DRAFT SCOPING REPORT

PROPOSED RICHARDS BAY PORT EXPANSION PROGRAMME WITHIN UMHLATHUZE LOCAL MUNICIPALITY IN KWA-ZULU NATAL PROVINCE

DEA REF NO: 14/12/16/3/3/3/103

INFRASTRUCTURE & ENGINEERING DIRECTORATE

MARCH 2014

TRANSNET

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MARCH 2014

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TITLE	***:***	***DRAFT SCOPING REPORT: PROPOSED RICHARDS BAY PORT EXPANSION PROGRAMME WITHIN UMHLATHUZE LOCAL MUNICIPALITY IN KWA-ZULU NATAL PROVINCE***
Project Team	***:***	*AECOM SA(Pty) Ltd*
Client	***:***	*Transnet SOC Limited (Transnet Capital Projects)*
AECOM Project No	***:***	*14C00389*
Status of Report	***:***	*Draft*
AECOM Report No	***:***	*14C00389/01*
Key Words	***:***	*Richards Bay, Port, Expansion Programme, Environmental Impact Assessment, EIA, Transnet, uMhlathuze Local Municipality, Kwa-Zulu Natal Province*
Date of this Issue	***:***	*25 March 2014*

For AECOM SA (Pty) Ltd

Compiled by	:	D. Naicker		
		Initials & Surname	Signature	Date
Reviewed & Approved by	:	P Teurlings		
		Initials & Surname	Signature	Date

EXECUTIVE SUMMARY

BACKGROUND TO THE PROJECT

The Transnet Port Terminals in Richards Bay are a target for major demand growth in bulk products up to 2040. The demand forecast for a rail, road and harbour bound conveyor linked industry, is expected to grow from 23 million tonnes per annum (mpta) in 2012 to over 59 mtpa by year 2040; with the bulk of demand expected to be realised in the next 10 years. It is therefore evident that Transnet needs to expand the Port and recapitalise facilities in the Port of Richards Bay to cater for the increase in general freight demand.

This EIA is done in terms of Government Notice Regulation (GNR) No. 543, 544, 545 and 546 of 2010 published in terms of the National Environmental Management Act, 1998 (Act No. 107 of 1998) as amended (NEMA) and the No 921 of 2013 in terms of the National Environmental Management: Waste Act, 2008 (Act No. 59 of 2008).

AECOM SA (Pty) Ltd was appointed by Transnet SOC Limited (Transnet Capital Project) in November 2013 as the environmental consultant to undertake the processes for the proposed Richards Bay Port Expansion Programme. Peter Teurlings of AECOM is the independent Environmental Assessment Practitioner (EAP) in terms of the Environmental Impact Assessment (EIA) Regulations of 2010.

The competent environmental authority is the Department of Environmental Affairs (DEA) and the KwaZulu-Natal Department of Agriculture and Environmental Affairs (KZN -DAEA) is the commenting authority. The application for environmental authorisation was submitted to the DEA on 12 December 2013. The DEA reference number for the environmental authorisation (received on the 20 December 2013) is 14/12/16/3/3/3/103.

OVERVIEW OF PROPOSED PROJECT

During the Pre-feasibility Phase of the Port Expansion study, a Multi-Criteria Evaluation (or alternatives analysis) was conducted where Option 3A was identified as the preferred option for the Expansion of the Port of Richards Bay for continuation into the Feasibility Phase, i.e. this application for an environmental authorisation and the detailed engineering design phase.

The proposed Expansion Programme of the Port of Richards Bay thus entails the following:

- *Extension of the existing railway lines with a rail balloon with split off for Ferro-Manganese, a short train arrival yard and a long train arrival yard;*
- *Construction of new railway siding to the 600 series berths;*
- *Construction of 2 new Tipplers (i.e. rail unloading equipment);*
- *Relocation of the break-bulk from the eastern side of the Port behind the high 700 series berths to the western side of the Port next to the 600 series berths;*
- *Construction of a new discard coal stockpile on the eastern side of the Port behind the high 700 series berths;*
- *Expansion of the magnetite facility to the south;*

- *Extension of the existing Ferro Manganese slab by 260m to the east;*
- *Construction of a new Ferro Manganese slab of 780m in length to the south of the existing Ferro Manganese slab;*
- *Upgrading or realignment of existing roads within the Port;*
- *Construction of a new road-over-rail bridge at the eastern entrance to the Port;*
- *Construction of 32 conveyors totalling 13,084m;*
- *Construction of a new 142,030m² container handling terminal;*
- *Construction of 2 new Panamax shipping berths at the 600 series berths, with associated dredging of a channel to a depth of 14m and 800m turning circle;*
- *Extension of the Finger Jetty (800 series berths) with 2 new Capesize Coal shipping berths, requiring significant dredging around the existing Finger Jetty;*
- *Construction of a new 610,000m³ stormwater surge dam inside the rail balloon, water pump stations, and upgrading of drains throughout the Port;*
- *Development of a Waste Transfer Station inside the Port, which will serve as the 'nerve centre' for managing waste in the Port; and*
- *Construction of a facility to discharge dredged material from the proposed construction of the berths; or*
- *Disposal of the dredged material off-shore.*

The proposed development is located within the Port of Richards Bay and is located on Portions 45, 21 and 157 of Erf 5333 and Lot 223 of the Farm Umhlatuzi, in the uMhlathuze Local Municipality.

PROJECT ALTERNATIVES

The project alternatives include the 'Do-Nothing' approach, the Multi-Criteria Evaluation, layout alternatives and sustainability alternatives.

ENVIRONMENTAL ISSUES AND POTENTIAL IMPACTS

Initial impacts have been identified during the undertaking of the baseline studies conducted between November 2012 and July 2013 by BKS (now AECOM). The baseline studies that have been conducted and which will be used as the basis for the Scoping Phase in the EIA process are summarised below:

- ***Ambient Noise Quality Baseline Study by M2ENCO Noise and Acoustics Consultants:***
    - *The ambient noise contour of 52dBA has been set at the Waterways Estate and the Mzingazi Waterfront Village.*
- ***Air Quality Baseline Study by Kijani Green:***
    - *An Air Emissions Licence (AEL) has been issued to TPT for the Port Expansion study area, which will need to be amended for the proposed expansions to the Port (i.e. the switching of the dry bulk and the coal bulk terminals).*
- ***Heritage resources (including palaeontological) baseline study by eThembeni Cultural Heritage:***
    - *Except for the likely presence of paleontological sites in the Bay, no structures older than 60 years are present in the study area as the port was only developed in 1973.*

- *A paleontological study is thus required for the Port expansion.*

- ***Dredge Disposal Site Baseline Study by BKS:***
  - *Currently, dredged material is being filtered into sand and silt. Sand is being deposited on the beaches of Richards Bay, and silt is disposed of at an offshore disposal site for which an annual permit is required from the DEA.*
  - *Offshore disposal is expensive and an investigation by the CSIR (2004) has indicated that 7 sites are available for on-shore disposal of silt, although the baseline study identified only 3 practical options which are situated at some distance from the port operations.*

- ***Metal Contamination of Sediment and Implications for Dredging Study by the CSR Group of the CSIR:***
  - *The DEA may prohibit unconfined open water disposal of sediment dredged from small areas of Inner Basins 2 and 3, where copper and/or chromium concentrations in the sediment exceeded the Level II of the SA Sediment Quality Guidelines (DEA, Water Research Commission – WRC), and could be required for on-shore disposal.*
  - *No metal concentrations in sediment from the Richards Bay Coal Terminal Basin and Kabeljou Flats exceeded the Sediment Quality Guidelines.*
  - *The sources of contaminant metals to Richards Bay must be identified, reduced and controlled.*
  - *Some parts of the study area are metal contaminated, most notably by copper, chromium and zinc.*

- ***Turbidity and Total Suspended Solids Study by the CSR Group of the CSIR:***
  - *Most of turbidity and TSS concentration data for Richards Bay is for the Kabeljou Flats area, but conditions in this area are atypical of the rest of the Bay. Hence, too little data is available to define turbidity and TSS baselines for all areas of Richards Bay – only 4 are available while 25 are required.* ***More monitoring is currently being undertaken by the CSIR to determine the baseline over a 6 month period covering mid-winter to mid-summer.***
  - *Compliance monitoring has been done on the Kabeljou Flats by the RBCT (2004-2008) only and does not include the Port Expansion area.*
  - *Data from the RBCT will be used (in a predictive model) to determine impact of dredging on suspended sediment and bay ecology for the Port Expansion programme.*
  - *A dredging compliance monitoring plan (including ecological sensitive areas) must be formulated as soon as practically possible, which could have project implications if the DEA attach onerous conditions for each non-compliance.*
  - *Modelling for simulated dredging conditions is required to set compliance monitoring points and assist the EIA process.*

- ***Traffic Baseline Study by AECOM:***
  - *Good internal and external road networks are available in and around the Port. Two main entrances exist to the Port of Richards Bay.*

- *Sufficient parking is available for light vehicles, but there is a lack of parking for the 3900+ heavy vehicles that visit the port monthly. A Truck Staging Area is currently being constructed by Transnet which will alleviate the situation.*
- *Limited traffic counts are available which do not provide an indication of the current traffic volumes and patterns.*
- *Rehabilitation of existing roads is required.*

- ***Implications of a Basic Water Quality Survey by the CS Research Group of the CSIR:***
  - *Inner Basin 3:*
    - *no mixing of water, dead-end basin, nutrient loading from anthropogenic source, increase in micro-algae, high pH.*
    - *result could be eutrophic conditions with impact on bottom water and sediment organisms which will have an ecological impact.*
    - *infrastructure design should consider achieving maximum possible water exchange between dead-end basins and the bay.*
  - *Bhizolo Canal:*
    - *low pH, low salinity, and previous recorded higher concentrations of fluoride, ortho-phosphate, chlorophyll-a, turbidity, total suspended solids.*
    - *connection of Bhizolo to dead-end basin could lead to eutrophic conditions.*
  - *Stormwater design to consider settlement ponds as stormwater discharge could impact on ecology and dredging.*

- ***Marine and Terrestrial Ecological Baseline Study by Marine and Estuarine Research:***
  - *Proposed port expansion lies within the delineated estuarine boundary or immediately adjacent to it. Some of these areas are already irreversibly transformed but unique and important habitats remain, i.e.*
    - *The estuary is classified as an "estuarine bay", a rare estuary type in KZN.*
    - *The intertidal mangrove habitat within the estuary is a protected forest habitat type in terms of the National Forests Act (NFA).*
    - *Open intertidal mud and sandbanks exist that are highly productive and considered extremely critical habitat for a variety of invertebrate and fish populations.*
    - *Impact to or loss of wetlands.*
    - *Small pockets of both dune and swamp forest which are protected in terms of the NFA.*
    - *Interference with a dynamic coastal zone cordon in the South Dunes area.*
  - *The Mangroves and Swamp Forest should not be considered for development, and be incorporated into future design and planning around the Port Expansion.*
  - *Intertidal Areas require further detailed investigation of physical and biological composition to inform more detailed planning phase of the Port Expansion.*

- *Biodiversity targets and ecological goods and services need to be integrated into the Port Expansion planning and implementation.*
- *Ecological consequences of changes in turbidity, suspended solids and sediment contamination from dredging, piling and infilling require detailed investigation.*
- *The 500 series berth site is highly transformed and polluted. However, the sandspit should be conserved.*
- *The South Dunes be included in detail in future Port planning.*
- *Mangroves in the rail loop area of the Port Expansion need to be investigated.*

These impacts, together with concerns identified during the official registration process of Interested and Affected Parties (I&APs), have been summarised during the Scoping Phase for further investigation during the EIA Phase of the project, with appropriate mitigation measures included in the Environmental Management Programme. These impacts are summarised in ***Table 1****.*

Table 1: Potential Identified Impacts

Potential Identified Impacts	
Socio-Economic Impacts	*Social impacts*
	Impact on Traffic
	Impact on Heritage Resources
	Impact on the Noise Levels
	Impact on the Air Quality
	Impact on the Visual Integrity
Bio-Physical Impacts	*Marine and Land-Based Ecological and Biodiversity Impacts*
	Impact on Water Resources
	Impact on Soils and Erosion
	Impact on the Sediment Quality
	Estuarine Turbidity Impacts
	Dredge Disposal Impacts
	Topographical Impacts
	Climatological Impacts

A number of potentially significant issues have been highlighted for further investigation in order to assess their significance, and to determine the need for the implementation of mitigation measures in order for the overall project to be environmentally sustainable. It is, therefore, recommended that additional, more comprehensive studies be conducted for the proposed project in the EIA Phase, as described in the Plan of Study for EIA.

ENVIRONMENTAL IMPACT STUDIES

Environmental impact studies are required to address the potential impacts associated with the proposed project, and to provide an assessment of the project in terms of the biophysical, social and economic environments. It is this assessment, which aids both the competent environmental

authority (in this case the DEA) and the applicant (i.e. Transnet) in making decisions regarding the future of the project.

An important phase of an EIA is Scoping. This is the phase during which issues and concerns are identified in order to focus the specialist studies and to provide a framework within which the assessment is to be undertaken.

PUBLIC PARTICIPATION

In keeping with environmental legislation, it is the responsibility of the Environmental Assessment Practitioner (EAP) to ensure that the public is provided the opportunity to participate meaningfully in the environmental investigation process. This includes registration, noting of concerns, identification of issues, and review of reports. Accordingly, I&APs will be invited to review the Draft Scoping Report - from the 25 March 2014 – 6 May 2014 at the Transnet offices in the Port and the Richards Bay Public Library that is situated at Kruger Rand Grove in Richards Bay (CBD). The public will also have the opportunity to review the Draft EIA Report, Specialist Studies and Draft Environmental Management Programme (EMPr) during the next phase of the EIA process.

The comments received during the review period will be incorporated into the Final Scoping Report, for submission to the DEA for consideration.

THE WAY FORWARD

Once the Draft Scoping Report and Plan of Study for EIA have been submitted to the DEA and reviewed by the public and stakeholders over a period of 40 days, the Final Scoping Report and the Plan of Study for EIA (including all comments from the stakeholders and public from the review period) will be compiled and submitted to the DEA for acceptance.

Detailed specialist investigations will then be undertaken during the second phase of the EIA (once the Final Scoping Report has been accepted by the DEA). Subsequently, the EIA Report will be compiled providing feedback on this second phase of the EIA process to address the following:

a) *A description of the project, together with a motivation for the project and details of potential alternatives that were identified, including advantages and disadvantages of the alternatives.*

b) *A description of the general environment (socio-economic, biophysical, ecological, etc.).*

c) *Impacts and issues identified.*

d) *An assessment of the significance of the identified impacts according to standard assessment criteria (nature, extent, duration, intensity, probability and significance), including cumulative impacts. These impacts will be assessed (i) with, and, (ii) without taking cognisance of the recommended mitigation measures.*

e) *Recommended mitigation measures.*

f) The Public Participation Process, draft site-specific EMPr and required Specialist Studies will be collated as a suite of appendices.

RECOMMENDATIONS

AECOM recommends that the Scoping Report be approved by the DEA, and that permission be granted to continue with the EIA Phase of the process as described in the Plan of Study for EIA.

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Appendix A9 Baseline Assessment for the Port of Richards Bay Expansion Programme – Selected Aquatic and Terrestrial Habitats

LIST OF ACRONYMS AND ABBREVIATIONS

Acronym / Abbreviation	Explanation
AMAFA	Amafa aKwaZulu iNatali (Heritage KZN)
amsl	above mean sea level
BID	Background Information Document
CBA	Critical Biodiversity Area
CSIR	Council for Scientific and Industrial Research
CSR	Coastal Systems Research group of the CSIR
DAFF	Department of Agriculture, Forestry and Fisheries
DEA	Department of Environmental Affairs
DBT	Dry Bulk Terminal
dia	diameter
DWA	Department of Water Affairs
EAP	Environmental Assessment Practitioner
EIA	Environmental Impact Assessment
EMF	Environmental Management Framework
EMPr	Environmental Management Programme (i.t.o. NEMA)
EPA	Environmental Protection Agency
FEL	Front End Loading phases
HIA	Heritage Impact Assessment
GFB	General Freight Bulk
GNR	Government Notice Regulation
I&AP(s)	Interested and Affected Party (-ies)
IDP	Integrated Development Plan
IRR	Issues and Response Report
IDZ	Industrial Development Zone
ISO	International Organisation of Standardisation

Acronym / Abbreviation	Explanation
km	kilometre(s)
KZN DAEA	KwaZulu-Natal Department of Agriculture and Environmental Affairs
m	metre(s)
MAP	Mean Annual Precipitation
mtpa	million tonnes per annum
MPT	Multi-Purpose Terminal
NECO	Nature and Environmental Conservation Ordinance
NEMA	National Environmental Management Act, 1998 (Act 107 of 1998)
NEM: AQA	National Environmental Management Act: Air Quality Act, 2004 (Act 39 of 2004)
NEM: BA	National Environmental Management: Biodiversity Act, 2004 (Act 10 of 2004)
NEM: ICMA	National Environmental Management: Integrated Coastal Management Act, 2008 (Act 24 of 2008
NEM: WA	National Environmental Management: Waste Act, 2008 (Act 59 of 2008)
NFA	National Forest Act, 1998 (Act 84 of 1998)
NHRA	National Heritage Resources Act, 1999 (Act 25 of 1999)
NWA	National Water Act, 1998 (Act 36 of 1998)
PIA	Paleontological Impact Assessment
PICC	Presidential Infrastructure Coordinating Commission
PPP	Public Participation Process
RBCT	Richards Bay Coal Terminal
SAHRA	South African Heritage Resource Agency
SANBI	South African National Botanical Institute
SANS	South African National Standards
SDF	Spatial Development Framework
SIPs	Strategic Integrated Projects
SOC	State Owned Company
Stats SA	Statistics South Africa
TCP	Transnet Capital Projects
TNPA	Transnet National Port Authority
TPT	Transnet Port Terminal
WRC	Water Research Commission

1. INTRODUCTION

1.1 PROJECT BACKGROUND

The Port of Richards Bay, South Africa's most northern and easterly port is situated 160 km northeast of Durban and 465 km (by road) southwest of Maputo, Mozambique. The Port of Richards Bay consists of the Transnet operated Dry Bulk Terminal (DBT) and Multipurpose Terminal (MPT), along with the privately operated Richards Bay Coal Terminal (RBCT). Other private operators within the port include several wood chip export terminals and a bulk liquid terminal.

The Port occupies 2,157 ha of land area and 1,495 ha of water area at present, but has the potential of expanding when required, making Richards Bay potentially one of the largest ports worldwide. Richards Bay serves the coalfields of KwaZulu-Natal and Mpumalanga, together with timber and granite exporters from as far away as the Eastern and Northern Cape. Exports remain the primary activity of the port. The port has extensive rail and conveyor belt systems servicing the berths from nearby factories and plants. A dedicated railway line connects the port with Mpumalanga and Gauteng, was designed specifically to handle the majority of South Africa's coal exports. Other rail links connect Richards Bay with Durban in the south and Swaziland and Mpumalanga to the north.

The Transnet Port Terminals in Richards Bay are a target for major demand growth in bulk products up to 2014. the demand forecast for rail, road and harbour bound conveyor linked industry, is expected to grow from 23 million tonnes per annum in 2012 to over 59 by year 2014; with the bulk of demand expected to be realized in the next 10 years.

It is therefore evident that Transnet needs to expand the Port and recapitalise facilities in the Port of Richards Bay to cater for the increase in general freight demand.

The Front-End Loading Phase 1 (FEL1) study (or Conceptual Phase) for the Richards Bay Port Expansion Programme was undertaken by Aurecon and completed during July 2012. The purpose of the FEL1 study was to conceptualise the commercially-viable immediate and long-term engineering options, as well as conduct an environmental fatal flaws analysis of all the options, for rail, material handling and marine to expand the Port of Richards Bay. This will enable the Port to handle the increase in demand of General Freight business up to the year 2040.

The project received a 'green' status from the Transnet Gate Review Panel to proceed to Front-End Loading Phase 2 (FEL2) study (or Pre-feasibility Phase). The FEL2 study commenced during October 2012. This FEL2 study is a further development and re-assessment of the options discussed in the FEL1 study for the bulk materials handling, rail

and marine disciplines. These main disciplines were supported by various other discipline investigations including Baseline Environmental Specialist Studies which were undertaken by BKS (now AECOM).

The baseline studies that have been conducted (and which will be used as the basis for the Scoping Phase in the EIA process) are listed below:

- Ambient Noise Quality Baseline Study by M^2ENCO Noise and Acoustics Consultants.
- Air Quality Baseline Study by Kijani Green.
- Heritage resources (including palaeontological) baseline study by eThembeni Cultural Heritage.
- Dredge Disposal Site Baseline Study by BKS.
- Metal Contamination of Sediment and Implications for Dredging Study by the Coastal Systems Research (CSR) Group of the CSIR.
- Turbidity and Total Suspended Solids Study by the CSR Group of the CSIR.
- Traffic Baseline Study by AECOM.
- Implications of a Basic Water Quality Survey by the CS Research Group of the CSIR.
- Marine and Terrestrial Ecological Baseline Study by Marine and Estuarine Research.

During the FEL2 Phase of the Port Expansion study, a Prioritisation FEL2 Multi-Criteria Evaluation (or alternatives analysis) was conducted where Option 3A was identified as the preferred option for the Expansion of the Port of Richards Bay for continuation into the Front-End Loading Phase 3 (FEL3) study (or Feasibility Phase), i.e. this application for an environmental authorisation and the detailed engineering design phase.

The proposed development is located within the Port of Richards Bay and is located on Portions 45, 21 and 157 of Erf 5333 and Lot 223 of the Farm Mhlatusi, in the Umhlatuze Local Municipality.

This EIA is done in terms of Government Notice Regulations (GNR) No. 543, 544 and 546 of 2010 published in terms of the National Environmental Management Act, 1998 (Act No.107 of 1998) as amended (NEMA) and the National Environmental Management: Waste Act, 2008 (Act No.59 of 2008) [NEM:WA] and Government Notice 921 of 2013.

1.2 APPLICANT

Details of the Applicant, Transnet State Owned Company (SOC) Limited, are presented in Table 1-1 below.

Table 1-1: Applicant Details

Applicant	Transnet SOC Limited (Transnet Capital Projects - TCP)
Applicant on behalf of Transnet	Ms Bessie S. Mabunda
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1.3 ENVIRONMENTAL AUTHORITY

The relevant environmental authority is the Department of Environmental Affairs (DEA) as the Approving Authority and KwaZulu-Natal Department of Agriculture and Environmental Affairs (KZN DAEA) as the Commenting Authority. The application for environmental authorisation was submitted to the DEA on 12 December 2013.

The DEA reference number for the environmental authorisation (received on the 20 December 2013) is 14/12/16/3/3/3/103 (refer to **Addendum A**).

1.4 ENVIRONMENTAL ASSESSMENT PRACTITIONER

1.4.1 Environmental Consultant Details

AECOM SA (Pty) Ltd was appointed by Transnet SOC Limited (Transnet Capital Projects) in November 2013 as the environmental consultant to undertake the EIA process for the proposed development. Peter Teurlings of AECOM is the independent Environmental Assessment Practitioner (EAP) in terms of the EIA Regulations of 2010. Details of the EAP are presented in **Table 1-2.**

Table 1-2: Environmental Consultant Details

Environmental Consultant	AECOM SA (Pty) Ltd
EAP	Mr Peter Teurlings
Contact Person	Ms Deshni Naicker
Postal Address	P O Box 56, Westville, 3630
Telephone	031 204 2834
Fax	031 204 3818
Email Address	deshni.naicker@aecom.com

1.4.2 Details of the Authors

As per the requirements of the NEMA, the details and expertise levels of the persons who prepared the report are provided in **Table 1-3.**

Table 1-3: Details of Authors

Project Manager	Deshni Naicker (Senior Environmental Scientist)
Responsibilities	Project management, compilation of reports and public participation
Highest Qualification	Masters in Environment and Development Studies (Geography)
Expertise to carry out preparation of Scoping Report	Deshni has 6 years of experience. She has undertaken a number of Environmental Impact Assessments (i.e. Basic Assessments; Scoping and EIA) under the EIA Regulations of 2006 and 2010 and has also been involved in environmental compliance monitoring and auditing (environmental control officer) on a number of construction projects. Her responsibilities have included undertaking environmental assessments, compilation of regulated EIAs (i.e. Scoping reports, EIA reports, Basic assessments and EMPs), incorporating specialists into the EIA team for any required specialist studies and undertaking the regulated public participation process required for EIAs, of which the following have specific reference: • Proposed Upgrading of Stormwater Infrastructure in Valencia, Addo of the Sundays River Valley Municipality. • Replacement of Existing Fence at the Saldanha Naval Base, National Department of Public Works, Saldanha. • Umhlanga Ridgeside Development, Tongaat Hulett, Durban. • Rethabiseng Extension 5 Phase 1 [Bronkhorstpruit], GDARD, Pretoria. • Danville (Elandspoort) Phase 1 [Pretoria West], GDARD, Pretoria West. • Vodacom Cell Phone Masts, Vodacom, Sandton. • Extension of the Existing Berth 10, Island View, Port of Durban.
Project Director	Peter Teurlings (Executive: Environmental Services)
Responsibilities	EAP, Quality review and approval of reports
Highest Qualification	MSc (Biogeography)
Professional membership	Professional Natural Scientist: Environmental Science (Registration No. 400027/95). International Association of Impact Assessments – South Africa (ID No 1398). Founding member of the Environmental Assessment Practitioners Association of South Africa (EAPASA). Member of the Environmental Law Association.
Expertise to carry out review / approval of Scoping Report	Peter has 26 years of experience and is a professional environmental scientist with a sound working knowledge of the environmental field, as well as in the engineering, town planning, socio-economic, and water chemistry fields. Author, co-author and/or presenter of over

	100 reports, presentations and manuals on EIAs, EMPrs, and environmental management and other related studies, including: • New Houhoek 400/132kV Main Transmission Substation, Loop-in and Loop-Out 400kV Transmission Power Lines to connect into the existing Bacchus-Palmiet 400kV Transmission Power Line, and connecting 132kV Distribution Power Line to the existing Houhoek 132kV Distribution Substation for Eskom Transmission SOC Limited. • A 400kV double-circuit Transmission Power Line from Firgrove to Mitchells Plain, a single circuit Transmission Power Line from the existing Philippi Substation to a proposed Mitchells Plain Substation, and for a new Mitchells Plain Substation for Eskom Transmission SOC Limited. • New Klinkerstene Landfill Site for Interwaste (Pty) Ltd. • A military facility for SANABO (Pty) Ltd on behalf of the Department of Defence. • Upgrading of Mamelodi and Pienaarspoort stations, upgrading of the railway line between Eerstefabrieke and Mamelodi stations and the development of a new station at Greenview for Khuthele Projects on behalf of PRASA. • A new landfill site in the Msukaligwa Regional Municipality for the Gert Sibande District Municipality in Mpumalanga. • A balancing dam in the Oranje-Riet rivers transfer scheme near Jacobsdal in the Free State for the DWA. • A proposed brewery and associated industrial activities on the remainder of Portion 8 of the Farm Witfontein 16 IR for Heineken Supply Co (Pty) Ltd on behalf of Heineken International. • A residential development (Kariega Sands) on Portion 2 of the Farm Grants Valley 396 in Kenton-on-Sea, in the Eastern Cape for Acme Capital. • EIA Review of Phase 2 of the Mooi-Mgeni Transfer Scheme (Spring Grove Dam and Appurtenant Works, i.e. pump station in the Mooi River, electrical substation, river flow gauging weirs, transfer pipeline, outfall works in the Mpofana River) (in terms of the ECA EIA Regulations) for the DWA. • The Cosmo City Township Development in northern Randburg for Basil Read/Cosmo City Development Company.

