditions etc. will be set at a restricted level in the early stages of the LNG terminal commissioning. These parameters will be reviewed during the commissioning or 'settling in' period where the working results can be validated against the simulation results to mirror or modify the "operational condition requirements" determined during simulation.

These parameters will be reviewed on a regular basis as the LNG trade continues to develop and may be varied from time to time as considered necessary.

1.3. PRIORITY OF DOCUMENTATION

The documents below are listed in order of increasing priority. In the event of any conflict or contradiction between the document, the provisions contained within the document of a higher priority shall prevail.

- National Ports Act no. 12 of 2005;
- Port Rules (National Ports Act);
- Guidelines for Agreements, Licenses and Permits;
- Harbour Master's Written Instructions;
- Port of Richards Bay Berthing Guidelines;
- TNPA's LNG Shipping Procedures (this document); and
- Terminal Operator Standard Operating Procedures and Policies.

1.4. DEFINITIONS

"Terminal": A place where vessels are berthed or moored for the purpose of loading or discharging cargo, and performing any other port related works.

"Terminal Operator": The preferred party granted the right to operate the LNG facility in terms of the terminal Operator Agreement signed with TNPA.

"Terminal Manager": A person designated by the terminal to take responsibility for an operation or duty.

"Harbour Master": Any person appointed by TNPA as Harbour Master or in his/her absence delegated to act as such.

"Master": Any person, other than a pilot, having charge or command of a vessel or pleasure vessel.

"LNG Shipping Procedures Standard": The policy contained in this document, as amended by the NPA from time to time, at its sole and unfettered discretion.

"Bollard Pull": The zero-speed pulling capacity of a tug.

"Fairway Buoy": Safe water mark in the approach channel.

"Wind Speed": The average wind speed over a 30 second period at 10m above Mean Sea Level.

1.5. ABBREVIATIONS

ESD	Emergency Shut Down	**LNG**	Liquefied Natural Gas
ETA	Estimated Time Arrival	**ETD**	Estimated Time Departure

FSRU	Floating Storage and Regasification Unit	**HM**	Harbour Master
IACS	International Association of Classification Societies	**IMA**	International Maritime Academy
TNPA	Transnet National Ports Authority of South Africa	**STS**	Ship-to-Ship Transfer
PPU	Portable Pilot Unit	**SOP**	Standard Operating Procedure
VTS	Vessel Traffic Service	**IMDG**	International Marine Dangerous Goods

2. GENERAL INFORMATION

2.1. TERMINAL DESCRIPTION

The LNG Terminal within the Port of Richards Bay is located at the site identified in the Transnet Port Development Framework Plan (Transnet, 2015) for the development of Berth 207, adjacent to Berth 208. Berth 208 is a liquid bulk berth used predominantly for the import and export of chemicals.

2.2. RELEVANT CHARTS AND NAUTICAL PUBLICATIONS

The master of a vessel must ensure that it has on board the latest editions of all relevant nautical charts and other nautical publications for safe navigation. Nautical charts required for the Port of Richards Bay include, but will not be limited to, the following:

- Approaches to Richards Bay – ZA400170; and
- Richards Bay Harbour – ZA500170.

Nautical publications required for the Port of Richards Bay include, but will not be limited to, the following:

- South African List of Lights, Fog Signals and Radio Services – SAN HO-1;
- South African Tide Tables – SAN HO-2; and
- South African Sailing Directions Volume iii – SAN HO-23.

2.3. TUG REQUIREMENTS

Typically, four (4) tugs will be utilised for all berthing and unberthing operations. Two tugs will assist the LNG vessel from the fairway buoy and two will join the inbound vessel in the vicinity of the inner breakwater. At this stage, it is not deemed necessary that these tugs are required to be escort tug classification. The tugs will be made fast subject to the discretion of the Pilot in charge and in conjunction with the Master of the vessel. On sailing, two tugs will be released in the vicinity of the

inner breakwater. The remaining two tugs will escort the vessel safely beyond the Fairway buoy. The following are the specific requirements for LNG manoeuvring operations:

- A minimum of four (4) tugs shall be available for all LNG vessel arrivals and departures;
- A minimum of two (2) of the tugs on arrivals and departures must be equipped with marine FiFi (fire-fighting) 1 capabilities;
- One (1) tug with FiFi 1 capabilities will remain on stand-by, in close proximity to the terminal and dedicated to the LNG vessel that is at the terminal;
- Additional tug support should be available at the terminal within a minimum of 20 minutes from request;
- The total combined bollard pull of the tugs shall not be less than two hundred and ten (210) tons, with none of the tugs having less than seventy (70) tons bollard pull capacity; and
- It is up to the vessel's Master and/or pilot to decide if additional tug capability is needed over and above the minimums specified.

2.4. PILOTAGE

In terms of the National Ports Act 12 of 2005, pilotage in the ports of South Africa is compulsory with the exceptions of ships that are exempt by statute or regulation. All shipping movements will be carried out at the discretion of the designated pilot, based on his/her local knowledge, prevailing weather conditions, state of the tide, type of vessel, etc. The pilot shall adhere to Section 75 of the National Ports Act no. 12 of 2005. The following specific requirements are considered for the pilotage of LNG vessels:

- LNG vessels entering and departing the port are required to have a pilot; and
- Pilots will not be required to remain onboard an LNG vessel whilst alongside but must be available within the time specified for the second tug to be in attendance (i.e. approximately 20 minutes).
- A berthing master, two berthing gangs and the FSRU vessel's master and crew will assist the mooring operations on the FSRU.

2.5. PORT OPERATIONAL LIMITS

2.5.1. Entrance/Exit channel limits

The following limits apply to the port entrance/exit channel:

Table 2-1: Port entrance channel limits

Restriction	Value
Vessel size	17.5m draft (width, LOA, Displacement unspecified) The channel is 300m wide.
Minimum under keel clearance	1.5m on berth
Maximum swell	+/- 3.5m (at Harbour Master's discretion)
Minimum distance from south breakwater for abandoning approach	1 nautical mile

General notices & regulations: Vessels must arrive with the following minimum drafts, with the propeller submerged for safe navigation:

- Vessels with LOA up to 250m: Forward - 2% of LOA; Aft - 3% of LOA
- Vessels with LOA over 250m: Forward - 2,5% of LOA; Aft - 3,5% of LOA

Maximum Permissible draft in channel is 17.5m. Vessel to ensure they navigate at all times within the designated navigation channels and within the leading light limits.

2.5.2. Daylight restrictions

Initially, all LNG vessel movements into and from the port will be restricted to daylight hours, initially identified as a daylight only manoeuvre. Due to the infrequent nature of an FSRU arrival and sailing, the FSRU can be suitably planned for daylight only operations.

Once the 'settling in period/commissioning period' has been completed and the facility successfully validated, the Harbour Master may allow for LNG vessels to be handled during the hours of darkness, subject to suitable weather conditions and provided that these conditions are successfully simulated.

2.5.3. Limiting conditions

Limiting conditions applied to LNG operations should consider the high wind areas associated with these vessels and the characteristics of their propulsion systems.

LNG vessels will not be handled in weather conditions that make operations hazardous. These are typically wind speeds in excess of 20 knots and wave heights above 3.5 m (as assessed by the pilot boat). The actual weather conditions are to be determined at the time of the manoeuvre.

When transiting the port and mooring in conditions of reduced visibility, the decision to move the vessel will be made jointly by the pilot and the ship's Master. It is expected that they will discuss the prevailing conditions and only move the vessel when they both agree that it is safe to do so.

Due to the high freeboard of LNG vessels manoeuvring in the Port of Richards Bay will be subject to the following port operational wind limits:

Table 2-2: Forecasted wind speeds – LNG/FSRU actions

Wind Speed (forecasted)	Vessel	Berthing Restricted	Tugs In Assistance	Stop Cargo Operations	Disconnection	Evacuation
>10 m/s	LNG/FSRU					
>20 m/s	LNG					
>23 m/s	LNG					
>23 m/s	FSRU					
>26 m/s	LNG					
>26 m/s	FSRU					
>28 m/s	FSRU					

Actions for forecasted wind speed

3. NAVIGATION IN THE APPROACHES TO THE PORT

3.1. NOTIFICATION TO VTS

The requirements outlined in Part B of the Port Rules for reporting to the VTS shall be observed with the exception of the following amendments or additions:

- An IMDG declaration must be made 72 hours prior to vessel arrival for Harbour Masters' approval.

3.2. ANCHORAGE

LNG vessels may arrive at the designated anchorage at any time of the day or night. If required to await berthing at the anchorage, the vessels are to drop their anchors at the designated LNG vessel anchorages for LNG vessels at positions as shown on the latest navigation charts.

Extreme caution should be taken during strong SW and NE winds as vessels have lost their anchors in the past. Anchorage immediately to the north of the Port entrance is prohibited due to the location of the offshore pipeline (SA Notices to Mariners 44/83). In addition to these anchorage guidelines further prohibited anchorage areas as listed in the relevant local (up-to-date) chart will also need to be considered (refer to Section 2.2).

4. REQUIREMENTS FOR ENTERING THE PORT

4.1. NOTICES AND PERMISSIONS TO ENTER

The notices outlined in Part C of the Port Rules shall be observed with the exception of the following amendments or additions:

- 1st notice – 96 hours before arrival;
- 2nd notice – 72 hours before arrival;
- 3rd notice – 44 hours before arrival; and
- 4th notice – 2 hours before arrival.

4.2. VESSEL SCHEDULING/ORDER OF WORKING

Priority of shipping will remain as per existing Port Rules except as stated below:

Ship scheduling will be carried out as at present by ship schedulers under the authority of the Harbour Master and in accordance with the following principles;

- LNG Vessels will advise their ETAs/ETDs as soon as possible and confirm ETA at least 48 hours prior to arrival;
- The ship scheduler will schedule the movement of the LNG vessel after consultation with the vessel's Agent;
- Once the time slot has been agreed between the Harbour Master and the Agent, then no other vessel may occupy that time slot;
- Other vessels that may experience delays may not occupy the time slot agreed for the movement of the LNG vessel except by mutual arrangement;
- LNG vessels that miss their time slot will be allocated the next available time slot that fits in with other port movements;
- Any vessels at risk of being tidally constrained at a berth shall have priority;
- All other movements shall take place on a priority system based on cargo type and whether a vessel is intending to enter or exit the port;
- All vessel movements shall be subject to the approval of the Harbour Master;
- Vessels will have an International Association of Classification Societies, (IACS) Cap 2 classification for vessels 15 years and older; and
- Date & time of arrival at the port limits of the Port of Richards Bay as recorded in VTS/Port Control will be the order of seniority.

The order of docking or sailing of vessels listed below will be determined by the Harbour Master or his/her appointee in his/her sole and unfettered discretion.

- Passengers;
- Foreign/ Local Naval vessels;
- Draft Restricted Vessels;
- LNG Vessels;
- Jobs of Special Nature;
- Bulk Carriers (Coal);
- Tankers – Chemical, products, gas carriers;
- General Cargo Vessels; and
- Other – Non-cargo working vessels.

The Harbour Master will take cognisance of dynamic changes related to operational suitability and safety when addressing priority of berthing.

In the interest of safety, security, good order, protection of the environment and orderly working of the port the Harbour Master will decide on how resources will be allocated taking into consideration the following:

- Vessels with emergencies;
- Shipping back-log recovery;
- Tidal vessels;
- Liner type vessels – time sensitive;
- Key Commodities that contribute to the revenue of the port;
- Cargo Sensitive vessels – e.g. Passengers; and
- Weather conditions.

4.3. PORT ENTRY INFORMATION

4.3.1. Pilot boarding

Port Control will advise as to which side the pilot ladder should be rigged. Man-ropes must be provided as pilot hoists are unacceptable. The marine pilot will determine the boarding points within an area designated for pilot boarding as per the local navigation chart. All vessels with a freeboard in excess of nine metres must have an accommodation ladder rigged in conjunction with the pilot ladder. The lower ledge of the accommodation ladder must not be more than nine metres above sea level (as per IMO Resolution A.899(21)).

Gas carriers are recommended not to undertake helicopter operations unless a purpose-built helicopter platform is provided. Whenever helicopter services are used the safety measures recommended in the latest International Chamber of Shipping (ICS) Guide to Helicopter/Ship Operations' should be taken into account.

All Pilot boarding arrangements must comply with IMO recommendations. According to the Port of Richards Bay Berthing Guidelines, the Pilot ladder is to be 2m above water, with two good manropes for Marine Pilot boarding by a pilot boat.

The Pilot boarding position for incoming vessels is four nautical miles South East of the South Breakwater with a minimum distance of one nautical mile from the approach channel fairway buoy for pilot transfer to occur. Port Control may advise the vessel for a different pilot boarding position subjected to the Marine Pilot discretion.

Table 2-1: Limiting conditions according to Port of Richards Bay Berthing Guidelines

Restriction	Pilot Boat
Wind Speed	Approx. 35 knots
Swell Height	+- 3.5m

4.3.2. Typical transit routes

The LNG Vessel will sail from anchorage towards the breakwater, where two tug vessels will be waiting to assist in the vessel's transit through the breakwater. These two tugs will meet the incoming LNG vessel approximately 0.5 miles from the harbour entrance/breakwater. Two additional tug vessels will be waiting inside the breakwater. The tugs will be attached on the vessels centre-leads on the bow and stern, port shoulder and port quarter.

The tugs will assist in manoeuvring the LNG vessel through the entrance channel, and in area adjacent to berth, the tugs will have room to rotate the LNG vessel to berth starboard side alongside Berth 207 double-banked alongside the FSRU.

Before sailing from anchorage to breakwater a check needs to be carried out to ensure that all the required channels in the port are open. An LNG vessel requires that all channels are unoccupied, besides the channels immediately outside either the RBCT or the MPT terminal, where vessels could be completing berthing operations. A VTS notice will precede the imminent arrival or departure of the LNG vessel.

4.3.3. Local navigation conditions

The port entrance channel has a width of 300m which extends 400m seaward beyond the breakwater to a depth of 22m. The unprotected approach channel and entrance channel are suitable for the safe navigation of the maximum design vessel for a single lane channel.

Wind data indicates two dominant wind directions which are closely aligned with the orientation of the local coastline (north-east and south-west). The north-easterly winds occur more frequently, but the strongest winds occur from the south-west.

4.3.4. Moving exclusion zone and passing vessels

No passing shall take place between LNG vessels and other vessels carrying dangerous goods. No passing shall take place between an LNG vessel and a deep draft vessel during the transit of any

channel area. Moving exclusion zones consider clear safe navigable area 500m ahead and 250m abeam and astern while transiting along shipping channels (i.e. the approach and entrance channels).

Separation between LNG vessels and other non-LNG vessels in the channels will be as per existing Port rules.

5. REQUIREMENTS FOR BERTHING

5.1. BERTHING AIDS

A berthing display board showing rate, angle, and distance off berth shall be provided and visible from the LNG vessel's bridge in all conditions of daylight and dark. Additionally, the pilot on the LNG vessel shall carry reliable PPU or other equipment to assist the Pilot in determining the distance off the berth and the speed of the vessel while approaching the FSRU for mooring.

5.2. MOORING LINE ASSISTANCE

Mooring line handling services will be scheduled, coordinated by, and are the responsibility of the terminal user or its shipping agent. The mooring line layout to be used for each ship will be established through a vessel mooring analysis study to be performed by the vessel's operators and agreed by the Terminal and the vessel's Master before the vessel's arrival at the port. Following agreement between the vessel's Master the ship operators and the Terminal regarding the mooring layout to be used for the particular ship, the Terminal will distribute each vessel's mooring layout to the mooring line handlers prior to the ship's arrival at the Terminal.

Mooring requirements will vary according to the type of vessel berthing, its LOA, breadth, freeboard prevailing weather conditions, berth and bollard configuration (distance between bollards, bollard SWL). In order to secure a vessel that is under 200m LOA, the minimum mooring line configuration is 3 headlines and 2 spring lines forward, 3 stern lines and 2 spring lines aft. For bigger vessels this can alternatively become 4 headlines, 2 breast lines, 2 spring lines and 4 stern lines, 2 breast lines and 2 spring lines. Under special conditions (e.g. strong winds, high swell, surges) additional mooring lines will be required to secure a vessel subject to the Harbour Master requirement. Only if it is safe to do so may storm surge lines be used.

The LNG vessel will require the minimum mooring requirements as specified by the Port for a high-risk berth. A mooring plan for high risk vessels (prone to wind, surge, swell or special vessel passing conditions) needs to be submitted to the Harbour Master for approval.

It is the Masters responsibility to ensure that the LNG vessel is secured and safe for cargo operations and the mooring lines are tended to during loading and discharge operations. The maximum traffic vessel transit speed recommended within a harbour to prevent the breaking of a vessel's mooring lines is 6 knots.

5.3. BUNKERING

Fuel oil transfer from a bunker barge to an LNG vessel is not allowed at the Terminal.

5.4. REPAIRS

Vessels may perform routine maintenance and inspection procedures while at the terminal provided that the required permits are obtained. No maintenance may be undertaken at the Terminal on any control or propulsion system that could compromise the LNG vessel's manoeuvrability in any way.

6. REQUIREMENTS FOR DEPARTURE FROM THE PORT

6.1. NOTICES AND PERMISSION TO DEPART

LNG Vessels may only depart the Port of Richards Bay when the prevailing environmental conditions are acceptable both within and outside the port. Marine vessel traffic needs to remain clear of the specified channels, mentioned in 6.3.2, once the LNG vessel has notified its readiness to depart and VTS has communicated the same.

As a general principle all vessels will be serviced based on bookings made on the Integrated Port Management System (IPMS) slot booking system and subject to the provisions of this policy, and compliance with the Ports Act and Port Rules.

Four hours before the LNG vessel's intended departure a pilot must be ordered and a departure notice to be sent to Port Control via IPMS. A two hours confirmation is required for via IPMS, the vessel Master needs to ensure that the pilot is reconfirmed exactly two hours before the intended LNG vessel departure time.

According to "Berthing Guidelines" all security regulated vessels must be ISPS cleared as per Maritime Security Regulations of 2004 prior to making a request for marine services on IPMS. Four tugs are required to manoeuvre the LNG vessel out of the port channel (refer to Section 2.3).

6.2. ORDER OF WORKING/VESSEL SCHEDULING

Departing vessels have transit priority over arriving vessels and will thus be given tug and port channel resources before a vessel that is intending to enter the port.

LNG vessels will furthermore have priority over any other cargo vessels wishing to depart the port within the same time frame. This situation needs to be assessed and confirmed by the Harbour Master should conditions justify priority otherwise.

6.3. PORT DEPARTURE INFORMATION

6.3.1. Typical transit routes

Before departing the berth and sailing from the anchorage to the breakwater, all the required channels in the port need to be confirmed as open and unavailable to other marine traffic. An LNG Vessel requires that all the port channels are unoccupied, besides the channels immediately outside either the RBCT or MPT terminal, where vessels could be completing berthing operations to enter.

Once these channels are confirmed open and the predetermined unmooring sequence has been agreed upon by the FSRU Master, berthing master, and LNG Vessel's Master together with the Pilot, the four tugs will assist the LNG vessel in manoeuvring off Berth 207 (as parallel as possible) and into the open channel adjacent to the berth. There is significant room here to manoeuvre the LNG vessel into the correct alignment to sail straight out of the remaining port channel and passed the breakwater.

6.3.2. Moving exclusion zone and passing vessels

No passing shall take place between LNG vessels and other vessels carrying dangerous goods. No passing shall take place between an LNG vessel and a deep draft vessel during the transit of any channel area. Moving exclusion zones consider clear safe navigable area 500m ahead and 250m abeam and astern while transiting along shipping channels (i.e. the approach and entrance channels).

Separation between LNG vessels and other non-LNG vessels in the channels will be as per existing Port rules.

6.3.3. Pilot disembarking

The marine pilot will determine the boarding points within an area designated for pilot disembarkation as per the local navigation chart (refer to Section 2.2). All vessels with a freeboard in excess of nine metres must have an accommodation ladder rigged in conjunction with the pilot ladder. The lower ledge of the accommodation ladder must not be more than nine metres above sea level (as per IMA Resolution A.899(21)). Port Control will advise as to which side the ladder should be rigged. Man-ropes must be provided as pilot hoists are unacceptable.

7. EMERGENCIES

This section describes typical LNG emergency scenarios on the LNG vessel, terminal or on a traffic vessel within the port. The terminal operator should provide a detailed description of the action plan for likely Emergencies in port. The typical emergencies described below should be read in conjunction with the TNPA emergency response plan and the terminal operator site specific emergency action plan.

7.1. EMERGENCY ON THE LNG VESSEL

If an emergency occurs on a vessel at the berth, the vessel must raise the appropriate alarm for the vessel that is recognised by its crew. At the sounding of the alarm all cargo and ballast transfer operations must be stopped and the ship's main engines and steering gear brought to an instant readiness condition.

The stand-by tug will be called by the vessel to come into close proximity with the vessel to be available to respond in any way that the ship's Master may deem practicable. This tug is always at the disposal of the LNG vessel's Master.

In the event that evacuation of a docked ship becomes necessary, the ship's crew will evacuate the ship via the terminal's gangway and muster at the personnel muster station. If the particular emergency precludes the use of the terminal gangway the secondary evacuation route for the ship's crew will be by the vessel's lifeboat(s).

7.2. EMERGENCY AT THE LNG TERMINAL

If an emergency on the berth is detected, the ship's main engines and steering gear must be brought to an instant readiness condition. The vessel's crew must be ready to disconnect the cargo arms from the manifold if it is deemed necessary by either the vessel's Master or by the terminal operator, if it is safe to do so.

Responsibility for responding to an emergency on the berth is that of the terminal operator. The LNG vessel's Master must assess the likelihood of the emergency effecting his vessel and take appropriate action to protect the vessel's crew, cargo and vessel. The stand-by tug will be called by the vessel to come into close proximity with the vessel to be available to respond in any way that the vessel's Master or the terminal management may deem appropriate for the particular emergency.

The LNG vessel's Master must assess the emergency and decide if evacuation of the ship's crew or taking the vessel off the berth and out of harm's way is his best course of action.

In case where an emergency departure from the berth is necessary, two tugs and a Pilot will be required to un-berth the LNG carrier. Since the vessel will be undergoing cargo operations, she would be pulled away from the FSRU by the two attending tugs after the activation of ESD (to release cargo discharge hoses) and the quick release of mooring hooks on the mooring dolphins and the FSRU, within a short time. The LNG vessel will be removed from the berth and held in the turning basin to await the arrival of additional tugs and Pilots to safely assist the vessel in a safe departure from the

turning basin, as necessary. The LNG carrier and the FSRU shall have a dedicated pilot cabin available for the pilot at all times.

If the particular emergency on the berth impacts the vessel and prevents its departure, while at the same time precluding the use of the terminal gangway as a route for evacuating the ship's crew from the vessel, the secondary evacuation route for the ship's crew will be by the ship's lifeboat(s).

7.3. EMERGENCY AT ANOTHER TERMINAL IN THE PORT

If an emergency is detected at another terminal within the Port, the LNG vessel's Master should immediately have the ship's main engines and steering gear brought to a state of instant readiness and to summon the attending tug(s) to come alongside the vessel. Thereafter, the terminal management will consult with the ship's Master in monitoring the emergency to assess the likely threat to which the LNG vessel may become exposed. Actions taken to ensure the safety of the ship's crew, terminal personnel, the ship and the cargo may include stopping cargo transfer, disconnecting the cargo arms and taking the vessel off the berth and sending her to sea.