1.4.3 Project Team

Peter and Deshni are supported by other members of the project team as indicated in **Table 1-4**. Input from the Applicant and engineering consultants is important for the completeness of the EIA process and accuracy of project related information. Specialists will be added to the project team during the EIA phase.

Table 1-4: Project Team

Name	Role on the team	Company
Peter Teurlings	Project Director & EAP	AECOM
Deshni Naicker	Project Manager; Assistant EAP, Senior Environmental Scientist	AECOM
Dr David de Waal	Public Participation Manager	AECOM
Marti le Roux	Public Participation Officer	AECOM
Emmanuel Mmotong	Environmental Technician	AECOM
Mamokete Maimane	Environmental Scientist and Public Participation Officer	AECOM
Maryna Storie	GIS Analyst	AECOM
Martina Martin	GIS Technologist	AECOM
Elsje Greyling	Project Financial Officer	AECOM
Dr Brent Newman	Principal Scientist: Project Manager, Data analysis and reporting	CSIR
Roy van Ballegooyen	Principal Scientist: Data analysis and reporting	CSIR
Prof Anthony Forbes	Estuarine Ecological Specialist	Marine and Estuarine Research
Nicolette Forbes	Mangroves and Estuarine Management Specialist	Marine and Estuarine Research
Simon Gear	Air Quality Specialist	Kijani Green
Mornè de Jager	Noise Impact Specialist	M²ENCO Noise and Acoustics
Gerhard de Wet	Specialist Traffic Engineer	AECOM
Len van Schalkwyk	Heritage Specialist	eThembeni Cultural Heritage
Dr Maria Ovechkina	Paleontological Specialist	eThembeni Cultural Heritage
Gillian Niven	Enviro-Legal Practitioner	Warburton Gunn Attorneys
Khathutshelo Tshipala	Project Manager: TCP	Transnet
Yolandi Robbetze	Assistant Project Manager: TCP	Transnet
Nelson Mbatha	Transnet Ports Environmental Manager	Transnet
Biance Smith	Environmental Scientist	Transnet

1.5 PURPOSE OF STUDY

An EIA is a planning and decision-making tool. It identifies potential negative and positive impacts of a proposed project and recommends ways to enhance the positive impacts and minimise the negative ones. The EIA will address the impacts associated with the project, and provides an assessment of the project in terms of the biophysical, social and economic environments to assist both the environmental authority (i.e. the DEA) and the applicant (i.e.

Transnet SOC Limited (Transnet Capital Projects) in making decisions regarding implementation of the proposed project.

An EIA consists of three phases:

a) the Scoping Phase;

b) the EIA Phase; and

c) the Decision-Making Phase.

The EIA is currently in the Scoping Phase, and its main purpose is to identify and define the issues that need to be addressed in the EIA Phase. In this regard, input from the project team, the authorities and interested and affected parties (I&APs) will be considered and integrated. AECOM will also assess the possible environmentally friendly mitigation measures to prevent or minimise the possible negative impacts as a result of the proposed project.

1.6 PURPOSE OF THIS REPORT

The purpose of the Scoping Report is to document all the issues that were identified during the Scoping Phase and the Public Participation Process (PPP). The Draft Scoping Report will be submitted to the DEA and the public for a 40 day review period (as per Section 56(9)(a) of the EIA Regulations, 2010), and to the DWA for a 60 day review period (as per Section 56(9)(a) for waste management activities. Following the public review period, the relevant comments from the I&APs will be incorporated into the Final Scoping Report which will be submitted to the DEA for acceptance.

1.7 STRUCTURE OF THIS REPORT

The Scoping Report includes information as required per Section 28 of GN R543 (of 18 June 2010). The structure of the Scoping Report is presented in **Table 1-1**.

Table 1-5: Structure of Report

Description	Chapter
Introduction, background, details of the Applicant, EAP and project team.	Chapter 1
A description of the proposed project, including the need and desirability.	Chapter 2
A description of all reasonable and feasible project alternatives.	Chapter 3
Legislation and guidelines that pertain to the project.	Chapter 4
A description of the receiving affected environment.	Chapter 5
Identification of the potential issues and impacts on the environment.	Chapter 6
A description of the EIA process including the PPP.	Chapter 7
A Plan of Study for the EIA.	Chapter 8
Conclusions and recommendations.	Chapter 9
References.	Chapter 10

2. OVERVIEW OF THE PROPOSED PROJECT

2.1 INTRODUCTION

As described in Section 1.1, Transnet needs to expand the Port and recapitalise facilities in the Port of Richards Bay to cater for the increase in general freight demand. However, the following projects have already been or are in the process of being environmentally authorised and should not be confused with this project:

- The container terminal truck stop and associated infrastructure;
- The diesel loco expansion;
- The coal slab adjacent to the 700 series;
- The South Dunes lease sites storm water channel and associated infrastructure;
- Doubling of the single railway track from the Port of Richards Bay to the Nsezi Railyard;
- Waste Compactor Slab and the associated infrastructure for the compaction of galley waste prior to disposal;
- Richards Bay Terminal – E&F Slab Expansion;
- The Delkor Waste Water Treatment Plant;
- Expansion of the Existing Cargo Handling Facility at their Multi-Purpose Terminal, Richards Bay;
- Proposed Expansion of Storage Areas, Richards Bay Dry Bulk Terminal.

The FEL-1 study for the Capacity Expansion Programme was completed in July 2012, with the project receiving a “green” status from Transnet’s Gate Review Panel. The FEL-2 study commenced in October 2012, with ten possible expansion options taken forward from the FEL-1 study for further engineering development. The FEL-2 study for the Richards Bay Port Expansion Programme was undertaken in line with Transnet’s Project Life Cycle Process. An overview of the entire process is depicted in Figure 2-1.

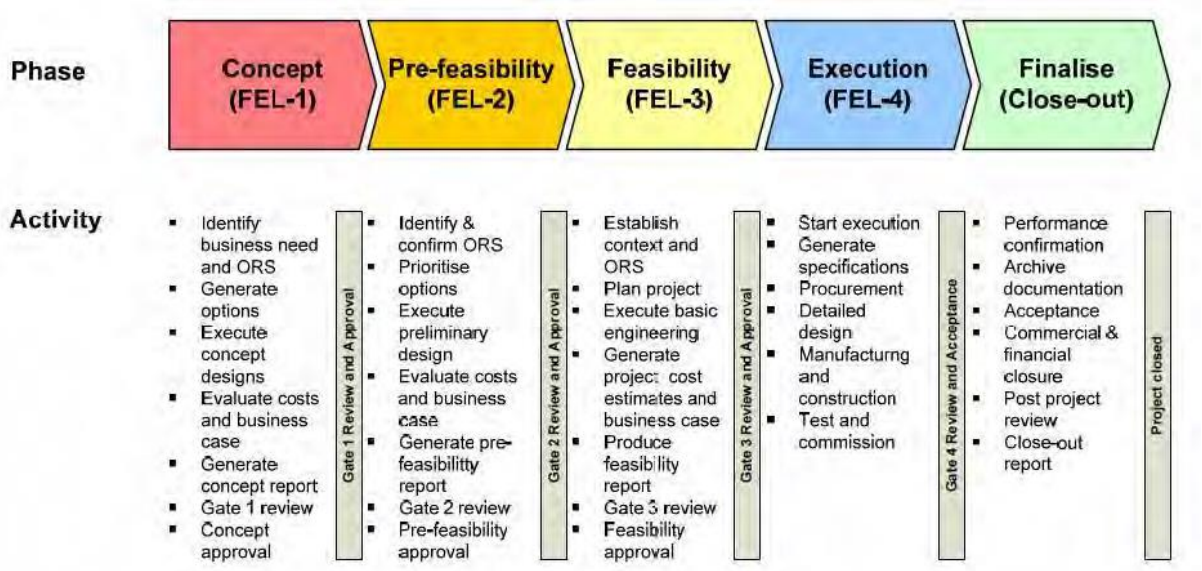

Figure 2-1: Transnet Project Life Cycle Process Overview

Based on the Project Life Cycle Process, the following objectives were pursued by the FEL-2 Pre-Feasibility Study undertaken by Aurecon (2012):

- Confirm Richards Bay Port's functional requirements with regards to rail, bulk materials handling and marine works as per the demand forecast as set out in the ORS document.
- Prioritise the design options taken forward from the FEL-1 study to consider during the FEL-2 Execute and Evaluate phases.
- Execute Preliminary design of the FEL 2 priority options to a FEL 2 engineering detail level.
- Evaluate preliminary designs to provide the basis of a preliminary project definition plan (including milestones, budget estimates and preliminary risk evaluation).
- Provide a FEL-2 Study Report to Transnet to enable Transnet decision-makers to perform a Gate Review, resulting in confident business case decisions.
- Undertake a FEL 2 Gate Review.
- Obtain FEL-2 Pre-Feasibility phase approval to proceed to a FEL 3 Feasibility Study.

The FEL-2 pre-feasibility study is based on the aligned, forecasted General Freight Bulk (GFB) demand up to year 2040 as described by Transnet. This includes the forecasted rail, road and harbour bound industries' demand volumes.

The purpose of the Prioritisation phase of a FEL-2 study is to determine the "priority" or "short list" options in accordance with the Transnet Project Life Cycle Process. The method for prioritisation of the solution options is a Multi Criteria Analysis which rates options

against weighted criteria to determine a most favourable option. Scoring of the options using main, and sub-criteria were used to score the ten design options. The top-scoring three options were carried forward to the FEL 2 Execution Phase of the study. The three priority options were engineered and evaluated to a FEL 2 design accuracy level. Pre-feasibility designs for all three options were compiled, with a rail solution; bulk material solutions for all the throughput streams, as well as berthing solutions, as per the master layouts for these options. Further to the main disciplines, infrastructure designs for each of the options were compiled with regards to the bulk earthworks and civil infrastructure, water, storm water management, power supply requirements, and control and instrumentation principles (Aurecon, 2012). An Evaluation Multi-Criteria Analysis, was undertaken with Transnet to vote and select a single "go-forward" option for further pursuit in FEL 3 (i.e. this EIA process). This "go-forward" option was Option 3A, which is described in further detail below.

2.1.1 Proposed Richards Bay Port Expansion Programme

The proposed Expansion Programme of the Port of Richards Bay (Refer to Figure 2-2 Locality Map) which is subject to this EIA process thus entails the following:

- Extension of the existing railway lines with a rail balloon with split off for Ferro-Manganese, a short train arrival yard and a long train arrival yard;
- Construction of new railway siding to the 600 series berths;
- Construction of 2 new Tipplers (i.e. rail unloading equipment);
- Relocation of the break-bulk from the eastern side of the Port behind the high 700 series berths to the western side of the Port next to the 600 series berths;
- Construction of a new discard coal stockpile on the eastern side of the Port behind the high 700 series berths;
- Expansion of the magnetite facility to the south;
- Extension of the existing Ferro Manganese slab by 260m to the east;
- Construction of a new Ferro Manganese slab of 780m in length to the south of the existing Ferro Manganese slab;
- Upgrading or realignment of existing roads within the Port;
- Construction of a new road-over-rail bridge at the eastern entrance to the Port;
- Construction of 32 conveyors totalling 13,084m;
- Construction of a new 142,030m² container handling terminal;

- Construction of 2 new Panamax shipping berths at the 600 series berths, with associated dredging of a channel to a depth of 14m and 800m turning circle (see Figure 2-3);
- Extension of the Finger Jetty (800 series berths) with 2 new Capesize Coal shipping berths, requiring significant dredging around the existing Finger Jetty;
- Construction of a new 610,000m³ stormwater surge dam inside the rail balloon, water pump stations, and upgrading of drains throughout the Port (see Figure 2-4);
- Development of a Waste Transfer Station inside the Port, which will serve as the 'nerve centre' for managing waste in the Port; and
- Construction of a facility to discharge dredged material from the proposed construction of the berths; or
- Disposal of the dredged material off-shore (see Figure 2-5).

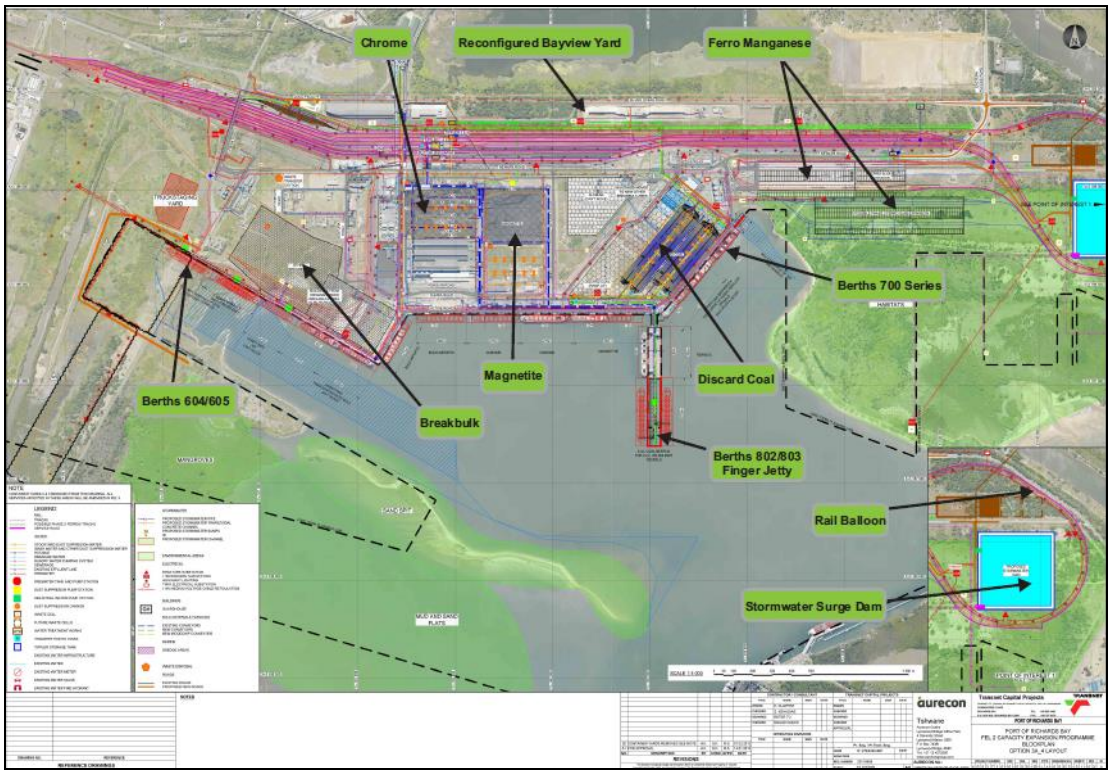

Figure 2-2: Locality Map of Richards Bay Expansion: Proposed Option 3A Layout

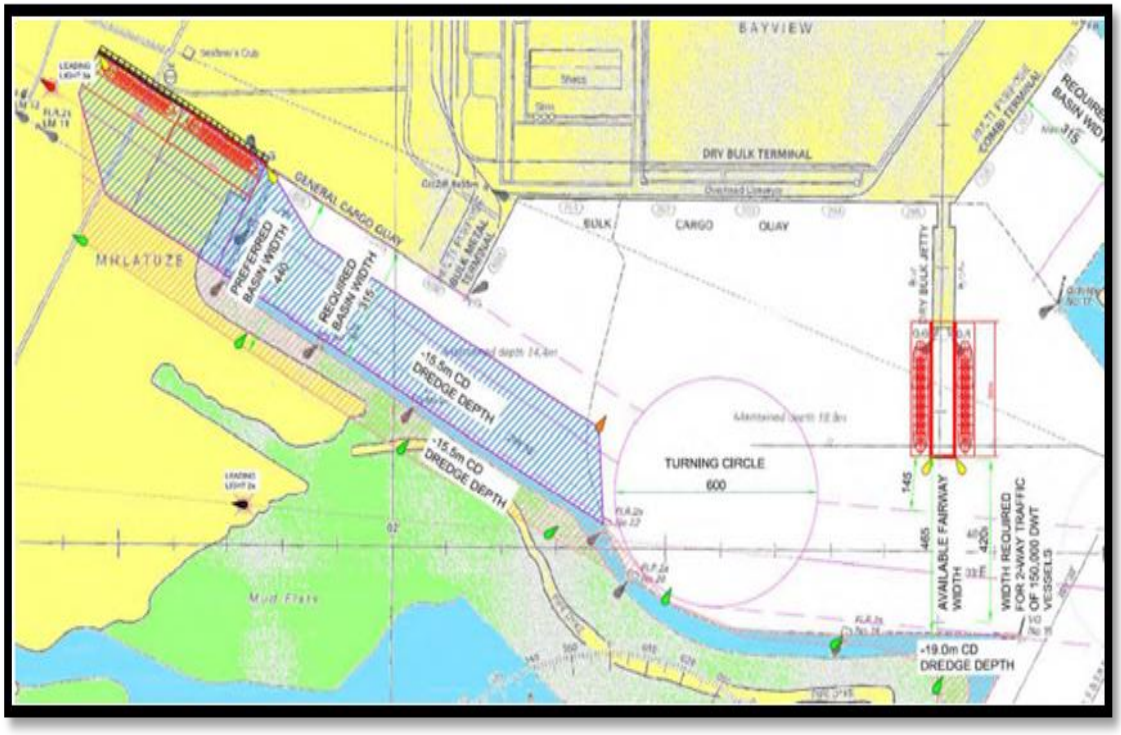

Figure 2-3: Schematic 2: Layout of 2 new 600 berths and 2 new 800 berths, showing channel and turning circle

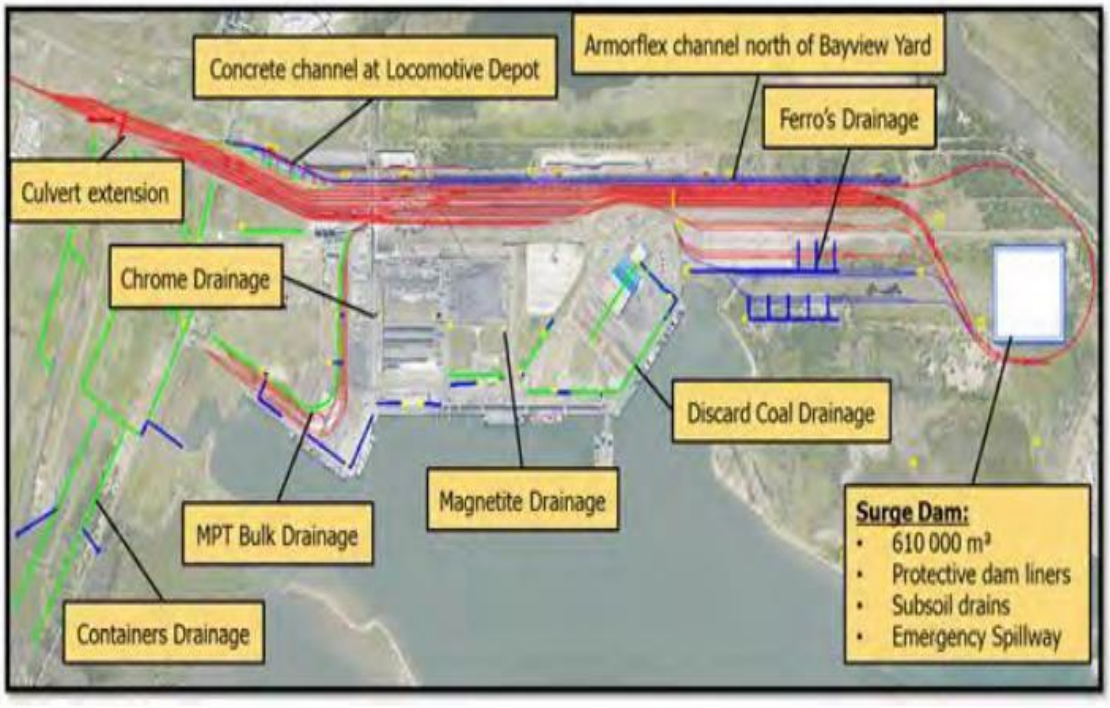

Figure 2-4: **Schematic 3: Proposed Stormwater Management in the Port**

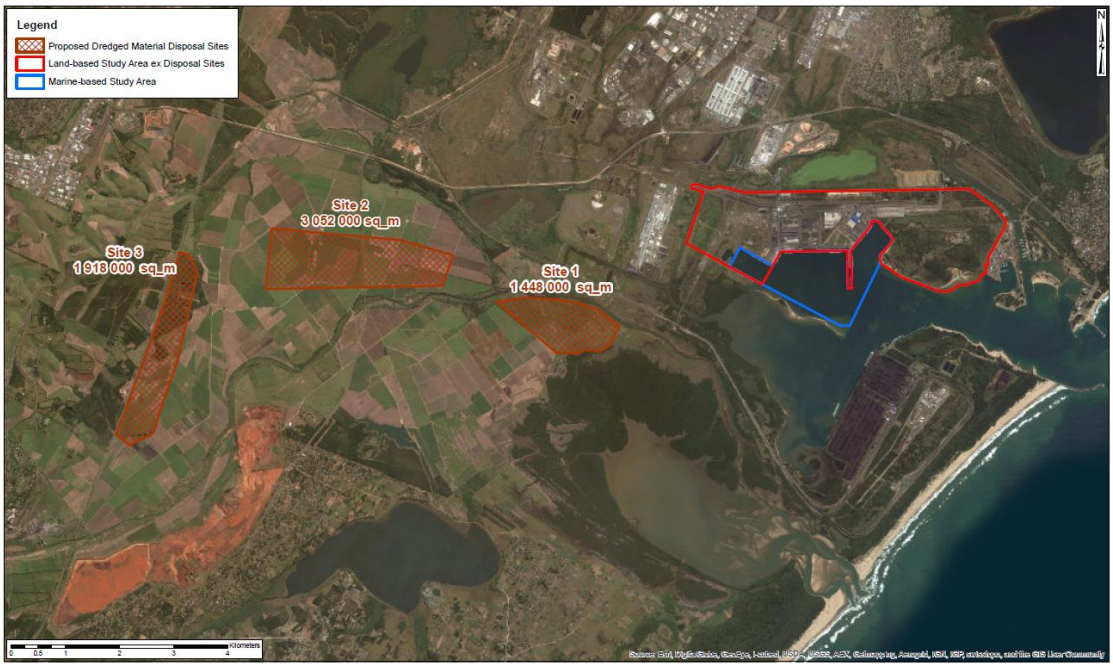

Figure 2-5: Proposed offshore dredging disposal sites

2.1.2 Option 3A – Capacity Expansion: Possible Environmental Impacts

Aurecon identified the following possible environmental impacts for Option 3A during FEL2:

- Dredging to facilitate the construction of new berths at the 600 series quays. The impact of the dredging would be as a result of the increase in turbidity as well as a possible disturbance in the flow dynamics of the area.
- Impact on the habitat of the sand spit and the mud and sand flats.
- The transport of the coal by means of a conveyor system could lead to dust and noise pollution.
- The transporting of the Other Break Bulk and Other Bulk by means of skips could lead to an increased possibility of accidents and spillage due to the increase in volume that will be transported.
- Damage to the biophysical environment as a result of the construction of the new rail infrastructure and upgrading of existing rail infrastructure such as clearing of land, crossing of water courses and disposal of contaminated ballast.
- Visual and noise impact of the rail loop in close proximity to the urban areas.
- Impact as a result of spillages or waste contamination on the marine environment and fresh water sources.
- The social impacts of the proposed Capacity Expansion of the Port include the potential increase in noise and air pollution as a result of the proposed rail loop.

2.2 NEED AND DESIRABILITY

Government recently adopted an Infrastructure Plan that is intended to transform the economic landscape of South Africa, create a significant number of new jobs, strengthen the delivery of basic services to the people of South Africa and support the integration of African economies.

The Presidential Infrastructure Coordinating Commission's (PICC) work was to assess the infrastructure gaps through spatial mapping which analyses future population growth, projected economic growth and areas of the country which are not served with water, electricity, roads, sanitation and communication. Based on this work, seventeen Strategic Integrated Projects (SIPs) have been developed and approved to support economic development and address service delivery in the poorest provinces. The Richards Bay Port Expansion falls within the SIP 1 project.

Transnet's vision and mission is to be a focused freight transport company, delivering integrated, efficient, safe, reliable and cost-effective services to promote economic growth in South Africa. Transnet aims to achieve this goal by increasing their market share, improving productivity and profitability and by providing appropriate capacity to customers ahead of demand. Transnet Port Terminals (TPT) is responsible for cargo handling and logistics management solutions. TPT's port operations service customers across a broad spectrum of the economy, including the shipping industry, vehicle manufacturers, agriculture, steel and the mining industry. The division operates 17 terminals across six South African ports.

Transnet National Port Authority (TNPA) is responsible for the safe, effective and efficient economic functioning of the national port system, which it manages in a landlord capacity. TNPA's core functions are to plan, provide, maintain and improve port infrastructure to provide or arrange marine-related services, to ensure the provision of port services, including the management of port activities and the port regulatory functions at all South African ports; and to provide aids to navigation and assistance to the manoeuvring of vessels within port limits and along the coast.

Transnet Freight Rail (TFR) is the largest division of Transnet. It is a world class heavy haul freight rail company that specialises in the transportation of freight. TFR's core business lies in freight logistics solutions designed for customers in industry based business segments, mining, heavy and light manufacturing.

TPT's Richards Bay Terminal services primarily the mining sectors in terms of general bulk freight, including some other smaller bulk and break-bulk commodities. A core strategic objective of Transnet for Richards Bay Port is to handle the increased volume demand for

freight bulk up to year 2040. The envisaged Port of Richards Bay Capacity Expansion Programme conforms entirely to this objective (Aurecon, 2012).

Furthermore, the uMhlathuze Spatial Framework Plan makes reference to existing and anticipated future development pressures and notes that the strategic location of the municipality (national and provincial economic development node), population increase, the need for more regional facilities and proposed port expansion (with associated industrial development) will increase future development pressures. There is a huge demand for residential development which may be met in the short term but there is reason to believe that the long-term demands for growth may not be so easily absorbed by the area. The City of uMhlathuze has incorporated sustainability principles in their planning, and has considered local environmental priorities but it is evident that they are faced with "a challenging series of decisions" to respond to existing and future development needs (Status Quo Report, 2009).

Transnet's strategic actions for the study area are captured in the Port Development Framework (PDF, 2006) and the more recent Due Diligence Investigation for the Acquisition of Land for Future Port Expansion (in finalisation phase). These strategic plans highlight the potential detrimental and adverse impacts that may be associated with port expansion activities in the future. However, it also reflects the extent to which Transnet has incorporated sustainability principles into their planning, taking cognisance of local environmental priorities and proposing long-term measures to address impacts.

The TPT in Richards Bay are a target for major demand growth in bulk products up to 2040. The current terminal facilities and machinery are near their operational capacity and many of the assets are at or near the end of their useful life, requiring major refurbishment and/ or replacement.

It is therefore more evident that Transnet needs to expand the port and/or recapitalise facilities in the Port of Richards Bay to cater for the increase in general freight demand. When developing the Port Expansion Programme's FEL-2 deliverables, it was prudent to consider the Programme's interfaces with other programmes to ensure alignment and mutualism.

2.3 BASELINE STUDIES CONDUCTED

The following Baseline Environmental Studies have been conducted by BKS (now AECOM) during the FEL2 phase of the project:

- Traffic Baseline Study;
- Air Quality Baseline Study;
- Baseline Heritage Study;

- Turbidity and Total Suspended Solids;
- Metal Contamination of Sediment and Implications for Dredging;
- Implications of a Basic Water Quality Survey;
- Acoustical Baseline Study on the Ambient Sound Levels; and
- Dredge Disposal Site Selection.
- Baseline Assessment for the Port of Richards Bay Expansion Programme – Selected Aquatic and Terrestrial Habitats.

It should be noted that the study area for these baseline studies was much wider than the current study area, as shown in Figure 2-6 below.

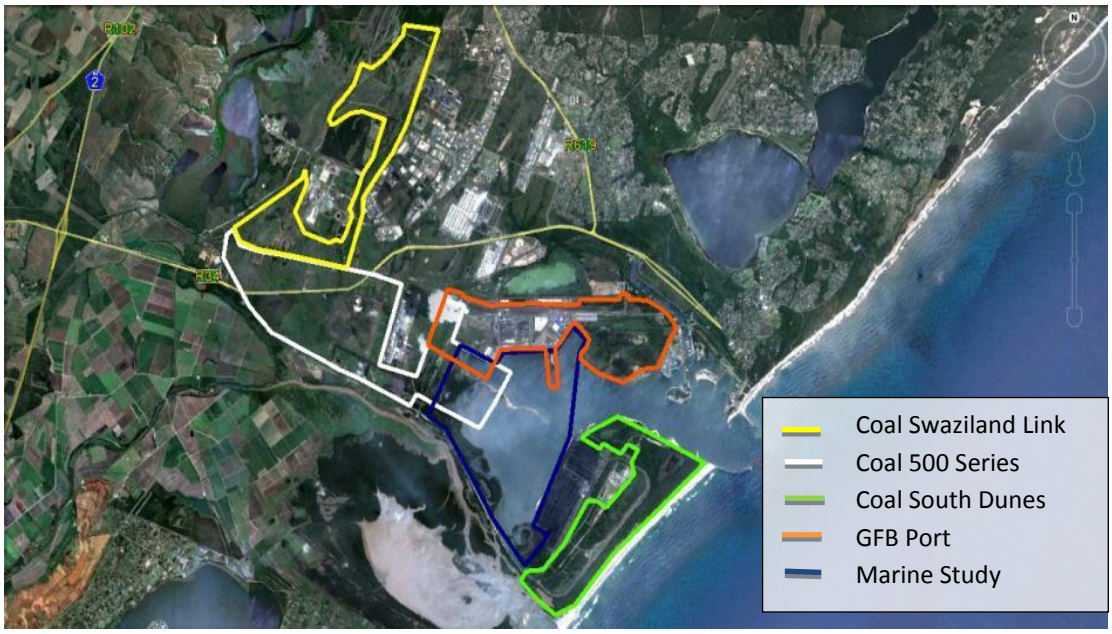

Figure 2-6: Study Area of Baseline Studies Conducted during FEL2

The focus of this application only relates to the GFB Port and the section of the Marine study area from the port to the sandspit.

2.3.1 Traffic Baseline Study

The AECOM SA transportation planning division conducted a baseline study to evaluate the status of the existing road network.

Direct rail and road links have been developed between the major South African cities and the port of Richards Bay to enable the transportation of goods to and from the port. The port handled approximately 22 million tonnes of cargo in 2011. Over the years, the volume of trucks accessing the port has increased, resulting in higher levels of congestion. In January

2012, more than 3 900 trucks accessed the port terminal (Taylor, 2012 and Wepener *et al.*, 2012).

ARUP conducted a traffic study in 2011, but limited data is available and thus not adequate for further modelling and capacity analyses. It is recommended that traffic surveys be conducted at critical intersections during the weekday morning and afternoon peak periods to establish the existing peak hour traffic volumes within the study area. In addition, traffic information regarding the vehicles accessing the port should be obtained from the gates.

Capacity analyses were conducted by ARUP by using Aimsun to evaluate the road network performance. The following intersection/access gates in Newark Road were evaluated (Moodley, 2011).

According to the analyses conducted by ARUP and the available information at that time, the following improvements were recommended:

- Right turn lanes of 50 m should be provided at all the intersections, currently this is not available, to accommodate a queue of two trucks. This is to improve safety and delays experienced at the intersections;
- The intersection of Newark Road with Petingo Road should be reconstructed to allow that the roads cross perpendicular;
- A U-turn facility should be introduced close to the Western Access Gate; and
- Ventura Road should be closed and a new access provided to the MPT 6 series and coal terminal.

The existing road conditions were evaluated per road type. The road type is dependent on the function of the road.

- **Main Roads:** The main roads carry through-traffic to serve all commodities. The condition of the main roads in the port was investigated by Steenkamp (2013) and two main roads are discussed below:
    - **Newark Road**: The road is currently surfaced with asphalt and visual evidence of distress includes rutting, crocodile cracking, surfacing failures, patching and longitudinal and transverse cracks (Steenkamp, 2013). In May 2011, six test pits were excavated by Transnet which indicated that at the western access gate (between km 0 and km 2.5) the asphalt surfacing is thicker than at the eastern access gate (between km 2.5 and km 4). This 1.5 km road section requires an asphalt overlay. However, no immediate repairs are required, but should not be postponed beyond the year 2017. Newark Road is a 4 km road of which 46% (1.85km) requires rehabilitation.

- **Ventura Road Section**: Ventura Road is only approximately 500 m long. It was therefore assumed that the road condition of Ventura Road, together with Durma Road, Minerva Road, and Cheldane Road (see Figure 2) was evaluated, forming the 3 km road section. The combination of these roads will be referred to as the Ventura Road Section. The existing road is made up of a combination of asphalt surfacing, concrete paving blocks and reinforced concrete slabs. The road section evaluated is 3 km of which 2.7 km requires immediate attention.

- **Collector Roads**: The collector roads connect to the main roads and contain junctions that link to service roads. Examples of connector roads in the port are Octopus Road, Wayfarer Road and Petingo Road. The total length of the collector roads is 14 km of which 4.42 km requires rehabilitation (Steenkamp, 2013).

Conradie and Van Rensburg (2013) conducted a traffic investigation to determine the required design traffic and pavement design for the roads of the Richards Bay Port. Please note that limited information was available and that a traffic study is required to verify the assumptions made by Conradie and Van Rensburg. The results from the study are as follows:

- The traffic volume on the main and collector roads is assumed to be between 10 million and 30 million E80s (an E80 is defined as a unit of road damage caused by a single 80 kiloNewton (kN) axle load) over a period of 20 years. The traffic volume for the surfaced service roads is assumed to be between 1 million and 3 million over a period of 20 years.
- According to the Department of Roads and Transport (1996), this is equivalent to an ES 30 traffic class for the main and collector roads and an ES 3 traffic class for surfaced service roads (Conradie and Van Rensburg, 2013).

It is therefore concluded that there is an anticipated increase demand in throughput at the port of Richards Bay and to provide for this demand the following have been evaluated:

- Good internal and external road networks provide access to the port and the terminals.
- There are two main entrances to the industrial operations at the Richards Bay port:
  - The western port access; and
  - The eastern port access.
- Sufficient parking are available for light vehicles, however, there is a lack of parking provided for heavy vehicles, which could be relieved by the proposed development of the Trucking Facility.

2.3.2 Air Quality Baseline Study

The Air Quality Baseline Study was conducted by Kijani Green Energy to provide specialist air quality input into the EIA of the proposed extension of the terminals at the Port of Richards bay.

The port has a valid Air Emission Licence (AEL) in the name of Transnet Port Terminals (TPT) and is valid until 21 March 2017. There are two complaints registers that are maintained for the port, a public complaints register and an internal incidents register. A dust monitoring program has been operational at the site from 2008 to at least March 2012 (last available records). The current land use of the site is typically associated with the generation of high dust loads, from vehicle entrained dust and exposure of areas exposed to wind erosion to the handling of materials in dry, windy conditions. The Transnet network that is run by WSP reports occasional incidence of high dust load well in excess of recommended guidelines. The network is split into three broad categories, fence line monitoring, internal dust fall out and PM_{10} monitoring. A Sulphur dioxide (SO_2) study was undertaken for the Richards Bay town which includes SO_2 monitoring at Bayside. The SO_2 levels for this site were registered between 45% and 58% of the National Environmental Management: Air Quality Act Act 39 of 2004) (NEM:AQA) guidelines for all time periods.

It is therefore recommended that the current dust mitigation methods and monitoring remain in place throughout the course of the project.

2.3.3 Baseline Heritage Study

eThembeni Cultural Heritage had undertaken a Baseline Heritage Study as a prelude to a full Phase 1 Heritage Impact Assessment (HIA) of the proposed Richards Bay Port expansion. The purpose of the study is to identify potential heritage resources / issues in the area proposed for the development, based on desktop studies and literature reviews.

No heritage resources with Grade I or Grade II status are present within the study area. Given the recent history of the establishment of the town of Richards Bay and its harbour it is unlikely that buildings or structures older than 60 years are present within the proposed development area. No oral traditions or living heritage are present within the proposed development area. Landscapes and Natural features form part of the heritage resource category which include sites, areas or reserves protected in terms of the environmental legislation.

The formally protected landscape of Richards Bay Nature Reserve is located on the northern banks of the uMhlathuze River Estuary, immediately south of the proposed development. It is a proclaimed Nature Reserve and is managed by Ezemvelo KZN Wildlife (Figure 2-7 and Figure 2-8). This protected landscape falls outside the study area for this Port Expansion application.

No cemeteries administered by the local municipality are present within the proposed development area. No battlefields are known to occur within the proposed development area. Shipwrecks are known to occur along most of the KwaZulu-Natal coastline, but none will be affected by the proposed development.

Figure 2-7: The Location of Richards Bay Nature Reserve (Source Ezemvelo)

Figure 2-8: The Extent of Richards Bay Nature Reserve and Support Areas (Source Ezemvelo)

The study area is considered as potentially very sensitive in terms of its paleontological significance and a full Phase 1 Paleontological Impact Assessment (PIA) must be undertaken prior to commencement of development.

It is therefore recommended that only a full PIA be conducted during the EIA Phase of the proposed expansion programme.

2.3.4 Turbidity and Total Suspended Solids

The study was conducted by the Coastal Systems Research Group of the CSIR. The objective of the study was to determine if there is sufficient turbidity and total suspended solids concentration data for the proposed Port of Richards Bay expansion footprint. It has been found that most of the turbidity and total suspended solids concentration data for Richards Bay is for the Mudflats area, but the conditions in this area are atypical of the rest of the Bay. Turbidity and total suspended solids concentrations in the water column over the mudflats are frequently higher compared to other areas of the Bay.

Due to the limited data for much of the proposed expansion footprint, a 6-month monitoring programme started in September 2013 for the definition of baselines and to estimate the potential ecological risks that are associated with dredging. The results of this monitoring programme will be included in the EIA Phase.

2.3.5 Metal Contamination of Sediment and Implications of Dredging

The study was conducted by the Coastal Systems Research Group of the CSIR. The objective of this study were to determine whether sediment in the proposed Port of Richards bay expansion programme footprint is contaminated by metals, to identify spatial trends in metal enrichment/contamination of sediment in the expansion footprint, to estimate the likelihood that metal contamination of sediment in the expansion footprint will pose an unacceptable ecological risk when the sediment is dredged and/or disposed at an open water spoil disposal ground offshore of Richards Bay, and to identify the implications of metal contamination of sediment in the expansion footprint for a permit application authorising open water disposal of dredged sediment. Surface sediment was collected at 97 sampling stations positioned in a grid like manner in the western part of Richards Bay, over an area that encompasses the proposed expansion footprint (Figure 2-9).

The implications of metal contamination of sediment for dredging must be considered in the context of decision-making associated with sediment quality guidelines used to determine if sediment identified for dredging in South African ports is suitable for disposal offshore.

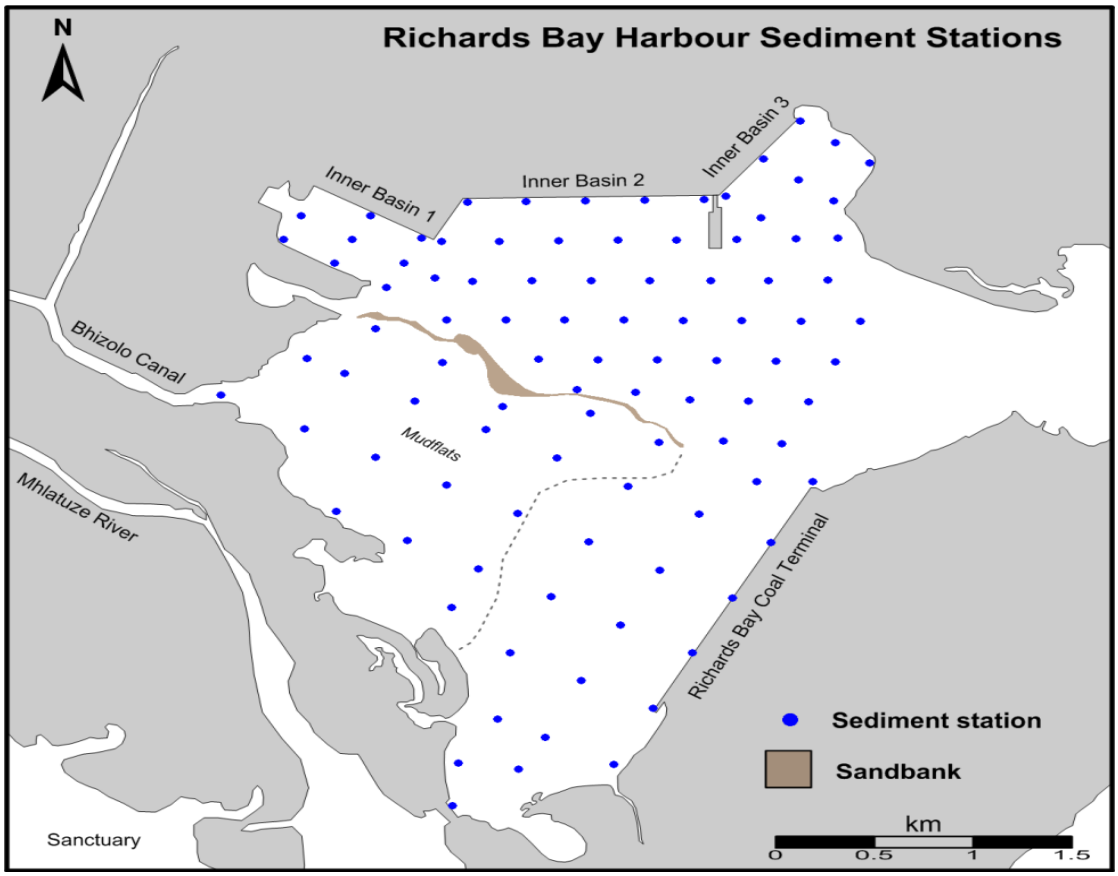

Figure 2-9: Map of the western part of Richards Bay showing the positions where sediment samples were collected in November 2012

Sediment with metals at concentrations equal to or lower than the Level I guideline is regarded as posing a low toxicological risk to bottom-dwelling organisms and is suitable for disposal offshore. Sediment with metals at concentrations between the Level I and Level II guidelines is regarded as posing a potential toxicological risk to bottom-dwelling organisms, with the degree of risk increasing as the Level II guideline is approached. A decision on whether this sediment is suitable for disposal offshore is made after considering the number of metal concentrations that exceed the Level I guideline and the degree of exceedance. Additional testing (e.g. chemical analysis of sediment elutriates) may be requested to assist decision-making. Sediment with metals at concentrations equivalent to or higher than the Level II guideline is regarded as posing a high toxicological risk to bottom-dwelling organisms and in the absence of other data or mitigating factors is considered unsuitable for disposal offshore. However, this decision is made on a case by case basis. In this situation the dredging proponent can perform additional studies (e.g. toxicity testing, benthic invertebrate community analysis) to determine whether contaminants in the sediment are indeed adversely affecting bottom-dwelling organisms. If the findings show contaminants in the sediment are not posing an unacceptable toxicological risk then the Department of Environmental Affairs may deem the sediment suitable for disposal offshore.

No metal concentrations in sediment from the RBCT Basin and Mudflats exceeded sediment quality guidelines, meaning there will be no limitation to the offshore disposal of sediment dredged in these areas from a contamination perspective. Sediment at four stations, two in Inner Basin 2 and two in Inner Basin 3, theoretically cannot be disposed offshore because copper and/or chromium concentrations in the sediment exceeded the Level II. The DEA may prohibit offshore disposal of this sediment if there are no mitigating factors. Should the DEA prohibit offshore disposal of the sediment then Transnet will need to commission a further study to determine whether metals in sediment are adversely affecting bottom-dwelling organisms (e.g. through sediment elutriate chemical or toxicity testing). Alternately, the sediment will need to be disposed on-land.

The sources of contaminant metals to Richards Bay must be identified, reduced and controlled. The most significant sources appear to be port associated activities, with the most important probably the spillage of metal ore fragments and scrap metal flakes during vessel loading. The most important areas of metal introduction are the 600 and 700 series berths, that is, in the Inner Basin complex.

2.3.6 Implications of a Basic Water Quality Survey

The study was conducted by the Coastal Systems Research Group of the CSIR. To supplement existing turbidity and total suspended solids concentration data for Richards Bay, these parameters were measured in surface and bottom water samples collected at 15 stations spread across the proposed expansion footprint (Figure 2-10). The purpose of this study is to present the findings of this survey to discuss the potential implications for the Port of Richards Bay expansion programme. The findings of the water quality monitoring are revealing in terms of the proposed expansion programme from several perspectives.

First, microalgal biomass was highest in and near Inner Basins 1 and 3, this is as a result of the exchange of water between these basins and the greater Richards Bay is restricted because of their “dead-end” nature. This facilitates an increase in the microalgal biomass because of the water retention time exceeds the generation time of the microalgal. Elevated microalgal biomass is a common feature of the water column in many South African ports, especially in areas of ports where water exchange is restricted and there is an anthropogenic source of nutrients. The implication for the proposed expansion programme is that if port development further restricts the exchange of water between ‘dead-end’ basins and the greater Richards Bay and anthropogenic nutrient inputs continue then there is strong possibility that eutrophic conditions may manifest. This will ultimately lead to the development of hypoxia and possibly even anoxia in bottom water and sediment, with a host of associated adverse ecological impacts. Careful consideration must, therefore, be given during the infrastructure design phase for achieving the maximum possible water exchange between ‘dead-end’ basins and the greater Richards Bay.

The second revealing feature is the low pH of the water column off the Bhizolo Canal. There was clearly an anthropogenic source of contamination to the Bhizolo Canal that was driving the low pH. As was the case for microalgal biomass this is not the first time the Coastal Systems research group of the CSIR has recorded low water column pH in and near the Bhizolo Canal (e.g. CSIR 2011). In fact, the concentrations of fluoride, some nutrients (especially ortho-phosphate), chlorophyll-a concentration, turbidity and total suspended solids are usually considerably higher in the Bhizolo Canal compared to the rest of the Bay (e.g. CSIR 2011). Careful consideration must, therefore, also be given during the infrastructure design phase as to the future discharge point of the Bhizolo Canal. Connecting this canal to a 'dead-end' basin will have adverse ecological implications unless the source/s of contaminants in the canal catchment are identified and controlled, although it is improbable that all sources will be identified and/or entirely controlled.

Third, consideration must be given during the infrastructure design phase as to where surface runoff (stormwater) from quay surfaces will be discharged. Discharging surface runoff into 'dead-end basins', where water exchange with the greater Richards Bay is poor, will increase the probability for water and sediment quality impairment. This is because surface runoff is an important vector for the introduction of materials accidentally spilled on quay surfaces into Richards Bay. Water and sediment quality impairment is not only important from an ecological perspective but also from a dredging perspective. As discussed in a companion report prepared by the CSIR (2013) that describes metal contamination of surface sediment in the proposed expansion footprint, there is very strong evidence that accidentally spilled metal ore fragments and metal flecks, and possibly also fragments and flecks introduced by surface runoff, are the cause of significant metal contamination of sediment in Inner Basins 1, 2 and 3. The magnitude of metal contamination in some parts of these basins is such that the Department of Environmental Affairs may prohibit the unconfined openwater disposal of dredged sediment. The financial implications of alternate (e.g. on-land) sediment disposal will be significant. This situation will continue unless the sources of and vectors for the entry of metals and other contaminants into Richards Bay are identified, reduced and controlled. As discussed above, one of the vectors is surface runoff. Ideally, surface runoff from quays should be diverted to detention ponds to facilitate the settlement of particulate material and the overflow then discharged to the Bay. The scientists that prepared this report are, however, aware that the construction of retention ponds may not be feasible, but it might be possible to construct particulate matter settlement systems within the stormwater reticulation system.

Figure 2-10: Map of Richards Bay showing the positions were *in situ* water quality measurements were made and water samples were collected for turbidity and total suspended solids concentration analysis in the laboratory

3. DESCRIPTION OF ALTERNATIVES

"*Alternatives are different means of meeting the general purpose and need of a proposed activity. The identification, description, evaluation and comparison of alternatives are important for ensuring the objectivity of the assessment process. In cases where there is no objective and thorough assessment of alternatives, the EIA process usually only confirms a chosen activity and the value of the assessment as an input to a decision-making may be compromised*" (DEAT Guideline 4, 2006).

3.1 MULTI-CRITERIA ANALYSIS DURING FEL1 AND FEL2

Through a combination of the various bulk materials handling and marine options a total of fifteen possible options were identified during the FEL-1 phase. The possible environmental impact of the fifteen development options were evaluated and described. The fifteen possible options developed as a result of the combination of the various development options were subjected to a multi-criteria analysis process to determine the preferred options for development. Through this process the number of options was reduced to ten during FEL1.

The ten identified development options were subjected to a second multi-criteria analysis in the Prioritisation Phase of FEL-2.

When considering how "good" any solution design option is, many factors or criteria need to be considered. A Multi Criteria Analysis aims to rate each design option against weighted criteria in order to determine the most favourable option(s) across the entire spread of criteria. A Multi Criteria Analysis is a logical process to determine a "most favourable" option across multiple criteria. The sections that follow detail all the steps taken by the project team to identify criteria, weight the identified criteria, rate the various options, and interpret the results obtained. The process is detailed in Figure 3-1.