APPENDICES

Note: In all cases check against online version for the latest revision prior to use

The following appendices are included with this report:

APPENDIX A: Port Rules

Note: In all cases check against online version for the latest revision prior to use

APPENDIX A: Port Rules

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GOVERNMENT NOTICE

DEPARTMENT OF TRANSPORT

No. 255 **6 March 2009**

PORTS RULES

I, Jeff Thamsanqa Radebe, Minister of Transport, hereby, in terms of section 80(2) of the National Ports Act no 12 of 2005, approve the rules made by the National Ports Authority for the control, management of ports, the approaches thereto, for the maintenance of safety and security; good order and the protection of the ports environment.

These Port Rules are published for general information and compliance and will come into operation on the date of publication.

J. Radebe

J. Radebe

Minister of Transport

TRANSNET
national ports
authority

Port Rules

"The Authority may, with the approval of the Minister, by notice in the Gazette, make rules for the control and management of ports and the approaches thereto and for the maintenance of safety, security and good order in ports,..."

National Ports Act No. 12 of 2005, Section 80 (2)

PORT RULES

Issued in terms of the National Ports Act, No. 12 of 2005, Section (80)(2)

CHAPTER 1: INTERPRETATION, APPLICATION AND POWERS OF THE HARBOUR MASTER AND THE *AUTHORITY*

1. Interpretation

(1) In these rules, unless the context indicates otherwise —

(a) "***Act***" means the National Ports Act No. 12 of 2005.

(b) "***agent***" refers to all representatives having commercial dealings with a *vessel* or its *cargo,* unless the context indicates that it refers to a particular kind of *agent*, and includes a *vessel's agent* and a *cargo agent*.

(c) "***approaches to a port***" means the *VTS zone* in respect of each *port* excluding the *port* limits, or, where a *port* does not have a *VTS zone*, the port limits.

(d) "***Authority***" means, subject to section 3 of the *Act*, the National Ports Authority of South Africa or the National Ports Authority Limited, as contemplated in section 4 of *the Act*.

(e) "***cargo***" means any cargo, goods, wares, merchandise, and articles of every kind whatsoever, including animals, birds, fish, plants and containers, carried, or intended to be carried, by sea.

(f) "***cargo agent***" includes both a clearing and forwarding *agent*.

(g) "***certified chemist***" means a person who holds a B. Sc degree in chemistry or a recognised equivalent certificate, or who has successfully completed a specialised course in Chemical Tanker or Oil Tanker Safety Training Program in accordance with the South African Code of Maritime Qualifications published by *SAMSA*, and who has at least two years laboratory experience and specialised training in the testing of atmospheres in vessels.

(h) "***chart***" means the latest valid navigational chart for sea navigation purposes.

(i) "***Chief Fire Officer***" means the Chief Fire Officer of the *Authority* or the Municipal Fire Services.

(j) "***container operator***" means any person providing international transportation of containerised goods, and approved by the Commissioner for the South African Revenue Service under section 96A of the Customs and Excise Act 91 of 1964, as amended, for operating containers in the *Republic*.

(k) "***customs***" means the South African Revenue Service.

(l) "***dangerous goods***" includes dangerous *cargo* and —

(i) goods classified in the *IMDG Code*, published by the International Maritime Organisation, as amended from time to time;

(ii) substances listed in chapter 17 of the International Code for the Construction and Equipment of Ships Carrying Dangerous Chemicals in Bulk (IBC Code), published by the International Maritime Organisation, as amended from time to time;

(iii) substances listed in chapter 19 of the International Code for the Construction and Equipment of Ships Carrying Liquefied Gases in Bulk (IGC Code), published by the International Maritime Organisation, as amended from time to time;

(iv) oils as defined in Annex I of the International Convention for the Prevention of Pollution from Ships 1973, as modified by the 1978 Protocol, as amended from time to time;

(v) noxious liquid substances as defined in Annex II of the International Convention for the Prevention of Pollution from Ships 1973, as modified by the 1978 Protocol, as amended from time to time;

(vi) harmful substances as defined in Annex III of the International Convention for the Prevention of Pollution from Ships 1973, as modified by the 1978 Protocol, as amended from time to time; and

(vii) radioactive materials specified in the Code for the Safe Carriage of Irradiated Nuclear Fuel, Plutonium and High-level Radioactive Wastes in Flasks on board Ships (INF Code), published by the International Maritime Organisation, as amended from time to time.

(m) "***entering port***" means a *vessel* entering the port's limits.

(n) "***entering the VTS zone***" means a *vessel* entering the *VTS* limits.

(o) "***foreign regulated ship***" means a foreign ship that is —

(i) in South African waters;

(ii) in, or is intending to proceed to, a port in the *Republic*; and

(iii) a *passenger* ship, a *cargo* ship of 500 gross tonnage or more, or a mobile offshore drilling unit (other than a unit that is attached to the seabed).

(p) "***fire protection personnel***" means fire protection personnel complying with the requirements set by the *Authority* in terms of rule 73.

(q) "***fishing vessel***" means a *vessel* that is used for the purpose of catching fish or other living resources of the sea for financial gain or reward.

(r) "***gangway***" means any access between *vessel* and shore and vice versa.

(s) "***gas free***" means that the tank, compartment or container has sufficient fresh air introduced into it in order to lower the level of any flammable, toxic or inert gas to that required for any purpose.

(t) "***Harbour Master***" means the employee of the *Authority* appointed for each port as contemplated in section 74(3) of the *Act*.

(u) "***hot work***" means work involving sources of ignition or temperatures sufficiently high to cause the ignition of a flammable gas mixture or combustibles. This includes any work requiring the use of welding, burning or soldering equipment, blow torches, some power driven tools, portable electrical equipment, which is not intrinsically safe or contained within an approved explosion proof housing or internal combustion engines.

(v) "***hot work permit***" means a document issued by the *Authority* permitting specific *hot work* to be done during a specific time interval in a defined area.

(w) "***IMDG Code***" means the International Maritime Dangerous Goods Code adopted by the Maritime Safety Committee of the International Maritime Organization by resolution MSC.122 (75).

(x) "***in contact***" means the wilful physical contact or interaction occurring between a *vessel* and a *pleasure vessel* that involves the movement of persons or goods or the provision of services to or from the *vessel*.

(y) "***industry guidelines***" includes the industry reference works referred to in rule 1041(2), as amended from time to time.

(z) "***IMO***" means International Maritime Organisation.

(aa) "***length***" refers to the length overall (LOA) and means —

(i) in the case of a registered *vessel*, the *length* shown in the certificate of registry; and

(ii) in the case of a vessel licensed in terms of section 68 of the Merchant Shipping Act, 1951 (Act No. 57 of 1951), the *length* shown in the licence.

(bb) "***manoeuvre***" means any *vessel* movement that may be detrimental to safe navigation, and includes —

(i) a compass adjustment;

(ii) the calibration and servicing of navigational aids;

(iii) a sea trial;

(iv) a dredging operation; and

(v) the laying, picking up and servicing of submarine cables.

(cc) "***master***" means any person, other than a pilot, having charge or command of a *vessel or pleasure vessel*.

(dd) "***motor vehicle***" means a vehicle that is registered in terms of the National Road Traffic Act No. 93 of 1996.

(ee) "***ISO container***" means a freight container with the specifications prescribed by the International Organization for Standardisation.

(ff) "***owner***" means any person to whom a *vessel* or *pleasure vessel* or a share in a *vessel* or *pleasure vessel* belongs or any other organisation or person, such as the manager or charterer, who has assumed the responsibility for the operation of the *vessel* or *pleasure vessel* from the owner of the *vessel* or *pleasure vessel*.

(gg) "***passenger***" means any person carried in a *vessel*, except —

(i) a person employed or engaged in any capacity on board a *vessel* on the business of the *vessel*;

(ii) a person on board the *vessel* either in pursuance of the obligation laid upon the master to carry shipwrecked, distressed or other persons or by reason of any circumstance that neither the master nor the owner nor the charterer (if any) could have prevented; and

(iii) a child under one year of age.

(hh) "***passenger vessel***" means a *vessel* that carries more than 12 *passengers*.

(ii) "***pleasure vessel***" means a *vessel*, however propelled, that is used, or intended to be used, solely for sports and recreation and that does not carry more than 12 *passengers*.

(jj) "***port***" means any of the ports as defined in section 1 or determined in terms of section 10 of the *Act*.

(kk) "***Port Security Officer***" means a person appointed by the *Authority* in a *port* to implement and maintain the *Authority*'s maritime security plan.

(ll) "***Republic***" means the Republic of South Africa.

(mm)"***revenue office***" means the *Authority*'s Revenue Office.

(nn) "***SAMSA***" means the South African Maritime Safety Authority, established as a juristic person by virtue of section 2(1) of the South African Maritime Safety Authority Act No. 5 of 1998.

(oo) "***security officer operating within a port***" means a person designated by the *Authority* or operator within a *port* to implement and maintain the relevant maritime security plan.

(pp) "***shift***" means the movement of a *vessel* from one place in the port to another, and "shifting" bears a corresponding meaning.

(qq) "***small vessel***" means a commercial small *vessel* that:

(i) is registered in the *Republic;*

(ii) lies in, is used in or operates from a *port*; and

(iii) includes a tug, *fishing vessel*, launch, barge, lighter, rowing boat, skiboat, sailing boat, yacht or similar vessel, or a hulk of any of the vessels enumerated, but excludes a *pleasure vessel.*

(rr) "***tanker***" means a *vessel* designed to carry liquid *cargo* in bulk, including a combination carrier being used for this purpose.

(ss) "***Tariff Book***" means the Tariff Book contemplated in section 72 of the *Act.*

(tt) "***unseaworthy***", used in relation to a *vessel*, has the same meaning as set out in the Merchant Shipping Act No. 57 of 1951, read with the changes required by the context.[1]

(uu) "***vessel***" means any water-navigable vessel or structure and includes a *passenger vessel*, ship, seaplane, *small vessel* and a non-displacement vessel, but excludes a *pleasure vessel,* to which Part B of Chapter 2 applies.

(vv) "***vessel agent***" refers to the *agent* of the owner of the vessel.

(ww) "***vessel in need of assistance***" means a *vessel* in a situation, apart from one requiring rescue of persons on board, that could give rise to the loss of the *vessel* or an environmental or navigational hazard. "***Pleasure vessel in need of assistance***" has a corresponding meaning.

(xx) "***VTS***" means the vessel traffic service of a *port* administered by the *Authority* in respect of a *VTS zone.*

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[11] The definition of "*unseaworthy*" in the Merchant Shipping Act 57 of 1951 is:

""***unseaworthy***", used in relation to a vessel, means that she —

(*a*) is not in a fit state as to the condition of her hull, equipment or machinery, the stowage of her *cargo* or ballast, or the number or qualifications of her master or crew, or in any other respect, to encounter the ordinary perils of the voyage upon which she is engaged or is about to enter; or

(*b*) does not comply with the conditions of assignment to the extent set forth in paragraph (*c*) of section *two hundred and seven*; or

(*c*) is loaded beyond the limits allowed—

(i) by a load line certificate issued in the *Republic* under this *Act*; or

(ii) if she is a load line ship, registered in a country in which the Load Line Convention applies, by a recognized non-South African international load line certificate; or

(iii) by a load line certificate to which a notice issued under section *two hundred and eighteen* applies:

Provided that a safety convention ship not registered in the *Republic*, in respect of which a recognized non-South African safety convention certificate is produced, shall not be deemed *unseaworthy*, as regards the condition of her hull, equipment or machinery, unless it appears, on the report of a surveyor, that she cannot proceed to sea without danger to human life owing to the fact that the actual condition of the hull, equipment or machinery does not correspond substantially with the particulars stated in the certificate;"

(yy) ***"vessel traffic services zone"*** or ***"VTS zone"*** means the inshore vessel traffic services zone in respect of a *port* as described in columns 1 and 2 of Annex 1.

(zz) "***writing***" includes electronic communications such as e-mails, facsimiles and telexes.

(2) Unless the context indicates otherwise, and except for the expressions defined in sub-rule (1), any expression used in these rules bears the same meaning assigned to it in the *Act*.

2. Purpose

The purpose of these rules is to ensure the proper control and management of *ports*, the regulation and control of navigation within the approaches to *ports* and the maintenance of safety, security and good order in *ports* and the protection of the environment.

3. Application

These rules apply to the *ports* of Richards Bay, Durban, East London, Ngqura, Port Elizabeth, Mossel Bay, Cape Town, Saldanha Bay and Port Nolloth and to any other *port* that has been determined to be a *port* in terms of section 10(2) of the *Act*.

4. Location of resources

The following documents may either be found on the website of the *Authority* or otherwise obtained from the *Authority*:

(a) Ballast Water Management Plan;

(b) Local Contingency Plan;

(c) National Contingency Plan;

(d) Port Contingency Plan;

(e) *Tariff Book*;

(f) Traffic Separation Scheme;

(g) *VTS charts*; and

(h) Port Waste Management Plan.

5. Powers of the *Harbour Master*

(1) If a matter falls within the *Harbour Master's* functions as specified in section 74(3) of the *Act*[2], then the *Harbour Master* may —

(a) give written or verbal instructions in accordance with the *Harbour Master*'s powers as set out in section 74(3) of the *Act*;

(b) permit a *vessel* to follow a procedure or practice other than that required by these rules, if he or she is satisfied that the other procedure or practice is as safe as that required by the relevant rule and is in the interests of security, good order, protection of the environment and the effective and efficient working of the *port*.

(2) Contravention of a procedure or practice substituted pursuant to sub-rule (1)(b) is deemed to constitute a contravention of the procedure or practice required by the relevant rule.

6. Powers of the *Authority*

(1) The *Authority* may give written or verbal instructions in accordance with the *Authority*'s powers and functions as set out in the *Act,* if the matter does not fall within the *Harbour Master's* functions as specified in rule 5.

(2) The *Authority* may permit a person to follow a procedure or practice other than that required by these rules in respect of matters that do not fall within the *Harbour Master*'s functions as specified in rule 5, if the *Authority* is satisfied that the other procedure or practice is as safe as that required by the relevant rule and is in the interests of security, good order, protection of the environment and the effective and efficient working of the *port*.

(3) Contravention of a procedure or practice substituted pursuant to sub-rule (2) is deemed to constitute a contravention of the procedure or practice required by the relevant rule.

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[2] In terms of section 74(3) of the *Act* —

(a) the *Harbour Master* is, in respect of the port for which he or she is appointed, the final authority in respect of all matters relating to pilotage, navigation, navigational aids, dredging and all other matters relating to the movement of vessels within port limits;

(b) for the purposes of paragraph (2), the *Harbour Master* may give written or verbal instructions as may reasonably be necessary for —

(i) promoting or securing conditions conducive to the ease, convenience or safety of navigation in the port;

(ii) regulating the movement or mooring and unmooring of a vessel in the port;

(iii) controlling the manner in which *cargo*, fuel, water or ship's stores are taken on, discharged or handled;

(iv) regulating the removal or disposal of any residues and mixtures containing oil or noxious liquid substances, sewage and garbage from vessels in a port and requiring any such matter to be deposited in reception facilities in the port;

(v) the detention of a vessel reasonably suspected of causing oil pollution and ensuring that the total cost of the pollution clean-up operation is recovered, or acceptable guarantees are provided, prior to the vessel being given permission to leave the port; and

(vi) carrying into effect the provisions of the *Act*.

7. Compliance with the *Harbour Master*'s and *Authority*'s instructions

All persons must comply with the instructions of the *Harbour Master* in respect of all matters referred to in rule 5 and the instructions of the *Authority* in respect of all matters referred to in rule 6(1).

8. Co-operation with other authorities

(1) In terms of section 84 of the *Act*, the *Authority* may enter into co-operation agreements with immigration, *customs*, law enforcement and any other authorities required to perform a function within a *port*.

(2) The co-operation agreement —

(a) must afford the authorities referred to in sub-rule (1) every facility reasonably necessary, subject to such compensation as may be agreed between the *Authority* and the other authorities, or failing an agreement, such compensation as the Minister may determine;

(b) must regulate the operational relationship between the *Authority* and the other authorities referred to in sub-rule (1); and

(c) may vary these rules for or exempt the authorities referred to in sub-rule (1) from complying with one or more of these rules, provided that the co-operation agreement puts in place adequate measures that ensure safety and that these measures are in the interests of security, good order, protection of the environment and the effective and efficient working of the *port*.

CHAPTER 2: *VESSEL* MOVEMENTS AND RELATED MATTERS

PART A: APPLICATION

9. Application of this Chapter and Part B

(1) Parts C to G of this chapter apply to *vessels*, but do not apply to *pleasure vessels*.

(2) Subject to sub-rule (3), Part B of this chapter applies to —

(a) the *approaches to a port* where there is a defined *VTS zone*;

(b) *vessels* and *pleasure vessels* of 15 metres or more in *length*;

(c) *vessels* and *pleasure vessels* engaged in towing or pushing any *vessel*, *pleasure vessel* or object, other than fishing gear, where —

(i) the combined *length* of the *vessel* or *pleasure vessel* and any *vessel*, *pleasure vessel* or object towed or pushed by the *vessel* or *pleasure vessel* is 30 metres or more in *length*; or

(ii) the *length* of the *vessel*, *pleasure vessel* or object being towed or pushed is 15 metres or more in *length*;

(d) *passenger vessels*; and

(e) a *vessel* carrying *dangerous goods*.

(3) Part B of this chapter does not apply to —

(a) *vessels* exempted from the provisions of the Marine Traffic Act No. 2 of 1981 by virtue of regulation 2 of the Marine Traffic Regulations, 1981, published by Government Notice No. R. 194 of 1 February 1985[3]; or

(b) *fishing vessels* of less than 24 metres in *length*.

PART B: THE REGULATION AND CONTROL OF NAVIGATION IN THE APPROACHES TO A PORT

10. Functions of the VTS with respect to the *approaches to a port*

With respect to any *vessel* about to enter or within a *VTS zone* and for the purpose of promoting safe and efficient navigation, the *VTS* may —

(a) give a traffic clearance to a *vessel* to enter, leave or proceed within a *VTS zone*;

(b) direct the *master*, pilot or person in charge of the bridge watch of the *vessel* to provide relevant information in respect of that *vessel*;

(c) direct the *vessel* to use specific radio frequencies in communications with coast stations or other *vessels*;

(d) advise the *vessel* of —

(i) the non-availability of a berth required for the *vessel*;

(ii) pollution or reasonable apprehension of pollution in the *VTS zone*;

(iii) the proximity of animals whose well-being could be endangered by the movement of the *vessel*;

(iv) any obstruction or hazard to navigation in the *VTS zone*;

(v) the proximity of a *vessel* in apparent difficulty or presenting a pollution threat or other hazard to life or property;

[3] In terms of regulation 2 of the Marine Traffic Regulations, 1981, warships, submarines or other underwater vehicles present in the territorial waters and which constitute or form part of a visiting force as defined in section 1 of the Defence Act No. 44 of 1957 are exempted from the provisions of the Marine Traffic Act No. 2 of 1981.

(vi) the proximity of a *vessel* navigating in an unsafe manner or with improperly functioning equipment or radio equipment, or without *charts* or publications required by these rules or any other law; or

(vii) *vessel* traffic congestion that constitutes an unacceptable risk to shipping, the public or the environment; and

(e) in the light of one of more of the conditions referred to in sub-rule (d), direct the *vessel*—

(i) to leave a *VTS zone*;

(ii) to leave or refrain from entering an area within a *VTS zone*; or

(iii) to proceed to or remain at a location within a *VTS zone*.

11. Nautical *charts* and publications relating to the VTS zone

The *master* of a *vessel* must ensure, before the *vessel* enters or proceeds within a *VTS zone*, that it has on board the latest editions of the nautical *charts* relating to that *VTS zone*.

12. Traffic clearance and communication with VTS

(1) Subject to sub-rules (4) and (6), no *vessel* may —

(a) enter, leave or proceed within a *VTS zone* without having previously obtained a traffic clearance as envisaged by rule 10(a); or

(b) proceed within a *VTS zone* unless able to maintain direct communication with the *port*'s *VTS* in accordance with sub-rule (2)(b).

(2) The *master* of a *vessel* must ensure that —

(a) before the *vessel* enters a *VTS zone*, its radio equipment is capable of receiving and transmitting radio communications on the channel and radio frequency published by the South African Navy Hydrographic Office or other recognised international hydrographic publications; and

(b) where the *vessel* is in a *VTS zone*, a continuous listening watch is maintained on the channel and radio frequency referred to in sub-rule (2)(a) on the radio equipment located —

(i) at any place on the *vessel*, when the *vessel* is at anchor or moored to a buoy; and

(ii) in the vicinity of the *vessel*'s conning position, when the *vessel* is under way.

(3) The listening watch to the port's *VTS* referred to in sub-rule (2) may be suspended if the *VTS* directs the *vessel* to communicate with coast stations and other *vessels* on a different channel and radio frequency.

(4) The *master* of a *vessel* may proceed on his or her route, if the *vessel*, for any reason other than the failure of shipboard radio equipment —

(a) is unable to obtain a clearance required by sub-rule (1)(a) by reason of inability to establish direct communication with the VTS; or

(b) after receiving a clearance, is unable to maintain direct communication with the *VTS*.

(5) The *master* of the *vessel* referred to in sub-rule (4) must take all reasonable measures to communicate with the *VTS* as soon as possible.

(6) The *master* of a *vessel* may not proceed on his or her route, if the *vessel*, due to the failure of shipboard radio equipment —

(a) is unable to obtain a clearance required by sub-rule (1)(a) by reason of inability to establish direct communication with the *VTS*; or

(b) after receiving a clearance, is unable to maintain direct communication with the *VTS*.

(7) The *master* of the *vessel* referred to in sub-rule (6) must take all reasonable measures to repair the radio equipment, broadcast the position of the *vessel* and report the occurrence to the *VTS* as soon as possible.

13. Reporting to the VTS

(1) The *master* of a *vessel* must ensure that a report is made to the *VTS* —

(a) at least 15 minutes before the *vessel* —

(i) enters a *VTS zone*, except where the *vessel* has been given a traffic clearance under rule 12(1)(a); or

(ii) commences a *manoeuvre* in a *VTS zone* that may be detrimental to safe navigation;

(b) as soon as practicable after the *vessel* arrives at an anchorage or mooring buoy in a *VTS zone*;

(c) at least five minutes before commencing a *manoeuvre* in a *VTS zone* during which the *vessel* leaves an anchorage or mooring buoy and gets safely under way;

(d) when the *vessel* arrives at a *VTS* reporting point as described on the *charts*;

(e) as soon as practicable after the *vessel* commences a *manoeuvre* in a *VTS zone* that may be detrimental to safe navigation; and

(f) immediately after the *vessel* gets safely under way after leaving an anchorage or mooring buoy in a *VTS zone*.