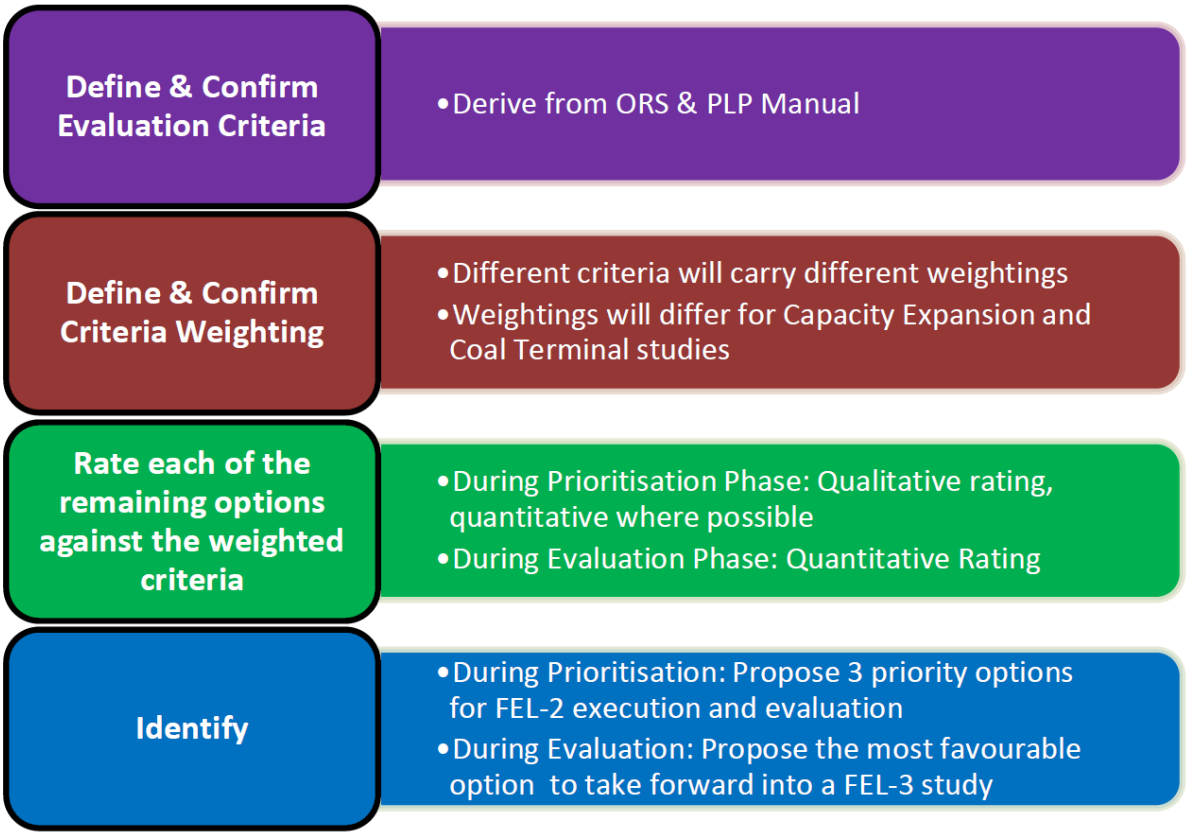

Figure 3-1: Multi-Criteria Analysis

During the FEL-1 study, the FEL-1 Owners Requirements Specification (ORS) Evaluation Criteria (i.e. safety, health, environment, community and society, sustainability, finance, operational performance, and direct and indirect job creation) were interpreted and expanded to suit the needs of the Richards Bay Port Expansion Capacity Programme's FEL-1 evaluation. The FEL-2 study required a greater level of analysis and details to ensure that Aurecon applied its mind to all relevant aspects regarding the remaining design options. Aurecon identified 6 main FEL2 criteria, which were further divided into sub-criteria (which are described behind each main criteria). When evaluating any solution over many criteria it is important to weight the criteria in a way that suits the objectives of the project. A new development might be weighted more in favour of economic sustainability while an upgrade might focus on operational performance.

The 6 main criteria used were as follows (with the weighting indicated in brackets):

- **Health and Safety** (10%) are a critically important design criterion. It is important to identify which design concept is safe in terms of construction and new operations, even during FEL 1. Any design with critical safety fatal flaw must be excluded.
- **Environmental and Social Sustainability** (20%): when dealing with any development/construction, one of the most important aspects to consider is the

effect on the environment as well as the community. It is critical to identify and quantify (to an extent), the environmental impact of the Richards Bay Port Expansion Project with regards to fauna, flora, social aspects, waste, water, energy efficiency, and the cost/effort of mitigating these impacts.

- **Finance** (25%): From Transnet's side there is no doubt that Capital Expenditure (Capex) will be a major driver. Operational Expenditure (Opex) is just as important as Capex when considering any new development. There is often a trade-off between the initial expenditure and the cost of running/maintaining a solution.
- **Operational Performance** (20%) of a port terminal: the main operational elements that were considered include Rail Yard Operations, Offloading & Stacking Operation, Stockpile Position & Cross Hauling Operations, Reclaiming & Shiploading Operations, Marine Operations, and Scalability / Flexibility of the proposed solution.
- **Economic Impact** (10%): A successful strategic transport solution is one that will have a positive impact on the economy of Richards Bay and South Africa. Aspects considered are job creation (during construction and due to expansion), the GDP impact, compliance to long-term planning, and compliance to SIP1.
- **Constructability** (15%): In a port terminal as complex as the Port of Richards Bay, the constructability of any solution could be a defining factor. Aspects considered include ease of construction, construction impact on current operations, and time to readiness.

Scoring was conducted by a broad technical team which included expertise in various relevant technical and non-technical disciplines. When scoring the options, the goal was to rate each option against each criterion, and award a score out of ten based on the option's performance in that criteria. Each set of criteria has a unique approach to scoring the respective options although the rating scale remains consistent.

The chosen scoring methodology was as follows:

- Each criterion has a different approach to scoring an option as some can be quantitatively measured while other criteria will have largely qualitative ratings.
- Each option is given a score between 0 and 10 where a 0 is a fatal flaw, and a 10 is ideal. These scores are based on the scoring approach for that particular criterion.
- These weighted scores are then tallied to a percentage score for the entire option, which is then compared to the other options.
- The goal is to select a well-balanced solution(s) that consistently scores well across many criteria.

All scores from the various criteria have been tallied and weightings have been applied. Table 3-1 lists the results obtained. The results show that options 1A, 1D and 3A are the most favourable and should be prioritised for FEL-2 Execution and Evaluation.

Table 3-1: Summary Scoring Sheet and Results

	Option	1A	1D	3A	1B	1C	3E	3C	2C	2A	2E
	Total % Score	65.4%	63.9%	63.8%	62.0%	60.4%	59.0%	57.3%	53.2%	53.0%	50.5%
Main Criteria	Sub-criteria										
Health & Safety	H&S During Construction	6	6	6	10	10	6	10	6	10	6
Health & Safety	H&S New Operations	7	7	8	7	8	8	8	4	7	4
Environmental & Social Sustainability	Environmental Red flags (Fauna & Flora)	6	4	6	3	5	5	5	6	5	5
Environmental & Social Sustainability	Social Red Flags (Community interface)	7	7	5	7	7	5	5	3	3	3
Environmental & Social Sustainability	Waste Management	3	3	4	3	3	4	4	5	5	5
Environmental & Social Sustainability	Water and Energy Usage	7	7	6	7	7	6	6	5	5	5
Finance	Capex	9	10	8	9	7	7	6	7	5	7
Finance	Opex	7	7	6	7	7	6	6	5	5	5
Operational performance	Rail yard & Operations	8	8	6	8	8	6	6	4	4	4
Operational performance	Offloading & Stacking	8	8	8	8	8	8	8	8	8	8
Operational performance	Stockpile Position & Cross Hauling	4	5	9	2	1	5	2	6	4	3
Operational performance	Reclaiming & Shiploading	7	7	7	7	4	7	4	5	5	5
Operational performance	Marine Operations	6	4	6	4	3	4	5	6	4	4
Operational performance	Scalability / Flexibility	5	4	7	4	4	6	5	5	5	5
Economic Impact	Job Creation (Construction)	6	5	7	6	7	7	8	7	9	7
Economic Impact	Job Creation (Due to expansion)	6	6	6	6	6	6	6	6	6	6
Economic Impact	GDP Impact	6	5	7	6	7	7	8	7	9	7
Economic Impact	Compliance to Long term planning	9	7	8	5	8	8	8	7	7	7
Economic Impact	Compliance to SIPS	8	8	8	8	8	8	8	8	8	8
Constructability	Ease of construction	6	6	6	6	6	6	6	6	6	6
Constructability	Construction Impact on current operations	6	6	6	6	7	6	7	6	7	6
Constructability	Time to readiness	7	7	7	7	7	7	7	7	7	7

The preferred options were subjected to an Evaluation Phase of FEL-2 to identify the go-forward option for FEL-3. The three priority issues were engineered and evaluated to a FEL 2 design accuracy level and are described in Table 3-2 below.

Table 3-2: Brief Description of Priority Issues

ORS main Element	Rail	Marine Works	Bulk Material Handling				
			Other Break-Bulk	Discard Coal	Chrome	Magnetite	Ferrochrome & Ferro-manganese
Option 1A	Rail Balloon with split off for Ferros, short train arrival yard & long train arrival yard	2 new berths at the 600 series. Finger Jetty extension (2 berths)	Break-bulk consolidated on Eastern end of port, next to the high-700 series berths	On the western end of the port behind the 600 series berths	As per Current Location with new storage method	As per Current Location with expansion south and new Bulk Material Handling equipment	Use existing system and extended Ferro slab.
Option 1D	Rail Balloon with split off for Ferros, short train arrival yard & long train arrival yard	2 new berths on the new 500 series, extend Finger jetty (2 berths)	Break-bulk consolidated on Eastern end of port, next to the high-700 series berths	On the western end of the port behind the 600 series berths	As per Current Location with new storage method	As per Current Location with expansion south and new Bulk Material Handling equipment	Use existing system and extended Ferro slab.
Option 3A	Rail Balloon with split off for Ferros, short train arrival yard & long train arrival yard	2 new berths at the 600 series. Finger Jetty extension (2 berths)	Break-bulk consolidated on western side of port next to the 600 series berths	Stockpile on eastern side of port behind the high 700 series berths	As per Current Location with new storage method	As per Current Location with expansion south and new Bulk Material Handling equipment	Use existing system and extended Ferro slab.

This evaluation is based on the evaluation criteria as defined during the Prioritisation phase (FEL1), and the technical findings of the Execution phase (FEL2). During the Options Selection workshop, held in conjunction with Transnet in February 2013, the following process was followed:

- The Aurecon Project Team presented the FEL-2 technical findings and then proposed scoring per criterion.
- Transnet was then given the opportunity to vote on the score by giving their own score of between 1 and 10 via an electronic keypad. The goal of the voting system was not to obtain a democratic answer, but rather to drive consensus between Transnet's Operating Divisions.
- The 1-10 scale is described as follows:
    - 9-10 – Ideal
    - 6-8 – Acceptable
    - 4-5 – Can be Improved
    - 1-3 – Possible but has many challenges
- Whenever a vote was cast, a histogram of the distribution of votes for that criterion was shown on the presentation. From these histograms it was a simple task to

determine whether there was consensus in the room. When there was no consensus, a discussion was initiated, and the vote was retaken.

Table 3-3 below shows the summary of the scoring and final result of the workshop.

Table 3-3: Option Selection Workshop Results

		Option		1A	1D	3A
		% Score		56.9%	60.0%	62.4%
Main Criteria	Weight	Sub-criteria	Weight			
Health & Safety	10%	H&S During Construction	40%	6.1	5.7	5.3
		H&S New Operations	60%	6	5.8	7.6
Environmental & Social Sustainability	20%	Environmental Red flags (Fauna & Flora)	35%	5.1	3.6	5.7
		Social Red Flags (Community interface)	35%	6.5	6.7	4.7
		Waste Management	10%	3.7	3.2	4.2
		Water and Energy Usage	20%	6.6	6.7	6.8
Finance	25%	Capex	50%	0.6	3.4	2.4
		Opex	50%	6.6	7.3	6.9
Operational performance	20%	Rail yard & Operations	15%	7.7	7.4	6.4
		Offloading & Stacking	5%	8.2	8.2	8.1
		Stockpile Position & Cross Hauling	20%	7.6	7.6	9.2
		Reclaiming & Shiploading	25%	7.3	5.7	9.1
		Marine Operations	20%	4.7	6.2	5.7
		Scalability / Flexibility	15%	7.0	5.7	7.4
Economic Impact	10%	Job Creation (Construction)	20%	10.0	9.2	9.7
		Job Creation (Due to expansion)	28%	7.0	7.0	7.0
		GDP Impact	22%	10.0	9.5	10.0
		Compliance to Long term planning	20%	6.7	5.9	7.3
		Compliance to SIPS	10%	7.0	7.0	7.0
Constructability	15%	Ease of construction	20%	5.8	6.2	6.5
		Construction Impact on current operations	60%	5.9	6.6	6.6
		Time to readiness	20%	4.4	5.4	5.5

Option 3A was thus chosen to be the most favourable option.

3.2 THE "DO NOTHING" APPROACH

The DEA stresses that the "Do-Nothing" approach should be considered in cases where the proposed activity will have a significant negative impact that cannot be effectively or satisfactorily mitigated.

The "Do-Nothing" approach entails that the proposed Richards Bay Port Expansion is not developed in the area, i.e. that no development as per the proposal is undertaken. The prevention of the proposed project will provide a setback as the current terminal facilities and machinery are near their operational capacity and many of the assets are at or near the end of their useful life, requiring major refurbishment and/or replacement. On the other hand no development means that the biodiversity connectivity for plants and animals continue to exist.

The advantages for the proposed Richards Bay Port Expansion include the following:

- New coal berths are constructed in deep water, by extending the DBT jetty, and no dredging is needed for these berths;
- Four NP berths at 600 series constructed alongside a large NP stockpile. So all NP can be consolidated on the western side of the port;
- The new NP berths could be converted to container berths in future;
- Three new tipplers provide additional throughput capacity and reduce train turnaround times;
- A fourth twin cell tippler will be dedicated to discard coal and this will open up capacity on the other tipplers;
- Consolidating the non-priority break bulk to the west of the port, next to 600 series berths;
- Short travel distances to the berths reduce traffic in the port;
- Flexibility to export non-priority break bulk through berths 706-708, although not preferred;
- All the discard coal is consolidated in the east of the port;
- All commodities are exported through berths as close as possible to the storing areas;
- Current storing areas for chrome, magnetite, ferrochrome, BHP aluminium and non-priority bulk are not moved to new positions;
- Development of non-priority break bulk infrastructure to the east of the port allows for easy expansion and is in agreement with the port's future development plan;
- Utilization of the 600 series berths in Option 3 is better when compared to Option 1;
- Constructing berths in the dry such as at the 600 series is considered simpler than in the wet.

The "Do-Nothing" scenario has been the basis against which the acceptability of the environmental issues as well as technical and socio-economical alternatives have been identified in FEL1 and assessed in FEL2.

3.3 SUSTAINABILITY ALTERNATIVES

The following criteria should be considered in the design of buildings and structures (where applicable) to support the efforts of Transnet towards a sustainable port:

Good construction management including:

- Environmental management and auditing;
- Waste management (recycling construction waste: rubble, steel, timber);
- Constructing of airtightness; and
- Protection of topsoil on site.

3.3.1 Buildings

Ensuring the indoor environmental quality is of a high quality, energy and water consumption remains efficient and thus building occupants remain healthy. This includes:

- Mechanical systems are designed to ensure that there is increased fresh air into the building:
    - Air movement i.e. no stagnant air;
    - Measures to control carbon dioxide build up i.e. carbon dioxide monitoring and measure to increase fresh air when required;
    - Less energy usage through efficient HVAC systems;
    - Less water usage through air cooled systems or water reuse systems;
    - Less harmful emissions into the atmosphere by specifying refrigerants with an Ozone Depleting Potential of zero.
    - Allow occupants to control their own temperature zones by providing manual controls, or controllable air vents etc.
- Electrical/ lighting systems that are specified to reduce uncomfortable headaches from low frequency flicker (high frequency ballasts to be used in all fluorescent lighting):
    - Ensuring that lighting is sufficient, but not overdesigned. Keep maintained luminance levels lower than 400 lux;
    - Sub-meter all energy uses, in order for building managers to monitor energy consumption so that the causes of high consumption can be resolved;
    - Zone lighting layouts for switching, reducing unnecessary energy consumption when occupants are not in certain areas of the building;
    - Reduce the consumption of energy in peak periods, through the use of ice tanks or photovoltaic panels; and
    - Generators that minimise harmful emissions should be specified.

- Building envelope and materials:
    - High performance glazing, wall and roof insulation to reduce energy loads and keep the building cool in the summer and warm in the winter;
    - Provide windows to allows a lot of natural daylight into the building, but include external shading to eliminate discomfort and glare from direct sun rays;
    - Avoidance of very deep internal spaces within the building, unless well-lit atria are included in design. Allow for external views of all occupants by locating usable area within 8m of a window;
    - Thorough hazardous material surveys must be conducted if buildings are being refurbished or extended;
    - Materials with good acoustic properties to ensure low noise levels should be specified;
    - Building materials with a recycled content (steel, wood etc.) should be chosen;
    - Timber from certified sustainable forests is preferred;
    - Substitute cement in concrete with flyash/ aggregate;
    - Specify paints, adhesives and carpets with low VOC contents;
    - Avoidance of products with formaldehyde content, for example: composite woods;
    - Contractor to source all building materials locally to reduce emissions of transportation and support the local economy;
    - All thermal insulation to be manufactured with no ozone depleting substances.
- Wet service design to include rainwater harvesting, grey water recycling, reduction of landscape irrigation;
    - Use waterless urinals, water efficient taps, shower heads and toilets; and
    - Sub-meter all major water uses, in order for building managers to monitor water consumption so that the causes of high consumption can be resolved;
- Provision of facilities to encourage alternative transport to work. Cyclist facilities that include bicycle racks, lockers and showers; preferential parking for car pool vehicles, alternative fuel transport and scooters.

- Include a recycling storage area for office waste.

3.3.2 Storm Water Management

The methodology during the FEL-2 study is based on collecting the dirty runoff volumes for at least a 10 mm first flush of the site into a collection sump and containing a maximum of 10 mm first flush events in a surge and dirty water containment facility. The dirty runoff will be pumped from collection sumps into the surge dam from which the water will be treated and reused.

In the occurrence of a single rainfall event of more than 10 mm precipitation, the dirty water will first be contained and pumped to the surge dam, while any excess runoff thereafter is assumed to be clean which can overflow into a 1:2 year storm water system that discharges into the sea.

3.3.3 Waste Minimisation

The implementation of waste minimisation methods in existing and proposed operations will reduce the environmental impacts. Waste taken to the landfill site can be significantly reduced by employing the following solutions within the port:

- ***Beneficiation***: Is a process were commodity waste streams can be recovered from being treated to improve the physical or chemical properties. This enables the port to reduce the waste volume disposed to landfill.
- ***Eco-efficient and economic handling equipment***: Eco-efficiency generates more value through technology and process changes whilst reducing resources use and environmental impact throughout the product or service's life.

3.3.4 CO_2 Footprint

The reduction of CO_2 footprint in ports and terminals is possible through a cleaner energy mix and through reduced energy consumption using some of the following technology indicated below:

- Electric AC Drive Technology;
- VSG (Variable Speed Generator) Technology;
- Hybrid Technology with energy storage and recirculation.

Efficiency and operability of equipment have direct impact on the environment. By employing eco efficient technology they will serve as solutions in the reduction of handling operations, improvement of operation efficiency, reduction of emissions and energy savings.

3.3.5 Recycling

When reuse can no longer be carried out, the materials should preferably be recycled back into similar products or become secondary raw materials for the production of new products.

Generally producing new products from recycled materials consumes less energy and minimises the impact on the environment. In addition to conserving resources and reducing the environmental impacts, recycling also minimizes the use of landfill space, an important waste management objective.

3.3.6 Recovery

Recovery can be a viable option after reduction, reuse, and recycling have been fully explored. It can involve for example, incineration of waste and heat generation. The heat generation can be converted into power to be used commercially or domestically.

3.3.7 Energy efficiency

- Passive design methods towards energy conservation and consumption.
- Energy efficient solutions and installations for lighting, ventilation, cooling, heating, etc. (e.g. energy efficient light fittings).
- Alternative or renewable energy sources where practical, feasible or economical.

3.3.8 Water Conservation

- The saving or re-use methods (e.g. the stormwater collection system and disposal into the storage dam proposed by Aurecon).

3.4 ALTERNATIVES ASSESSMENT

Option 3A, sustainability design alternatives within Option 3A, and the “do nothing” approach are the only alternatives that will be comparatively assessed in the EIA phase in terms of environmental acceptability, technical and economic feasibility.

4. LEGAL FRAMEWORK

4.1 NATIONAL ENVIRONMENTAL MANAGEMENT ACT

The National Environmental Management Act, 1998 (Act No. 107 of 1998) [NEMA], as amended, provides a framework for the integration of the environmental management activities of various spheres of government. It promotes integrated management to ensure sustainable resource utilisation and development and requires that the DEA be the lead agent in ensuring effective custodianship of the environment. It also provides that sensitive, vulnerable, highly dynamic or stressed ecosystems, such as coastal shores, estuaries, wetlands, and similar systems require specific attention in management and planning procedures, especially where subjected to significant human resource usage and development pressure. The NEMA principles clearly emphasize the need to protect threatened ecosystems and are binding on all organs of state including the local authorities.

Section 23 of NEMA further determines that Integrated Environmental Management should be employed when any policies, programmes, plans or projects are drawn up to minimise the impact on the environment. The duty of officials to prevent pollution and ecological degradation, to promote conservation and secure ecologically sustainable development and use of natural resources, originates from the Constitution and NEMA.

An application for development has to conform to the requirements of the NEMA and the regulations promulgated in terms of Section 24 thereof. The proposed Port expansion development includes activities that may have a detrimental effect on the environment as listed in GNR 544, GNR 545 and GNR 546 (of 18 June 2010). The process to be followed in the application for an Environmental Authorisation regarding the relevant activities (as listed in **Table 4-1**) is a Scoping and EIA process, as described in the EIA Regulations, 2010, published in terms of Section 24(5) of the NEMA. The proposed Richards Bay Port Expansion Programme may not commence without an Environmental Authorisation from the DEA.

Table 4-1: EIA Listed Activities – Capacity Expansion

Listed Activity Number & Description		Relevance to the Expansion Programme
R544: 9	The construction of facilities or infrastructure exceeding 1000 m in length for the bulk transportation of … storm water – (i) with an internal diameter of 0.36 m or more; or (ii) with a peak throughput of 120 litres per second or more.	To provide for storm water management solutions and the required structures it is expected that the parameters within this activity will be exceeded. This activity is therefore relevant.

Listed Activity Number & Description		Relevance to the Expansion Programme
R544: 11	The construction of (i) canals, (ii) channels, (iii) bridges, (iv) dams, (v) weirs, (vi) bulk storm water outlet structures, (vii) marinas, (viii) jetties exceeding 50m^2 in size, (ix) slipways exceeding 50m^2 in size, (x) buildings exceeding 50 m^2 in size or (xi) infrastructure or structures covering 50 m^2 or more where such construction occurs within a watercourse or within 32m of a watercourse, measured from the edge of a watercourse, excluding where such construction will occur behind the development setback line.	The construction of the capacity expansion facilities which will involve other activities such as bulk storm water outlets, buildings and other infrastructure as listed in the listed activity will be performed within a watercourse and or the vicinity of a watercourse which therefore makes this activity relevant. Subsequent to construction impacts.
R544: 12	The construction of facilities or infrastructure for the off-stream storage of water, including dams and reservoirs, with a combined capacity of 50,000m^3 or more, unless such storage falls within the ambit of activity 19 of Notice 545 of 2010.	For construction and operational purposes, the storage of water in excess of volumes that exceed the parameters given in the listed activity is expected. This activity is thus relevant.
R544:13	The construction of facilities or infrastructure for the storage, or for the storage and handling, of a dangerous good, where such storage occurs in containers with a combined capacity of 80 but not exceeding 500 m^3.	Dangerous goods may be stored at the proposed development to a capacity exceeding the given threshold within this activity.
R544: 17	The planting of vegetation or placing of any material on … exposed sand surfaces, within the littoral active zone for the purpose of preventing the free movement of sand, erosion or accretion, excluding where the planting of vegetation or placement of material relates to restoration and maintenance of indigenous coastal vegetation or where such planting of vegetation or placing of material will occur behind a development setback line.	This activity is triggered as a result of the need to facilitate and manage the resultant impact of storm water. Due to the capacity expansion, control measures and associated structures to sufficiently manage the expected flow and load may be developed. This activity is thus relevant.
R544: 18	The infilling or depositing of any material of more than 5 cubic metres into, or the dredging, excavation, removal or moving of soil, sand, shells, shell grit, pebbles or rock from (i) a watercourse, (ii) the sea; (iii) the seashore, (iv) the littoral active zone, an estuary or a distance of 100m inland of the high-water mark of the sea or an estuary, whichever is greater.	Dredging will be necessary to accommodate the significant increase of infrastructure. This activity will be triggered by dredging activities during the construction of the development.
R544: 20	Any activity requiring a mining permit in terms of section 27 of the Mineral and Petroleum Resources Development Act, 2002 (Act No. 28 of 2002) or renewal thereof.	This activity may be triggered by the need to remove significant volumes of minerals in the form of sand, clay, gravel, soil etc. to facilitate the construction of infrastructure and or structures.