(2) The contents of the reports required in sub-rule (1) must specify the issues set out in the third column of the table below:

Item	Nature of the Report	Report to specify
1	Rule 13(1)(a)(i) – At least 15 minutes before the *vessel* enters a *VTS zone*, except where the ship has been given a traffic clearance under rule 12(1)(1)(a).	• The name of the *vessel*; • The radio call sign of the *vessel*; • The position of the *vessel*; • The estimated time that the *vessel* will enter the *VTS zone*; • The destination of the *vessel*; • The estimated time that the *vessel* will arrive at its destination; and • Whether any *dangerous goods* are carried on board the *vessel* or the *vessel* being towed or pushed by the *vessel*.
2	Rule 13(1)(a)(ii) – At least 15 minutes before the *vessel* commences a *manoeuvre* in a *VTS zone* that may be detrimental to safe navigation.	• The name of the *vessel*; • The position of the *vessel*; and • The *manoeuvre* that the *vessel* is about to commence.
3	Rule 13(1)(b) – As soon as practicable after the *vessel* arrives at an anchorage or mooring buoy in a *VTS zone*.	• The name of the *vessel*; and • The position of the *vessel*.
4	Rule 13(1)(c) – At least five minutes before commencing a *manoeuvre* in a *VTS zone* during which the *vessel* leaves an anchorage or mooring buoy and gets safely under way.	• The name of the *vessel*; • The radio call sign of the *vessel*; • The position of the *vessel*; • The estimated time that the *vessel* will depart the anchorage or mooring buoy; • The destination of the *vessel* in the *port*; • The estimated time that the *vessel* will arrive at its destination; and • Whether any harmful substance *cargo* is carried on board the *vessel* or any *vessel* being towed or pushed by the *vessel*.
5	Rule 13(1)(d) – When the *vessel*	• The name of the *vessel*;

Item	Nature of the Report	Report to specify
	arrives at a *VTS* reporting point as described on the *charts*. Rule 13(1)(f) – Immediately after the *vessel* gets safely under way after leaving an anchorage or mooring buoy in a *VTS zone*.	• The position of the *vessel* and the number of the reporting point on the *charts*; and • The estimated time that the *vessel* will arrive at the next location where a report is required by these regulations to be made.
6	Rule 13(1)(e) – As soon as practicable after the *vessel* commences a *manoeuvre* in a *VTS zone* that may be detrimental to safe navigation.	• Description of the *manoeuvre*.

14. Anchoring or sojourning of vessels with nuclear material

No *vessel* propelled by nuclear power or which has on board any radioactive material capable of causing nuclear damage may anchor or sojourn in the *approaches to a port* without a nuclear vessel licence issued by the Chief Executive Officer of the National Nuclear Regulator in terms of section 21(2) of the National Nuclear Regulator Act No. 47 of 1999.[4]

15. Vessels may not be *unseaworthy*

For the purpose of promoting safe and efficient navigation, the provisions of rule 50, read with the changes required by the context, apply to *vessels* within the *approaches to a port*.

PART C: REQUIREMENTS FOR ENTERING A PORT

16. Permission to enter a port

(1) No *vessel* may enter a *port* without the permission of the *Harbour Master*. The *Harbour Master* may grant, refuse, withdraw or amend the permission.

(2) No *vessel* propelled by nuclear power or which has on board any radioactive material capable of causing nuclear damage may enter a *port* without a nuclear vessel licence issued by the

[4]Section 21(2) of the National Nuclear Regulator Act No. 47 of 1999 states the following:
"Any person wishing to—
(*a*) Anchor or sojourn in the territorial waters of the *Republic*, or
(*b*) Enter any port in the *Republic*,
With a vessel which is propelled by nuclear power or which has on board any radioactive material capable of causing nuclear damage may apply to the chief executive officer [of the National Nuclear Regulator] for a nuclear vessel licence and must furnish such information as the board requires."

Chief Executive Officer of the National Nuclear Regulator in terms of section 21(2) of the National Nuclear Regulator Act No. 47 of 1999.[5]

17. Notices in terms of Merchant Shipping (Maritime Security) Regulations, 2004 to be copied to the *Authority*

At least 96 hours before the arrival in a *port* of a *foreign regulated ship*, the *owner*, *master* or *agent* of that vessel must send to the *Authority* a copy of the ship's pre-arrival information that was sent to the South African authorities in terms of regulation 86 of the Merchant Shipping (Maritime Security) Regulations, 2004.[6]

18. Notice of arrival

(1) The *owner*, *master* or *agent* of a *vessel* must give at least 72 hours notice in *writing* of the arrival of a *vessel* at a *port* to the *Harbour Master* of that *port*.

(2) The notice must include —

(a) the expected date and time of arrival of the *vessel*;

(b) the name and type of the *vessel*, call sign, *port* of registration and flag;

(c) the purpose of the call at the *port*;

(d) the *vessel*'s draught (both fore and aft), deadweight, *length* overall, freeboard and gross tonnage;

(e) the name and contact details of the *agent* representing the *vessel*;

(f) whether the *vessel* is compliant with the International Safety Management (ISM) Code;

(g) the *vessel's IMO* number;

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[5] See footnote 4.

[6] Regulation 86 of the Merchant Shipping (Maritime Security) Regulations, 2004 states the following:

"(1) The master of a *foreign regulated ship*, or a ship intending to enter South African waters that would, once it had done so, be a *foreign regulated ship*, must provide pre-arrival information in accordance with the requirements determined in writing by the Director-General.

(2) Without limiting subregulation (1), the Director-General may determine —

(a) The person or persons to whom pre-arrival information must be given;

(b) The circumstances in which pre-arrival information must be given; and

(c) The form and manner in which pre-arrival information must be given.

(3) Pre-arrival information is information that —

(a) Must be provided by the ship before the ship enters one or more of the following:

(i) South African waters;

(ii) A security regulated port;

(iii) A port that is not a security regulated port; and

(b) Is of a kind that can be requested, under X1-2/9 of the Safety Convention, by a port state from a foreign flagged ship.

(4) If the master of a ship contravenes subregulation (1), the master or the ship operator for the ship may be given a control direction under Division 2 of this Part."

(h) the *port* where the *vessel* paid or intends to pay its light dues;

(i) the *vessel*'s last and next ports of call;

(j) conditions that may cause the *vessel* to be *unseaworthy*;

(k) the quantity of bunkers on board, and the *vessel*'s bunker and other requirements;

(l) whether the *vessel* will be bunkering by barge or by pipeline;

(m) any nuclear installations, radio-active or toxic material or waste, explosives, flammable liquids or other *dangerous goods* on board, in accordance with Rule 20;

(n) the nature and quantity of *cargo* to be shipped, landed or transhipped;

(o) any other matter, including stowaways on board, which may affect the safety, security, good order and the protection of the environment in the *port*;

(p) the crew complement on the *vessel*;

(q) whether the *vessel* is engaged in a towage or salvage service; and

(r) whether the *vessel* has one or more *vessels* in tow and the particulars of these *vessels*, as required by rule 19.

19. Procedures to approach and enter a port if there are vessels in tow

(1) If the *vessel* intending to enter a *port* has one or more *vessels* in tow, then the notice of arrival referred to in rule 18 must disclose —

(a) the number of *vessels* being towed and the total length of the tow, which is the distance from the forepart of the towing *vessel* to the after-part of the last *vessel* under tow;

(b) the method of towing;

(c) whether the towing *vessel* or any *vessel* being towed is *unseaworthy*;

(d) whether auxiliary power is available on the *vessel* or *vessels* under tow;

(e) if auxiliary power is available on the *vessel* or *vessels* under tow, the extent of the power available and whether it is sufficient for working the main engine, steering gear, deck machinery and lowering or heaving the anchors of the *vessel* or *vessels* under tow;

(f) the crew complement on board the towing *vessel and the vessel* under tow;

(g) whether any of the *vessels* in tow are *tankers*, and if so, whether the *tankers* are *gas free;*

(h) what quantity of fuel and lubricating oil is on board the towing *vessel*;

(i) what quantity and type of fuel and lubricating oil is on board any *vessel* in tow and where such fuel and oil is located;

(j) what means of radio communication is available to the *master* of the towing *vessel*;

(k) whether the *vessel* or *vessels* in tow can be disconnected and handed over to another tug at sea; and

(l) any other details which may affect the safety, security, good order and the protection of the environment in the *port*.

(2) Unless the *Harbour Master* directs otherwise, the towing *vessel* and the *vessel* or *vessels* in tow must request the *Harbour Master* for permission to enter the *port* at a position no closer than 12 nautical miles to seaward.

(3) Unless the *Harbour Master* directs otherwise, a *vessel* engaged in a towage or a salvage service may not *enter the VTS zone* .

20. Notice of weapons, explosives and other *dangerous goods* on board

(1) The *owner*, *master* or *agent* of a *vessel* having any radio-active or toxic material or waste, weapons, explosives, flammable liquids or other *dangerous goods* on board must give the *Harbour Master* and the terminal operator full written particulars of these items at least 72 hours before the arrival of the *vessel* at the *port*.

(2) The particulars must include —

(a) the items' correct technical name;

(b) the UN number;

(c) the net explosive quantity and mass of the *cargo*;

(d) the class of the *dangerous goods*, as specified by the categories listed in the *IMDG Code*;

(e) the type of packaging used; for example, drums, containers or bulk;

(f) the nature of any weapons on board the *vessel* and the purpose for which they are kept on board;[7]

(g) copies of any permits or licences in respect of the weapons, explosives or *dangerous goods* that were issued in terms of any applicable legislation;

(h) any other information relevant to the maintenance of the safety, security, good order of the *port* and the protection of the environment; and

(i) in the case of a *vessel* propelled by nuclear power or which has on board any radioactive material capable of causing nuclear damage, a nuclear vessel licence in terms of section 21(2) of the National Nuclear Regulator Act No. 47 of 1999.

(3) The *Harbour Master* may shorten the 72-hour period specified in sub-rule (1).

[7] See rule 27.

21. Requirements for *passenger* vessels

(1) A *passenger vessel* calling at any *port* must hold relevant and valid *passenger* vessel safety certificates in accordance with the Safety of Life at Sea Convention 1974, as amended.

(2) The total complement of *passengers* may not exceed the total number of *passengers* allowed to voyage on board a *vessel* according to the certificates described in sub-rule (1).

22. List of *passengers* and crew

(1) At least 24 hours before the arrival of the *vessel* in the *port*, the *vessel's owner*, *master* or *agent* must submit to the *Authority*, and where applicable to the terminal operator, a list of the *passengers* and crew for disembarkation.

(2) The *Authority* may shorten the 24-hour period specified in sub-rule (1).

23. Nautical *charts* and publications relating to the port

The *master* of a *vessel* must ensure, before the *vessel* enters or proceeds within a *port*, that it has on board the latest editions of the nautical *charts* and publications relating to that *port* and the Traffic Separation Scheme applicable to the *port*, where one exists.

24. Vessels to communicate with VTS or Port Control

(1) *Vessels* must comply with all traffic directives issued by the *port's VTS* or, where the *port* does not operate a *VTS*, the Port Control.

(2) A *vessel* must communicate to *VTS* or, where the *port* does not operate a *VTS*, the Port Control, its arrival at the reporting points indicated on the *chart* for that *port*.

25. Signals, flags and lights

When entering a *port* a *vessel* must display —

(a) its national colours;

(b) the flag of the *Republic*;

(c) if applicable, a signal indicating that a pilot is on board (international code flag "H");

(d) if free pratique has not been granted, a quarantine flag (international code flag "Q");

(e) if immigration officials are required (international code flag "I");

(f) if there are *dangerous goods* on board, international code flag "B" by day and a red light by night; and

(g) any other signal the *Harbour Master* requires.

26. Mooring plan

(1) The *Harbour Master* may direct that a mooring plan be furnished to the *Harbour Master* before the entry of a *vessel* into the *port*.

(2) If a plan is not furnished as directed, or the plan is, in the opinion of the *Harbour Master*, inadequate, the *Harbour Master* may refuse permission for the *vessel* to enter the *port*.

(3) If the *Harbour Master* is of the opinion that the plan is inadequate, the *Harbour Master* will provide reasons for that opinion.

27. Weapons and explosives to be locked up and disarmed

(1) Unless the *Harbour Master* directs in writing otherwise, before a *vessel*, other than a South African naval *vessel*, enters a *port*, the *master* of the *vessel* must ensure that all weapons and explosives on board the *vessel*, irrespective of whether or not they are intended for import or transit, are locked up in a secure place such as a gun safe and are disarmed.

(2) If the weapons or explosives are to be imported into or transported through the *Republic*, then the owner or master of the vessel must comply with section 73 of the Firearms Control Act No. 60 of 2000.[8]

PART D: VESSELS WITHIN A PORT

28. Moorings and shore connections

(1) A *vessel* within a *port* must at all times and to the satisfaction of the *Harbour Master* —

(a) have sufficient hands on board to attend to its moorings, *gangways* and other shore connections; and

(b) deal with its moorings, *gangways* and other shore connections so as to ensure the safety and security of the *vessel*.

(2) No rope may be made fast except to the dolphins, buoys, mooring posts and bollards that are designated for that purpose.

(3) No wire rope may be used, unless the bollards and the edging of the coping of the wharf or jetty are protected to the satisfaction of the *Harbour Master* from chafe.

(4) Chain cables may not be used for mooring, except with the permission of the *Harbour Master*.

[8] Section 73 of the Firearms Control Act No. 60 of 2000:
"(1) No person may import into or export from South Africa any firearms or ammunition without an import or export permit issued in terms of this Act.
(2) No person may carry in transit through South Africa any firearms or ammunition without an in-transit permit issued in terms of this Act."

29. Vessels to have sound and efficient mooring lines

(1) A *vessel* must have sound and efficient mooring lines when it moors in a *port* so that it moors safely.

(2) If the *vessel* does not have sound and efficient mooring lines on board, then the *vessel*'s *agent* must see to it that mooring lines of this nature are provided to the *vessel* at the time that it moors.

(3) The *Harbour Master* may direct a *vessel* that does not have sound and efficient mooring lines to obtain them before the *vessel* is moored.

(4) No mooring line may be cast off, unless the *Harbour Master* directs or authorises this.

30. Permission to *shift* or to immobilise within a port

(1) No *vessel* may *shift* within a *port* without the permission of the *Harbour Master*. The *Harbour Master* may grant, refuse, withdraw or amend the permission.

(2) While within a *port,* no *vessel* may be immobilised without the prior written permission of the *Harbour Master*. The *Harbour Master* may grant permission for the immobilisation of a *vessel,* subject to whatever conditions he or she prescribes in the interests of safety, security, the efficiency and good order of the *port* and the protection of the environment.

31. Notice of port movements

(1) The terminal operator, *master* or *agent* of a *vessel* must give at least four hours notice to the *Harbour Master* of the time the *vessel* will be ready to *shift* within a *port*.

(2) The terminal operator, *master* or *agent* of the *vessel* must confirm this notice no less than two hours before the movement takes place.

(3) The *Harbour Master* may vary the notice periods set out in sub-rules (1) and (2).

32. Signals, flags and lights

When alongside a quay or jetty or moving within a *port,* a *vessel* must display the signals, flags and lights required by the *Harbour Master*.

33. *Harbour Master* may require the movement of a vessel

The *Harbour Master* may, in the interest of safety, security, good order and the efficient working of the *port*, or the protection of the environment, require a *vessel* to *shift* from a berth to another part of the *port*. The costs of this movement will be for the *master* of the *vessel*, unless otherwise agreed.

34. Explosives and pyrotechnics

(1) No explosives or pyrotechnic signals may be used within a *port*, unless a *vessel* is in distress or the *Harbour Master* permits otherwise.

(2) The *Harbour Master* may impose any conditions upon the use of explosives or pyrotechnic signals in the interests of safety, security, good order and the protection of the environment.

35. VTS or Port Control

While in a *port*, *vessels* must comply with all the traffic directives of the *port*'s *VTS* or, where the *port* does not operate a *VTS*, the Port Control.

PART E: DEPARTURE FROM A PORT

36. Permission to leave a port

No *vessel* may leave a *port* without the permission of the *Harbour Master*. The *Harbour Master* may grant, refuse, withdraw or amend the permission.

37. Notice of departure

(1) The terminal operator, *master* or *agent* of a *vessel* must give at least four hours notice to the *Harbour Master* of the time that the *vessel* will be ready to depart from the *port*.

(2) The terminal operator, *master* or *agent* of the *vessel* must confirm this notice no less than two hours before the departure is to take place.

(3) The *Harbour Master* may vary the notice periods set out in sub-rules (1) and (2).

38. List of *passengers* and crew

(1) At least 24 hours before the departure of the *vessel* in the *port*, the *vessel*'s *owner*, *master* or *agent* must submit to the *Authority*, and where applicable, the terminal operator, a list of the *passengers* and crew for embarkation.

(2) The *Authority* may shorten the 24-hour period specified in sub-rule (1).

39. Vessels to communicate with VTS

(1) *Vessels* must comply with all traffic directives issued by *VTS* or, where the *port* does not operate a *VTS*, the Port Control.

(2) A *vessel* must communicate to *VTS* or, where the *port* does not operate a *VTS*, the Port Control, its departure at the reporting point indicated on the *chart* for that *port*.

PART F: PILOTS AND PILOTAGE

40. Pilotage is compulsory unless exemption is granted

(1) Pilotage is compulsory for *vessels* entering, departing from or moving within a *port*.

(2) If the *Harbour Master* is satisfied that the *master* of a *vessel* is competent to navigate the *vessel* safely within *port* limits without assistance of a pilot, then the *Harbour Master* may —

(a) grant permission in *writing* to the *master* to navigate the *vessel* without the assistance of a pilot on a specified occasion; or

(b) grant to the *master* standing permission in the form of a pilotage exemption licence to navigate the *vessel* without the assistance of a pilot during the period of validity of the licence.

(3) The *Harbour Master* may suspend or cancel a pilotage exemption licence if it is in the interests of safety, security, good order and the protection of the environment.

41. Pilot's functions

In terms of sections 75(3) to (5) of the *Act* —

(a) the pilot's function is to navigate a *vessel* in the *port*, to direct its movements and to determine and control the movements of the tugs assisting the *vessel* under pilotage;

(b) the pilot must determine the number of tugs required for pilotage with the concurrence of the *master* of the *vessel*;

(c) in the event of a disagreement between the pilot and the *master* of the *vessel* regarding the number of tugs to be used, the *Harbour Master* takes the final decision.

42. Licensing of pilots

(1) In terms of section 77(1) of the *Act,* no person may perform the functions of a pilot in a *port* unless —

(a) *SAMSA* has certified the person; and

(b) the *Authority* has issued the person with a licence to perform these functions.

(2) The *Authority* may —

(a) determine the manner in which applications for licences are assessed and decided;

(b) subject to the provisions of the *Act*, the requirements set by the Minister of Transport and these rules, determine the terms and conditions of the licence;

(c) impose conditions upon the issuing of a licence; and

(d) on good cause shown, suspend, withdraw or cancel a licence or registration after it has followed a fair procedure.

43. Master remains in control of a vessel under pilotage

In terms of sections 75(6) and (7) of the *Act* —

(a) the *master* of the *vessel* must at all times remain in command of the *vessel*;

(b) neither the *master* nor any person under the *master*'s command may, while the *vessel* is under pilotage, in any way interfere with the navigation or movement of the *vessel* or prevent the pilot from carrying out his or her duties, except in an emergency; and,

(c) in an emergency, the *master* may intervene to preserve the safety of the *vessel*, *cargo* or crew and take whatever action he or she considers reasonably necessary to avert the danger.

44. Assistance to the pilot

In terms of section 75(8) of the *Act*, the *master* of the *vessel* must ensure that the officers and crew are at their posts, that a proper lookout is kept and that the pilot is given all assistance necessary in the execution of his or her duties.

45. Pilot ladders

(1) The *master* of a *vessel* entering or leaving or moving within a *port* under pilotage must provide a pilot ladder unless the pilot is embarking and disembarking by helicopter.

(2) The pilot ladders must comply with the *IMO*'s Recommendation on Pilot Transfer Arrangements and the International Organisation for Standardisation (ISO) standards on pilot ladders.

(3) The *master* in charge of an unmanned *vessel* under tow must, on arrival at the *approaches to a port*, arrange for a safe and suitable way for *port* and other officials to board the *vessel* under tow. In general, this means that the *master* should arrange for a pilot ladder equipped with two man-ropes over-side of the *vessel* under tow.

46. Helicopter vessel-shore operations

(1) The *Harbour Master* may decide to use a helicopter for the pilot to embark and disembark from a *vessel*.

(2) All helicopter operations must be carried out in compliance with Schedule 1 of the South African Civil Aviation Authority Act No. 40 of 1998.

(3) The *master* of a *vessel* must follow the procedures and take the measures indicated in the International Chambers of the Shipping Guide when using a helicopter for the transfer of persons to and from a ship.

PART G: PERMITS FOR SMALL VESSELS - AND RELATED MATTERS

47. *Small vessels*

(1) No *small vessel* may lie in, be used in or operated from a *port* unless —

(a) *SAMSA*, or another authority acceptable to *SAMSA,* has granted the *owner* or *master* of the *small vessel* a certificate of fitness; and

(b) the *Harbour Master* for that *port* has granted the *owner* or *master* of the *small vessel* a permit to do so.

(2) The *Authority* may determine —

(a) the manner in which applications for permits for *small vessels* are to be invited, assessed and decided;

(b) in the *Tariff Book,* the fees payable for application for a *small vessel* permit and the permit itself;

(c) the qualifications and suitable criteria that applicants for a permit must meet in order to obtain a permit; and

(d) subject to the *Act* and these rules, including the powers of the *Harbour Master* in terms of section 74(3), the terms and conditions of the permit.

(3) The *Harbour Master* for the *port* where the *small vessel* has applied for a permit as contemplated in sub-rule (1) may impose conditions or limitations upon the granting of the permit in the interests of safety, security, protection of the environment and the good order and efficient working of the *port*.

(4) The *Authority* may, on good cause shown, refuse, suspend, withdraw or cancel a permit provided it has followed a fair procedure before the decision is taken.

(5) If an *owner* or *master* of a *small vessel* fails to obtain a permit, the *Harbour Master* may remove or *shift* the *small vessel* at the expense of the *owner* or *master* of the *small vessel*.

(6) The *owner* or *master* of a *small vessel* must comply with the *Harbour Master*'s restrictions relating to launching, speed and area of operations or any other restrictions determined by the *Harbour Master* in respect of *small vessels* within port limits.

(7) A *small vessel* in possession of a permit as contemplated in sub-rule (1) must, at all times, keep out of the way of a *vessel* navigating in any channel or other area of the port.

(8) No *owner* or *master* of a *small vessel* may allow the *small vessel* to come into contact with another *vessel* while within *port* limits unless the *Harbour Master* authorises it.

(9) The provisions of rules 129 and 130, read with the changes required by the context, apply to *small vessels* in possession of a permit as contemplated in sub-rule (1).

(10) The *Authority* will set out, in the *Tariff Book,* the fees, dues and fines applicable to *small vessels* in possession of a permit as contemplated in sub-rule (1).

(11) The *Harbour Master* may issue written instructions about the regulation and control of *small vessels* in possession of a permit as contemplated in sub-rule (1).

(12) The *Authority* may exempt *small vessels* in possession of a permit as contemplated in sub-rule (1) from the provisions of one or more of these rules[9].

PART H: GENERAL

48. Compliance with laws, *charts*, schemes and directives with regard to vessel movement

While within the *approaches to a port* or within *port* limits, the *master* of a *vessel* is required to —

(a) comply with all applicable international and South African legislation with respect to *vessel* movement, including the Merchant Shipping (Collision and Distress Signals) Regulations 2005 and the Convention on International Regulations for the Prevention of Collisions at Sea 1972;

(b) move in accordance with the *chart* of the *port* or the Traffic Separation Scheme applicable to the *port;* and

(c) adhere to the instructions of the *VTS* or port control with regard to designated anchorage areas that the *Harbour Master* may have determined.

49. Master's authority not affected

Nothing in this Chapter affects the authority and responsibility of the *master* of a *vessel* for the safe navigation of his or her *vessel*.

50. Vessels may not be *unseaworthy*

(1) A *vessel* entering, leaving, moving or *shifting* within a *port*, or moving to an anchorage, may not be *unseaworthy* for that purpose.