Listed Activity Number & Description		Relevance to the Expansion Programme
R544: 22	The construction of a road, outside urban areas, (i) with a reserve wider than 13,5m.	The construction of roads for access to specific areas within the proposed development area is required. It is expected that this activity will be triggered.
R544: 23	The transformation of undeveloped, vacant or derelict land to (i) industrial use, outside an urban area and where the total area to be transformed is bigger than 1 ha but less than 20ha.	Although the total area to be developed and transformed is 2877 ha which far exceeds the 20 ha maximum requirement, pockets of vacant or derelict land may be required for transformation that are smaller than 20 ha, for the purpose of e.g. a construction camp/office.
R544: 27	The decommissioning of existing facilities or infrastructure, for (iv) storage, or storage and handling, of dangerous good) of more than 80 m^3 but excluding any facilities or infrastructure that commenced under an environmental authorisation issued in terms of the EIA Regulations, 2006 made under Section 24(5) of the Act and published in Government Notice No. R. 385 of 2006, or Notice No. 543 of 2010 (to confirm if magnetite, ferrochrome and ferromanganese are listed as dangerous).	The removal or decommissioning of existing infrastructure will be undertaken to accommodate for other infrastructure development which triggers this listed activity.
R544: 28	The expansion of existing facilities for the process or activity where such expansion will result in the need for a permit or license in terms of national or provincial legislation governing the release of emissions or pollution, excluding where the facility, process or activity is included in the list of waste management activities published in terms of Section 19 of the National Environmental Management: Waste Act, 2008 (Act No. 59 of 2008) in which case that Act will apply.	The expansion of the port will result in an increase in storage capacity and handling of increased volumes of materials/ goods (e.g. coal). Increased transportation into and out of the development area will also influence the relevance of this listed activity.
R544: 37	The expansion of facilities or infrastructure for the bulk transportation of sewage or stormwater where: (a) the facility or infrastructure is expanded by more than 1000m in length; or (b) where the throughput capacity of the facility or infrastructure will be increased by 10% or more, excluding where such expansion (i) relates to transportation of water, sewage or stormwater within a road reserve, or (ii) where such expansion will occur within urban areas but further than 32m from a water course, measured from the edge of the watercourse.	The existing water and storm water infrastructure system will be expanded to which the volumes or lengths are unknown at present. The capacity of the systems to be developed is also unknown.

Listed Activity Number & Description		Relevance to the Expansion Programme
R544:39	The expansion of (i) canals; (ii) channels; (iii) bridges; (iv) weirs; (v) bulk storm water outlet structures; (vi) marinas; within a watercourse or within 32 metres of a watercourse, measured from the edge of a watercourse, where such expansion will result in an increased development footprint but excluding where such expansion will occur behind the development setback line.	The expansion of the proposed development is associated with the listed infrastructure in the activity and it is within the vicinity of watercourse or watercourses.
R544:40	The expansion of (i) jetties by more than 50 m^2; (ii) slipways by more than 50 m^2; or (iii) buildings more than 50 m^2 within a watercourse or within 32 metres of a watercourse, measured from the edge of watercourse, but excluding where such expansion will occur behind the development setback line.	The port expansion would result in the demand for additional and or expansion of buildings to facilitate various services. This activity is relevant in this regard.
R544: 43	The expansion of structures in the coastal public property where the development footprint will be increased by more than 50 m^2, excluding such expansions within existing ports or harbours where there would be no increase in the development footprint or throughput capacity of the port or harbour.	With the expected expansion of the port which will increase the throughput capacity of the port and consequently the development footprint
R544: 44	The expansion of structures in the coastal public property where the development footprint will be increased by more than 50 m^2, excluding such expansions within existing ports or harbours where there would be no increase in the development footprint or throughput capacity of the port or harbour.	The proposed area to be development is about 2877 ha and it is at the edges of the coast. The conditions provided within this listed activity are therefore applicable to the proposed development.
R544: 45	The expansion of facilities in the sea, an estuary, or within the littoral active zone or a distance of 100 m inland of the high-water mark of the sea or an estuary, whichever is greater, for (i) fixed or floating jetties and slipways where such expansion will result in an increase in the development footprint of such facilities but excluding where such expansion occurs (b) within existing ports or harbours where there will be no increase in the development footprint or throughput capacity of the port or harbour.	Due to the expansion of the port, existing infrastructure (e.g. buildings, water infrastructures) will need to be expanded to provide for the increase in service requirements.

Listed Activity Number & Description		Relevance to the Expansion Programme
R544: 53	The expansion of railway lines, stations or shunting yards where there will be an increased development footprint, excluding (i) railway lines, shunting yards and railway stations in industrial complexes or zones, (ii) underground railway lines in mines, (iii) additional railway lines within the reserve of an existing railway line.	Existing rail infrastructure will be expanded to help improve transportation requirements of the proposed capacity expansion programme. This will involve construction on virgin land and thus will increase he development footprint.
R544: 54	The expansion of an island, anchored platform or any other permanent structure on or along the sea bed, where the expansion results in an increased development footprint.	This activity is relevant because the proposed expansion magnitude of 2877 ha will significantly increase the development footprint.
R545: 3	The construction of facilities or infrastructure for the storage, or storage and handling of a dangerous good, where such storage occurs in containers with a combined capacity of more than 500 m^3.	Considering the magnitude of the proposed development it is expected that the construction of such facilities at the provided capacities or even more will be undertaken.
R545: 6	The construction of facilities or infrastructure for the bulk transportation of dangerous goods (iii) in solid form, outside an industrial complex, using funiculars or conveyors with a throughput capacity of more than 50 tons per day.	Due to the magnitude, associated functions and activities of the proposed project it is expected that the threshold in this activity will be exceeded.
R545: 8	The construction of facilities or infrastructure for the transmission and distribution of electricity with a capacity of 275kV or more, outside an urban area or industrial complex.	Increased electrical capacity to feed the proposed expansion will be developed. It is expected that the required capacity to service the port expansion will be within the conditions given in this listed activity. This activity is thus relevant.
R545: 11	The construction of railway lines, stations or shunting yards, excluding (i) railway lines, shunting yards and railway stations in industrial complexes or zones; or (iii) additional railway lines within the reserve of an existing railway line.	There is a need to provide for additional rail structures to assist facilitate transportation requirement for the capacity expansion programme. Development of new and expansion of existing rail structures will be constructed to help facilitate transportation services. This activity is triggered.
R545: 14	The construction of an island, anchored platform or any other permanent structure on or along the sea bed.	The port expansion will involve the development of infrastructure along the sea bed. This activity is therefore relevant.
R545: 15	Physical alteration of undeveloped, vacant or derelict land for industrial use where the total area to be transformed is 20ha or more.	The total area to be transformed is 2877 ha. The impacts of such large developments include, *inter alia,* ecosystem degradation and habitat destruction. This activity is therefore triggered.

Listed Activity Number & Description		Relevance to the Expansion Programme
R545: 19	The construction of a dam, where the highest part of the dam wall, as measured from the outside toe of the wall to the highest part of the wall, is 5m or higher or where the highwater mark of the dam covers an area of 10ha or more.	To provide for the storage of storm water and water required for construction and operational purposes, it is expected that this activity will be triggered.
R545: 24	Construction or earth moving activities in the sea, an estuary, or within the littoral active zone or a distance of 100 metres inland of the high-water mark of the sea or an estuary, whichever is greater, in respect of: (i) facilities associated with the arrival and departure of vessels and the handling of cargo, (ii) piers, (iii) inter- and sub-tidal structures for entrapment of sand; (iv) breakwater structures; (v) coastal marinas; (vi) coastal harbours or ports; (vii) structures for reclaiming parts of the sea; (viii) tunnels; or (ix) underwater channels; But excluding – (a) activities listed in activity 16 in Notice 544 of 2010. (b) construction or earth moving activities if such construction or earth moving activities will occur behind the development setback line; (c) where such construction or earth moving activities will occur in existing ports or harbours where there will be no increase of the development footprint or throughput capacity of the port or harbour, or (d) where such construction or earth moving activities take place for maintenance purposes.	Activities associated with the expansion of the port include construction of or increase in capacity of water infrastructure and other facilities. Such construction will occur within the sea as well as in close proximity to estuaries and other water courses. With the increase in the footprint of the port, this activity is thus relevant for the proposed development.
R546:4	The construction of a road wider than 4 metres with a reserve less than 13,5 metres, (a) In KwaZulu-Natal … (i) In an estuary; (ii) Outside urban areas, in: … (aa) National Protected Area Expansion Strategy Focus areas; …	Road construction due to increased transportation requirements for access into and from the port triggers this activity.

Listed Activity Number & Description		Relevance to the Expansion Programme
R546: 12	The clearance of an area of 300 m^2 or more of vegetation where 75% or more of the vegetative cover constitutes indigenous vegetation. (a) Within any critically endangered or endangered ecosystem listed in terms of section 52 of the NEMBA or prior to the publication of such a list, within an area that has been identified as critically endangered in the National Spatial Biodiversity Assessment 2004. (b) Within critical biodiversity areas identified in bioregional plans.	The land area expected to be developed is 2877 ha and is expected to traverse natural land which constitutes indigenous vegetation. This will impact on sensitive ecological areas such as mangroves. This activity is thus triggered.
R546:13	The clearance of an area of 1 hectare or more of vegetation where 75% or more of the vegetative cover constitutes indigenous vegetation, except where such removal of vegetation is required for (2) the undertaking of a linear activity falling below the thresholds mentioned in Listing Notice 1 in terms of GN No. 544 of 2010. (a) Critical biodiversity areas and ecological support areas as identified in systematic biodiversity plans adopted by the competent authority. (b) National Protected Area Expansion Strategy Focus areas. (c) In KwaZulu-Natal: (ii) Outside urban areas, the following: (aa) A protected area identified in terms of NEMPAA, excluding conservancies. (bb) National Protected Area Expansion Strategy Focus areas.	The expected area to be developed is approximately 2877 ha which exceeds the threshold within this listed activity.
R546:14	The clearance of an area of 5 hectares or more of vegetation where 75% or more of the vegetative cover constitutes indigenous vegetation, except where such removal of vegetation is required for: (1) purposes of agriculture or afforestation inside areas identified in spatial instruments adopted by the competent authority. (a) In Kwa Zulu Natal… (i) All areas outside urban areas	The land area expected to be developed is 2877 ha and is expected to traverse natural land which constitutes indigenous vegetation. Clearance of site for infrastructure development may result in degradation disturbance and disturbance of indigenous vegetation. This may impact on the natural value of the area. The listed activity is thus relevant.
R546:16	The construction of: (i) jetties exceeding 10 square metres in size (ii) slipways exceeding 10 square metres in size;	Considering the total land area to be developed and the required infrastructural expansions the given threshold within this activity will be exceeded. Therefore this activity is triggered.

4.2 NATIONAL ENVIRONMENTAL MANAGEMENT: INTEGRATED COASTAL MANAGEMENT ACT

The National Environmental Management Integrated Coastal Management Act (No.24 of 2008) [NEM:ICMA] aims to establish a system of integrated coastal and estuarine management and to ensure that development within the coastal zone is socially and economically justifiable and ecologically sustainable.

In order to minimise or mitigate negative environmental impacts, the NEM:ICMA refers to the NEMA provisions for the need to obtain environmental authorisations prior to undertaking certain listed activities. Any of the listed activities that are conducted in the coastal zone will require and environmental authorisation in terms of NEMA. In addition to the NEMA requirements and criteria for environmental authorisations, the NEM:ICMA provides for additional criteria that must be considered by the relevant competent authority when evaluating an application for an activity which will take place in the coastal zone.

4.3 NATIONAL ENVIRONMENTAL MANAGEMENT: WASTE ACT

The National Environmental Management: Waste Act, 2008 (Act No. 59 of 2008) (NEM:WA) regulates waste management in order to protect human and environmental health, by providing reasonable measures for the prevention of pollution and ecological degradation, and for securing ecologically sustainable development. It also provides for national norms and standards for regulating the management of waste by all spheres of government, providing for specific waste management measures for licensing and the control of waste management and remediation activities associated with contaminated land. This legislation provides for compliance and enforcement of the above requirements.

The activities listed under Categories A and B in Government Notice (GN) 921 of July 2013 (Government Gazette No. 32368 as amended) published in terms of the NEM:WA shown in Table 2 below are applicable to the Capacity Expansion project.

The competent authority for the issuing of a Waste Management License for the disposal of general waste to land is the KZN DAEA. However, since there is a potential that hazardous waste is present in the material removed during dredging, this authority reverts back to the DEA.

Table 4-2: Listed Activities in terms of NEM:WA

Category Number	Description of Activity
Cat A(2)	The sorting, shredding, grinding, crushing, screening or bailing of general waste at a facility that has an operational area in excess of 1000m^2.
Cat A(3)	The recycling of general waste at a facility that has an operational area in excess of 500m^2, excluding recycling that takes place as an integral part of an internal manufacturing process within the same premises.

Category Number	Description of Activity
Cat A(5)	The recovery of waste including the refining, utilisation, or co-processing of waste in excess of 10 tons but less than 100 tons of general waste per day or in excess of 500 kg but less than 1 ton of hazardous waste per day, excluding recovery that takes place as an integral part of an internal manufacturing process within the same premises.
Cat A(8)	The remediation of contaminated land.
Cat A(12)	The construction of a facility for a waste management activity listed in Category A of this schedule (not in isolation to associated waste management activity).
Cat A(14)	The decommissioning of activities listed in this Schedule.
Cat B(2)	The reuse and recycling of hazardous waste in excess of 1 ton per day, excluding reuse or recycling that takes place as an integral part of an internal manufacturing process within the same premises.
Cat B(3)	The recovery of hazardous waste including the refining, utilisation or co-processing of waste at a facility with a capacity to process more than 100 tons of general waste per day or in excess of 1 ton of hazardous waste per day excluding recovery that takes place as an integral part of an internal manufacturing process within the same premises.
Cat B(7)	The disposal of any quantity of hazardous waste to land.
Cat B(8)	The disposal of general waste to land covering an area in excess of 200m^2 and with a total capacity exceeding 25000 tons.
Cat B(10)	The construction of a facility for a waste management activity listed in Category B of this Schedule (not in isolation to associated waste management activity).

4.4 NATIONAL ENVIRONMENTAL MANAGEMENT: AIR QUALITY ACT

An Air Emissions Licence (AEL) number UDM/11-12/AEL0005/1 in the name of Transnet Port Terminal (TPT), which handles the coal in the Port of Richards Bay, is valid until 21 March 2017. The requirement for an AEL is triggered by listed activity number 14, Category 5, sub-category 5.1: Storage and Handling of Ore and Coal, and possibly listed activity number 11, Category 2, sub-category 2.2: Storage and Handling of Petroleum Products. The licence is issued by the uThungulu District Municipality.

As it is yet unclear whether TPT will continue with the handling of the coal once the proposed expansion is completed, either an amendment of the TPT AEL or a new AEL in the name of TNPA needs to be applied for. Information required for the AEL will be inclusive of atmospheric emission impacts, discharges to the atmosphere under various scenarios and fugitive emissions regarding the increased and/or location changes for the storage of coal for the Capacity Expansion programme.

4.5 NATIONAL WATER ACT

The National Water Act (Act No. 36 of 1998) (NWA) aims to regulate the use of water and activities, which may impact on water resources through the categorisation of listed water uses, which encompass water abstraction, flow attenuation within catchments, construction within the flood lines of a river, as well as the potential contamination of water resources. Such activities require authorisation and/or licensing by the Department of Water Affairs (DWA) before they may take place.

In accordance with GN R1199 of 18 December 2009 Replacement of General Authorisations in terms of Section 39 of the NWA, water uses associated with the diversion of roads, construction of bridges/culverts and for the abstraction of water for construction related activities from, as yet unidentified, water courses may be required. AECOM will propose to the DWA for the application of one Water Use Licence Application for the Capacity Expansion programme.

Should a Contractor require water for construction purposes, a general authorisation could be applied for any amount up to 1000 m^3.

Table 4-3: indicates the anticipated water uses in terms of the NWA for the proposed works.

Table 4-3: Water Uses

Relevant NWA Section & Description		Relevance to the Proposed Programme
S 21 (a)	The taking of water from a water resource	Taking water from a water resource such as a river or stream (whether canalised or not), dam (the proposed storage dam which will become a water resource), spring, aquifer, wetland, or lake.
S 21 (b)	Storage of water	Water will be stored in the proposed storage dam.
S 21 (c)	Impeding or diverting the flow of water in a watercourse	Causing an obstruction to the flow of water in a watercourse or diverting some or all of the flow from a watercourse. The diverted water must eventually be returned to the natural watercourse. It can also be temporary in nature, such as the safe construction of a bridge or coffer dam.
S 21 (f)	Discharging waste or water containing waste into a water resource through a pipe, canal, sewer, sea outfall or other conduit.	The direct discharge of water or wastewater into a water resource. Examples are waste released into a river or dam at the discharge point.

Relevant NWA Section & Description		Relevance to the Proposed Programme
S 21 (g)	Disposing of waste in a manner which may detrimentally impact on a water course.	This includes the disposal of contaminated stormwater in the proposed storage dam.
S 21 (h)	Disposing in any manner of water which contains waste from, or which has been heated in, any industrial or power generation process.	Refers to the increased temperature of wastewater that may have a significant effect on the environment
S 21 (i)	Altering the bed, banks, course or characteristics of a watercourse	Refers to the physical changes that are made to a water resource such as widening or straightening of a river, the alteration of the streambed and banks are usually needed for construction or infrastructure or across a river, includes any activity closer than 500 m upstream or downstream from the boundary of any wetland or estuary.

It is unclear at this stage whether the expansion project requires a Water Use Licence or a General Authorisation. Direction from the DWA is required in this regard.

4.6 National Forests Act and National Environmental Management: Biodiversity Act

In terms of the National Forests Act (No 84 of 1998) [NFA] all natural forests are important for conservation from a national perspective, but those listed as Critically Endangered and Endangered under the National Environmental Management: Biodiversity Act (Act No 10 of 2004) [NEM:BA] must receive highest priority for protection, whether in the planning of new conservation areas, or control of development and land use change. In the case of Richards Bay, three forest types; Mangrove Forest, KwaZulu-Natal Coastal Forest and Swamp Forest, occur within the site boundary and are designated as Endangered. The guidelines provided under the NFA for this habitat category are indicated in Table 4-4.

Table 4-4: Guidelines for the Protection of Endangered Forest Habitats

Threat Status Rating of forest type and forest patch	Guidelines	Offset considered if possible
Endangered	No activities or development must be considered that will destroy forest; Low-impact eco-tourist facilities like boardwalks and bird-hides, and small bush-camps, but no buildings and infrastructure.	Only for projects proven to be of national or provincial strategic importance, with no feasible alternatives.

Some of the trees which occur on the sites are listed as protected species (Section 12 (1) (d) in terms of Section 15 of the NFA. These species were included as per Regulation R716 of 7

September 2012 in terms of the NFA. Protected trees many not be "cut, disturbed, damaged or destroyed and no person may collect, remove, transport, export, purchase, sell or donated, except under a licence or exemption granted by the Minister". Contravention of this declaration is regarded as a first category offense by this schedule.

4.7 MINERAL AND PETROLEUM RESOURCES DEVELOPMENT ACT

The Port Expansion Programme will, where practical, procure material from commercial sources.

In terms of the GN R762 of 25 June 2004, "Exemptions of Organs of State from Certain Provisions of the Mineral and Petroleum Resources Development Act (Act 28 of 2002) [MPRDA]" Transnet is exempt from complying with the provisions of Sections 16, 20, 22 and 27 of the Act.

Hard rock quarries and borrow pits larger than 1.5 hectares require a Scoping Report and Environmental Management Programme (EMPr), whilst borrow pits (less than 1.5 hectares) require only an EMPr to be submitted to the Department of Mineral Resources (DMR) for approval.

In terms of Section 43(4) of the MPRDA an application for a Closure Certificate is required on the cessation or completion of mining activities (i.e. relevant to old borrow pits). In terms of Regulation 57 the following would be required:

- Closure Plan.
- Environmental Risk Report.
- Final Performance Assessment.
- Application Form.

4.8 NATIONAL HERITAGE RESOURCES ACT

The National Heritage Resources Act (No. 25 of 1999) (NHRA) stipulates in:

- Section 34(1) that no person may alter or demolish any structure or part of a structure which is older than 60 years without a permit issued by the relevant provincial heritage authority;
- Section 35(3) that any person who discovers archaeological or palaeontological objects or material or a meteorite in the course of development or agricultural activity must immediately report the find to the responsible heritage resources authority, or to the nearest local authority offices or museum, which must immediately notify such heritage resources authority;

- Section 35(4) that no person may, without a permit issued by the responsible heritage resources authority -a) destroy, damage, excavate, alter, deface or otherwise disturb any archaeological or palaeontological site or any meteorite; b) destroy, damage, excavate, remove from its original position, collect or own any archaeological or palaeontological material or object or any meteorite; c) trade in, sell for private gain, export or attempt to export from the Republic any category of archaeological or palaeontological material or object, or any meteorite; or d) bring onto or use at an archaeological or palaeontological site any excavation equipment or any equipment which assist in the detection or recovery of metals or archaeological and palaeontological material or objects, or use such equipment for the recovery of meteorites;
- Section 36(3) that no person may, without a permit issued by SAHRA or a provincial heritage resources authority - a) destroy, damage, alter, exhume or remove from its original position or otherwise disturb the grave of a victim of conflict, or any burial ground or part thereof which contains such graves; b) destroy, damage, alter, exhume, remove from its original position or otherwise disturb any grave or burial ground older than 60 years which is situated outside a formal cemetery administered by a local authority; or c) bring onto or use at a burial ground or grave referred to in paragraph (a) or (b) any excavation equipment, or any equipment which assists in the detection or recovery of metals
- Section 38 that a Heritage Impact Assessment (HIA) is required for undertaking the following activities: a) A road, wall, power line, pipeline, canal or other similar form of linear development or barrier exceeding 300m in length, b) The construction of a bridge or similar structure exceeding 50m in length, c) any development or other activity which will change the character of a site — (i) exceeding 5 000m^2 in extent; (ii) involving three or more existing erven or subdivisions thereof; or (iii) involving three or more erven or divisions thereof which have been consolidated within the past five years, d) the re-zoning of a site exceeding 10 000m^2 in extent, and e) any other category of development provided for in regulations by SAHRA or a provincial heritage resources authority.

However, the Heritage and Paleaontological Resources Baseline Study undertaken by eThembeni Cultural Heritage found that except for the likely presence of paleontological sites in the Bay, no structures older than 60 years are present in the study area as the port was only developed in 1973. A paleontological study only is thus required for the Port Expansion.

4.9 OTHER APPLICABLE LEGISLATION

Other applicable legislation not listed in the aforementioned sections, which must be considered by the Applicant (i.e. Transnet SOC Limited (TCP)) during the implementation of the proposed project, is summarised in **Table 4-5** below.

Table 4-5: Summary of Other Applicable Legislation

Legislation	Sections	Relates to
The Constitution (No 108 of 1996)	Chapter 2	Bill of Rights
	Section 24	Environmental rights
	Section 25	Rights in property
	Section 32	Administrative justice
	Section 33	Access to information
National Environmental Management Act (No 107 of 1998) as amended	Section 2	Defines the strategic environmental management goals, principles and objectives of the government. Applies throughout the Republic to the actions of all organs of state that may significantly affect the environment.
	Section 23	Determines that Integrated Environmental Management should be employed when any policies, programmes, plans or projects are drawn up to minimise the impact on the environment. The duty of officials to prevent pollution and ecological degradation, to promote conservation and secure ecologically sustainable development and use of natural resources.
	Section 24	Provides for the prohibition, restriction and control of activities which are likely to have a detrimental effect on the environment.
	Section 28	The developer has a general duty to care for the environment and to institute such measures as may be needed to demonstrate such care.
	Section 30	Control of emergency incidents and duties of persons responsible.
National Environmental Management: Air Quality Act (No 39 of 2004)	Section 32	Control of dust
	Section 34	Control of noise
	Section 35	Control of offensive odours
	Chapter 5	Licensing of listed activities
	Schedule 2	Ambient air quality standards
National Environmental Management: Biodiversity Act, 2004 (Act 10 of 2004)	Sections 56 and 57	These sections deal with the listing of species that are threatened or in need of national protection and restricted activities involving listed threatened or protected species.
	Sections 65-69	These sections deal with restricted activities involving alien species; restricted activities involving certain alien species totally prohibited; and duty of care relating to alien species.
	Sections 71 and 73	These sections deal with restricted activities involving listed invasive species and duty of care relating to listed invasive species.
National Environmental Management: Protected Areas Act (No 57 of 2003)	The aim of the Act is to provide for the protection and conservation of ecologically viable areas representative of South Africa's biological diversity, natural landscapes and seascapes.	
Conservation of Agricultural Resources Act (No 43 of 1983) and regulations	Section 5, 6	Implementation of control measures for alien and invasive plant species, especially in urban areas. Control of wetland areas including rehabilitation thereof.
Occupational Health and Safety Act (No 85 of 1993) and regulations	Section 8	General duties of employers to their employees.
	Section 9	General duties of employers and self-employed persons to persons other than their employees.
Hazardous Substances Act (No 15 of 1973) and	Provides for the definition, classification, use, operation, modification, disposal or dumping of hazardous substances.	