(2) No *vessel* within a port may materially reduce its state of seaworthiness for any purpose without the prior written consent of the *Harbour Master*.

(3) As the final authority in respect of all matters relating to pilotage, navigation, navigational aids, dredging and all other matters relating to the movement of *vessels* within *port* limits, the *Harbour Master* may direct that measures be adopted to prevent an *unseaworthy vessel* from navigating from, and within, the *port*.

(4) All costs and expenses incurred by the *Authority* or by the *vessel* as a result of having to comply with any of the *Harbour Master*'s measures as contemplated in terms of sub-rule (3) must be paid by the *vessel* before the *vessel* departs from the *port*.

[9] In terms of the current permit conditions, *small vessels* may be exempt from rules 18, 31, 37, 115, 117, 118 and 119.

51. Assignment of berths

(1) The terminal operator will determine the assignment of berths where only one terminal operator operates the berth.

(2) The *Authority* will determine the assignment of berths where a single terminal operator does not operate a berth and it may impose conditions upon the assignment of such a berth.

(3) In making its determination referred to in sub-rule (2), the *Authority* will take into account the contractual and other requirements of any terminal operators operating at that berth and the good order and efficient working of the *port*.

(4) Despite the provisions of this rule, the *Harbour Master* may determine the assignment of any berth if it is in the interests of the safety and security and the protection of the environment.

52. Assignment of marine services

(1) The *Harbour Master* determines the order of provision of marine services, which includes pilotage, tug and berthing services to *vessels* and the movement and mooring of ships in the *port*.

(2) In making the determination, the *Harbour Master* will take into account the interests of safety, security, and good order, the efficient working of the *port* and the protection of the environment.

53. Vessels to rig and stow gear

A *vessel* entering a *port*, berthing, *shifting* or departing from a *port* must have its sides clear, its boats swung inboard and projections of any kind rigged inboard.

54. Lost anchors

(1) The *master* of a *vessel* must, on becoming aware of any anchor, chain or cable that has parted or slipped from the *vessel,* report to the *VTS or port control* .

(2) The *master* must communicate to the *VTS* or port control the position where the anchor, chain or cable parted or slipped and whether the anchor, chain or cable was buoyed when the parting or slipping took place.

(3) The *master* must recover any parted or slipped anchor, chain or cable as soon as possible, if it is reasonably possible to do so, and failing that, the *Authority* will recover it at the expense of the *owner* or *master* of the *vessel*.

55. Making fast to navigational aids

No *vessel* may be made fast to any marking buoy, light buoy, or any navigational aid or mark provided for the safety of *vessels*.

56. Incidents in the approaches and within ports

(1) The *master* of a *vessel* that is within or about to enter the *approaches to a port* or within *port* limits must ensure that a report is made to the *Harbour Master* about any of the following matters as soon as the *master* becomes aware of them:

(a) the occurrence on board the *vessel* of any fire or explosion;

(b) the involvement of the *vessel* in a collision, grounding or striking;

(c) any defect in the *vessel*'s hull, main propulsion systems or steering systems, radars, compasses, radio equipment, anchors or cables;

(d) any discharge or threat of discharge of *dangerous goods* or other harmful substances from the *vessel* into the water;

(e) another *vessel* in apparent difficulty;

(f) any obstruction to navigation;

(g) any aid to navigation that is functioning improperly, damaged, off-position or missing;

(h) the presence of any *dangerous goods* or harmful substances in the water;

(i) the presence of a *vessel* that may impede the safe movement of other *vessels*;

(j) any weather conditions that are detrimental to safe navigation;

(k) any matter that may affect the safety and security of the *vessel*, its crew or *passengers* and the port, or any matter that may affect the environment; and

(l) any other navigational or environmental incident.

(2) The *owner* or *master* of a *vessel* that has been involved in any navigational incident within the approaches to or in a *port*, or any environmental incident within a *port*, whether or not damage is done to any property, including underwater property, must —

(a) immediately report the incident to the *Harbour Master* as well as any other applicable regulatory body or government department;

(b) submit to the *Harbour Master* a full written report setting out the circumstances of the incident, within 24 hours after the accident or before the departure of the *vessel* from the *port*, whichever is the sooner; and

(c) furnish any further particulars that the *Harbour Master* may require.

57. Damage to property

The *owner* or *master* of any *vessel* that damages any property within the *port* or the approaches thereto, including fouling or displacing any buoy, navigational aid or navigational channel, must —

(a) immediately report the occurrence to the *Harbour Master* and any other applicable regulatory body or government department;

(b) submit to the *Harbour Master* a full written report setting out the circumstances of the occurrence, within 24 hours of the occurrence or before the departure of the *vessel* from the *port*, whichever is the sooner;

(c) furnish any further particulars that the *Harbour Master* may require.

58. Financial security for damages caused

Before a *vessel* departs from a *port*, the *Authority* may require the *owner* or *master agent* of a *vessel* to lodge financial security with the *Authority* to the satisfaction of the *Authority* if that *vessel* or its staff have caused pollution or damage to the environment or to property within a *port*.

59. Master to produce *vessel's* papers

The *Harbour Master* may require the *master* of a *vessel* arriving in a *port* to produce for inspection the *vessel*'s register, certificates and any other papers relating to the *vessel*.

60. *Vessels* in need of assistance

(1) If a *vessel* is in need of assistance and requests permission to enter into a *port*, the *Harbour Master* may consult with *SAMSA* and any other relevant statutory body.

(2) In considering whether to allow the *vessel* into a *port*, the *Harbour Master* takes into account the following factors —

(a) safeguarding of human life at sea;

(b) the *port*'s industrial and urban environment;

(c) the risk of pollution and damage to the environment;

(d) the evaluation of consequences if a request is refused, including the possible effect to neighbouring states;

(e) the risk of disruption to the *port*'s operations;

(f) the seaworthiness of the *vessel*, in particular its buoyancy, stability, means of propulsion and power generation, and its docking ability;

(g) the nature and condition of the *cargo*, stores and bunkers, especially if there is any hazardous *cargo*;

(h) the preservation of the hull, machinery and *cargo* of the *vessel in need of assistance*;

(i) the distance and estimated transit time to a *SAMSA* allocated place of refuge;

(j) whether the *master* is still on board;

(k) the number of crew, salvors and other persons on board and an assessment of human factors, including fatigue;

(l) whether the *vessel* in question is insured or not insured;

(m) where the *vessel* is insured, identification of the insurer, and the limits of liability available;

(n) provisions of financial security in favour of the *Authority* to guarantee payment of all expenses that may be incurred in connection with its operations;

(o) whether the *owner* and *master* of the *vessel* have agreed to the proposals of the *Authority* and/or salvor to proceed or to be brought to a place of refuge;

(p) commercial salvage contracts already concluded by the *master* or *owner* of the *vessel*;

(q) information on the intention of the *master* and/or salvor;

(r) the designation of a representative of the *owner* of the *vessel* in the *Republic*;

(s) the risk of disruption to the *Authority*'s operations taking into account the *IMO* guidelines; and

(t) any other relevant considerations.

61. Arrested *vessels*

(1) The *Harbour Master* may direct that any *vessel* that has been arrested or attached by order of court, or detained by another authority, be moved to another place within *port* limits.

(2) The *Harbour Master* will give notice to the sheriff of the court, or any other official responsible for the upkeep of an arrested *vessel,* that the *vessel* must be moved.

(3) If the sheriff of the court or any other official of another authority contemplated in sub-rule (2) is unable to move the *vessel* within the period stipulated in the notice, the *Harbour Master* may move the *vessel* at the expense of the arresting creditor or creditors after consultation with the sheriff or other authority, as the case may be.

(4) In the event of the vessel's *agent* terminating his or her services, the sheriff of the court, or any other official responsible for the upkeep of an arrested *vessel*, must include any fees charged by the *Authority* in his or her claim against the Preservation Fund as contemplated in the Admirality Jurisdiction Regulation Act No. 105 of 1983 in respect of the arrested, attached or detained *vessel* from the time of its arrest, attachment, or detention until it is freed from the arrest, attachment or detention.

CHAPTER 3: HEALTH AND SAFETY

PART A: VESSEL SAFETY MEASURES

62. The master is responsible for the safety of the vessel

The *master* of a *vessel* within the *port* limits is at all times responsible for the safety of his or her *vessel* and nothing in these rules may be construed as relieving the *master* of this responsibility.

63. Conduct of the crew

The *owner* or *master* of a *vessel* must ensure the orderly conduct and behaviour of the crew of his or her *vessel* and ensure that all persons on board the *vessel* observe the laws of the *Republic* while the *vessel* is within *port* limits.

64. Fires and *hot work* repairs on vessels

(1) No open fires are permitted on board a *vessel* unless the *master* of the *vessel* has obtained the *Authority*'s permission for that fire.

(2) No *hot work* repairs are permitted on board a *vessel* unless the *master* of the *vessel* is authorised in terms of a *hot work permit* issued by the *Authority* in terms of rule 154.

(3) If a fire occurs on board a *vessel* within *port* limits, the *master* must inform port control by VHF radio, telephonically or any other appropriate means possible of the fire and —

(a) immediately give the alarm by sounding one continuous blast on the *vessel*'s siren; or

(b) if it is not possible to use the *vessel*'s siren, by the continuous ringing of the *vessel*'s bell.

(4) The staff of a *vessel* with a fire on board must immediately —

(a) take practicable steps to extinguish the fire and to protect adjoining property; and

(b) provide any further assistance that the *Harbour Master* or the *Chief Fire Officer* requires.

65. Sparks and the lighting of fires

(1) The *master* of a *vessel* in a *port* must take all necessary precautions to avoid the emission of sparks from his or her *vessel*, except where a *hot work permit* is issued in terms of rule 154.

(2) No person may light a fire upon any wharf, jetty, stacking area, quay or at any other place where the lighting of fires is prohibited by notice, except with the permission of the *Authority.*

(3) The *Authority* may impose conditions on any permission granted, to maintain safety, security, good order or to protect the environment.

(4) No person may smoke, ignite a match or lighters, or otherwise create or allow a fire or flame in any hold or at any open hatch of any hold of any *vessel* or within an area adjacent to such hold or open hatch —

(a) while flammable *cargo* is being shipped, discharged or transhipped into or from a hold or open hatch; or

(b) when non-flammable *cargo* is being worked in a hold that contains flammable *cargo*.

(5) Portable radios and cellular phones may not be used in any hold or at any open hatch of any hold of any *vessel* or within an area adjacent to such hold or open hatch, unless the radio or cellular phone is certified to be intrinsically safe.

66. Smoking on board vessels

(1) Notices must be displayed on board *vessels* where smoking is prohibited for safety reasons.

(2) Smoking is prohibited in the holds or on deck of *vessels* with open hatches or in the vicinity of deck *cargo*.

(3) *Vessels* carrying *dangerous goods* must prominently display at the *gangway* or other shore access points notices inscribed with the words: "Dangerous goods on board, smoking strictly prohibited."

(4) The notices must be written in English and accompanied by the international prohibition symbol for no smoking.

67. Persons disembarking or embarking

(1) A competent member of the *vessel*'s crew must be in attendance at the *vessel*'s *gangway* while persons, other than pilots, are disembarking from or embarking upon a *vessel* lying alongside a wharf, jetty or quay, in order to attend to the security of the *gangway* and the safety of persons passing over it.

(2) The same applies when a *vessel* lying at anchor uses a *gangway*, an accommodation ladder or other similar equipment.

(3) No person, other than a pilot in the exercise of his or her duties, may, except after obtaining the *Harbour Master*'s permission, board or leave a *vessel* while that *vessel* is in motion and that person may only leave or board the *vessel* by way of the pilot ladder or a helicopter provided for that purpose.

68. *Gangways*

(1) The *master* of a *vessel* that is alongside a wharf, quay or jetty, lying at buoys or at anchor, or outside another *vessel* must provide a safe and proper *gangway* to allow for free and safe passage to and from the deck of the *vessel*.

(2) The *gangway* must be sufficiently illuminated.

(3) A proper safety net must be rigged and secured below a *gangway* as soon as the *gangway* is in position, to safeguard persons using the *gangway* from falling into the water or onto a wharf, quay or jetty.

(4) The *master* is responsible for the handling of the *gangway* and must ensure that the operations are carried out in a proper and safe manner.

(5) The person in control of the *gangway* must regulate the number of persons allowed on the *gangway* at any one time.

(6) A notice indicating the maximum number of persons to be allowed on the *gangway* at any one time must be clearly displayed at each end of the *gangway*.

(7) A lifebuoy with a line attached to it must be placed near each *gangway* and kept ready for immediate use.

(8) The *master* must ensure that the *gangway* is at all times positioned so that it does not obstruct or foul rail or crane tracks, constitute a hazard to the safe movement of trucks and cranes or interfere with bunkering operations.

(9) The *master* of a *vessel* must take the necessary precautions to prevent damage to quay surfaces by the *vessel*'s *gangways* and loading ramps.

(10) Where the nature or construction of a jetty or wharf is such that it is impossible for the *vessel* to comply with this rule, the *master* of the *vessel* must conform to the *Harbour Master*'s instructions concerning *vessel* to shore access.

69. Engine trials

No *master* may perform engine trials of the *vessel* while it is alongside a wharf, quay or jetty or while it is berthed outside another *vessel* in a *port,* unless the *master* has the permission of the *Harbour Master*.

70. Lowering of boats from vessels

A *master* may cause or permit a boat to be lowered from his or her *vessel* in a *port* only if the *master* has permission from *Customs* and the *Harbour Master*.

71. Vessel's handling material or gear in port

(1) Unless a vessel's handling material or gear is being used for legitimate operational purposes, a *vessel* may not place its handling material or gear upon any wharf, jetty or quay, or elsewhere within *port* limits without the written consent of the terminal operator, in the case of a terminal, or the *Harbour Master*, in the case of any other area.

(2) If it is placed anywhere without the required consent, it may be removed immediately, at the expense of the *owner* or *master* of the *vessel*, to a place determined by the terminal operator or the *Harbour Master*.

72. Vessels may not be moored nor obstacles placed within the water area of a port repair facility

Unless the *Harbour Master* directs otherwise, no *vessel* may anchor or be moored within, and no person may place any chain, anchor or other obstacle in the water area adjacent to a *port* repair facility, which includes a floating dock, synchrolift or slipway.

PART B: GENERAL SAFETY MEASURES

73. Requirements for *fire protection personnel*

(1) The *Authority* may set requirements for *fire protection personnel* who operate within a *port*.

(2) All *fire protection personnel* must comply with the *Authority*'s requirements.

74. The *Harbour Master* may instruct that safety measures be taken

Despite the provisions of any other rule, the *Harbour Master* may, in the interests of the safety of the *port*, the persons, *vessels* and other property in it, issue instructions that safety precautions be taken, or take emergency measures that the *Harbour Master* believes are necessary or appropriate.

75. Heating of substances

(1) No person may boil or heat pitch, tar, resin, turpentine, oil or other flammable matter on shore within a *port* on any wharf, jetty, stacking area, quay or at any other place where the lighting of fires is prohibited by notice except —

(a) with the permission of the *Authority*; or

(b) if the person has a valid *Hot Work Permit* issued by the *Authority*.

(2) The *Authority* may impose conditions upon any permission granted to maintain safety, security, good order or to protect the environment.

76. Smoking on the shore

The *Authority* will designate areas on the shore of the *port* where no smoking may take place. No person may smoke in such a designated *no-smoking area*.

77. The use of portable radios or cellular phones on the shore

The *Authority* will designate areas on the shore of the *port* where portable radios and cellular phones may not be used. No person may use portable radios or cellular phones, other than those that are certified to be intrinsically safe, in such a designated area.

78. Occupational health and safety legislation

All persons, including service providers, terminal operators, drivers of transport vehicles, employers, lessees and visitors within *port* limits, must comply with the provisions of any legislation relating to occupational health and safety matters, including the Merchant Shipping Act No. 57 of 1951, the Occupational Health and Safety Act No. 85 of 1993 and its regulations, the Maritime Safety Regulations of 1994, the *IMDG Code* and the National Road Traffic Act No. 93 of 1996.

79. *Authority*'s written instructions with regard to occupational health and safety matters

(1) In order to give effect to rule 77, the *Authority* may issue verbal or written instructions relating to occupational health and safety matters within the *port*.

(2) All persons are required to adhere to these instructions.

80. Personal protective equipment

All persons working within an area that is designated as an operational area by the *Authority* must wear the appropriate personal protective equipment, including a hard hat, safety boots and reflective high-visibility vests.

81. Closing of parts of the port

(1) In the interests of maintaining safety, security, good order and the protection of the environment, or if the *Authority* determines that construction work should be carried out in any part of the *port*, the *Authority* may —

(a) close any part of the *port* to the public; or

(b) prohibit the public's use of or restrict the public's access to any part of the *port*.

(2) Despite sub-rule (1), the *Authority* may allow access to parts of the *port*s to which the public has restricted access or which are closed to the public on conditions to be determined by the *Authority*.

82. Incidents or damage to property on the shore within ports

All service providers, employers, lessees or other persons, other than a licensed operator[10], involved in an incident on the shore within a *port*, whether or not damage is done to any property or the environment, or involved in damage to the *Authority*'s property on the shore or the environment within the *port*, must —

(a) immediately report the incident to the *Authority* as well as any other applicable regulatory body or government department;

[10] Licensed operators are required to report incidents in terms of s 62(5) of the *Act*.

(b) submit to the *Authority* a full written report setting out the circumstances of the incident or damage to property within 24 hours after the incident; and

(c) furnish any further particulars that the *Authority* may require.

83. Swimming, surfing, fishing, diving and water sports

(1) No person is allowed to dive or perform diving operations within *port* limits without the permission of the *Harbour Master*.

(2) A person may only swim, surf, fish or engage in water sports within *port* limits in areas designated for these purposes by the *Authority* or a person authorised by the *Authority*.

(3) The *Harbour Master* may, in the interests of maintaining safety, security, good order and the protection of the environment, impose conditions upon any swimming, surfing, fishing, diving or water sports that take place within port limits.

84. Animals

(1) For the purposes of this rule, animals include birds.

(2) The *Authority* may confiscate or confine any domesticated, tame or wild animal that is found at large on the *Authority*'s premises within *port* limits.

(3) The *master* of a *vessel* must properly secure animals that are on board a *vessel* in a *port*.

(4) The *master* of a *vessel* may not allow an animal to come ashore without the *Authority*'s permission.

CHAPTER 4: PROTECTION OF THE ENVIRONMENT

85. Prevention of pollution and protection of the environment

(1) All persons within a *port* must take all reasonable steps to prevent, minimise and mitigate pollution or damage to or degradation of the environment.

(2) Any person who pollutes or causes damage to the environment will bear the costs associated with the combating and cleaning up of that pollution, damage or degradation, and the associated impacts relating thereto.

(3) If the person or persons responsible for the pollution or damage to the environment fail to take the necessary measures to prevent, minimize, mitigate, combat and clean up the pollution or damage to the environment, including its associated impacts, the *Authority* may take the necessary measures. The person or persons who caused the pollution or damage to the environment will be liable for the costs associated with the pollution, damage or degradation to the environment, its associated impacts and any mitigating measures.

86. Deposit of harmful matter, including oil, in a port

(1) No person may throw or deposit within *port* limits any harmful matter or substance of whatsoever nature, including effluent or polluted water or foreign organisms, without the permission of the *Authority*, and, in the case where it is to be thrown or deposited from a *vessel*, without the permission of the *Harbour Master*. The *Authority* or the *Harbour Master*, as the case may be, may impose conditions upon the permission to be granted.

(2) No person may cause or allow pollutants, including paint, or cause or allow substances that can cause pollution or negatively impact on the environment, whether or not the substance or pollutant is of a mineral, animal or plant origin, to be dumped on the property of a *port* or to be discharged or to escape into waters within *port* limits.

(3) No oil of any description or harmful matter or substances of whatever nature, including effluent, polluted water or foreign organisms, may be discharged or dumped from a —

(a) *Vessel,* or be allowed to escape from a *vessel* into any part of the *port*; or

(b) terminal or any other source, or be allowed to escape into *port* waters from a terminal or any other source.

(4) The *master* of a *vessel* that is berthed alongside a quay or jetty must cause all the discharge outlets of the *vessel* facing the quay or jetty to be closed or to be provided with adequate covers to prevent any inadvertent discharge of water or effluent or substances onto the quay or jetty surface, bollards, moorings, telephone cables, fenders or hose connections or into the environment.

(5) The cleanup of pollutants, including oil, which is spilled within port limits, must be dealt with in accordance with the applicable Port Contingency Plan.

(6) If the spill straddles the area within *port* limits and areas falling outside *port* limits, the spill must be dealt with in accordance with the applicable Port Contingency Plan, and in the case of oil pollution management, the National Contingency Plan and any applicable legislation.

(7) A person who drops or deposits any article within *port* limits that might cause a danger, obstruction, pollution, a negative impact upon the environment or a nuisance, or any person who witnesses a person doing this, must report the matter to the *Authority* immediately.

(8) The *owner* or *master* of a *vessel*, terminal operator, lessee or *port* user that contravenes this rule, causing an obstruction in the *port* must immediately cause the obstruction to be removed at their expense, failing which the *Authority* may remove the obstruction at their expense. If any damage arises from the obstruction, the person responsible for it is liable for the costs relating to the damage.

87. Cleanliness of the quayside

(1) This rule applies to quaysides that are not operated by a terminal operator.[11]

(2) The *owner* or *master* of a *vessel* must ensure that the quayside is cleaned after the *vessel* has completed its working operations.

(3) If the *owner* or *master* of the *vessel* fails to affect the cleanup, the *Authority* will affect the cleanup at the cost of the *owner* or *master* of the *vessel*. These costs will include the costs associated with or incidental to the clean up and the removal of materials on the quayside.

88. Ballast water

The *master* of a *vessel* and any other person to whom the Port Ballast Waste Management Plan applies, must comply with that plan.

89. Port waste reception facilities

(1) Every terminal operator and master of a *vessel* must make use of the *port's* facilities for the reception of wastes from *vessels*.

(2) Despite sub-rule (1), the *Authority* may require —

(a) a terminal operator to provide or procure proper and adequate facilities from a licensed waste disposal service provider for the reception of wastes from *vessels* using the *port* terminal; and

(b) the *vessel's owner* or *master* to provide or procure proper and adequate facilities from a licensed waste disposal service provider for the reception of wastes from *vessels*, if the berth is not operated by a terminal operator.

(3) In assessing the adequacy of the waste reception facilities contemplated in sub-rule (2), the terminal operator or *owner* or master of the *vessel*, as the case may be, must have regard to the Port Waste Management Plan.

(4) Despite the provisions of this rule, the *owner*- or *master* of a *vessel* must arrange to dispose galley waste in accordance with the Port Waste Management Plan.

90. Compliance with Port Waste Management Plan

All persons to whom the Port Waste Management Plan applies, including terminal operators and tenants, must comply with that plan.

[11] The cleanliness of a quayside operated by a terminal operator will be regulated by the licence agreement with the terminal operator.

91. Compliance with Vessel Waste Management Plan

The *owner*, *master* or *agent* of a *vessel* must comply with their Vessel Waste Management Plan.

92. Use of port waste reception facilities

Any waste reception facilities provided for a particular purpose by the terminal operator must be open for use for that purpose by all *vessels* using the terminal.

93. Discharge or dumping in a port of sewage or residue water as a result of hatch or tank cleaning

(1) No *vessel* may discharge or dump sewage into *port* waters or any part of the *port* except into a facility dedicated for that purpose.