Legislation	Sections	Relates to
regulations		
National Road Traffic Act (No 93 of 1996) and regulations	Section 54	Transportation of dangerous goods.
National Veld and Forest Fire Act (No 101 of 1998)	Chapter 2	Promotes and regulates the formation of fire protection associations which aim to manage and coordinate fire protection and fire services in an area.
	Chapter 4, 5	Organizations are required to make and maintain firebreaks and firefighting equipment and personnel should a risk exist that a fire may start or spread from the premises.
National Forest Act (No 84 of 1998)	Section 7	No person may cut, disturb, damage or destroy any protected tree except if a permit has issued.
Water Services Act (No 108 of 1997) and regulations	Section 7	Effluent acceptance from Local Authority.
Development Facilitation Act (Act 67 of 1995)	Relates to land development objectives (LDO) in the area due to construction.	
National Building Regulations and Building Standards Act (No 103 of 1977)	Section 4	Local Authority approval of plans to erect buildings.
	Section 10	Local Authority may prohibit work from continuing and may set standards for earthwork or construction being done.
uMhlathuze Local Municipality By-Laws	Noise Control By-law, 2010 Municipal Health By-law, 2010 Waste Management By-law, 2010 Fire Safety By-law, 2007 Roads, Traffic and Safety By-law, 2007 Water and Sanitation By-law, 2010 Stormwater Management By-law (Draft)	

4.10 GUIDELINE DOCUMENTS

The following guideline documents have been considered during the process:

a) Companion to the National Environmental Management Act Environmental Impact Assessment Regulations of 2010, Integrated Environmental Management Guideline Series 5, 2010, Department of Environmental Affairs, Pretoria.

b) Public Participation in the EIA Process, Integrated Environmental Management Guideline Series 7, 2010, Department of Environmental Affairs, Pretoria.

c) Guideline 5: Assessment of Alternatives and Impacts in support of the Environmental Impact Assessment Regulations, Integrated Environmental Management Guideline Series, 2006, Department of Environmental Affairs, Pretoria.

d) South African National Standard – The Application of the National Building Regulations, Part X: Environmental Sustainability, Part XA: Energy Usage in Buildings, SABS Standards Division, 2011. (SANS 10400-XA: 2011).

e) DAERD, (2011) Environmental Management Framework for the Richards Bay Port Expansion Area and Industrial Development Zone. Department of Agriculture, Environmental Affairs and Rural Development (DAERD), Pietermaritzburg, South Africa.

f) Environmental and Community Interface Report (Document 4653710-RPT-0016 (Rev 1)). Report prepared by Aurecon Pty Ltd on behalf of Transnet, 2012).

g) Standards South Africa (2005). Ambient air quality – List of common pollutants. South African National Standard 1929:2005.

h) City of uMhlathuze, IDP – Draft Process Plan, 2014-2015.

i) Draft Environmental Management Framework (EMF) report for Richards Bay Port Expansion Area and Industrial Development Zone, 2009.

5. DESCRIPTION OF THE AFFECTED ENVIRONMENT

5.1 STUDY AREA CONTEXT

The study area is situated within the uMhlathuze Local Municipality. The natural environment in this area is highly sensitive and under severe development pressure. The local landscape is characterised by interconnected network of hydrological ecosystems that sustains a combination of locally important habitats and species and contributes to the maintenance of one of South Africa's biodiversity hotspots. It also sustains a growing population in an area with very high levels of poverty.

The Port of Richards Bay, South Africa's premier bulk port, falls within the same area. Its strategic location and the availability of land offer opportunities for further growth and port expansion.

5.2 CLIMATE

Richards Bay has a warm to hot and humid subtropical climate, with warm moist summers. Average daily maximum temperatures range from 29° C in January to 23° C in July. The Mean Annual Precipitation (MAP) is 1 228 mm and most (~80%) of the rainfall occurs in the summer, from October to March. Early summer rainfall is derived mainly from deep convective showers and thunderstorm with occasional hailstorms. Late summer rainfall is less severe with more widespread convective activity associated with sub-tropical easterly circulation patterns. Tropical cyclones and middle-latitude systems have resulted in extreme rainfall events on several occasions and pose a risk to infrastructure within Richards Bay.

Table 5-1: Climate data for Richards Bay (based on monthly averages for a 30 year period, between 1961 – 1990 (SAW, 2005).

	Jan	Feb	Mar	April	May	June	July	Aug	Sept	Oct	Nov	Dec
Average Daily Max Temp (°C)	29	29	29	27	25	23	23	24	25	25	27	29
Average Daily Min Temp (°C)	21	21	20	18	15	12	12	14	16	17	19	20
MAP (mm)	172	167	107	109	109	57	60	65	77	105	114	86

5.2.1 Wind

The prevailing winds are from the north and north northeast (Figure 5-1), with an occasional southerly component, strengthening in mid-summer. As a result, any dispersion from the

site is likely to vary with the passage of weather systems up the coast but will be primarily to the south of the site.

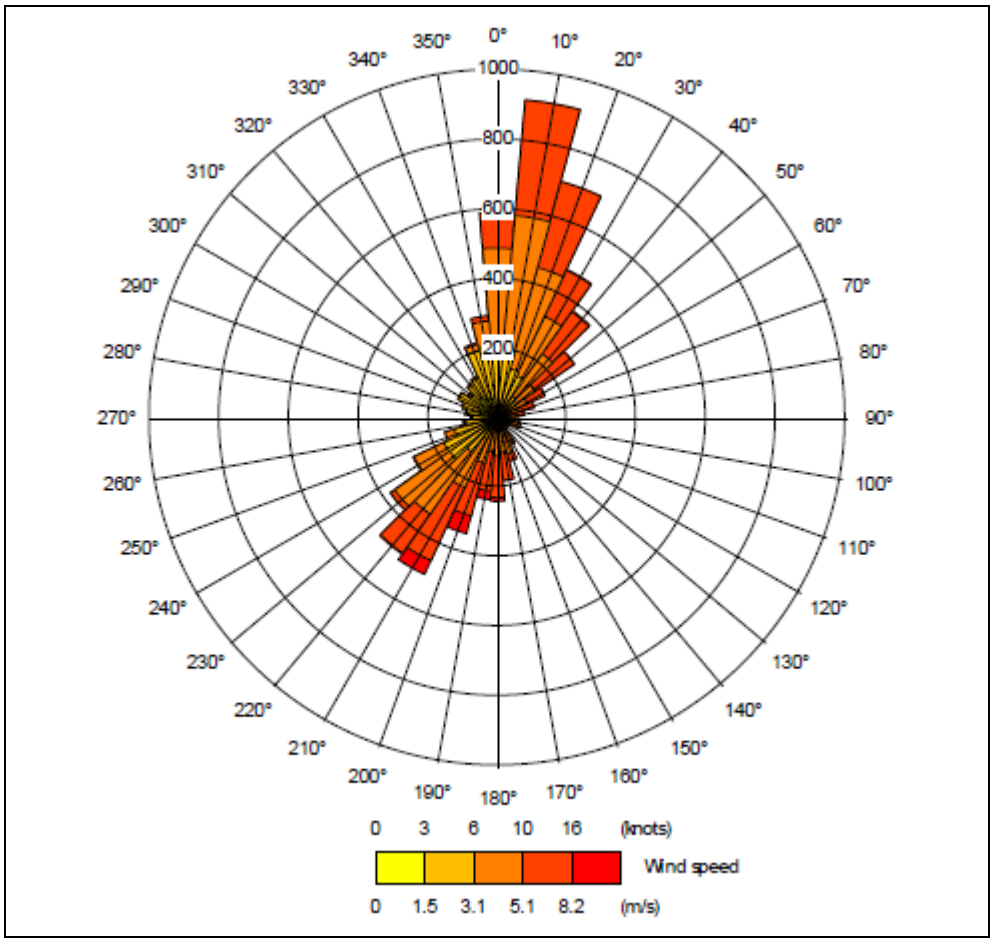

Figure 5-1: Annual wind rose for Richards Bay, KwaZulu-Natal Province, South Africa (SAWS, 2011)

5.2.2 Precipitation

The site is on the northeast coast of South Africa, in an area known for its warm, moist subtropical climate. The region is known colloquially as the KwaZulu-Natal north coast. This region is typified by regular, year round rain and spells of very hot and humid weather. The annual average rainfall for the region is 1228 mm per year. Rain peaks in late to mid-summer, in January and February, but is also likely to receive rain all year round (Figure 5-2).

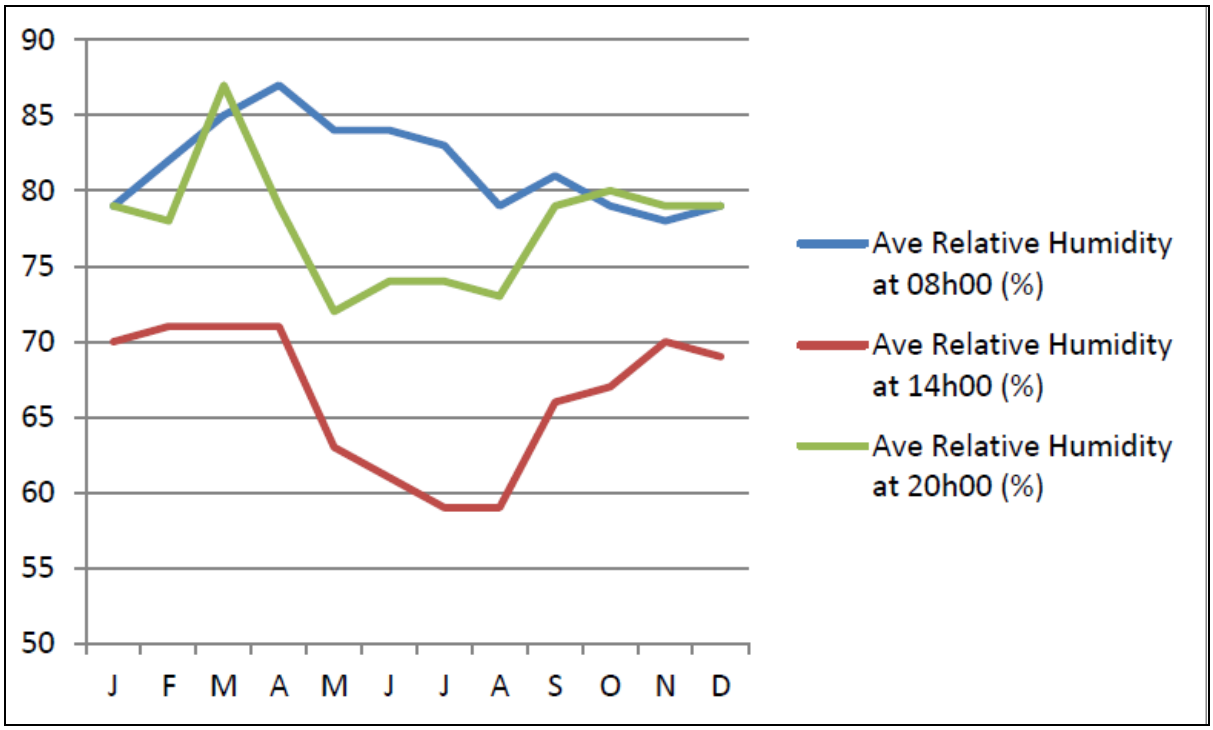

Figure 5-2: Average monthly rainfall figures for Richards Bay, KwaZulu-Natal Province, South Africa (SAWS, 1961-1990) (mm per month)

5.2.3 Temperature

The climate is consistently warm and moist, with minimum temperatures seldom, if ever dropping below the 10° C mark. The area experiences hot conditions during the summer, with the warmest period during December and January, when maximum temperatures average close to 30° C (Figure 5-3). Winters are mild with daytime temperatures reaching into the mid-twenties on most days and overnight temperatures never dropping below freezing. Despite it being nominally the dry season, winter remains consistently wet with occasional rain.

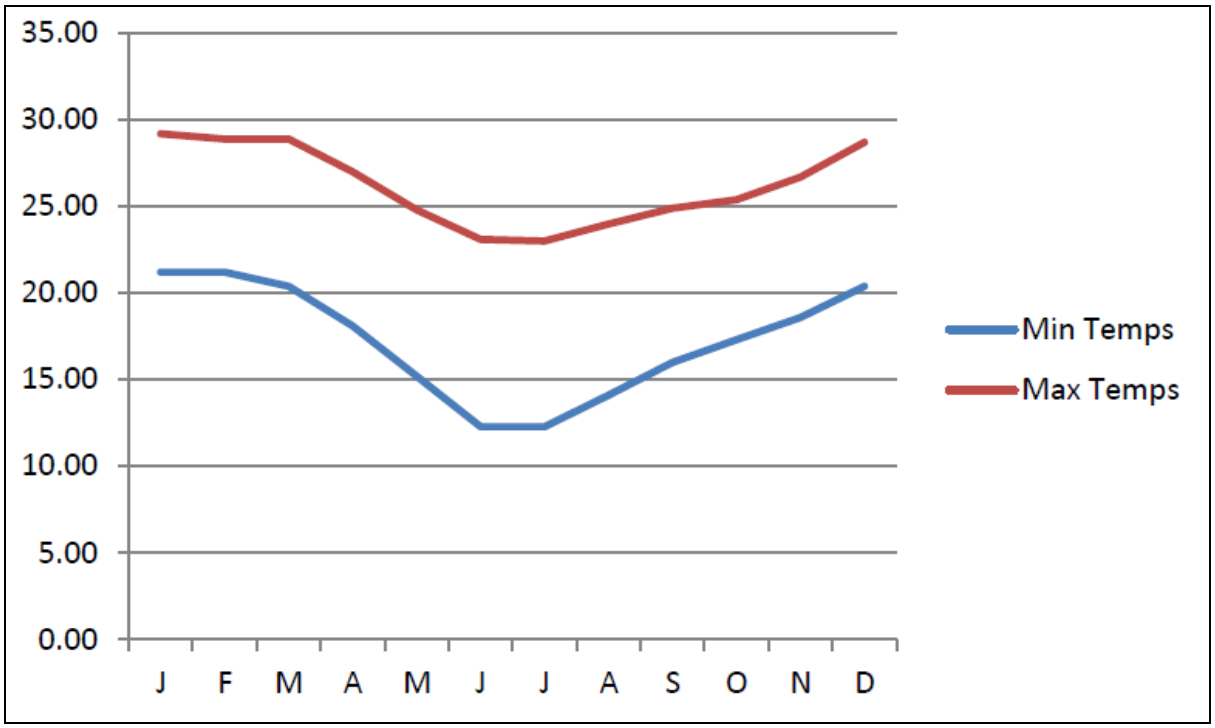

Figure 5-3: Average daily minimum and maximum temperatures for Richards Bay, KwaZulu-Natal Province, South Africa (SAWS, 1961-1990) (°C)

5.2.4 Extreme Weather Conditions

Rainfall variability over the last 30 years is illustrated in Figure 5-2 below. An extreme wet period occurred when Domoina and Imboa struck in 1984 after the 'deepening drought of 1982-1983'. The data highlights the natural local climate variability that is typical of the study area and which makes it vulnerable to flooding and climate change.

5.2.5 Climate Change

There is enough evidence to suggest that climate change is a reality in KwaZulu-Natal (Thornhill, Govender and Khoza; 2009).

The Natural Resources Section of the KZN Department of Agriculture, Environmental Affairs and Rural Development (DAERD) has demonstrated the implications of a warmer province. The DAERD model only used a single climatic variable, namely temperature, for these scenarios. Their scenarios show a clear shift in bio-climatic zones in the province under warming conditions. Such a scenario will change the current sub-tropical climate of the study area into a tropical climate in the near future (+1°C). This may cause significant changes in the area.

The significance of the existing climate change projections lies in the effect that these climate conditions may have on the resilience of the ecosystems in the study area, and whether the socio-economic systems will be able to adapt to changing conditions. For this

reason the City of uMhlathuze has commissioned a climate change vulnerability study for the area which was conducted by Zitholele Consulting in 2009.

5.3 HYDROLOGY

The main water resources of the City of uMhlathuze area can be divided into marine and freshwater systems that have strong ecological linkages (Mhlathuze Reserve Determination, DWAF, 2000). The Mhlathuze valley further divides the area into the eSikaweni region in the south and the Empangeni and Richards Bay region in the north. The original Mhlathuze estuary was split into the Richards Bay Harbour and a much reduced estuary with a new mouth (Figure 5-4). There are numerous rivers, streams, canals and diffuse seepage zones of freshwater that drain toward the estuary and harbour. These streams are all linked hydrologically and ecologically to a large number of lakes, swamps, and wetlands. The groundwater has strong linkages to all the other water resources that function as drainage boundaries. The groundwater is also the main flow component in some of these resources. Consequently the hydrological network forms a very important component of the water resources as it provides the hydraulic linkages, and often the ecological linkages, between the different resources.

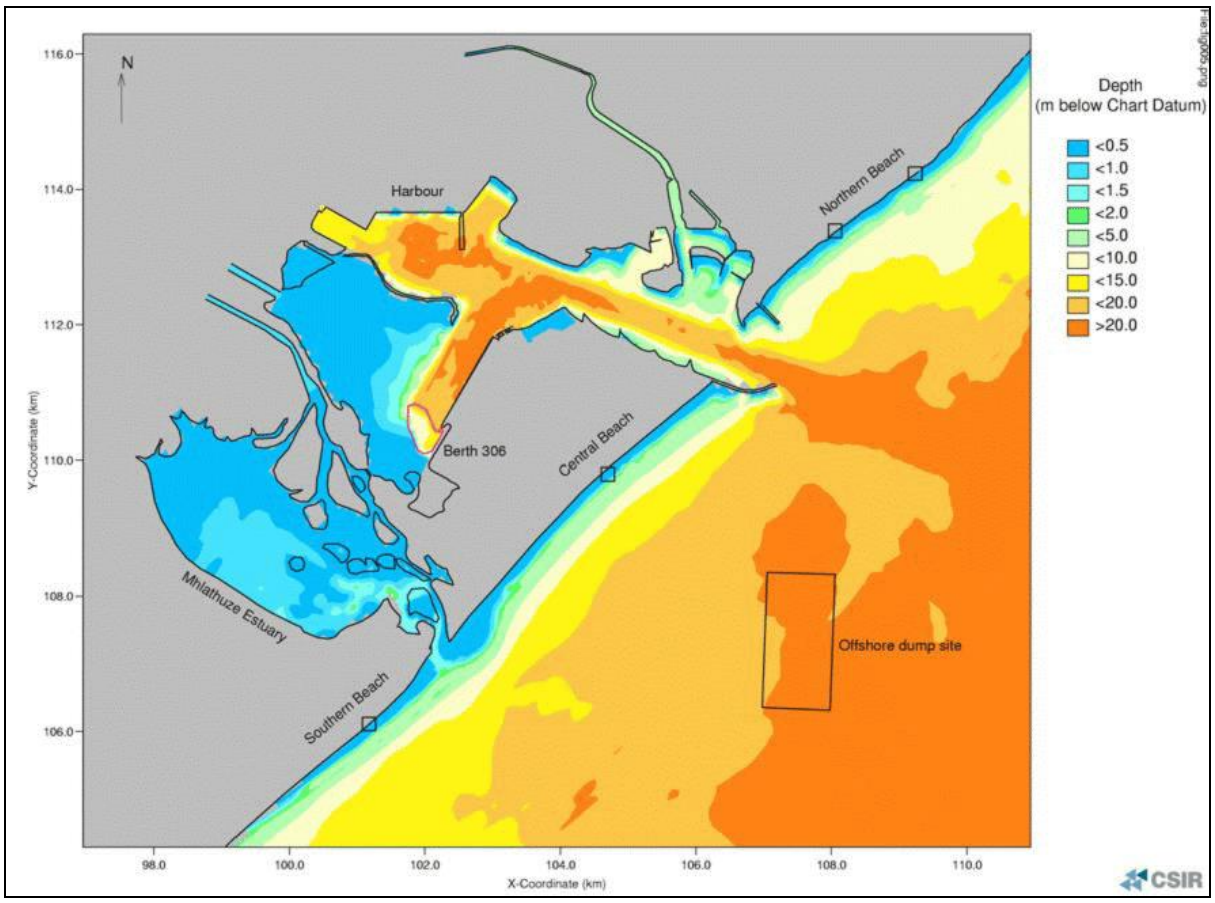

Figure 5-4: The Bathymetry of the new estuary and harbour (after INR, 1993)

5.4 GEOLOGY

The underlying physical geological foundation of the area gives rise to specific landscape features. It also controls the occurrence, distribution and type of water resources in the area, including the groundwater. The Richards Bay area lies on-top of the unconsolidated Cenzonic Era sediments of the Maputaland Lithological Group that stretch along the Maputaland coastal plain into Mozambique as illustrated in Figure 5-5.

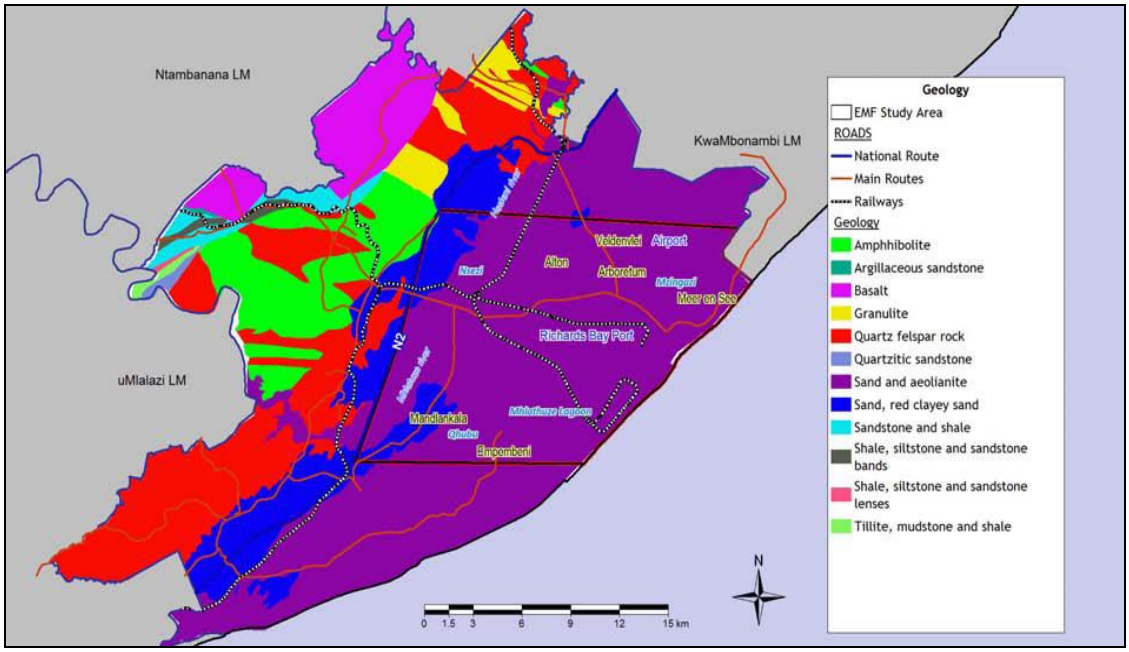

Figure 5-5: Geology of the Study Area.

5.5 SOILS

As stated in the Richards Bay Port Expansion and IDZ Environmental Management Framework, the soils in the area are closely related to the geology and landforms and compromise three main land types, namely deep grey sands, deep alluvial soils and red and yellow adepal soils (Figure 5-6).

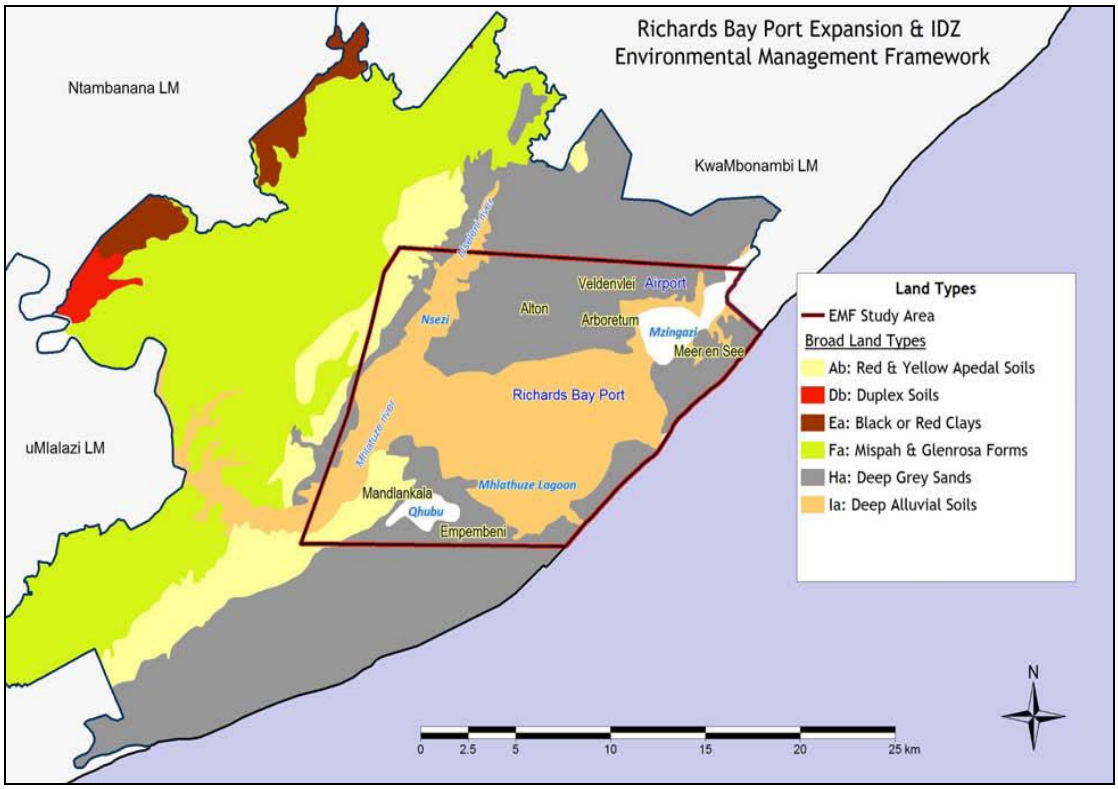

Figure 5-6: Soil Types

5.6 EXTREME FLOODING

The study area falls within a floodplain which, together with the rivers and lake systems forms a complex, dynamic physical and biological system that provides benefits to the humans and the natural systems in the area. Regular floods are necessary for maintain water quality, recharging groundwater, maintaining biological productivity and the general integrity of ecosystems. Although the study area is subject to marked flood-drought cycles, the frequency and magnitude of floods has probably been dampened by the construction of the Lake Pobane (Goedertrouw Dam) and modifications in the local landscape. The N2 freeway and numerous drainage canals in the Mhlathuze flood plain will have changed the natural flooding characteristics of the Mhlathuze Valley. The area is still subject to floods and the maintenance of critical areas within the area would reduce the number and severity of floods. Figure 5-7 illustrates the 1:100 year floodplain.