(2) No *vessel* may discharge or dump residue water into *port* waters as a result of hatch or tank cleaning without the written permission of the *Harbour Master*. The *Harbour Master* may impose conditions upon the granting of his or her permission.

94. Removal of vessels having offensive matter on board

(1) The *Harbour Master* may order the removal of a *vessel* from a *port* if that *vessel* has *cargo* or other matter on board that may be a threat to the environment.

(2) At the expense of the *owner* or *master* of the *vessel*, the *Harbour Master* may order that the *cargo* or other matter be disposed of.

95. The emission of fumes or smoke

(1) The *master* of a *vessel* in a *port* must take all necessary precautions to avoid the emission of excessive fumes or smoke from his or her *vessel*.

(2) No *master* of a *vessel* in a *port* may permit the emission of fumes, smoke or atmospheric pollutants from the *vessel* that violates the National Environment Management: Air Quality Act No. 39 of 2004 or any other applicable law.

(3) The provisions of sub-rule (2) do not apply —

(a) to smoke emanating from a *vessel* within 5 minutes during the start-up period;

(b) while the smoke-producing appliance is being overhauled if the emission cannot reasonably be prevented; or

(c) during the period of any breakdown or disturbance of an appliance.

(4) All persons must comply with the applicable legislation relating to pollution, including the National Environmental Management: Air Quality Act No. 39 of 2004.

96. Protection of animals, birds, fish and plants

Subject to rule 83 and any lease, licence or agreement with the *Authority* regulating pest control, no person may collect, use, remove or relocate any animal, bird, fish or plant that is within the *port* unless the *Authority* has authorised this in *writing*.

97. Burials

No dead persons or carcasses of any kind may be buried within waters of the *port*.

CHAPTER 5: WORKING OF *VESSELS* AND DANGEROUS AND FLAMMABLE GOODS HANDLING

PART A: WORKING OF VESSELS

98. Working of vessels may be refused

The *Harbour Master* may, in the interests of safety, security, good order and the protection of the environment, impose conditions upon the handling of goods, including *dangerous goods*, and may refuse to allow such goods to be landed from a *vessel* until –

(a) a suitable wharf, shed, quay, or other accommodation is available for the goods; or

(b) arrangements to the satisfaction of the *Harbour Master* have been made for the removal and storage of the goods.

99. The master or his or her delegatee to supervise and to protect all persons during the handling of *cargo*

(1) The *master* or his or her delegatee must remain on board the *vessel* whilst it is loading or discharging *cargo*, which includes containers, for the purpose of supervising these operations.

(2) The *master* may only delegate the supervision of the loading or discharge operations to a suitably qualified person.

(3) The *master* must take all reasonable steps to ensure the safety and protection of all persons working aboard the *vessel* during the loading or discharge operations.

100. Prevention of *cargo* and vessel's gear falling into a port

(1) The *master* of a *vessel* that is loading or discharging *cargo* must ensure, in accordance with best practice, that all measures are taken to prevent *cargo* or the vessel's gear from falling into the water.

(2) If measures to the satisfaction of the *Harbour Master* have not been put in place, the *Harbour Master* may suspend the working of the *vessel* until satisfactory measures are put in place.

101. Reporting about *cargo* and vessel's gear that has fallen into the port

(1) The *master* must immediately and fully report to the *Harbour Master* about any *cargo* or *vessel's* gear that is dropped overboard as soon as the master becomes aware of it.

(2) The *master* must provide the *Harbour Master* with any particulars that the *Harbour Master* requires.

102. Recovery of *cargo* or vessel's gear that has fallen overboard

(1) The *master* of the *vessel* must immediately cause the *cargo* or *vessel's gear* that has fallen overboard to be recovered as soon as is reasonably possible.

(2) The *master* of the *vessel* must abide by the *Harbour Master*'s directives regarding the recovery.

(3) If the *vessel* fails to recover the *cargo* or vessel's gear that has fallen overboard, the *Harbour Master* may direct another person to recover it, and the *owner* or *master* of a *vessel* will be liable for the costs associated with the recovery of the *cargo* or vessel's gear that has fallen overboard.

(4) The terminal operator or any *port* service provider must ensure that any *cargo*, *cargo* handling or packing materials or oil-spills that have fallen on the quayside or terminal of any part of the *port* are removed, failing which the *Harbour Master* may arrange for its removal at the expense of the responsible person.

103. Mechanical handling appliances

(1) A *vessel* berthed near or under the mechanical handling appliances must have sufficient crew on board ready to *shift* the *vessel* at any hour, day or night, as or when directed by the *Harbour Master*.

(2) The *Harbour Master* may *shift* the *vessel* at the expense of the *owner* or *master* of the *vessel*, if the *vessel* fails to comply with the *Harbour Master*'s directives.

(3) Operators of mechanical or other *cargo*-handling appliances or installations may not cause the booms, chutes, loading gantries or other appurtenances to be lowered, to protrude or to be so positioned so as to cause an obstruction on a berth or over the water.

(4) The *Harbour Master* may grant an exception to sub-rule (3) and may impose conditions in the interests of safety, security, good order and the protection of the environment.

PART B: HANDLING OF DANGEROUS GOODS

104. Compliance with other legislation and *industry guidelines*

(1) All persons must comply with the applicable legislation relating to dangerous and flammable liquids in bulk and in containers, including the Explosives Act No. 26 of 1956 and any regulations promulgated under that Act.

(2) All persons involved in the handling of *dangerous goods* must comply with the standards, procedures, practices and requirements set out in the *industry guidelines*, as amended from time to time, including:

(a) The International Safety Guide for Oil Tankers and Terminals (presently in its fifth edition);

(b) Marine Terminals Baseline Criteria and Assessment Questionnaire;

(c) Liquified Gas Handling Principles on Ships and in Terminals;

(d) Ship/Shore Interface: Safe Working Practice for LPG and Liquified Chemical Gas Cargoes;

(e) Guidelines for the Handling, Storage, Inspection and testing of Hoses in the Field; and

(f) Chemical carriers entered into the CDI Scheme.

(3) The *Harbour Master* may permit a vessel to follow a procedure or practice other than those required by the *industry guidelines*, if he or she is satisfied that the other procedure or practice is as safe as that required by the *industry guideline* and is in the interests of security, good order, the protection of the environment and the effective and efficient working of the port.

(4) Contravention of a procedure or practice substituted pursuant to sub-rule (3) is deemed to constitute a contravention of the practice or procedure required by these rules.

105. *Harbour Master*'s directives relating to *dangerous goods*

(1) The *Harbour Master* may, in the interests of safety, security, good order and the protection of the environment and at the expense of the *owner* or *master* of the *vessel* —

(a) approve the discharge and storage of uncontainerised, *dangerous goods* at demarcated areas in the *port* at the expense of the *owner* or *master* of the *vessel* and impose conditions upon the approval, in the interests of safety, security, good order and the protection of the environment;

(b) order that *dangerous goods* be discharged from a *vessel*, removed from the *port* or be otherwise disposed of, at any time of the day or night;

(c) order that landed *dangerous goods* —

(i) be returned on board the vessel from which it was landed;

(ii) be destroyed; or

(iii) be dealt with in a manner that the *Harbour Master* considers necessary and appropriate.

(d) order that vessels having *dangerous goods* on board that are berthed alongside a wharf or jetty have sufficient *fire protection personnel* and equipment in attendance;

(e) order that the *master of a vessel* with *dangerous goods* on board adopt precautionary measures, as the *Harbour Master* considers appropriate.

(2) Miscellaneous class 9 dangerous substances of the *IMDG Code*, which do not need to be labelled, are exempted from the requirements of sub-rules (b) to (e).

106. *Dangerous goods* landed in ISO containers

(1) If *dangerous goods* are landed in *ISO containers*, then the *vessel*'s *agent* must present the terminal operator with a packing declaration before the container is landed.

(2) The packing declaration must reflect —

(a) the correct technical name;

(b) mass;

(c) the UN number;

(d) *IMDG Code* class of each consignment in the container; and

(e) a declaration that —

(i) the container is fit to transport this kind of *dangerous goods*;

(ii) the *cargo* is adequately secured in the container; and

(iii) no other *cargo* known to be incompatible with the *dangerous goods* has been placed in the container.

(3) The packing declaration must accompany the container to its final destination.

(4) If *dangerous goods* are to be shipped in *ISO containers*, the packing station must provide a packing declaration as stipulated in sub-rule (2) with the loaded container. The packing declaration must accompany the container at all times and must be provided to the *owner* or the *master* of the *vessel* when the container is loaded on board.

(5) All *ISO containers* with *IMDG Code* labels attached must be treated as though they contain *dangerous goods*.

(6) The *container operator* and the *agent* of the *vessel* must ensure that old *IMDG Code* labels are defaced or removed.

107. The need for a landing, delivery, forwarding or container terminal order

(1) No *dangerous goods* may be landed, delivered or forwarded without the terminal operator's completed landing, delivery, forwarding or container terminal order.

(2) If any *dangerous goods* are to be landed, delivered or forwarded without the appropriate order, the terminal operator must report this to the *Authority* immediately.

(3) The correct type of landing, delivery, forwarding or container terminal order referred to in sub-rules (2) and (3) is governed by the *cargo*'s IMDG hazardous *cargo* classification, or, if the commodity is not listed in the *IMDG Code*, by the definition of *dangerous goods* contained in the Code.

108. Copy of packing certificate to be provided to the *Authority*

(1) A copy of the packing certificate referred to in the Merchant Shipping (Dangerous Goods) Regulations, 1997 must be attached to the order covering the shipment and sent to the *Authority*'s offices at the *port* 24 hours before the arrival of the *dangerous goods* within *port* limits. If this is not done, the *Authority* may refuse the shipment and the shipper will be liable for all costs arising from the non-compliance with this requirement, including costs incurred in connection with the return of the *cargo*.

(2) The *Authority* may request the correct Material Safety Data Sheet.

109. Explosive standards

The *Harbour Master* may issue written instructions for the shipment, handling and short-term storage of explosives in *port*s.

PART C: HANDLING OF BULK FLAMMABLE LIQUIDS AND FLAMMABLE LIQUID CONTAINERS

110. Survey certificate for the carriage of flammable liquid

(1) Every *tanker* carrying flammable liquids that enters *port* limits must be in possession of a valid survey certificate issued by the flag state, or an authority recognised by the flag state, for the carriage of any flammable liquid.

(2) The *Harbour Master* may refuse to allow any *tanker* that is not in possession of a valid survey certificate for the carriage of flammable liquid to enter into *port*.

111. Vessels to operate with due regard to safety, security and the protection of the environment

*Vessel*s that convey, discharge or ship flammable liquids in bulk or during bunkering operations, or convey or discharge containers that hold or held flammable liquids, must

conduct their operations in a safe and secure manner, and in a way that does not threaten the environment.

112. *Harbour Master*'s instructions

(1) In order to give effect to rule 111, the *Harbour Master* may, in the interests of safety, security and the protection of the environment, issue verbal or written instructions relating to—

(a) the conveyance, discharge or shipping of flammable liquids in bulk or during bunkering operations; and

(b) conveyance, discharge or shipping of containers that hold or held flammable liquids.

(2) All persons to whom the instructions are directed must adhere to them.

(3) For the purpose of any rule or written instruction that requires that a *gas free* certificate be obtained, the certificate is deemed not to have been issued until —

(a) both the *master* and the *Harbour Master* are in possession of duplicate originals signed by the *certified chemist*; and

(b) it is posted in a conspicuous place on board the *vessel* where all persons concerned can easily read it.

(4) The *master* of a *vessel* and the terminal operator must afford every facility to the *Harbour Master* to ascertain whether any of these rules or any instruction, which is intended to give effect to any of these rules, has been and is being observed.

113. Liability for costs

(1) All persons to whom the verbal or written instructions referred to in rule 112 are directed are jointly and severally liable for the costs of implementing those instructions.

(2) Despite sub-rule (1) —

(a) the *owner* or *master* of a *vessel*, pipeline, bulk storage or other installation that discharges or allows flammable liquid or contaminated water to escape into a *port*, is liable for the costs that the *Authority* may incur in removing the flammable liquid or contaminated water;

(b) the *owner* or *master* of a *vessel* is responsible for the costs of *fire protection personnel*, safety measures and supervision as may be provided, taken or exercised in terms of these rules or by the direction of the *Harbour Master*; and

(c) if the *Harbour Master* orders the removal of a *tanker* that has flammable liquids on board from the berth at which it is lying because the *Harbour Master* is of the opinion that this is in the interests of safety or the efficiency of the *port*, the *owner* or *master* is responsible for the costs of the removal, unless otherwise agreed.

PART D: AGENTS, FINANCIAL SECURITY, PORT AND CARGO DUES AND CHARGES, AND PENALTIES

114. Appointment of *vessel agents*

Every *owner* of a *vessel* intending to enter a *port* in the *Republic* must appoint a *vessel agent*, unless the *Authority* grants an exemption to a *vessel*.

115. Security to be furnished to the *Authority*

(1) Before a *vessel* enters a *port* the *owner*, *master* or *agent* of that *vessel* must furnish security to the satisfaction of the *Authority* for the payment of any fees payable to the *Authority*.[12]

(2) Despite sub-rule (1), the *Authority* may, on written application by an *agent*, and subject to conditions that it may impose, open a credit account or credit facility against which will be levied any fees or charges that may become payable by the applicant under these rules or the *Tariff Book*.

116. Termination of vessel *agent*'s mandate

(1) If the vessel *agent's* mandate is terminated, the vessel *agent* —

(a) must give the *Authority* written notice of the termination; and

(b) remains liable for all fees due and payable up to the expiry of the termination notice.

(2) Upon the termination of a vessel *agent*'s mandate, the owner or master of a vessel must appoint forthwith another vessel *agent*.

117. Port dues, fees and fines to be paid before vessel departs from *port*

(1) Before a *vessel* departs from a *port*, the *Authority* may require the *owner*, *master* or *agent* of that *vessel* to pay or provide sufficient security to the satisfaction of the *Authority*, for all *port* dues, fees, fines or any other monies owing to the *Authority* by the *vessel's owner*.

(2) Despite anything to the contrary in these rules, the *vessel*'s *agent* is responsible for all the *vessel*'s debts that remain due to the *Authority* after the *vessel* has departed from the *port*.

118. Manifest of *cargo*

(1) At least one day before the arrival of a *vessel* in the *port* in respect of imported *cargo* and at least 14 days after the *vessel*'s departure in respect of exported *cargo* —

[12] In terms of section 73(4) of the *Act*, the Authority may require any person to furnish such security as it deems fit for the payment of any fee payable to the Authority.

(a) the *owner*, *master* or *agent* of a *vessel* must submit to the *Authority* a certified true copy in English of the manifest of any non-containerised, breakbulk or bulk *cargo* intended for landing or that has been shipped;

(b) the *container operator* must submit to the *Authority* a certified true copy in English of the manifest of any containerised *cargo* intended for landing or that has been shipped.

(2) The manifest referred to in sub-rule (1) must include —

(a) the *vessel*'s details, voyage number, and estimated arrival and departure dates;

(b) its country or origin and destination;

(c) the *port* of loading, discharge, and trans-shipment;

(d) for non-containerised, breakbulk and bulk —

(i) the consignee and consignor names, addresses and contact details, where available;

(ii) the *cargo agent*'s or *cargo agents*' names, addresses and contact details;

(iii) the bill of lading or mates receipt;

(iv) the marks and numbers;

(v) the number and description of packages or goods;

(vi) the commodity description of the *cargo*; and

(vii) the gross mass; and

(e) for containers —

(i) the consignee and consignor names, addresses and contact details, and in the case of a group consignment, all the consignee and consignor names, addresses and contact details, where available;

(ii) the *cargo agent*'s or *cargo agents*' names, addresses and contact details;

(iii) the container number, size, type, status and *container operator*;

(iv) the commodity description of the *cargo*; and

(v) the gross mass.

(3) The *container operator* must submit to the *Revenue Office* within the timeframes stipulated in the *Tariff Book* a list of empty containers intended for landing or shipping at the *port*.

(4) The list referred to in sub-rule (3) must include –

(a) the *vessel*'s details, voyage number, and estimated arrival and departure dates;

(b) the *port* of loading and discharge; and

(c) the container number, sizes, type, status and *container operator*.

119. Outturn reports

(1) After the *vessel* has completed its working the terminal operator must submit to the relevant *Revenue Office* outturn reports in respect of all *cargo* landed, shipped or transhipped at all *port* terminals on a per *vessel* basis and within the timeframes stipulated by the *Authority*.

(2) The outturn report referred to in sub-rule (1) must contain the —

(a) *vessel*'s details and voyage number;

(b) arrival and departure dates;

(c) terminal indicator;

(d) berth indicator;

(e) for containerised *cargo* —

(i) container number, indicator, size, type and status; and

(ii) *container operator*; and

(f) for bulk and breakbulk *cargo*—

(i) bill of lading number or mate receipt's number, together with a commodity description of goods, number of packages and mass; and

(ii) *vessel's agent*.

120. Cancelling *cargo* documentation

(1) The applicable charges for cancelling *cargo* documentation to be submitted to the *Authority* is stipulated in the *Tariff Book*.

(2) The *Authority* may raise a charge in respect of each *cargo* document, cancelling a previously submitted *cargo* document, and the charge is due and payable at the time that the cancelling *cargo* document is delivered to the *Authority*.

(3) The *Authority* may accept cancelling *cargo* documentation only if the *cargo owner* or his or her *agent* has signed an undertaking to pay the additional charges that are stipulated in the *Tariff Book*.

121. *Cargo* dues

The *Authority* may require an exporter or importer of *cargo* and the *cargo agent* appointed to act on behalf of the importer or exporter, if such an *agent* is appointed, to furnish such security as the *Authority* deems fit for the payment of *cargo* dues.

122. Penalties

The *Authority* may levy penalties as stipulated in the *Tariff Book* for late submission, non-submission or cancelling of *cargo* documentation.

CHAPTER 6: *PLEASURE VESSELS*

123. Application of this chapter

This chapter applies to *pleasure vessels* only.

124. Permission to approach, enter into, *shift* within or leave a port

(1) No *pleasure vessel* may approach, enter into, *shift* within or leave a *port* without the permission of the *Harbour Master*.

(2) The *Harbour Master* may grant, refuse, withdraw or amend the permission.

125. Pleasure vessels to comply with applicable legislation

The *owner* or *master* of a *pleasure vessel* must comply with all applicable legislation, including the Merchant Shipping (Collisions and Distress Signals) Regulations, 2005 and the Merchant Shipping (Small Vessel Safety) Regulations, 2002, which apply also within a *port*.

126. Pleasure vessels to make way

Pleasure vessels must, at all times, keep out of the way of a *vessel* navigating in any channel or other area of the *port*.

127. Pleasure vessels to communicate with VTS

The *Harbour Master* may require a *pleasure vessel* to communicate their arrival and departure to Port Control.

128. The *Harbour Master*'s restrictions on pleasure vessels

The *owner* or *master* of any *pleasure vessel* must obey the *Harbour Master*'s restrictions relating to launching, speed, and area of operations or any other restrictions determined by the *Harbour Master* in respect of *pleasure vessels* within *port* limits.

129. Mooring only at places assigned by the *Harbour Master*

(1) *Pleasure vessels* may be moored only at positions assigned by the *Harbour Master*.

(2) No *pleasure vessel* may be beached within *port* limits except with the prior permission of the *Harbour Master*.

(3) The *Harbour Master* may issue written instructions about where *pleasure vessels* may be beached.

(4) No *pleasure vessel* may be made fast to a channel marking buoy, light buoy, or other navigational aid or mark provided for the safety of *vessels*.

130. No anchoring or mooring in a channel navigable by a vessel without *Harbour Master*'s permission

(1) No *pleasure vessel* may be anchored or moored in any channel of a *port* that is navigable by a *vessel* except with the permission of the *Harbour Master*.

(2) If the *Harbour Master* grants a *pleasure vessel* permission to anchor or moor in a channel that is navigable by *vessels*, then the *pleasure vessel* must, at all times, not interfere with *vessels* navigating in that channel.

(3) If, for reasons beyond the control of the *owner* or *master* of the *pleasure vessel*, a *pleasure vessel* is moored at a berth or position that has not been specifically assigned to it by the *Harbour Master*, then —

(a) the *owner* or *master* of the *pleasure vessel* must immediately notify the *Harbour Master* that the *pleasure vessel* is so moored; and

(b) the *Harbour Master* may, at the expense of the *owner* or *master* of the *pleasure vessel*, take whatever action is necessary for the maintenance of safety, security, good order and the protection of the environment.

131. Pleasure vessels not to be *in contact* with vessels

No *owner* or *master* of a *pleasure vessel* may permit the *pleasure vessel* to come *in contact* with a *vessel* within the *port*'s limits unless the *Harbour Master* authorises this.

132. Damage to or displacement of navigational aids

(1) The *owner* or *master* of a *pleasure vessel* that fouls, displaces or damages a buoy or navigational aid or mark, must —

(a) immediately report the incident to the *Harbour Master*;

(b) within 24 hours after the incident took place, submit to the *Harbour Master* a full written report setting out the circumstances of the incident; and

(c) provide in *writing* any particulars that the *Harbour Master* requires.

(2) The *owner* or *master* of a *pleasure vessel* that fouls, displaces or damages a channel marking, buoy, light buoy or other navigational aid or mark is liable for all costs incurred in the replacement or repair of that channel marking, buoy, light buoy or other navigational aid or mark.

133. Pleasure vessels in need of assistance

The provisions of rule 60 apply to *pleasure vessels* with the necessary changes required by the context.

134. Discharge of sewage in a port

No *pleasure vessel* may discharge or dump sewage into *port* waters or any part of the *port* except into a facility dedicated for that purpose.

135. Weapons and explosives to be locked up and disarmed

(1) Before a *pleasure vessel* enters a *port*, the *master* of the *pleasure vessel* must ensure that all weapons and explosives on board the *pleasure vessel* are locked up in a secure place such as a gun safe and are disarmed.

(2) Upon arrival in a *port*, the *master* of a *pleasure vessel* must declare to the *VTS* or Port Control whether any person on board his or her *pleasure vessel* is in possession of a weapon or explosives and, if so, the nature of the weapon or the explosive.

136. Permits for a *pleasure vessel*

(1) No *pleasure vessel* may lie or be used in or operated from a *port* unless —

(a) *SAMSA*, or another authority acceptable to *SAMSA*, has granted the *owner* or *master* of the *pleasure vessel* a certificate of fitness; and

(b) the *Harbour Master* for that *port* has granted the *owner* or *master* of the *pleasure vessel* a permit to do so.

(2) The *Authority* may determine —

(a) the manner in which applications for permits for *pleasure vessels* are to be invited, assessed and decided;

(b) in the *Tariff Book*, the fees payable for application for a pleasure vessel permit and the permit itself;

(c) the qualifications and suitable criteria that applicants for a permit must meet in order to obtain a permit; and

(d) subject to the *Act* and these rules, including the powers of the *Harbour Master* in terms of section 74(3), the terms and conditions of the permit.

(3) The *Authority* may on good cause shown, refuse, suspend, withdraw or cancel a permit, provided it has followed a fair procedure before the decision is taken.

(4) If an *owner* or *master* of a *pleasure vessel* fails to obtain a permit, the *Harbour Master* may remove or *shift* the *pleasure vessel* at the expense of the *owner* or *master* of the *pleasure vessel*.

(5) The *Authority* will set out, in the *Tariff Book*, the fees, dues and fines applicable to *pleasure vessels in possession of a permit as contemplated in sub-rule (1)*.

137. Visiting pleasure vessels

Pleasure vessels visiting the *port* must pay port dues as stipulated in the *Tariff Book*.

138. Inspection of pleasure vessels

The *Harbour Master* or any of the *Harbour Master*'s staff may, in the interests of safety, security, the protection of the environment and the good order of the *port* inspect and examine the *pleasure vessel* and its equipment.

CHAPTER 7: SECURITY AND ACCESS

139. The *Authority* is responsible for security

Subject to the provisions of any legislation regulating other state security agencies, the *Authority* is responsible for the regulation and control of security within *port* limits.

140. Security officers operating in the port

(1) *Security officers operating within a port* must have been trained in accordance with the provisions of the ISPS Code and must be conversant with the provisions of the following documents —

(a) the ISPS Code;

(b) the Merchant Shipping (Maritime Security) Regulations, 2004; and

(c) any other relevant security legislation.

(2) The *Port Security Officer* or his or her appointee may stop and interview any *security officer operating within a port* in order to establish whether the security officer —

(a) has been trained in accordance with the provisions of the ISPS Code; and

(b) is conversant with the documents referred to in sub-rule (1) and the standard operating procedures associated with his or her work.

(3) In carrying out the functions contemplated is sub-rule (2), the *Port Security Officer* or his or her appointee must record in the *Authority*'s Occurrence Book —

(a) the name of the person interviewed;

(b) the date when the interview took place;

(c) the *port* facility or the contracted private security firm to which the security personnel belongs; and

(d) his or her findings.

(4) The *Port Security Officer* or his or her appointee must discuss his or her findings with the *port* facility operator or the contracted security firm as soon as possible after the interview.

(5) If, in the opinion of the *Port Security Officer*, it is apparent that the person interviewed is not conversant with the provisions of any or some of the documents referred to in sub-rule (1), the *Port Security Officer* must —

(a) bring this to the attention of the *port* facility operator or the contracted private security company to whom that security officer is associated; and

(b) give written notice that the deficiency be corrected within a period of one month.

(6) If the matter is not remedied within the period specified in the notice, the *Authority* may —

(a) in the case of a port facility operator, report the matter to the Minister of Transport or the Director General of the Department of Transport, as may be required by relevant legislation, for appropriate action; and

(b) in the case of a contracted private security firm, terminate the authorisation to provide that service.

141. Access permits are required for entry into a *port*

(1) Subject to sub-rule (9), no person may enter a *port* without a valid access permit.

(2) The *Authority* will designate an area or areas of the *port* where a person is not required to obtain an access permit.

(3) The *Authority* will determine whether a permit is issued by the *Authority*, the operator of a facility within a *port*, or both.

(4) The *Authority* may, in respect of an access permit issued by the *Authority* —

(a) determine the manner in which a permit is issued;

(b) determine the duration for which it is valid;

(c) set out in the *Tariff Book*, the fees, if any, payable for access permits;

(d) determine the conditions of access; and

(e) suspend, withdraw or cancel the permit.

(5) The operator of a port facility may, with the approval of the *Authority*, in respect of an access permit issued by the operator —

(a) determine the manner in which a permit is issued;

(b) determine the duration for which it is valid;

(c) determine the conditions of access; and

(d) suspend, withdraw or cancel the permit.

(6) The Authority may require the operator that issues an access permit as contemplated in sub-rule **Error! Reference source not found.**, to pay to the *Authority* the fees, if any, set out in the *Tariff Book* for access permits.

(7) A person may be required to produce and show a valid access permit to an officer of the *Authority* or the operator of the relevant facility at any time while he or she is in the port, including at any exit point.

(8) Despite anything to the contrary in these rules, entry into any part of a *port* or port facility within a *port* is subject to the security plans for that *port* and that port facility as provided for by the Merchant Shipping (Maritime Security) Regulations, 2004.

(9) The master of a *vessel* must ensure that all crew members of the *vessel* have an identity document that complies with the Seafarers' Identity Documents Convention, 1958 or the Seafarers' Identity Documents Convention (Revised), 2003. The *Authority* will determine the date when it will no longer accept identity documents that are not in compliance with the Seafarers' Identity Documents Convention (Revised), 2003.

(10) The following categories of persons may enter a *port* without an access permit —

(a) persons authorised in terms of section 12 of the National Key Points Act No. 102 of 1980 to enter any National Key Point that is within *port* limits;

(b) officials who are empowered in terms of any legislation to enter a *port*;

(c) persons attending to emergencies, including doctors, paramedics and ambulance personnel attending to patients, fire fighters from local authorities and veterinary surgeons attending to animals.

(11) The persons referred to in sub-rule (9) must carry a letter or card identifying the institution that they work for or identifying their membership of the relevant professional society, as the case may be.

142. Compliance with the conditions of an access permit

A person in a *port* must comply with the conditions of his or her access permit or permits, unless the person is in an area of the *port* that is designated as not requiring an access permit.

143. Removal of persons and *motor vehicles* from a *port*

The *Authority* may remove or cause to be removed any person who or *motor vehicle* that fails to comply with the provisions of these rules, the *Harbour Master*'s or *Authority's* instructions or the conditions of the access permit or *motor vehicle* access permit.

144. Firearms

(1) No person may carry a firearm within a *port* unless the *Authority* has authorised that person to do so.

(2) The *Authority* may impose conditions upon the manner in which a firearm may be used or carried within a *port*.

(3) Despite sub-rule (1), *vessels* that have firearms on board must comply with rule 27 and *pleasure vessels* that have firearms on board must comply with rule 135.

(4) The provisions of this rule do not apply to members of the following organs of state who are on official business: government law enforcement agencies, including the South African Police Service (SAPS), the South African National Defence Force (SANDF), *customs* and the National Intelligence Agency (NIA).

145. Entry points into a *port*

A person may only enter or leave a *port* through an entrance or exit designated by the *Authority* for that purpose.

146. Motor vehicles in a *port*

(1) A *motor vehicle* may only enter a *port* or be used in a *port* after the *Authority* has issued an access permit for that *motor vehicle*.

(2) Despite sub-rule (1), the *Authority* may designate an area or areas of a *port* where a *motor vehicle* is not required to obtain an access permit.

(3) The *Authority* will determine whether a *motor vehicle* access permit is issued by the *Authority*, the operator of a facility within a *port*, or both.

(4) The *Authority* may, in respect of *motor vehicle* access permits issued by the *Authority* itself—

(a) determine the manner in which a permit is issued;

(b) determine the duration for which it is valid;

(c) require the holder of the permit to display proof of the permit in the *motor vehicle*;

(d) set out in the *Tariff Book*, the fees, if any, payable for *motor vehicle* access permits;

(e) determine the conditions of access; and

(f) suspend, withdraw or cancel the permit.

(5) The operator of a port facility may, with the approval of the *Authority*, in respect of a *motor vehicle* access permit issued by the operator —

(a) determine the manner in which a permit is issued;

(b) determine the duration for which it is valid;

(c) require the holder of the permit to display proof of the permit in the *motor vehicle*;

(d) determine the conditions of access; and

(e) suspend, withdraw or cancel the permit.

(6) The *Authority* may require the operator that issues a *motor vehicle* access permit as contemplated in sub-rule (5), to pay to the *Authority* the fees, if any, set out in the *Tariff Book* for *motor vehicle* access permits.

(7) The categories of persons set out in rule 141(10) are not required to obtain a motor vehicle access permit.

147. Rail traffic within port limits

(1) By virtue of section 3 of the National Railway Safety Regulator Act No. 5 of 2002, that Act applies within the *port*'s limits. These rules do not derogate from that Act.

(2) The *Authority* may, in the interest of safety, security, good order and the protection of environment, give directions to a train driver relating to the movement, stopping or parking of trains within a port.

CHAPTER 8: LICENCES AND REGISTRATION

148. Activities to be licensed or registered

The *Authority* may require persons who carry out activities in the *ports* and at off-shore *cargo*-handling facilities to register or apply for a licence. These activities include —

(a) fire protection and fire equipment installation and maintenance;

(b) bunkering;

(c) pollution control;

(d) diving;

(e) pest control; and

(f) *vessel agents*.

149. Activities requiring licensing or registration may not be carried out without a licence or registration

If a licence or registration is required, no person may carry out an activity in a *port* or at an off-shore *cargo*-handling facility without having a licence or being registered.

150. Determination of licences or registration

The *Authority* may determine—

(a) which activities carried out in the *ports* should be regulated by way of licence or registration;

(b) the manner in which applications for licences or registrations are to be invited, assessed and decided;

(c) set out in the *Tariff Book*, the fees payable for applications for a licence or a registration, and the licence or registration itself;

(d) the qualifications and other suitable criteria, including security clearances, that applicants for licence or registration must meet in order to be licensed or registered;

(e) subject to the *Act* and these rules, including the powers of the *Harbour Master* in terms of section 74(3)(b), the terms and conditions of the licence or registration.

151. Suspension, withdrawal or cancellation

The *Authority* may, on good cause shown, suspend, withdraw or cancel a licence or registration provided that it has followed a fair procedure before the decision is taken.

CHAPTER 9: GENERAL

152. Port repair facilities

(1) In the interests of safety, security, good order and the protection of the environment, the *Harbour Master* may, in respect of any *port* repair facility, direct that priority be given to a *vessel* in a damaged or *unseaworthy* condition.

(2) While in any *port* repair facility, no *vessel* may discharge effluent water, oil or refuse, except with the permission in *writing* of the *Harbour Master* or his or her appointee. The *Harbour Master* or his or her appointee may impose conditions upon the granting of permission in order to maintain safety, security, good order and the protection of the environment.

153. The *Authority*'s port repair facilities

(1) The *Harbour Master* determines the order of provision of *port* repair facility services.

(2) In making the determination the *Harbour Master* will take into account the interests of safety, security, good order, the efficient working of the port and the protection of the environment.

(3) The decision of the *Harbour Master* as to the use or turn of use of the *Authority*'s *port* repair facility in all cases of dispute is final.

154. Hot work permit

(1) No *hot work* may be performed on a *vessel* or *pleasure vessel* within a *port* without a permit issued by the *Harbour Master*.

(2) No *hot work* may be performed on the shore within a *port* without a permit issued by the *Authority*.

(3) The *Harbour Master* or the *Authority* may inspect the place where the *hot work* will be performed before it issues the permit.

(4) The *Harbour Master* or *Authority* may impose conditions upon the performance of the *hot work*.

155. Repairs or maintenance to a vessel

(1) No external repairs or maintenance to a *vessel* may be carried out in a *port* except with the permission of the *Harbour Master*.

(2) The *Harbour Master* may direct that precautionary measures be implemented or the *Harbour Master* may impose conditions upon the permission granted to ensure safety, security, good order and the protection of the environment.

(3) If the *master* fails to comply with the *Harbour Master*'s directives, the *Harbour Master* may withdraw his or her permission and order that work be stopped.

(4) No internal repairs or maintenance to a *vessel* may be carried out in a *port* unless the *master* has —

(a) advised the *Harbour Master* of the nature and extent of the repairs contemplated;

(b) obtained a *hot work permit* from the *Authority*; and

(c) taken adequate precautions to guard against the risk of fire occurring through or in consequence of the carrying out of the work.

(5) If, in the opinion of the *Harbour Master*, the precautions taken are not adequate, the *Harbour Master* may order that the work be stopped until precautions to the satisfaction of the *Harbour Master* have been taken.

156. Inspections and searches

(1) Subject to the provisions of any legislation —

(a) the *Authority*'s authorised officials may inspect and search any person, vehicle or trailer within *port* limits, including at the entry and exit points of the *port*; and

(b) no person may board a *vessel* within *port* limits without the permission of the *master* or person authorised by the *master*.

(2) Despite sub-rule (1) and subject to the provisions of any applicable legislation —

(a) the *Harbour Master* or any person authorised by the *Harbour Master* may board a *vessel* for purposes of investigating any matter related to the safety, security and protection of the environment of the *port*; and

(b) the *Authority*'s authorised officers may board a *vessel* or enter any premises in the *port* for purposes of investigating any matter related to the safety, security and protection of the environment of the *port*.

157. Fumigation of vessels

(1) No *master* may cause his or her *vessel* to be fumigated in a *port* except with the permission of the *Harbour Master*.

(2) The *Harbour Master* may impose conditions upon any permission granted as contemplated in sub-rule (1), in order to maintain safety, security, good order or to protect the environment.

158. Late or incomplete notices

(1) The acceptance of a late or incomplete notice required in terms of these rules may be granted if there are special circumstances and it is in the interests of safety, security, the protection of the environment, good order and the efficient management and control of the *port*.

(2) Application in respect of the late or incomplete notice must be sought from the *Authority* or the *Harbour Master*, as the case may be.

159. Advertising

(1) No person may, without the permission of the *Authority* —

(a) exhibit or cause to be exhibited any advertisement, placard, notice or sign on any land, building or structure; or

(b) distribute or cause to be distributed any literature within *port* limits.

(2) No person may deface, damage or cause to be defaced or damaged any advertisement, placard, notice, or sign within *port* limits.

160. Prohibited actions

(1) No person within *port* limits may —

(a) for the purposes of avoiding prosecution, give a false name or address to an employee of the *Authority* on duty;

(b) be in a state of intoxication or behave in a threatening or violent manner;

(c) do anything wilfully or negligently that may cause injury to persons or damage to property or the environment;

(d) commit any nuisance or act of indecency or use any defamatory language;

(e) take photographs or film without the *Authority*'s permission;

(f) write, draw or affix any defamatory matter upon any premises or property of the *Authority* within *port* limits;

(g) remove or deface the *writing* on a notice board or document set up or posted by order of the *Authority* or deface the *writing* on a board or a notice authorised by the *Authority* to be exhibited;

(h) obstruct or do anything likely to obstruct the authorised use of a *port* facility; and

(i) interfere with or hinder an employee of the *Authority* in the execution of his or her duty.

(2) The *Authority* may exempt categories of persons from the prohibition referred to in sub-rule (1)(e).

161. Dredging

The *Harbour Master* will, as far as it is practicable and reasonably possible, ensure that the depth of the channels and the *port* is kept at a depth not less than the promulgated depths for channels, basins and berths of the *port*.

162. Declaration of a wharf

The *Authority* may at any time declare and define a certain area within the limits of the *port* to be a wharf on which *cargo* may be landed and from which *cargo* may be shipped in *vessels*.

163. Breaking up and removal of wrecks in a port

(1) No person may break up or remove a wreck, hulk or *vessel* within *port* limits without the written permission of the *Harbour Master*.

(2) The *Harbour Master* may impose conditions upon the granting of this permission in order to maintain safety, security, good order and the protection of the environment.

(3) No permission will be granted unless the applicant has provided security to the satisfaction of the *Authority*, in an amount not exceeding the cost that the *Authority* estimates for breaking up and removal of the wreck.

(4) If the applicant fails to remove every part of the wreck, hulk or *vessel* within the period stipulated by the *Authority*, the *Authority* may use the security to remove those parts of the wreck, hulk or *vessel* that have not been removed by the applicant. Any additional costs will be for the account of the applicant who undertook to remove the wreck.

(5) This rule does not apply to historic wrecks.

164. Information to be furnished by port users

Despite the provisions of these rules, the *Authority* may request information from users of the *port* in relation to any of their activities within *port* limits and that information must be furnished to the *Authority* when requested.

165. Manner in which time is to be specified

If a report or notice is made or given in terms of these rules and it requires a time to be specified, then the time must be specified in local time (UTC + 2), using the 24-hour clock system.

166. Changes in information to be reported

A person who provides information to the *Authority* pursuant to these rules must ensure that the *Authority* is provided with any significant change in the information as soon as it is reasonably possible.

167. Liability of the *Authority*

Neither the *Authority* nor an employee or a representative of the *Authority* is liable for loss or damage caused by anything done or omitted by the *Authority*, the employee or the representative in good faith whilst performing any function in terms of these rules.

168. Observance of other laws and conventions

The provisions of these rules do not exempt any person from the due observance of the provisions of any other law or convention that applies within a *port*.

169. Offences

(1) A person is guilty of an offence if he or she contravenes rule 7, 10(e), 34(1), 64(1), 64(2), 65(2), 65(4), 66, 75(1), 76, 79,80, 820,83(1), 83(1), 85(1), 86(1), 86(2), 86(3), 86(7), 86(8), 91, 96, 97, 104, 159, 141(1), 142, 0(1), 145, 0**Error! Reference source not found.**, 0**Error! Reference source not found.** to **Error! Reference source not found.**, 0**Error! Reference source not found.**, 149, 156(1)(1)(b), 157(1), 158 or 163.

(2) The *master* of a *vessel* is guilty of an offence if he or she contravenes rules 16(1), 20(1), 27, 30, 36, 54**Error! Reference source not found.**, 54(1), 55, 56, 69, 70, 72, 84(3), 84(4), 88, 93, 101(1), 154(1), 154(2), 155(1), 155(4),

(3) The *master* of a *pleasure vessel* is guilty of an offence if he or she contravenes rule 124(1),126, 131, 132(1), 133, 135, 136(1) or 154(1).

170. Transitional arrangements

A licence issued by the *Authority* or permission granted, order or direction given by the *Authority* or other action lawfully taken under repealed legislation remains valid until the licence, permission, order ,direction or action expires or is suspended or cancelled in terms of the *Act* or these rules.

ANNEXURE 1 (RULE (1)(YY)) INSHORE *VESSEL* TRAFFIC SERVICES (*VTS*) *ZONES*

Item	Column 1 *Vessel traffic services zones*	Column 2 Description
1	Saldanha Bay and approaches	All South African waters contained within— A. Cape Columbine 32°49'.6 S 017°50'.9 E B. 33°00'.0 S 017°30'.0 E C. 33°25'.0 S 017°45'.0 E D. Yzerfontein Point 33°21'.0 S 018°08'.6 E
2	Table Bay and approaches	All South African waters contained within— A. Bok Point 33°34'.0 S 018°18'.4 E B. 33°45'.0 S 018°02'.5 E C. 34°00'.0 S 018°10'.0 E D. Duiker Point 34°02'.4 S 018°18'.6 E
3	Port Elizabeth and approaches	A1 34°01.7' S 25°47.4' E, a line to St,. Croix Island bearing 330° (T) to the shore high water mark. B1 33°54.3' S 25°50.0' E, a line to Cape Recife bearing 270° (T) to the shore high water mark.
4	Durban and approaches	A radius of 12 nautical miles from 29°50.2' S and 31°05.8' E to the shore high water mark.
5	Richards Bay and approaches	A radius of 15 nautical miles from south breakwater position 28°48.86' S and 32°05.85' E to the shore high water mark.

Since 1949 the "Committee for Waterfront Structures" has operated on honorary base as a committee of the Society for Harbour Engineering (HTG), Hamburg, and since 1951 also as working group of the German Society for Geotechnics (DGGT), Essen. Its full designation reads "Committee for Simplification and Standardization of Calculation and Construction of Waterfront Structures", which also outlines its goals. Following on from the previous collective publications, the new edition of EAU 1996 contains the safety concept with partial safety factors in accordance with the Eurocodes or the European prestandards as well as with the corresponding German standards and prestandards, while taking the National Application Document (NAD) into account. The revised version thus follows the goal of harmonising standards in Europe. At the same time, much updating and streamlining means that the recommendations continue to satisfy the requirements for international recognition and application with regard to planning, design tendering, the awarding of contracts, construction and supervision, as well as the inspection and account for harbour and waterway structures from the point of view of uniformity.

Recommendations of the Committee for Waterfront Structures Harbours and Waterways EAU 1996

7th Edition

Ernst & Sohn
A Wiley Company

5 Ship Dimensions and Loading of Waterfront Structures

5.1 Ship Dimensions (R 39)

The following exemplarily listed average ship dimensions may be used for the calculation and design of waterfront structures and in the design and layout of fenders and dolphins:

5.1.1 Seagoing Vessels

5.1.1.1 Passenger Vessels (table R 39-1.1)

Tonnage	Carrying capacity	Displacement *G*	Overall length	Length between perps	Beam	Draft
GT	DWT	t	m	m	m	m
80 000	–	75 000	315	295	35.5	11.5
70 000	–	65 000	315	295	34.0	11.0
60 000	–	55 000	310	290	32.5	10.5
50 000	–	45 000	300	280	31.0	10.5
40 000	–	35 000	265	245	29.5	10.0
30 000	–	30 000	230	210	28.0	10.0

5.1.1.2 Bulk Carriers (table R 39-1.2) (oil, ore, coal, grain, etc.)

–	450 000	524 000	424	404	68.5	25.0
–	420 000	490 000	418	398	67.0	24.5
–	380 000	445 000	407	386	64.5	24.0
–	365 000	428 000	404	383	63.5	23.0
–	340 000	400 000	398	378	62.5	23.0
–	300 000	356 000	385	364	59.5	22.0
–	275 000	326 000	376	355	57.5	21.5
–	250 000	300 000	367	346	55.5	20.5
–	225 000	270 000	356	336	53.5	20.5
–	200 000	240 000	345	326	51.0	19.5
–	175 000	212 000	330	315	48.5	18.5
–	150 000	180 000	315	300	46.0	16.5
–	125 000	155 000	295	280	43.5	16.0
–	100 000	125 000	280	265	41.0	15.0
–	85 000	105 000	265	255	38.0	14.0
–	65 000	85 000	255	245	33.5	13.0
–	45 000	60 000	230	220	29.0	11.5
–	35 000	45 000	210	200	27.0	11.0
–	25 000	30 000	190	180	24.5	10.5
–	15 000	20 000	165	155	21.5	9.5

5.1.1.3 Mixed Cargo Freighters (Full Deck Construction) (table R 31-1.3)

Tonnage	Carrying capacity	Displacement *G*	Overall length	Length between perps	Beam	Draft
GT	DWT	t	m	m	m	m
10 000	15 000	20 000	165	155	21.5	9.5
7 500	11 000	15 000	150	140	20.0	9.0
5 000	7 500	10 000	135	125	17.5	8.0
4 000	6 000	8 000	120	110	16.0	7.5
3 000	4 500	6 000	105	100	14.5	7.0
2 000	3 000	4 000	95	90	13.0	6.0
1 500	2 200	3 000	90	85	12.0	5.5
1 000	1 500	2 000	75	70	10.0	4.5
500	700	1 000	60	55	8.5	3.5

There appears to be no trend towards construction of larger cargo freighters. If necessary, the dimensions used in section 5.1.1.2 may be used accordingly.