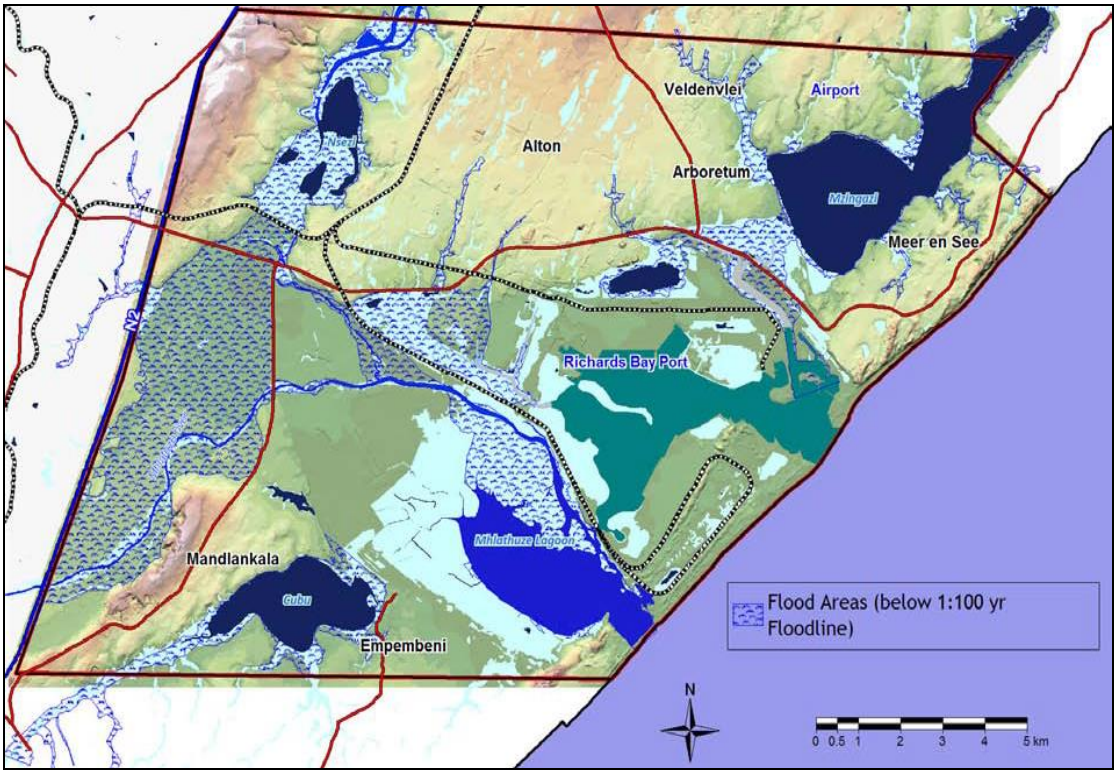

Figure 5-7: Land Types and Flood Areas

5.7 TOPOGRAPHY

Richards Bay is located at the seaward margin of the Mozambique Coastal Plain at an altitude of less than 100m. The Coastal Plain is characterised by an undulating surface of old dune ridges supporting shrub land and forest, swampy drainage courses and lake systems. The dune ridges were formed inn an alternating sequence parallel to the present coastline by a receding Pleistocene sea with the onset of the wurm glaciation (Tinley, 1985).

Both the shore foreland is eroding (Tinley, 1985) and massive dune slumping areas continually along the seaward edge. The red dune sands overlie a thick layer of clay material which influences in situ water drainage. The wetting of the clay by water percolation and seaward drainage which occurs through lateral piping at the point of contact between the dune sand and zones creates unstable conditions along the dune front. This resulted in cavitational dune slumping and the formation of steep basin shaped scars or cirques with flat floors of deep, steep-sided ravines. Because the water table becomes exposed at the cirque floor surface, these areas are usually stabilised with hygrophilous vegetation (Tinley, 1985).

5.8 ROAD NETWORKS

5.8.1 External Road Network

The road network providing access to the port, see Figure 1, is summarised as follows (Mpumalanga Provincial Government, 2010):

- **The National Route 2 (N2):** The N2 is a national route functioning as a north-south link in KwaZulu-Natal providing access to Richards Bay.
- **John Ross Parkway (R34):** John Ross Parkway is a provincial road that connects the port (and surrounding industries) to the N2. The road is a dual carriageway and functions as the main link between Richards Bay and Empangeni (a neighbouring town of Richards Bay). There are currently two road-over-rail bridge structures in John Ross Parkway. The design speed of the road is 100km/h and the speed limit is 80 km/h.
- **West Central Arterial**: The road provides access to the western entrance of the port, linking with the port internal road, Urania Road. The West Central Arterial is the main access road to the discard coal and liquid bulk terminals. The arterial also provides access to the Richards Bay Central Business District (CBD).
- **Harbour Arterial**: The road provides access to the Alusaf Bayside smelters. To the eastern end of the road, it becomes Ferro Close and connects to the John Ross Parkway.
- **Medway Road**: Medway Road provides access to the eastern entrance of the port. It also provides a link to the Multi-Purpose Terminals (MPT) series 7 and the Ferro and Timber storage areas.
- **Bayview Boulevard**: Bayview Boulevard, together with Bridgetown Road, provides access to the eastern section of the port, i.e. The Village (referring to the Richards Bay Waterfront, small crafts harbour, Naval Island and the commercial developments).

5.8.2 Internal Road Network

The internal road network provides access to a number of berths and developments. The main internal routes according to the Mpumalanga Provincial Government (2010) and Kehagias and Otto (2013), are:

- **Newark Road**: Forms the main east-west collector/distributor. The road provides access to the MPT, DBT and the port's administration complex. The road is divided into two sections:
    - − West of the eastern access: The main access road to the DBT.

  - − East of the eastern access: A public road that provides access to The Village.

- **Urania Road / Duine Road**: Provides access to the South Dunes area, where the privately owned Richards Bay Coal Terminal and the Island View bulk liquid storage areas are situated. Urania Road is also the main public road in the port.
- **Medway Road**: The road functions as a link between Newark Road and John Ross Parkway. Parts of the road are outside the port boundary and thus, both port and public vehicles use this road.
- **Bridgetown Road**: Bridgetown Road in conjunction with Pioneer Road, Mendoza Road and the eastern part of Newark Road serve The Village at the eastern end of the port.
- **Silver Ocean Road**: The road connects with Newark Road and provides access to the Shincel operation.
- **Ventura Road**: The road links with Newark Road and is the main road to the port's administration complex.
- **Octopus Road**: The road provides access to the MPT series 6 and connects with Newark Road.
- **Wayfarer Road**: Connects Newark Road with Minerva Road.
- **Petingo Road**: The road provides access to the western side of the MPT series 7 and the staging area and connects with Newark Road.
- **Chaldane Road**: The road provides access to the eastern side of the MPT series 7 and the staging area and connects with Newark Road.
- **Other Internal Roads**: There are a number of additional roads providing access to the developments in the port operational area. These roads include: San Thom Road, Gordon Road, Colombo Road, Northmoor Road, Dumra Road, Active Road, and Tugela Road.

5.8.3 Site Access

There are two main gates providing access to the industrial operations at the port of Richards Bay. These gates are manned and security clearance is required before access is granted.

These are:

- **The western port access**: This access is situated on the western end of Newark Road where it meets with the Western Central Arterial. The gate operates with two entry lanes and two exit lanes.
- **The eastern port access**: The eastern access is on Medway Road, just south of the intersection with the eastern part of Newark Road. The gate operates with one entry and one exit lane.

The Village is open to the public and can be accessed through the following roads:

- **Newark Road east**: The road can be accessed from Medway Road, just north of the eastern access.
- **Bridgetown Bridge Road**: The bridge in Bridgetown Road consists of only one lane and therefore operates with priority control, allowing one-way flow at a time on a first-come first-served basis.

5.8.4 Hydrology

Richards Bay is situated in the Usuthu-Mhlathuze Water Management Area. This Water Management Area is one of three large water management units in KwaZulu-Natal and shares its resources with Mpumalanga, Mozambique and Swaziland.

In terms of its geography, Richards Bay forms part of the uMhlathuze catchment.

The surface water component comprises the following features:

- Estuary;
- Rivers and Streams;
- Lakes;
- Harbour; and
- Canals.

5.8.5 uMhlathuze Estuary

The uMhlathuze Estuary is situated within a flood plain and is consequently the recipient of rivers, streams, canals and diffuse seepage zones of freshwater that drain towards the estuary and harbour. Surrounding lakes, swamps and wetlands are hydrologically and ecologically linked to these streams.

Also, groundwater is also greatly tied in with the aforementioned water resources and also forms the primary flow component in many of these resources. This hydrological network forms a crucial component in these water resources, as it provides the hydraulic and ecological link between the different resources.

5.8.6 Rivers and Streams

The uMhlathuze River is the largest river system within the uMhlathuze Estuary. It is characterised by a large flood plain that is exposed to intense exploitation and impacts upstream. The Nseleni stream feeds the uMhlathuze in the north-west through Lake Nsezi; the Nsezi stream is the freshwater link between Lake Nsezi and the uMhlathuze River.

The uMhlathuze River and its catchment have been extensively re-engineered over past decades. As a result of this re-engineering, it has reduced water inputs from the river to surrounding water features, which has consequently affected hydrological corridors and ecosystem maintenance.

5.8.7 Lakes

Several lakes form part of the uMhlathuze Estuary. Lakes Mzingazi and Cubhu are categorised as coastal lakes and are fed by rainfall, surface runoff and groundwater. These lakes have a very small stream network and their sustainable yield is believed to be primarily contributed by groundwater.

Lake Nsezi is located at the transition between the coastal plain and hard rock geological features, which provides it with a different hydrological function to the coastal lakes. Lake Nsezi is regarded as a combination lake – it is supplied from both groundwater and surface water from the Nseleni stream and direct rainfall.

5.8.8 Harbour

The harbour is associated with a reshaped water body and highly developed infrastructure areas on the northern and eastern perimeters. The structure of the port and its operations has an influence on the hydrodynamic processes of the harbour. Also, dredge spoils impacts the surf zone to cause in increase in turbidity, which in turn have aesthetic and ecological implications.

5.8.9 Canals

Three smaller streams in the central portion of Richards Bay drain directly into the Bhizolo or Ngodweni Canals, which in turn drains into the harbour area. An important aspect of these canals is their ability to carry pollutants from the industrial area into the harbour.

5.8.10 Quaternary Catchment

The site falls within the W12F Quaternary Catchment.

5.9 BIOLOGICAL ENVIRONMENT

5.9.1 Description of the Harbour Habitats

The current situation in the Port of Richards Bay is completely different from the situation prior to the development of the port, for example the course of the uMhlathuze River has been moved and the river now discharges into the Sanctuary. Although the system has been drastically altered, it still provides valuable ecosystem services. Should any of these functions be lost as a result of the proposed development, it has to be considered an impact of high significance in view of the importance of the system in terms of its regional and local contribution of the off-shore coastal ecology.

Fossil remains have been found in the Richards Bay area in the Cretaceous sedimentary rock of the St Lucia Formation. These sedimentary rocks are rich in fossil remains including that of ammonites, bivalves, gastropods, echinoids and foraminifera (Acer (Africa), 2008.

A number of sensitive habitats occur within the Port of Richards Bay and is illustrated in Figure 5-8. These include amongst others the following (CSIR 1996 in ACER (Africa) 2008), namely:

- Subtidal Mud flats;
- Sand flats;
- Freshwater environment;
- Mangroves;
- Reed swamps;
- Undeveloped terrestrial; habitats.

Of importance is the fact that the different habitats in the Richards Bay Port and adjacent estuary play a significant role in the ecology of the entire KwaZulu-Natal coast line. Any future development will have to consider this role.

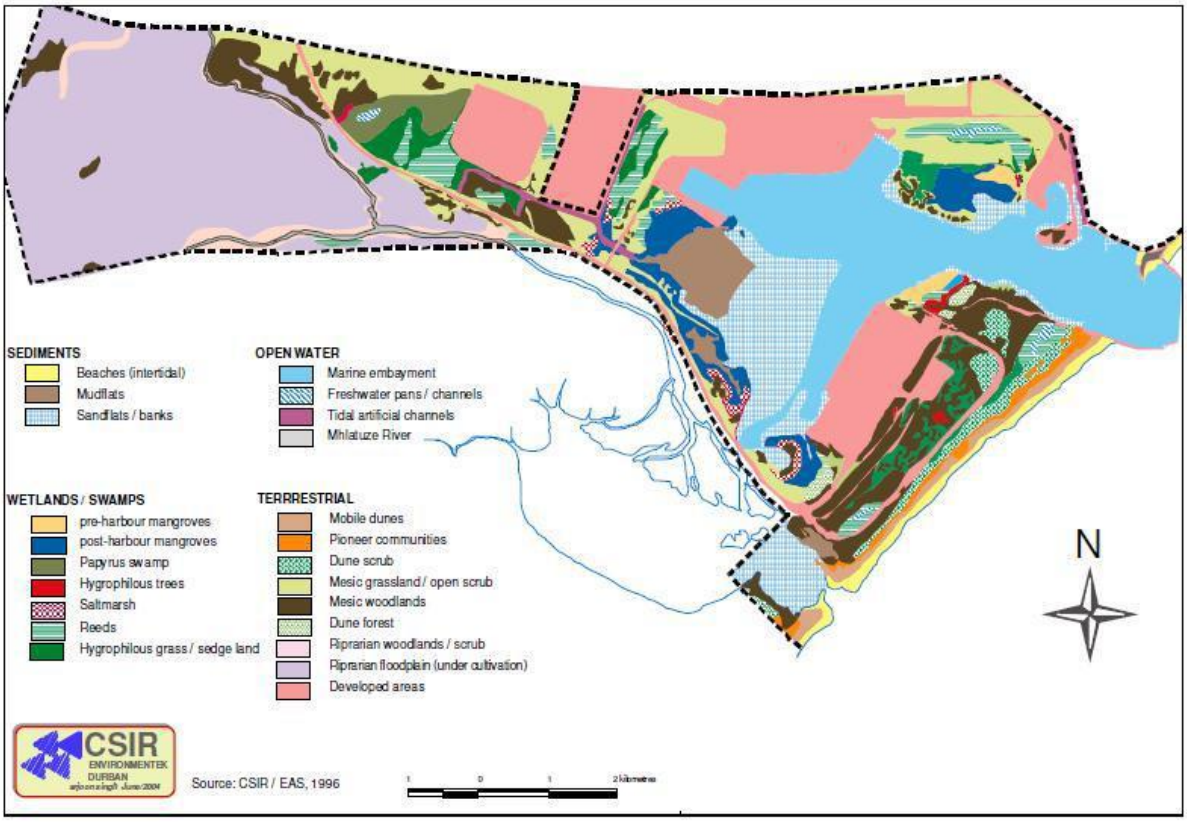

Figure 5-8: Sensitive habitats in the Port of Richards Bay ((CSIR, 1996 in ACER (Africa), 2008.

5.9.2 Subtidal Mud Flats

The subtidal mud flats occur in the south-western side of the port at the outlet of the Bhizolo Canal and cover an area of some 125 ha (Acer 2008). The subtidal mudflats are characterised by high biodiversity and contain up to 53 fish species (Forbes et al, 1996) and serve as important nursery habitats for estuarine dependant species. They also play an important role in nutrient processing and support a complex food web.

The mudflats are important habitats in the functional estuarine ecosystem and support both estuarine species and avifauna species. Species found in this habitat include nematodes and crustaceans as well as various life cycle stages of a number of fish species.

The subtidal mudflats also harbour a relatively large number of bird species, which include species listed in the IUCN Red List of Threatened Species (2012). The area, which is sheltered from the general public, is considered an area of high regional importance as some of the avifauna species such as the *Numenius phaeopus* (Whimbrel), *Limosa lapponice* (Bartailed godwit) and *Pluvialis squatarola* (Grey plover) are listed in terms of the African - Eurasian Waterbird Agreement under the Convention on the Conservation of Migratory Species of Wild Animals (also known as CMS or Bonn Convention), which therefore lends an international obligation to the area.

5.9.3 Sand Flats

The sand flats occur mainly in the south-western area of the port as well as on the edges where no quay development has taken place, and covers an area of more than 400 ha.

The sand flats function as nutrient processing areas and also serve as important habitats to birds, particularly waders. The faunal component of the sand flats includes species across the size range from micro – to macro faunal species.

One of the most conspicuous features of the port currently is the sand spit, which forms the northern boundary between the mud and sand flats in the south –western area of the port. The intertidal areas of the sand flats also serve as a refuge area for juvenile fish.

The sand spit serves as an important habitat for the roosting of birds, in particular waders, tern and gulls. The following species, listed in terms of the African –Eurasian Waterbird Agreement under the Bonn Convention, are regular occurrences:

- *Dromas ardeola (*Crab plover);
- *Tringa cinerea (*Terek sandpiper*);*
- *Sterna caspia (*Caspian tern*);*
- *Sterna bengalensis (*Lesser-crested tern*);*
- *Sterna albifrons (*Little tern*);*
- *Charadrius mongolus (*Mangolian sandplover*).*

Along the KwaZulu-Natal coast, large sand flat and mud flat habitats occur only in the larger estuaries, such as for example St Lucia, Kosi and Durban port. In view of the fact that many of the smaller similar habitats are under continuous threat from development, the importance of the sand and mud flats in Richards Bay, in the regional context cannot be over-estimated.

5.9.4 Fresh Water Environment

The Richards Bay Port receives fresh water through the following dredged canals, viz. Bhizolo Canal and Manzamnyama Canal, which flow into the port and disperse on the mud and sand flats in the south-western area. The Mzingazi Canal, which flows from Lake Mzingazi, is considered to be outside the port.

Nutrients from freshwater and mangrove swamps feed into these canals and are important nutrient processing areas, which feed into the marine environment along the coast. These canals also receive fresh water from the developed areas alongside Bayside Aluminium.

The Bhizolo and Manzamnyama Canals serve as important habitat for post larvae and juvenile prawn stages. These migrate, as adults, to the breeding grounds of the Thukela Bank.

The freshwater component of the port therefore plays an important role in the offshore production of prawns.

5.9.5 Mangroves

The mangroves are an important habitat for sea life, for birds and animals such as turtles and crocodiles. Sea life includes *Uca* species (Fiddler crabs), *Scylla serrate* (Mud crab), *Periophthalmus kalolo* (Mudskippers) and many species of sea snails and sea slugs. The mangroves are also visited by large numbers of migratory bird species. Fish also use this for mating grounds. As a result of intertidal inundation, fish and crustaceans are swept into this highly productive habitat to feed on the meio – and macro faunal species in the muddy sediments.

The development of the port in the 1970's disturbed the distribution of mangroves in the area. However, the development of the port has also created new mangrove colonies, such as in the south-western corner of the port. The current area covered by mangroves in Richards Bay, including the uMhlathuze estuary, is approximately 450 ha and accounts for nearly 80% of the national area covered by mangroves in South Africa.

One of the last remaining stands of the original distribution of mangroves, the Echwebeni Site of Conversation Significance, is found on the southern bank of the mouth of the port. This stand of mangroves is important as all three mangrove species, *Avicennia marina* (White mangrove), *Briguiera gymnorhize* (Black mangrove) and *Rhizophora mucronata* (Red mangrove) occur here. This area has been proclaimed a Natural Heritage Site in terms of the defunct Natural Heritage Programme of the Department of Environmental Affairs. The site is, however, afforded a certain degree of protection in terms of the Ezemvelo KZN Wildlife's Site of Conservation Significance Programme.

5.9.6 Reed Swamps

Similar to the occurrence of mangroves, the presence of reed swamps was also impacted on by the development of the port.

The reed swamps consist of *Phragmites australis* (Common reed) and support a high diversity of aquatic fauna such as dragonflies and mayflies, as well as small mammals such as *Aonyx capensis* (Otter), *Atilax paludinosis* (Water mongoose) and *Otomys spp* (Water rats and birds. The reed swamps also act as sinks for pollutants such as heavy metals, which, when adsorbed into the mud that is present in these habitats, are rendered biologically unavailable (Acer, 2008).

5.9.7 Undeveloped Terrestrial Habitat

The area west of the Mzingazi Canal is an undeveloped terrestrial habitat, which comprises of primary woodlands and secondary grasslands with large areas of alien species*, Casuarina equisetifolia* (Beef wood), which has also been used to stabilise the southern part of this area and sometimes surround existing mangrove communities. Although certain elements of coastal vegetation occur, invasion by alien species is common.

Any development in this area would be a green field development and would therefore increase the disturbed areas in the Richards Bay Port area.

5.9.8 Fauna and Flora

At a regional level, Richards Bay falls within the 'Maputaland-Pondoland-Albany Biodiversity Hotspot' which is recognised as the "second richest floristic region in Africa" containing approximately 80% of South Africa's remaining forests, rich bird life and many other significant flora and fauna species. A large proportion of this hotspot is being transformed and degraded by human activities, resulting in many vegetation types being vulnerable to further disturbances. The Port of Richards Bay and surrounds are situated within the Maputaland Coastal Belt vegetation type as described by Mucina and Rutherford 2006. The vegetation type is classified as Vulnerable and has a conservation target of 25%, of which 15% is contained within the iSimangaliso Wetland Park. The vegetation type is under severe pressure from development. An environmental sensitivity analysis was carried out as part of the EMF to identify areas which are more susceptible to change than others and to give an indication of the type of development control that may be needed in certain areas as illustrated in Figure 5-9.

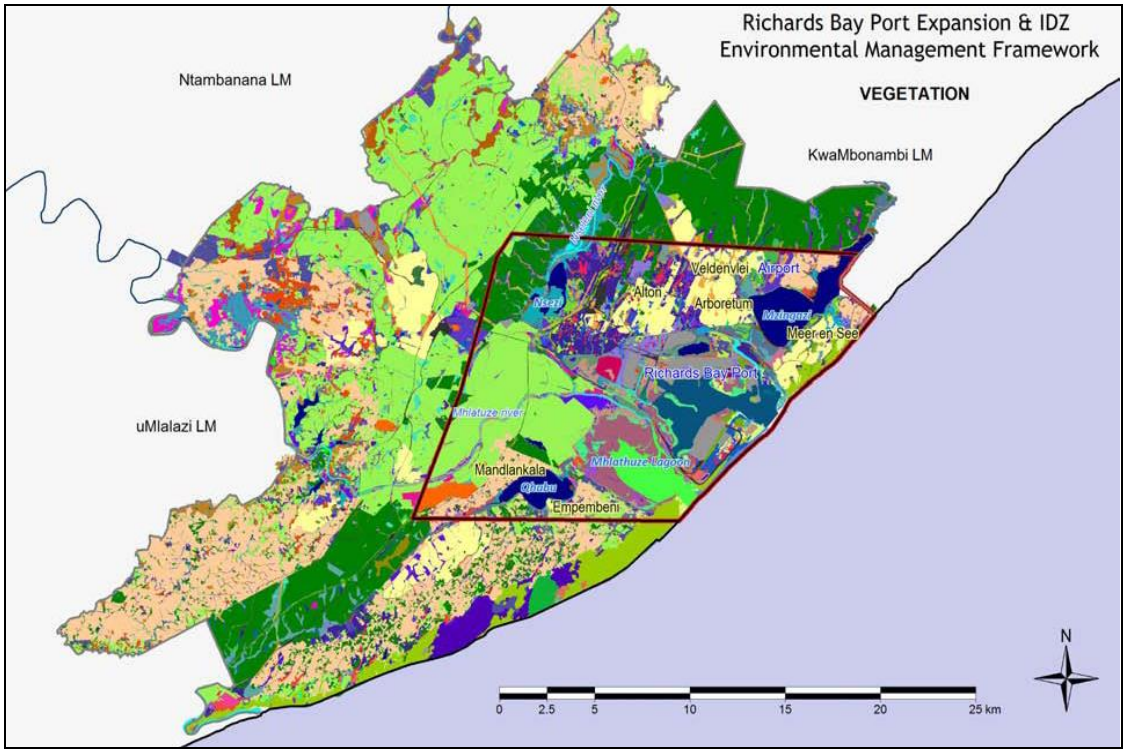

Figure 5-9: Vegetation in the study area.

5.10 TERRESTRIAL FAUNA

5.10.1 Birds

Richards Bay has been ranked the second most important habitat for birds along the entire KwaZulu-Natal coastline, while the Thulazihleka Pan is ranked third (BirdLife International;

2009). There are 350 known species of birds in the area, and 66 internationally significant waterbird species. These species utilises the wetlands, tidal flats and sand pits in the Port Estuary and the uMhlathuze Sanctuary Estuary. The abundance of particular species in dependent in the water levels in these habitats. A total of 44 Red Data bird species have been listed for the broader municipality area (Table: 5-2: Red Listed Bird Species).

Table 5-2: Red Listed Bird Species

RED LISTED BIRD SPECIES	
RED LISTED CATEGORIES	**NUMBER LISTED**
Critically Endangered	1
Endangered	3
Vulnerable	15
Near Threatened	25
TOTAL	**44**

5.10.2 Amphibians, Reptiles and Mammals

The study area is considered to be of significance as a bio-geographical corridor for many species. Extensive loss and fragmentation of wetlands and other habitat types in the study area has restricted population of species. Nineteen species of mammal occur in the municipal area in special habitats.

Hyperolius pickersgilli is a high priority frog species (Endangered) because of its narrow distribution. It occurs in wetlands. Amphibians are good indicators for assessing ecosystem health as they are generally sensitive to environmental change.

Eleven species of reptiles are of significance in the study area, occurring in wetlands, forests and grasslands. Two of these species are classified as Vulnerable, one as Rare, while three are KwaZulu-Natal endemics and six are peripheral in South Africa, but rare.

5.11 Socio Economics

5.11.1 Population

38% of the uMhlathuze Local Municipality's population is located in the formal urban area, 27% in rural nodes and 35% in the remaining rural areas of the municipality. The highest population densities are observed in rural settlement areas such as Nseleni and Esikhaweni. The lowest population densities are found in the non-tribal rural areas of the municipality. Although population growth has been decreasing in the District Municipal Area, the opposite seems to be true for the uMhlathuze Area.