5.1.1.4 Fishing Vessels (table R 39-1.4)

2 500	–	2 800	90	80	14.0	5.9
2 000	–	2 500	85	75	13.0	5.6
1 500	–	2 100	80	70	12.0	5.3
1 000	–	1 750	75	65	11.0	5.0
800	–	1 550	70	60	10.5	4.8
600	–	1 200	65	55	10.0	4.5
400	–	800	55	45	8.5	4.0
200	–	400	40	35	7.0	3.5

5.1.1.5 Container Ships (table R 39-1.5)

Carrying capacity	Displacement *G*	Overall length	Length between perps	Beam	Draft	Number of containers	Generation
DWT	t	m	m	m	m	circa	
75 000	90 000	350	335	45.0	14.0	6 000	6th
66 300	80 000	275	262	40.0	14.0	4 800	5th
64 500	77 500	294	282	32.2	13.5	4 400	5th
55 000	77 000	275	260	39.4	12.5	3 900	4th
50 000	73 500	290	275	32.4	13.0	2 800	3rd
42 000	61 000	285	270	32.3	12.0	2 380	3rd
36 000	51 000	270	255	31.8	11.7	2 000	3rd
30 000	41 500	228	214	31.0	11.3	1 670	2nd
25 000	34 000	212	198	30.0	10.7	1 380	2nd
20 000	27 000	198	184	28.7	10.0	1 100	2nd
15 000	20 000	180	166	26.5	9.0	810	1st
10 000	13 500	159	144	23.5	8.0	530	1st
7 000	9 600	143	128	19.0	6.5	316	1st

5.1.1.6 Car transport Ships (table R 39-1.6)

Carrying capacity	Displacement *G*	Overall length	Length between perps	Beam	Draft	No. of cars
DWT	t	m	m	m	m	approx.
28 000	45 000	198	183	32.3	11.8	6 200
26 300	42 000	213	198	32.3	10.5	6 000
17 900	33 000	195	180	32.2	9.7	5 600

5.1.1.7 Ferries and Ro-Ro Ships (table R 39-1.7)

Carrying capacity	Displacement *G*	Overall length	Length between perps	Beam	Draft
DWT	t	m	m	m	m
106 400	115 000	253.00	238.00	40.00	15.10
64 400	76 100	225.00	215.00	34.00	13.00
42 500	53 000	182.50	173.00	32.30	12.00
27 750	39 800	177.30	158.10	27.30	11.55
18 000	32 650	181.20	165.00	30.40	9.30
16 000	23 400	178.10	164.00	26.80	7.60
14 000	21 500	163.80	148.60	23.50	8.80
12 000	20 000	190.90	173.00	26.00	7.18
10 000	23 410	192.50	181.00	27.30	6.75
8 000	16 000	156.00	137.00	22.60	7.30
6 000	20 750	179.40	170.00	27.80	6.27
4 000	17 500	163.40	150.00	27.00	6.20
2 000	10 800	164.70	159.60	17.70	5.90

The data in the table vary according to type of load (cars, trucks, trailers, waggons, passengers) and load shares.

5.1.2 River-sea Ships (table R 39-2)

Tonnage	Carrying capacity	Displacement *G*	Overall length	Beam	Draft
GT	DWT	t	m	m	m
999	3 200	3 700	94.0	12.8	4.2
499	1 795	2 600	81.0	11.3	3.6
299	1 100	1 500	69.0	9.5	3.0

The length, width and draft of all types of freighters depend on the ship's construction and the country of origin. The dimensions can be expected to vary by up to 5 % (see also [197], [199] and [200]).
The gross tonnage (GT) is taken as the dimension-less gross space number [201]. The carrying capacity is stated in deadweight tons (DWT), namely the weight of provisions, supplies, fresh water, crew, reserves of boiler water, fuel, freight and passengers, measured in English tons (long tons) at 2240 lbs = 1016 kg.

5.1.3 Inland Vessels (table R 39-3)

Designation	Carrying capacity	Displacement *G*	Length	Beam	Draft
	t	t	m	m	m
Motor freighters:					
Large Rhine ship	4 500	5 200	110.0	11.4	4.5
2600-ton class	2 600	2 950	110.0	11.4	2.7
Rhine ship	2 000	2 385	95.0	11.4	2.7
"Europe" ship	1 350	1 650	80.0	9.5	2.5
Dortmund-Ems-Canal ship	1 000	1 235	67.0	8.2	2.5
Large-Canal-Class ship	950	1 150	82.0	9.5	2.0
Large-"Plauer"-Class ship	700	840	67.0	8.2	2.0
BM-500 ship	650	780	55.0	8.0	1.8
Kempenaar	600	765	50.0	6.6	2.5
Barge	415	505	32.5	8.2	2.0
Peniche	300	405	38.5	5.0	2.2
Large-Saale-Class ship	300	400	52.0	6.6	2.0
Large-Finow-Class ship	250	300	41.5	5.1	1.8
Push lighters:					
Europe IIa	2 940	3 275	76.5	11.4	4.0
	1 520	1 885			2.5
Europe II	2 520	2 835	76.5	11.4	3.5
	1 660	1 990			2.5
Europe I	1 880	2 110	70.0	9.5	3.5
	1 240	1 480			2.5
Carrier ship lighters:					
Seabee	860	1 020	29.7	10.7	3.2
Lash	376	488	18.8	9.5	2.7
Push tows:					
with one lighter Europe IIa	2 940	3 520[1]	110.0	11.4	4.0
	1 520	2 130[1]			2.5
with 2 lighters Europe IIa	5 880	6 795[1]	185.0	11.4	4.0
	3 040	4 015[1]	110.0	22.8	4.0
					2.5
with 4 lighters Europe IIa	11 760	13 640[2]	185.0	22.8	4.0
	6 080	8 080[2]			2.5

[1] Push vessel 1 480 kW; approx. 245 t displacement
[2] Push vessel 2963–3333 kW; approx. 540 t displacement

According to ECE resolution no. 30 dated 12.11.1992 – TRANS/SC 3R.153, the following classification applies to European waterways:

Type of inland waterway		Class of inland waterway	Motor vessels and barges in tow Type of vessel: general features					Push tow Type of pushed lighter: general features					Vertical clearance under a bridge [m][2]	Graphical symbol on the map
			Designation	Max. length L [m]	Max. beam B [m]	Draft d [m][7]	Tonnage T [t]	Formation	Length L [m]	Beam B [m]	Draft d [m][7]	Tonnage T [t]		
1		2	3	4	5	6	7	8	9	10	11	12	13	14
of regional significance	west of the Elbe river	I	Penische	38.5	5.05	1.8–2.2	250–400						4.0	
		II	Kempenaar	50–55	6.6	2.5	400–650						4.0–5.0	
		III	Gustav Konigs	67–80	8.2	2.5	650–1000						4.0–5.0	
	east of the Elbe river	I	Large Finow	41	4.7	1.4	180						3.0	
		II	BM-500	57	7.5–9.0	1.6	500–630						3.0	
		III	[6]	67–70	8.2–9.0	1.6–2.0	470–700		118–132[1]	8.2–9.0[1]	1.6–2.0	1000–1200	4.0	
of international significance		IV	Johann Welker	80–85	9.5	2.5	1000–1500		85	9.5[5]	2.50–2.80	1250–1450	5.25 or 7.00[4]	
		Va	large Rhine ship	95–110	11.40	2.50–2.80	1500–3000		96–110[1]	11.40	2.50–4.50	1600–3000	5.25 or	
		Vb							172–185[1]	11.40	2.50–4.50	3200–6000	7.00 or 9.10[4]	
		VIa							95–110[1]	22.80	2.50–4.50	3200–6000	7.00 or 9.10[4]	
		VIb	[3]	140	15.00	3.90			185–195[1]	22.80	2.50–4.50	6400–12000	7.00 or 9.10[4]	
		VIc							270–280[1] 195–200[1]	22.80 33.00–34.20[1]	2.50–4.50	9600–18000 9600–18000	9.10[4]	
		VII							285	33.00–34.20[1]	2.50–4.50	14500–27000	9.10[4]	

Foot notes for the classification table:

[1] The first number considers the current situation, whereas the second shows both future developments and, in some cases, the existing situation.
[2] Considers a safety clearance of approx. 30 cm between the highest fixed point of the ship or its cargo and a bridge.
[3] Considers the dimensions of vessels under own power expected in Ro-/Ro- and container traffic. The stated dimensions are approximate values.
[4] Rated for transporting containers:
- 5.25 m for ships with two layers of containers,
- 7.00 m for ships with three layers of containers,
- 9.10 m for ships with four layers of containers.
- 50 % of the containers can be empty, otherwise ballast is required.

[5] Some existing waterways can be allocated to class IV on account of the greatest permissible length of ships and barges, although the greatest beam is 11.40 m and the largest draft 4.00 m.
[6] Vessels used in the region of the Oder and on the waterways between Oder and Elbe.
[7] The draft for a specific federal waterway is to be ascertained according to the local conditions.
[8] On certain sections of waterways in class VII, push tows can be used consisting of a larger number of lighters. Here the horizontal dimensions can exceed the values stated in the table.

Table R 39-3.1. Classification of the European inland waterways

5.1.4 Displacement

The displacement G [t] is the product of the length between perpendiculars, the width, the draft, the block coefficient c_B and the mass density ρ_w [t/m^3] of the water. The block coefficient varies from 0.50 to 0.80 for seagoing vessels, from 0.80 to 0.90 for inland vessels, and from 0.90 to 0.93 for push lighters.

5.2 Assumed Berthing Pressure of Vessels at Quays (R 38)

In preparation of the design, accidental impacts need not be taken into consideration but only the usual berthing loads. The magnitude of these berthing loads depends on the ship's dimensions, the berthing velocity, the fenders and the deformation of the ship's hull and the structure.
In order to give the quay sufficient stability against normal berthing loads, but on the other hand to avoid unnecessarily large dimensions, it is recommended that the front wall be so designed that at any position of a section, a concentrated impact load in the magnitude of the relevant line pull force can act, without the total stresses exceeding the permissible limits. Berthing impact for quay walls in seaports according to R 12, section 5.12.2 with the values in table R 12-1, and for quay walls in inland harbours 100 kN according to R 102, section 5.13.2.
This concentrated force may be distributed over a square area 0.50 m on a side. In sheet pile walls without solid superstructures, only the wales and bolts need be designed for this force.
The berthing loads on dolphins are dealt with in R 128, section 13.3.

5.3 Berthing Velocities of Vessels Transverse to Berth (R 40)

When vessels make their approach transverse to a berth, it is recommended that the following berthing velocities be taken into consideration when designing the corresponding fendering:

Condition	Approach	Berthing velocity transverse to berth (m/s)			
		up to 1000 DWT	up to 5000 DWT	up to 10000 DWT	Larger ships
		corresponding to approx. 1500 t displacement	6500 t	13000 t	
Strong wind and heavy sea	difficult	0.75	0.55	0.40	0.30
Strong wind and heavy sea	favourable	0.60	0.45	0.30	0.20
Moderate wind and heavy sea	moderate	0.45	0.35	0.20	0.15
Protected	difficult	0.25	0.20	0.15	0.10
Protected	favourable	0.20	0.15	0.10	0.10

Table R 40-1. Berthing velocity transverse to berth

5.4 Load Cases (R 18)

The following load cases (combination of actions) are considered as a general principle for the statical calculations and allocation of the partial safety factors:

5.4.1 Load Case 1

Loads due to active earth pressure (in unconsolidated, cohesive soils, separately for both initial and final states) and to water pressure differences where unfavourable outer and inner water levels frequently occur (see R 19, section 4.2), Earth pressures resulting from the normal live loads, from crane tracks and pile loads, directly acting surcharges from dead weight and normal live load.

5.4.2 Load Case 2

Same as load case 1, but with restricted scour from flow or from ship's screw action, and together with the following, insofar as they can occur simultaneously: water pressure difference according to R 19, section 4.2, wave loads from frequent waves ("design wave" as per R 136, section 5.6.5), water pressure difference caused by regularly anticipated flooding of the waterfront structure, the suction effect of passing ships, loads and active earth pressure from unusual local surcharges, hawser pull on bollards, recess bollards or mooring hooks, and the impact of vessels; the effect of temporarily unfavourable loads during construction and the protection afforded by any existing piling should be neglected.

5.4.3 Load Case 3

Same as load case 2, but taking into consideration additional surcharges not previously allowed for on larger areas, or the possibility that elements which help to stabilize the structure in general may fail because of unfavourable circumstances. Examples of these contingencies are the complete failure of the drainage system, an unusual slumping of an underwater slope in front of the sheet piling, unusual scouring due to current or ship's screws, water pressure difference after extreme water level situations and wave loads from rare waves ("design wave" as per R 136, section 5.6.5), unexpected flooding of the banks or a severe groundwater rise due to an ice jam with subsequent sudden drop of the outer water after the jammed ice goes out, the bursting of a large water pipe behind the waterfront structure, unforeseen transhipment of unusually heavy goods. The combination of several such unfavourable actions is also to be taken into consideration, as far as this occurrence is possible and probable.

5.4.4 Partial Safety Factors

It must be taken into account whether the acting loads are stated as "*nominal* loads" (i.e. design loads) or "*characteristic* loads". In the latter case, they are to be multiplied by the partial safety factors according to DIN V 1054-100. For load case 3, as a rule the partial safety factor 1.0 is used.

5.5 Vertical Live Loads (R 5)

All quantitative loads (actions) stated in this section are *characteristic* values.

5.5.1 General

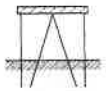
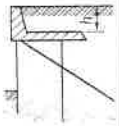
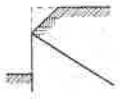
Vertical live loads (variable loads in accordance with DIN V ENV 1991-1) are essentially the surcharges resulting from stored material and the loads from vehicular traffic. The load actions of rail-mounted or vehicular mobile cranes must be considered separately, insofar as they exert any effect on the waterfront structures. At waterfront structures in inland ports, the latter is generally only the case for waterfront structures which are expressly intended for heavy load handling with mobile cranes. In seaports, in addition to the rail-mounted quay cranes, mobile cranes are being used increasingly for general cargo handling, that is to say, not only for heavy loads.
A distinction is to be made between three different basic types (table R 5-1) for the live loads:

In *basic type 1*, the bearing members of the structures are driven over directly by the vehicles and/or stressed by the stacked materials, e.g. at pier bridges (table R 5-1a).

In *basic type 2*, the load from vehicles and the stacked material acts on a more or less deep bedding course, which distributes and transmits the loads to the structural members. This type of design is used for example at super-structured slopes with load distributing bedding layer on the pier slab (table R 5-1 b).

In *basic type 3*, the load from vehicles and the stacked goods acts only on the solid mass of earth fill behind the waterfront structure, which consequently is subject only indirectly to additional stress from the live loads as the result of increased active earth pressure. Simple sheet piling bulkheads or partially sloped banks are characteristic for this (table R 5-1c).

Supplementing the three basic types, there are also transitional types, for example pile-founded structures on piles with a short pile cap.
If complete and reliable calculations are available, the live loads should normally be taken at the anticipated magnitude. Any subsequently necessary increases in the live loads can be better accommodated within the tolerable limits, the greater the deadweight share and the better the distribution of loads in the structure. Support systems according to basic type 2 and in particular basic type 3 offer particular advantages in this respect.
Reference is made to R 18, section 5.4 when it comes to allocation of the corresponding loads to load cases 1, 2 and 3.

Basic type	Traffic live loads[1]				Storage area outside the waterfront cargo-handling area
	Railroad	Roads			
		Vehicle	Road-bound cranes	Light-weight traffic	
a) BT 1 	Issue B.3 dated 08.03.93 (DS 804) Regulations for railroad bridges and other engineering structures (VEI)	Load assumptions as per DIN 1072 (road and foot bridges – load assumptions)	Fork lift loads as per DIN 1055, Claw loads of 550 kN for mobile cranes	5 kN/m²	Loads according to the use actually anticipated in accordance with section 5.5.6
	Impact factor: The parts exceeding 1.0 can be decreased by half				
b) BT 2 	As 1, but further reduction of the impact factor to 1.0 at bedding layer thickness $h = 1.00$ m. For bedding layer thickness $h \geq 1.50$ uniformly distributed surface load of 20 kN/m² | 33.3 kN/m²				
c) BT 3 	Loads as in BT 2 with a bedding layer thickness of more than 1.50 m				

[1] Crane loads are to be taken as stipulated in R 84, section 5.14

Table R 5-1. Vertical live loads

5.5.2 Basic Type 1

Railroad live loads correspond to the load diagram UIC[1)] 71 of the Regulation for Railroad Bridges and other Engineering Structures (VEI), issue B3 of 8.4.1993 (DS 804). The load assumptions according to DIN 1072 are to be applied for road traffic. Bridge class 60/30 is to be adopted in general. In indicated impact factors (DS 804) and vibration coefficients (DIN 1072), with which the live loads of the main track are to be multiplied, the parts exceeding 1.0 can as a rule be decreased by half, because of the slow speed. For piers in seaports, loads from fork lifts are to be taken according to DIN 1055 and claw pressures for mobile cranes of 550 kN, insofar as higher assumptions are not required in special cases (see table R 84-1, section 5.14.3).

Outside the waterfront cargo handling area, the actually expected surcharge from stored goods is to be taken, but at least 20 kN/m^2 (see section 5.5.6), because of later possible changes in use of the area. A live load of 5 kN/m^2 is adequate if the nature of the facility means that only light traffic is possible or anticipated.

5.5.3 Basic Type 2

Essentially the same as basic type 1. The impact factors and coefficients however may be linearly further reduced according to bedding layer thickness, and completely ignored when the bed is at least 1.00 m thick, for road traffic taken from the top of the road, and when the rails are embedded in the pavement, from the top of the rails. Load by sections is however still to be taken into account.

If the bedding layer thickness is at least 1.50 m, the total live load can be replaced by a uniformly distributed area load corresponding to the actually anticipated live load, but not less than 20 kN/m^2. In cases of light traffic, a live load of 5 kN/m^2 suffices.

5.5.4 Basic Type 3

Load as for basic type 2, with a bedding layer thickness of more than 1.50 m.

5.5.5 Load Assumptions Directly Behind the Head of the Waterfront Structure

When working with heavy vehicular cranes or similar heavy-duty vehicles and heavy construction gear, such as crawler excavators and similar, which drive along directly behind the front edge of the waterfront structure, the following are to be applied for the design of the uppermost parts of the structure, inclusive of an eventual upper anchoring:

[1)] UIC = Union Internationale des Chemins de Fer.

a) Live load = 60 kN/m^2 from rear edge of coping, inboard for 2.0 m width, or
b) Live load = 40 kN/m^2 from rear edge of coping, inboard for 3.50 m width.

In a) and b), effects from a claw end load $P = 550$ kN are covered insofar as the distance between the axis of the waterfront structure and the axis of the claw is at least 2.0 m.

5.5.6 Loads Outside the Waterfront Cargo Handling Area

Outside the waterfront cargo handling area, the following live loads are taken as the basis in accordance with [140], working on the basis of 300 kN gross load for 40' containers and 200 kN for 20' containers.

• Light traffic (cars)	5 kN/m^2
• General traffic (trucks)	10 kN/m^2
• General cargo	20 kN/m^2
• Containers:	
– empty, stacked 4 high	15 kN/m^2
– full, stacked 2high	35 kN/m^2
– full, stacked 4 high	55 kN/m^2
• Ro-Ro loads	30–50 kN/m^2
• Multi-purpose facilities	50 kN/m^2
• Offshore feeder bases	55–150 kN/m^2
• Paper	depending on the
• Timber products	bulk/stacking height,
• Steel	calculating values of the
• Coal	weight density according to
• Ore	DIN1055, part 4

Further details regarding the material properties of bulk and stacked goods are to be found in the tables of ROM 02.-90 [197].

When calculating the active earth pressure of retaining structures, as a rule the differing loads in the cargo handling and container area can be grouped together to produce an average surface load of 30 to 50 kN/m^2.

5.6 Determining the "Design Wave" for Maritime and Port Structures (R 136)

5.6.1 General

In order to rate the wave loads acting on maritime and port structures, the sea conditions in the planning area should be analysed and studied with regard to probabilities. This includes an investigation of the wave data, such as wave heights, periods, lengths and directions in connection with wind conditions, tides and currents, including their seasonal frequency. It is then possible to determine the applicable wave value as so-

ANNEXURE E (example)

PART 1 OF 2 **TERMINAL OPERATOR PERFORMANCE STANDARDS (TOPS) REPORT FOR:**

NAME OF THE TERMINAL

LICENCE NUMBER:

ASSESSMENT PERIOD: **From:** _____ **To:** _____

PERFORMANCE MEASURE		INSTALLED NORM	ACTUAL TOPS YEAR ANNUAL	TARGET FOR TOPS YEAR ANNUAL	TARGET FOR THE 1st QUARTER	ACTUAL FOR THE 1st QUARTER	% DEVIATION FOR THE 1st QUARTER	SUMMARY REASONS FOR NON ACHIEVEMENT OF TOPS IN BULLETTED FORMAT (DETAILED REASONS TO BE SUPPLIED IN PART 2 OF THIS REPORT)
1. Terminal Berthing Delays								
2. Berth Productivity								
3. Ship Working Hour	commodity							
	commodity							
	commodity							
	commodity							

Initial here:

4. Truck Turnaround Time								
5. Rail Turnaround Time								
6. Throughput								
7.								

PART 2 OF 2

DETAILED REASONS FOR NON ACHIEVEMENT OF TOPS PER MEASURE

(The purpose of Part 2 is to provide reasons for non-achievement of TOPS per measure where TOPS have not been met, remedial action/s and timeframes for implementation of remedial action. Relevant supporting documentation may be attached separately)

MEASURE	REMEDIAL ACTION	TIMEFRAMES
1.		
2.		
3.		
4.		
5.		

6.		
7.		

DECLARATION:

I, the under-signed, _____ (name printed in full) in my capacity as

_____ (designation) and being duly authorised, hereby declare and warrant that the information contained in this

TOPS report is true and correct.

_____ _____

SIGNATURE: **DATE:**

Please send completed report to ***(TOPS.Richardsbay@transnet.net)***

Annex F Breach of Law Form

NAME OF ENTITY:

_____

We_____

do hereby certify that we **have/have not** been **[delete as applicable]** found guilty during the preceding 5 (five) years of a serious breach of law, including but not limited to a breach of the Competition Act, 89 of 1998, by a court of law, tribunal or other administrative body. The type of breach that the Bidder is required to disclose excludes relatively minor offences or misdemeanours, e.g. traffic offences.

Where found guilty of such a serious breach, please disclose:

NATURE OF BREACH:

_____

_____

_____

_____

DATE OF BREACH:

_____

Furthermore, we acknowledge that TNPA reserves the right to exclude any Bidder from the bidding process, should that person or entity have been found guilty of a serious breach of law, tribunal or regulatory obligation.

SIGNED at _____ on this _____ day of _____ 20__.

_____ _____

SIGNATURE OF WITNESS SIGNATURE OF BIDDER

Annexure G – Economic Development Plan by Bidder

(Detailed Plan to be developed by bidder in line with Annexure RR & SS of this RFP)

ECONOMIC DEVELOPMENT PLAN

Transnet requires that all Respondents submit an **Economic Development Plan** demonstrating how they will discharge their commitments made in the Development Phase and Operational Phase Value Summary.

The Economic Development Plan is a detailed narrative document explaining the Respondent's Economic Development proposal as summarised in the Development Phase and Operational Phase Value Summary.

Respondents must compile the Economic Development plan, with an understanding of Economic Development as detailed and described in the Economic Development Guideline Document and further guided by the specific requirements mentioned below.

Important Notes for completion of Economic Development Plan:

(i) Respondents are urged to pay careful attention to the compilation of the Economic Development Plan since it, together with the Development Phase and Operational Phase Value Summary, represents a binding commitment on the part of the successful Respondent.

(ii) Respondents are required to address each of the categories under the detailed Economic Development Description as a minimum for submission. This is however not an exhaustive list and Respondents are not limited to these choices when compiling each section.

(iii) Respondents must ensure that the Development Phase and Operational Phase Value Summary submission and the Economic Development Plan submission are accurately cross-referenced with each other.

(iv) Respondents are requested to address each of the Economic Development aspects in no more than two (2) pages per category, to avoid lengthy submissions.

(v) Respondents are required to provide an electronic copy [Economic Development] of the completed Development Phase and Operational Phase Value Summary and Economic Development Plan as part of their submissions.

Minimum Economic Development plan requirements

The Economic Development Plan should outline the type of activities you intend to embark upon should you be awarded the contract. This Economic Development Plan should also provide an

overview of what you intend to achieve, by when, and the mechanisms to be used to achieve those objectives.

Category	Description
Local Capability and Capacity Building in South Africa (existing industry)	Industrial capability building that focuses on value-added activities of the South African industry through manufacturing or service-related activities
New Skills development	Skills transfer & skills education which will occur as a result of the award of contract
Job Creation/Preservation	Number of jobs created or preserved resulting from the award of contract
Small Business Promotion	Encouragement for growth and the expansion of emerging local firms, through procurement and support mechanisms
Rural Integration and Regional Development	Incorporation of the use of rural labour and regional businesses which will contribute to NDP objectives

ECONOMIC DEVELOPMENT PLAN

1. Economic Development Executive Summary
   .....
   .....
   .....

2. Economic Development plan per category:

   2.1. Local Capability and capacity building in South Africa (Localisation)

   2.2. New Skills development

   2.3. Job Creation/preservation

   2.4. Small Business Promotion

   2.5. Rural / regional integration

Conclusion

.....

Annex H

Supplier Integrity Pact

1. TNPA's Integrity Pact requires a commitment from Bidders to TNPA that they will not engage in any:

   1.1 corrupt and fraudulent practices;

   1.2 anti-competitive practices; and

   1.3 act in bad faith towards each other.

2. The Integrity Pact also serves to communicate TNPA's Gift Policy as well as the remedies available to TNPA where a Bidder contravenes any provision of the Integrity Pact.

3. Bidders are required to familiarise themselves with the contents of the Integrity Pact which is available on the Transnet Internet site [www.transnet.net/Tenders/Pages/default.aspx] or on request.

   NAME OF ENTITY:

   _____

   We _____ do hereby certify that we have acquainted ourselves with all the documentation comprising the TNPA Integrity Pact. We agree to fully comply with all the terms and conditions stipulated in the TNPA Supplier Integrity Pact.

4. We furthermore agree that TNPA shall recognise no claim from us for relief based on an allegation that we overlooked any terms and conditions of the Integrity Pact or failed to take it into account for the purpose of submitting our offer.

5. We confirm having been advised that a signed copy of this Schedule can be submitted in lieu of the entire TNPA Integrity Pact as confirmation in terms of the Returnable Schedule.

   SIGNED at _____ on this _____ day of _____ 20 ___.

   _____ _____

   SIGNATURE OF WITNESS SIGNATURE OF BIDDER

Annex I

RFP Clarification Request Form

RFP No: TNPA 2017/01/013/CM

RFP deadline for questions / RFP Clarifications: Before 15:00 on 28 September 2016

TO: TNPA

ATTENTION: The Tender Administrator

EMAIL:

DATE: _____

FROM: _____

_____

RFP Clarification No ***[to be inserted by TNPA]*** .....

REQUEST FOR RFP CLARIFICATION

_____
_____
_____
_____
_____
_____
_____
_____
_____
_____
_____
_____
_____

TNPA Declaration of Bidder

NAME OF ENTITY: _____ [insert name of Bidder] ("the Bidder")]

We _____ do hereby certify that:

In this declaration, words and expressions which are defined in the Request for Proposals for 25 (twenty-five) year concession for the LNG Terminal in the Port of Richards Bay, Tender No: TNPA 2022/06/14/RFP shall bear the same meaning when used in this letter, unless the context requires otherwise.

1. The Bidder further certifies that:

   1.1. TNPA has supplied and we have received appropriate responses to any or all questions, as applicable, which were submitted by ourselves for the RFP clarification purposes;

   1.2. we have received all information we deemed necessary for the completion of this RFP;

   1.3. at no stage have we received additional information relating to the subject matter of this RFP from TNPA sources, other than information formally received from the designated TNPA contact(s) as nominated in the RFP documents;

   1.4. we are satisfied, insofar as our entity is concerned, that the processes and procedures adopted by TNPA in issuing this RFP and the requirements requested from Bidders in responding to this RFP have been conducted in a fair and transparent manner; and

   1.5. furthermore, we declare that a relationship formed on the basis of any one or more of family (including spouses and in-laws), friendship, business acquaintance, professional engagement or employment exists or does not exist [delete as applicable] between an owner or member or director or partner or shareholder of our entity and an employee or board member of TNPA including any person who may be involved in the evaluation and or adjudication of this Bid.

In addition, we declare that an owner or member or director or partner or shareholder of our entity is or is not [delete as applicable] an employee or board member of TNPA.

If such a relationship exists, the Bidder is to complete the following section:

FULL NAME OF OWNER/MEMBER/DIRECTOR/PARTNER/SHAREHOLDER:

_____

ADDRESS:

_____

Indicate nature of relationship with TNPA:

_____

DATE:

_____

SIGNATURE:

_____

[Failure to furnish complete and accurate information in this regard will lead to the disqualification of a response and may preclude a Bidder from doing future business with TNPA]

We declare, to the extent that we are aware or become aware of any relationship between ourselves and TNPA (other than any existing and appropriate business relationship with TNPA) which could unfairly advantage our entity in the forthcoming adjudication process, we shall notify TNPA immediately in writing of such circumstances.

We accept that any dispute pertaining to this Bid Response will be resolved through the Ombudsman process and will be subject to the Terms of Reference of the Ombudsman. The Ombudsman process must first be exhausted before judicial review of a decision is sought.

We further accept that TNPA reserves the right to reverse an award of business or decision based on the recommendations of the Ombudsman without having to follow a formal court process to have such award or decision set aside.

SIGNED at _____ on this _____ day of _____ 20___

For and on behalf of AS WITNESS:

_____

duly authorised hereto

Name:_____ Name:_____

Position:_____ Position:_____

Signature:_____ Signature:_____

Date:_____

Place:_____

Annex K - Resolution of Board of Directors

(TO BE COMPLETED BY LEAD MEMBER OF A BIDDER CONSORTIUM, OR BY THE PROJECT COMPANY IF ESTABLISHED AT BID SUBMISSION DATE)

[Name of Entity] (Registration Number: **[insert]**)

(the "**Company**")

RESOLUTION OF THE BOARD OF DIRECTORS OF THE COMPANY PASSED AT A MEETING HELD ON [●],

---

RESOLVED THAT:

1. The Company participates as the Bidder **[*OR, in the case of a Bidder consortium*]**, in the **[insert name of Bidder]** consortium ("**Bidder**") in responding to the RFP issued by TNPA on or about ***[insert date]*** under Tender Reference number [■], in respect of the 25 (twenty-five) year concession for the design, development, financing, Construction, Operation and Maintenance of the new Multipurpose Terminal at the Port of Port Elizabeth,

2. ***[Note: This paragraph is for Bidders that are consortia]***the Company, by agreement with the other Members, be the Lead Member of the Bidder consortium (the "**Lead Member**"); and

3. ***[Note: This paragraph is for all Bidders]*****[insert name of authorised individual in the Company]** be and hereby is authorised to authorised to enter into, sign, execute and complete any documents relating to this Bid Response and any subsequent agreement for the provision of services.

Signed by the Directors

_____

Name: _____

Date: _____

Annex L - Resolution of each Member

(OTHER THAN THE LEAD MEMBER) OF A BIDDER CONSORTIUM OR EACH SHAREHOLDER OF A BIDDER PROJECT COMPANY

[Name of Entity] (Registration number: **[insert]**)

(the "**Company**")

RESOLUTION OF THE BOARD OF DIRECTORS OF THE COMPANY PASSED AT A MEETING HELD ON [INSERT DATE]

RESOLVED THAT:

1. the Company participates as the Bidder **[*OR, in the case of a Bidder consortium***, in the **[insert name of Bidder]** consortium ("**Bidder**") in responding to the RFP issued by TNPA on or about ***[insert date]*** under Tender Reference number [■], in respect of the for 25 (twenty-five) year concession for the design, development, financing, Construction, Operation and Maintenance of the new Multipurpose Terminal at the Port of Port Elizabeth.

2. ***[Note: This paragraph is for Bidders that are consortia]***the Company, by agreement with the other Members, be the Lead Member of the Bidder consortium (the "Lead Member"); and

3. ***[Note: This paragraph is for all Bidders]*****[insert name of authorised individual(s) in the Company]** be and hereby is authorised to authorised to enter into, sign, execute and complete any documents relating to this Bid Response and any subsequent agreement for the provision of services.

Signed by the Directors

_____

Name: _____

Date: _____

Annexure N- Essential Returnable Documents

ESSENTIAL RETURNABLE DOCUMENTS & SCHEDULES	RFP REFERENCE	SUBMITTED [Yes or No]
Information of the Bidder	Clause 75.2.4.	
Evaluation Criteria Stage 1	Clause 76.3	
Bidders Experience & Track Record	Clause 76.4.	
Bidders SHE & Risk Information	Clause 76.5	
Bidders Financial Capacity	Clause 76.6	
Evaluation Criteria Stage 2	Clause 77.	
Concession Fee Offer	Clause 77.7.	
B BBEE Contributor Level	Clause 77.8.	
Objective Criteria	Clause 78	
Development Phase Value Summary	Clause 78.2.3.2	
Operational Phase Value Summary	Clause 78.2.3.3.	

Annexure O – Mandatory Returnable Documents

MANDATORY RETURNABLE DOCUMENTS	RFP REFERENCE 75.2.3.	SUBMITTED [Yes or No]
A Valid B-BBEE Verification Certificate	Clause 75.2.3.1.	
A mark-up version of the Terminal Operator Agreement	Clause 75.2.3.3.	
Business Case	Clause 75.2.3.4.	
Preliminary Designs & Bill of Quantities	Clause 75.2.3.4	

ANNEXURE P

TRANSNET

SAFETY, HEALTH, ENVIRONMENTAL AND QUALITY (SHEQ)

RISK MANAGEMENT POLICY STATEMENT

Commitment

Transnet SOC Ltd ("Transnet") as the custodian of rail, ports and pipeline businesses, while committed to enable the competitiveness, growth and development of the South African economy, will integrate SHEQ Risk Management to its core business activities and, as part of such integration undertakes to:

- Comply, as a minimum, with all applicable Safety, Health, Environmental and Quality legislation, regulations, standards as well as international Protocols and Codes ratified by the Republic of South Africa;
- Provide and maintain appropriate resources to identify and manage SHEQ risks or impacts and support the development and implementation of relevant management systems that the company subscribes to, such as ISO 14001, ISO 9001, NOSA CMB253 and ISO / OHSAS 18001;
- Manage and mitigate SHEQ risks inherent to Transnet to minimise adverse impact to the quality of service, quality of products, health and safety of employees and the general public as well as the natural environment;
- Promote a SHEQ Risk Management culture;
- Communicate transparently to promote dialogue with the relevant stakeholders and integrate SHEQ Risk Management performance in its triple bottom line reporting process in accordance with global sustainability principles;
- Promote wise and efficient utilization of natural resources and respond to climate change;
- Provide necessary support and information, including this Policy, to relevant stakeholders to SHEQ Risk Management objectives throughout the value chain;
- Consistently render services that meet the quality requirements and expectations of our customers;
- Proactively manage natural resources by reducing emissions and discharges as well as implementing waste reduction strategies;
- Make all employees, including contractors, aware of this Policy and ensure that they accept their duty and responsibility to take appropriate care for their own health and safety and also that of fellow employees and any other person who may be affected by their actions at work;
- Monitor and audit SHEQ Risk Management systems and take corrective and preventative action to ensure effectiveness, efficiency and continuous improvement throughout Transnet;
- Ensure contingency plans, service recovery plans, pollution prevention plans and emergency response measures are in place and communicated to all employees and stakeholders; and
- Review this policy every two years or as circumstances dictate to ensure effectiveness, relevance and continual improvement of SHEQ performance.

Accountability and Responsibility

Transnet recognises its ultimate accountability and responsibility for SHEQ Risk Management in its capacity as the employer and that all the employees of Transnet, including contractors, have a role to play in delivering on the commitments set out in this Policy.

Signed: .....

Siyabonga Gama
Acting Group Chief Executive

Date: 2015·05·28

HARBOUR MASTER'S WRITTEN INSTRUCTIONS, 2007

Issued in terms of the National Ports Act No. 12 of 2005, Section (74)(3)

HARBOUR MASTER'S WRITTEN INSTRUCTIONS FOR THE HANDLING OF BULK FLAMMABLE LIQUIDS

These written instructions are issued by the Harbour Master in terms of rule 110(1)(a) of the Port Rules, which are issued in terms of section 80(2) of the National Ports Act, and section 74(3) of that Act.

1. Purpose of these instructions

The purpose of these written instructions is to ensure safety, security, efficiency, good order and the protection of the environment.

2. Application of these instructions

In addition to the Port Rules, these written instructions apply at a port to *tanker*s that are conveying, discharging or shipping *flammable liquids* in bulk or during bunkering operations.

3. Interpretation

(1) In these instructions, unless the context indicates otherwise —

(a) "***cargo deck***" means the deck of the *tanker* on which openings to oil are situated;

(b) "***certified chemist***" means a person who holds a B. Sc degree in chemistry or a recognised equivalent certificate, or who has successfully completed a specialised course in Chemical Tanker or Oil Tanker Safety Training Program in accordance with the South African Code of Maritime Qualifications published by *SAMSA*, and who has at least two years laboratory experience and specialised training in the testing of atmospheres in vessels;

(c) "***flammable liquids***" means a liquid, or mixture of liquids, or liquids containing solids in solution or suspension (except substances otherwise classified on account of their dangerous characteristics), which give off a flammable vapour at or below 61 degrees Celsius closed-cup test (corresponding to 65.6 degrees Celsius open-cup test), normally referred to as the "flashpoint". This includes liquids offered for transport at temperatures at or above their flashpoint, and, substances transported or offered for transport at elevated temperatures in a liquid state, which give off a flammable vapour at temperatures equal to or below the maximum transport temperature;

(d) "***flammable liquid in bulk***" means any flammable liquid conveyed otherwise than in containers;

(e) "***flash point***" means the lowest temperature at which the application of a flame causes the vapour above a liquid to ignite when the product is heated under prescribed conditions, in a closed container;

(f) *"**gas free**"* means that the tank, compartment or container has sufficient fresh air introduced into it in order to lower the level of any flammable, toxic or inert gas to that required for any purpose;

(g) *"**industry guidelines**"* means the industry reference works referred to in rule 41(1), as amended from time to time.

(h) "***Prohibited area***" means any area declared as a *prohibited area* by the Authority and includes the entire water surface within 30 metres of the *tanker*;

(i) "***tank***" means any hold, tank, compartment, pipeline (whether ashore or afloat), or any enclosed place, which contains or has contained any *flammable liquid in bulk*, or any sludge, deposit or residue from the flammable liquid or bulk;

(j) "***Tanker***" means a vessel designed to carry liquid cargo in bulk, including a combination carrier being used for this purpose.

(k) "***Vapour pressure***" means the absolute pressure of a liquid exerted by the gas produced by evaporation from the liquid when gas and liquid are in equilibrium at the prevailing temperature and the gas or liquid ratio is effectively zero.

4. *Industry guidelines*

(1) All persons involved in the handling of bulk flammable liquids must comply with the standards, procedures, practices and requirements set out in the *industry guidelines*, as amended from time to time, including:

(a) The International Safety Guide for Oil Tankers and Terminals (presently in its fifth edition);

(b) Marine Terminals Baseline Criteria and Assessment Questionnaire;

(c) Liquified Gas Handling Principles on Ships and in Terminals;

(d) Ship/Shore Interface Safe Working Practice for LPG and Liquified Chemical Gas Cargoes;

(e) Guidelines for the Handling, Storage, Inspection and testing of Hoses in the Field;

(f) Chemical carriers entered into the CDI Scheme.

(2) The Harbour Master may permit a vessel to follow a procedure or practice other than those required by the *industry guidelines* or these written instructions, if he or she is satisfied that the other procedure or practice is as safe as that required by the *industry guideline* or these written instructions and it is in the interests of security, good order, protection of the environment and the effective and efficient working of the port.

(3) Contravention of a procedure or practice substituted pursuant to sub-rule (2) is deemed to constitute a contravention of the practice or procedure required by the *industry guidelines* or these written instructions.

5. Safety measures on berthing

(4) The terminal operator in a port must on berthing cause a telephone and a VHF radio communication link to be established with port control.

(5) A *tanker* must not lie within 30 meters of any other vessel except by express direction of the Harbour Master, but in case of transshipment this sub-rule may be departed from on the written authority of the Harbour Master.

6. *Tanker* moorings

(1) All *tanker* moorings must be capable of being readily cut or slipped from both the *tanker* and the shore in case there is an emergency.

(2) Wire towing pendants must be rigged at all times while the *tanker* is in a port.

(3) Wire towing pendants must be made fast to bitts and ranged out through bow and stern on a *tanker*'s offshore side so that it is convenient to tugs.

(4) If insulation is required between the *tanker* and pipelines, all moorings must be insulated with fibre tails for a distance of at least two metres. The fibre tails must be at least 25% stronger than the wire ropes to which they are attached.

7. Safety measures after berthing

(1) The main engines, steering engine, or deck machinery of a *tanker* may not be immobilised, except with the permission of the Harbour Master.

(2) A *tanker* must be sufficiently manned for the purposes of dealing with any situation that may detrimentally affect the safety, security, good order and the protection of the environment.

(3) The terminal operator must ensure that fire-fighting personnel are in attendance at all times when a *tanker* is berthed in the port and is —

(a) loaded with flammable liquid having a flashpoint of less than 61 degrees Celsius; and

(b) in ballast, but is not gas-free.

(4) The Harbour Master may order the removal of a *tanker* that has *flammable liquids* on board from the berth at which it is lying, if the Harbour Master is of the opinion that this is in the interests of safety.

8. Hoses

(1) The hoses that are used must be sufficiently flexible to allow for any movement of the *tanker* whilst moored.

(2) All connections must be properly and tightly made, with oil-tight gaskets and every bolthole in the flange being securely fastened.

(3) In the event of any section of flexible hose showing signs of bulging or of percolation, the section in question must be replaced immediately.

(4) The flexible hose must be supported and raised above the deck wharf level.

(5) Drip pans must be placed under each joint where practicable and the flexible hose and drip pans must be kept under constant supervision at all times while pumping is in progress.

9. Safety measures during handling of cargo

(1) No loading or discharge of *flammable liquids* after sunset may take place unless deck lighting is provided to the satisfaction of the Harbour Master.

(2) Before any cargo handling operations commence, the master must —

(a) ensure that all scuppers are plugged effectively; and

(b) all sea valves and overboard discharges in the pump rooms and cofferdams are securely closed and remain closed and lashed during discharging or shipping operations.

(3) A *tanker*'s manifold valves and shore pipeline valves must be kept closed until –

(a) a hose connection has been made;

(b) the vessel's cargo valves have been set and outlet valves checked; and

(c) safety precautions have been complied with.

(4) As soon as pumping has commenced and when full pressure has been reached, the *tanker*'s officer on duty and the terminal operator must ensure that no oil or ballast is discharged into sea or onto the quayside.

(5) In order to minimize the risk of spills, the pressure during pumping must be increased gradually and all flexible pipe joints must be carefully examined during this period.

(6) The terminal operator must secure the *tank* immediately after all *flammable liquids* have been removed from that *tank*.

(7) The lid of any tank may only be opened after it has been established that the *tank* is *gas-free*.

10. Conditions when pumping or ballasting may be stopped

(1) The Harbour Master may order that pumping of *flammable liquids* or ballasting be stopped if —

(a) There is spillage of flammable liquid beyond a minor drip leakage;

(b) Anything occurs that necessitates repair to the plant, pipes, pumps or connections;

(c) If there is a failure of lighting either on the *cargo deck* or on the wharf;

(d) An electric storm is approaching and during that storm;

(e) If there is any undue concentration of vapor being detected in the accommodation, engine room or pump room; or

(f) Anything occurs or any condition is observed, which in the opinion of the Harbour Master, may not be conducive to the safe working of the *tanker* or may endanger the *tanker*, wharf or be threat to safety, security or protection of the environment.

(2) If the Harbour Master orders that pumping be stopped, then pumping may only be resumed with the Harbour Master's permission and in accordance with the Harbour Master's safety precautions and directives.

11. Safety measures for the handling of stores and equipment

(1) The handling of the stores and equipment of a *tanker* must be completed before any *tank* on the *tanker* is opened for any purpose whatsoever.

(2) Stores for consumption on the voyage may be loaded during cargo handling operations only if they carried on board by hand or are placed aboard on the after-deck away from the discharge and the loading manifolds.

12. Repairs

(1) A *tanker* that is conveying or has conveyed *flammable liquids* may not enter a repair quay unless it is certified *gas free* by a *certified chemist*.

(2) A *tanker* that is conveying or has conveyed *flammable liquids* may not carry out any repairs while it is in a port, unless –

(a) a gas-free certificate for the vessel has been issued or all the tanks are inert;

(b) the Harbour Master has permitted the repairs; and

(c) the vessel abides by the Harbour Master's conditions that are determined in the interests of maintaining safety, security, good order and the protection of the environment.

(3) The Harbour Master may direct that —

(a) a fresh gas-free certificate issued by a *certified chemist* be obtained daily before work is commenced or at any time if, in the opinion of the Harbour Master, this is in the interests of safety;

(b) work be suspended until a further gas-free certificate is obtained, if, during the course of the work, the Harbour Master is of the opinion that there is any risk of flammable vapour or a threat to safety.

(4) The Harbour Master may permit minor repairs to be carried out on board a *tanker*, but may specify conditions for that work in the interests of safety, security, good order and the protection of the environment, including the following:

(a) a gas-free certificate must be obtained daily in respect of the tank, compartment or hold where the minor repairs are to be carried out and for each adjourning tank, compartment or hold.

(b) a sign must be prominently displayed on each tank hatch on the *cargo deck* indicating the condition of that tank, namely "danger" or "gas-free", as the case may be.

(c) similar signs must be displayed at the entrance to any hold or compartment affected.

(d) "Danger" signs must have white letters on a red background.

(e) "Gas-free" signs must have black letters on a white background.

(f) any electrical equipment required to carry out repairs may be examined and approved by the Harbour Master, if the Harbour Master so directs.

(5) Despite the provisions of this rule, repairs, other than minor routine maintenance, may be carried out in the engine room of a *tanker* if the Harbour Master has approved the repairs.

(6) If a *tanker* is not gas-free, the Harbour Master may permit immobilisation at a berth outside the security area designated by the Harbour Master, but;

(a) only before breaking cargo or after completion of discharging or ballasting; and

(b) when all openings, except the gas-line vent, are closed.

(7) Until a *tank*, compartment or hold has been certified gas-free, no person may —

(a) take into or within close proximity of the *tank*, compartment or hold anything that could cause ignition; or

(b) enter the *tank*, compartment or hold, unless the person is —

(i) provided with a suitable self-contained breathing apparatus consisting of a helmet or face-piece that has the necessary connections for the person to breath outside air;

(ii) wearing a safety belt connected to a lifeline that is tended by two persons; and

(iii) kept in sight at all times by one of the attending persons.

(8) No portable electronic device or any device that is capable of emitting or causing a spark that has not been certified intrinsically safe by a recognized testing authority may be used in any *prohibited area*.

(9) No person may enter, remain in or leave a *prohibited area* at a *tanker* berth without a permit issued by the Harbour Master.

(10) When cargo is being handled or ballast taken on board, all *cargo deck* doors and ports as well as all upper deck doors facing the *cargo deck* must be kept closed. These doors may only be opened for the purpose of entry and exit where this is essential to the working of the *tanker*.