5.11.2 Employment

The unemployment level in the area is high at 36.28% whilst that of the province lies at 47.4%. Manufacturing is the dominant economic sector in the area. Most industries are capital intensive with low employment opportunities.

5.11.3 Household Income

Based on the uMhlathuze IDP 2011/12, close to 20% of households in the Esikhaleni rural areas earn between R 9,601 and R 19,200 per annum. This equates to a monthly household income of between R 800 and R 1,600. If the average number of persons per household is 4.4 then the estimated monthly income per person is between R 181 and R 363, which is remarkably low. A broader, perhaps more accurate picture, is that more than 60% of uThungulu District residents survive on less than R 1,500 every month to buy basic necessities such as food, clothes and pay for school fees and shelter. This trend seems to be prevalent at a local level as well.

5.11.4 Education

Despite improvements in access to education, education levels remain low in the municipality. Approximately 12% of the population over the age of 20 has not had access to any formal education. Within the municipality, there are a number of primary and high schools and several tertiary educational institutions, including the Umfolozi FET, University of Zululand and the Owen Sithole Agriculture College, as well as a satellite branch of the Durban University of Technology. The Department of Education has highlighted a proposal to build a further ten schools in the uMhlathuze area over the next 10 years (uMhlathuze IDP, 2010/2011).

5.11.5 Health & HIV/AIDS

It is difficult to estimate the population due to the HIV/AIDS pandemic. The City of uMhlathuze is one of the major provincial nodes and attracts people to employment opportunities. The update of land is also dependent on the rather uncertain impact of the HIV/Aids pandemic on the municipal population growth rate.

It is a known fact that there is a lack of clear and reliable data regarding HIV at a local municipal level. However, it is nonetheless clear that it is a very serious issue and should be incorporated into whatever strategies or developments undertaken in the study area. Typical impacts of AIDS include decreased productivity of workers, increased absenteeism and additional costs of training of new workers. It also represents a greater demand and pressure on health facilities and as the statistics gathered from antenatal clinics indicate a very real problem of AIDS orphans and child (minor) headed households. These factors must be taken cognizance of when devising local economic development strategies.

The concerns regarding the impact of HIV on uMhlathuze need to be reiterated as KwaZulu-Natal has the highest HIV prevalence rate of all the provinces. The uMhlathuze municipal clinic sets aside approximately R35 000 for provision for HIV and AIDS. The City of uMhlathuze's Clinic Services launched an HIV testing campaign as part of President Jacob Zuma's mass HIV testing campaign, which aimed to test 15 million people between April 2010 and June 2011. uMhlathuze Clinic Services encourages all people in the community to know their HIV status. The objective of the ministerial initiative was to expand access to HIV counselling, testing (HCT) and treatment.

5.11.6 Socio-Economics of the Port of Richards Bay

The Richards Bay harbour has 81 tenants. See Appendix 1 in Addendum B for more details on the types of tenants.

6. ENVIRONMENTAL ISSUES AND POTENTIAL IMPACTS IDENTIFIED

The aim of this Scoping Study is to identify, record and describe the issues that have been identified and/or raised by stakeholders, I&APs and specialists with regard to the proposed Port Expansion development. This enables the specialist studies to be clearly focused on aspects of significant concern. It also provides a framework for the assessment of the impacts that the proposed project will have on the environment, and of the impacts the environment will have on the proposed project.

The following environmental (biophysical, socio-economic and cultural-historic) issues have been identified and will be investigated during the EIA phase.

6.1 POTENTIAL SOCIO-ECONOMIC IMPACTS

As the development of the Port of Richards Bay is closely linked to the inhabitants of the uMhlathuze Local Municipality and an even wider sphere of influence due to the national and regional importance of the port it is imperative that attention should be directed to the potential social impacts of the development. The importance of assessing the impact of any development of the social environment is also reflected in the prominence of social environment in the principles adopted by the international community for the assessment of environmental impacts such as the Equator Principles and the Performance Standards adopted by the International Finance Corporation. In this regard the potential impacts of the development on the affected communities were assessed in terms of amongst others:

- Noise pollution;
- Air quality;
- Visual impact;
- Proximity of development of the community;
- Socio-economic impacts;
- Pollution prevention and waste minimisation;
- Cultural and heritage issues.

The social impacts will be assessed in the EIA process. It should be noted that the social impacts and the PPP are interdependent and inseparably linked. The results of the public involvement and social impacts will be integrated into the issues and related reports.

6.1.1 Socio – Economic Issues

The capacity expansion of the Port of Richards bay would have a significant socio-economic impact on the province of KwaZulu-Natal as well as South Africa. This is illustrated through the estimated changes in economic metrics caused by the changes in final demand.

The effect of the estimated project expenditure of the respective options, on employment, total output and value added were estimated. This was conducted on national level by the use of multipliers of an input-output model of the South African economy.

The national economy effects of the capital expansion are summarised accordingly:

1. Total output would increase between 36.8 and 38.9 billion ZAR.
2. Gross value added at basic prices would increase between 13.9 and 14.8 billion ZAR.
3. Employment would increase by between 20,300 and 22,100 jobs; comprising of job creation due to direct effects between 8,800 and 9,500, indirect effects between 3,700 and 4,000 as well as induced effects between 7,900 and 8,500 jobs.

From the results presented it is apparent that the option with the greatest project value would have the greatest socio-economic impact due to constant returns to scale. As a result the greater the output required during the construction phase, the greater the demands on the industries that produce the required inputs.

Given that there is very little variance in the socio-economic effects of the respective expansion options, it is acknowledged that the focus of the selection of the preferred option pertain to issues such as commercial aspects, operational efficiency and constructability.

It should be noted that the socio-economic impacts reported are high-level estimates based on estimated costs of preliminary designs. These figures are indicative of nature and should be treated as such. A multi-regional analysis would enable a more comprehensive evaluation of the socio-economic effects on the local and national economy and is proposed for the FEL-3 phase of the project.

6.1.2 Potential Noise Impacts

M^2 Environmental Connections (M^2ENCO) conducted the acoustical impact assessment for the Baseline study for the Richards Bay Expansion Programme. (Refer to Appendix A1 for *ACOUSTICAL BASELINE REPORT –RICHARDS BAY PORT EXPANSION*).

Site investigations took place between the 17th and the 21st of January 2013. The only receptors that fall within the study area are receptors **NSD01** to **NSD03** (Refer to Figure 6-1).

There are currently no significant noise contributors at receptors **NSD01** to **NSD03** (Refer to Figure 6-1) except for the tarred non-porous Ridge Town Road**.** This tarred road did contribute an identifiable and measurable amount of noise in terms of road traffic volumes,

but volumes are not comparable to those in an urban setting. During the night-times the insignificant traffic volumes (in terms of acoustical reporting) on the Ridge Town Road were not considered or calculated. This does not mean that the road will not have the odd vehicle during these hours.

The existing commercial area and small boats port is in close proximity to these receptors and will therefore be audible at times. This is specifically relevant to times when the Waterfront is used for commercial activities or when the restaurants in the area play loud music during night-times. These noise sources were not calculated or considered as part of the ambient soundscape. At over 1,500m the existing Richards Bay and Transnet facilities cannot be considered as a noise source of significance at receptors **NSD01** to **NSD03** (Refer to Figure 6-1).

Measurements conducted indicated noise levels due to faunal, metrological (during rainy conditions) and anthropogenic noises emanating from daily activities associated at the dwellings. The Ridge Town Road would contribute a fair amount of measurable data to the soundscape during daytimes. Taking into account the measured ambient sound levels and detected noises it has been selected to classify the residential as "**Urban districts"**.

The extension of the Port's railways into the rail balloon area could thus impact negatively on the residents of the entire Waterways Residential Estate, the entire Mzingazi Waterfront Village, Protea Waterfront Hotel, various commercial and/or business sites are featured in and around the three mentioned NSDs.

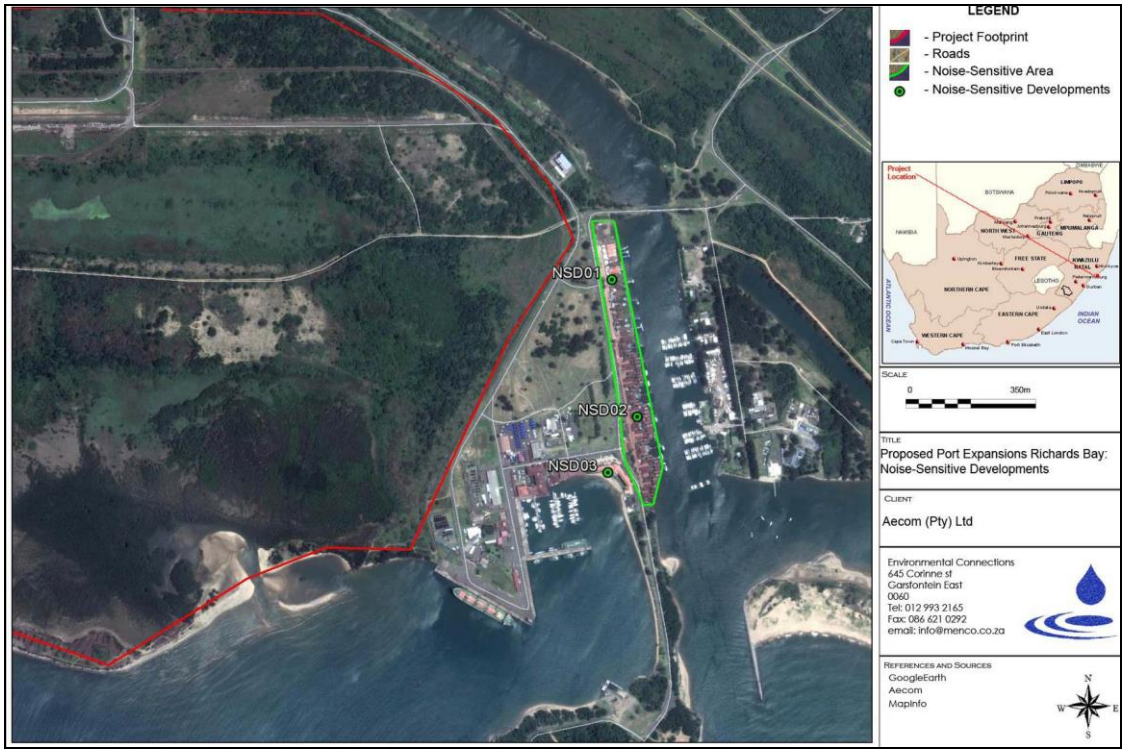

Figure 6-1: Location of Potential Noise-Sensitive Developments in Relation to the GFB Study Area Boundary

6.1.3 Potential Air Quality Issues

Kijani Green Energy conducted the Air Quality baseline study for the Richards Bay Expansion Programme (Refer to Appendix A2 for the Richards Bay Expansion – Air Quality Baseline Study).

It is recommended that the current dust mitigation methods and monitoring remain in place throughout the course of the project.

The residential areas adjacent to the port are recommended to be monitored:

It is recommended that the changes in operational activity be accurately assessed and the resultant increases in emissions be modelled. This applies specifically to increased particulate and SO_2 emissions resulting from increased ship traffic into the port.

6.1.4 Heritage Resources Issues

The purpose of this Baseline Heritage Study is to identify potential heritage resources / issues in the area proposed for development, based on desktop studies and literature reviews. This will allow the developers to evaluate the viability of the project in terms of potential impacts on heritage resources.

Various factors mitigate against the presence of significant heritage resources in the proposed development area:

- Historical environment, comprising a near-coastal lagoon, would have been unattractive as a place of human settlement prior to European occupation, given the presence of diseases deleterious to the health of people and domestic animals.
- The relatively recent establishment of the town and the port largely precludes the presence of structures or buildings with historical value.
- The nature of the construction of the port, involving massive environmental disturbance, would have destroyed any traces of archaeological or geological sites.
- Much of the greenfield area proposed for development has already been transformed by intensive and extensive land uses, including timber and sugarcane plantations.

The potential occurrence of various heritage resource types is described below, along with the implications for the proposed development (Refer to Appendix A3):

- **FORMALLY PROTECTED HERITAGE RESOURCES**: No heritage resources with Grade I or Grade II status are present within the study area.
- **BUILDINGS AND STRUCTURES**: Given the recent history of the establishment of the town of Richards Bay and its harbour it is unlikely that buildings or structures older than 60 years are present within the proposed development area. However, should

such resources be present, their rarity may afford them a heritage significance that precludes their alteration or demolition, and they would have to be included within the proposed development.

- **PLACES ASSOCIATED WITH ORAL TRADITIONS OR LIVING HERITAGE**: Given the nature of the historical environment and modern land uses it is unlikely that places associated with oral traditions or living heritage are present within the proposed development area. However, should such resources be present, their social, cultural and/or spiritual values may afford them a heritage significance that precludes their alteration or demolition, and they would have to be included within the proposed development.
- **LANDSCAPES AND NATURAL FEATURES**: The formally protected landscape of Richards Bay Nature Reserve is located on the northern banks of the uMhlathuze River Estuary, immediately south of the proposed development. It is a proclaimed Nature Reserve managed by Ezemvelo KZN Wildlife. In a report to the Regional Mining Development Environment Committee Ezemvelo states that the estuary is ranked the sixth most important estuary in terms of ecosystem services in the country. The sanctuary is an International Birding Area and a candidate area for RAMSAR. Richards Bay Nature Reserve evidently constitutes a conservation area of local, regional, national and international ecosystem significance. It is therefore clear that the reserve and adjacent forest on the south bank of the uMhlathuze Estuary comprise a resource that has high heritage significance at all levels for its scientific, economic, social and cultural values. This significance, coupled with its rarity and endangered status, merits the site‘s declaration as a Grade I, or National Heritage Site in terms of the National Heritage Resources Act, 25 of 1999 (NHRA). No development activity that could negatively affect the heritage significance of Richards Bay Nature Reserve may be countenanced.
- **TRADITIONAL BURIAL PLACES**: No cemeteries administered by the local municipality are present within the proposed development area. Given the history and nature of the environment it is unlikely that traditional burial places (located outside a formal cemetery) occur in any number. All human remains have high heritage significance at all levels for their spiritual, social and cultural values and may not be altered/disturbed in any way without the permission of Amafa and the next-of-kin (refer to Appendix A of the Richards Bay Port Expansion Baseline Heritage Study).
- **ECOFACTS, GEOLOGICAL AND ARCHAEOLOGICAL SITES, PUBLIC MONUMENTS AND MEMORIALS**: Given the history and nature of the environment it is unlikely that such heritage resources are present within the proposed development area. If

present, they are likely to have low heritage significance at all levels and will require little, if any, further mitigation prior to destruction

- **PALEONTOLOGICAL SITES:** The significance of the paleontological content of the study area has been highlighted recently. The St Lucia Fm. is known to be exceptionally rich in high-quality fossils, and the study area is located in the region where unique fossils like mammalian or cephalopod remains were found, or can be found once development starts. Activities associated with development may lead to complete destruction of the fossil material and/or restrict access to fossiliferous beds in the future. Since any piece of paleontological evidence is crucially important for our understanding the past biodiversity and modelling future environmental changes, all effort should be made to save paleontological objects for subsequent studies. The study area is therefore considered as potentially very sensitive in terms of its paleontological significance and a full Phase 1 PIA must be undertaken prior to commencement of development.
- **BATTLEFIELDS**: No battlefields are known to occur within the proposed development area.
- **SHIPWRECKS**: Shipwrecks are known to occur along most of the KwaZulu-Natal coastline, but none will be affected by the proposed development.

6.2 POTENTIAL BIOPHYSICAL IMPACTS

6.2.1 Ecological Impacts of Increased Turbidity and Suspended Solids Concentrations

Primary producers, including microalgae, macroalgae and submerged vegetation rely on sufficient light for photosynthesis. It is well-known that primary production is depressed in waters where light penetration is limited by turbidity (*e.g.* Cloern 1987, Parr *et al*. 1998, Nicholls *et al*. 2003). In cases where elevated turbidity is a consequence of anthropogenic activities, the depression of primary production has a ripple-like impact on the ecosystem (Rowe *et al*. 2003, Newcombe 2003). This is because microalgae, macroalgae and submerged vegetation comprise the base of the aquatic food web, akin to grasslands and forests in terrestrial ecosystems.

Excessive suspended particulate matter, especially sediment, may adversely affect the feeding rate of invertebrate filter feeders, reducing their growth and productivity (*e.g.* Hewitt *et al*. 2001, Nicholls *et al*. 2003). This occurs when the filter feeding apparatus becomes clogged with fine-grained material or when the energetic return from processing large volumes of organically poor material exceeds the energetic gain (Widdows *et al*. 1979). Fine particles can also coat gill surfaces, isolating them from contact with water and thereby preventing gas exchange. Some bivalves cease filtering at high suspended matter

concentrations, reducing the intake of food and hence impacting growth and so on (*e.g*. Foster-Smith 1976).

As is the case for invertebrate filter feeders, fine particles can coat the gill surfaces of fish, isolating them from contact with water and thereby preventing gas exchange. Alternately, larger particles can clog gill lamellae and block water circulation, by creating a dead space between the lamellae, and similarly prevent gas exchange (Sherk *et al*. 1974, 1975, Servizi and Martens 1992, Martens and Servizi 1993). Turbid conditions may enhance the visual contrast of prey items and increase overall feeding rates of some fish, as demonstrated for larval Pacific herring (Boehlert and Morgan 1985). In contrast, excessive turbidity can adversely affect feeding in fish that locate their prey by sight (Minello *et al*. 1987, Hecht and van der Lingen 1992).

It has been postulated that the foraging success of seabirds (and by implication estuarine birds) may be affected by turbid water (COE 1997). Increased turbidity results in longer foraging journeys for adults and increases the risk to chicks through predation, starvation and environmental exposure whilst the adults are foraging. It is for this reason that in some countries dredging windows that only fall outside breeding seasons or migratory periods of aquatic organisms have been invoked to protect species known or strongly suspected of being sensitive to changes in turbidity and suspended particulate matter.

Not all of the effects of turbidity and suspended particulate matter are detrimental to aquatic organisms. Some organisms are adapted to living in areas dominated by fine-grained (muddy) sediment and at the sediment water interface, and are tolerant of high turbidity and suspended particulate matter concentrations. Kiorbe *et al*. (1981) observed that suspended sediment might serve as an additional food source for blue mussels, which are filter feeders that rely on suspended particulate matter as a primary food source. It is reasonable to assume that this effect could apply to other filter feeders, including other molluscs and polychaetes amongst others. Many fish thrive in and indeed actively seek out turbid environments (Blaber and Blaber 1980, Gradall and Swenson 1982, Cyrus and Blaber 1987, Cyrus and Blaber 1992, Gregory and Northcote 1993, Wilber and Clarke 2001). This is presumably attributable to the benefit of reduced risk from predation and increased foraging rates. Also, some fish prefer relatively turbid waters due to their ambush hunting strategy (Wilber and Clarke 2001).

Another potential effect associated with suspended particulate matter occurs when the matter settles on the bottom. The excessive and persistent settling of this matter may cause reduced rates of survival, growth and reproduction in organisms because of the smothering effect of the matter and alteration of the grain size composition of sediment (Bray *et al*. 1997). Some aquatic organisms are, for example, specific in the type of sediment they can survive in (sand versus mud), either because of the need to construct burrows or because of

the manner in which they feed. A change in the grain size composition of sediment has obvious implications.

6.2.2 Potential Biodiversity Impacts of Development

The Richards Bay Port is a functional ecosystem and the proposed development could have a detrimental impact on the future function of the system. This is particularly true with regard to the survival of the existing sheltered and shallow marine habitat of the bay's peripheral sand and mud banks. The proposed development through the implementation of any of the three preferred options in the Richards Bay harbour could potentially impact on the environment and the following habitats would be particularly sensitive in this respect:

- Mudflats and sand flats;
- Mangroves;
- Undeveloped terrestrial habitat.

6.2.2.1 Mudflats and Sand Flats

The impact of the development through, for example dredging, for the construction of new berths at the existing series 600 berths and the southern bank of the area opposite the series 600 berths, where the proposed construction is envisaged, would have a detrimental impact on the mudflats.

Dredging would create an impact through an increase in turbidity as well as a possible disturbance in the flow dynamics of the area. The loss and degradation of mudflats and adjacent sandbanks, which sustain a high biodiversity, is of concern, both from a the point of view of reduction of biodiversity, as well as the loss of the functional value of these areas in terms of nutrient processing and assimilation. The overall result of the loss of these ecological functions would translate to downgraded water quality in the harbour, with increased risk of a trajectory towards eutrophication (CSIR, 2008).

The development would also impact on the freshwater discharge through the Bhizolo and Manzamnyama Canals, which would have an impact on the prawn ecology and hence on the commercial fishing industry north and south of the Port. These two canals play an important role as a nursery area and as a migratory route for certain faunal species that migrate from freshwater to a saline environment and *vice versa* during certain periods of their life cycle. Should the water quality and particularly the turbidity deteriorate, it could have a profound impact on the functioning of the Richards Bay ecosystem.

Similarly, the loss of the sand spit, which is regarded as a critical bird roosting area, may result in permanent losses of certain species (CSIR, 2008). This, together with other impacts on feeding grounds (shallows of mudflats and sandbanks), may result in a significant impact

on bird populations. South Africa is a signatory to the Convention on Migratory Species (Bonn Convention) and has an obligation to protect migratory birds.

The loss of this birding roost habitat is a significant environmental issue as there is no other supra-tidal sand spit area elsewhere in the Port or Sanctuary area. Similar habitats along areas such as Pelican Island are likely to be already ecologically "occupied" and are also used by humans for recreational activities, further reducing their ecological availability.

Thus, the loss of the sand spit for bird roosting is expected to result in a major loss of the avifauna of the Richards Bay environment.

6.2.2.2 Mangroves

The proposed development of the Richards Bay Port will have a detrimental impact on the post-harbour mangrove populations. These mangrove populations are considered to be of national importance, in view of the fact that they represent a very high percentage of the total mangrove population of the country.

Of particular importance is the protection of the mangrove population at the Echwebeni Site of Conservation Significance. This conservation of this area has been used as a trade-off during the development of the Port. Maintaining the goodwill of the community would greatly enhance the buy-in by the community of the project.

6.2.2.3 Undeveloped Terrestrial Habitat

The undeveloped area west of the Mzingazi Canal would be under threat should the development of the rail loop be undertaken. Although the area is to a certain extent invaded by alien vegetation, any loss of natural habitat is an issue that needs to be considered, as it plays a role in the overall functioning of the port ecosystem.

Over and above the ecological impact of such a development, the social impact on the community of Richards Bay and the surrounding areas should also be considered. The habitat is relatively close to the community and the construction of the rail loop and other potential developments should also take into account the potential noise impact. In this regard mitigation efforts should be developed at a very early stage.

Similar to the situation with the Echwebeni Site of Conservation Significance, it will also be important to obtain the goodwill of the community regarding the development in green field areas and to ensure sound management of the potential negative impact of development on the community.

6.2.3 Potential Impacts on Water Quality

The findings of the water quality monitoring are revealing in terms of the proposed expansion programme from several perspectives.

First, microalgal biomass (chlorophyll-*a* concentration) was highest in and near small 'dead-end' basins, namely Inner Basins 1 and 3 (Refer to Figure 6-2). This is not the first time the Coastal Systems Research Group of the CSIR has recorded higher chlorophyll-*a* concentrations in these basins compared to other areas of the Bay (*e.g.* CSIR 2011). There was obviously a source of nutrients sustaining the elevated microalgal biomass in and near these basins and which was presumably derived from an anthropogenic source. However, of greater significance is that the exchange of water between these basins and the greater Richards Bay is restricted because of their 'dead-end' nature.

This facilitates an increase in microalgal biomass, because the water retention time exceeds the generation time of the microalgae. Elevated microalgal biomass is a common feature of the water column in many South African ports, especially in areas of ports where water exchange is restricted and there is an anthropogenic source of nutrients. The implication for the proposed expansion programme is that if port development further restricts the exchange of water between 'dead-end' basins and the greater Richards Bay and anthropogenic nutrient inputs continue then there is strong possibility that eutrophic conditions may manifest. This will ultimately lead to the development of hypoxia and possibly even anoxia in bottom water and sediment, with a host of associated adverse ecological impacts. Careful consideration must, therefore, be given during the infrastructure design phase for achieving the maximum possible water exchange between the 'dead-end' basins and the greater Richards Bay.

The second revealing feature is the low pH of the water column off the Bhizolo Canal. There was clearly an anthropogenic source of contamination to the Bhizolo Canal that was driving the low pH. As was the case for microalgal biomass this is not the first time the Coastal Systems research group of the CSIR has recorded low water column pH in and near the Bhizolo Canal (*e.g.* CSIR 2011). In fact, the concentrations of fluoride, some nutrients (especially ortho-phosphate), chlorophyll-*a* concentration, turbidity and total suspended solids are usually considerably higher in the Bhizolo Canal compared to the rest of the Bay (*e.g.* CSIR 2011). Careful consideration must, therefore, also be given during the infrastructure design phase as to the future discharge point of the Bhizolo Canal. Connecting this canal to a 'dead-end' basin will have adverse ecological implications unless the source/s of contaminants in the canal catchment are identified and controlled, although it is improbable that all sources will be identified and/or entirely controlled.

Third, consideration must be given during the infrastructure design phase as to where surface runoff (stormwater) from quay surfaces will be discharged. Discharging surface runoff into the 'dead-end basins', where water exchange with the greater Richards Bay is poor, will increase the probability for water and sediment quality impairment. This is because surface runoff is an important vector for the introduction of materials accidentally spilled on quay surfaces into Richards Bay. Water and sediment quality impairment is not

only important from an ecological perspective but also from a dredging perspective. As discussed in a companion report prepared by the CSIR (2013) that describes metal contamination of surface sediment in the proposed expansion footprint, there is very strong evidence that accidentally spilled metal ore fragments and metal flecks, and possibly also fragments and flecks introduced by surface runoff, are the cause of significant metal contamination of sediment in Inner Basins 1, 2 and 3.

The magnitude of metal contamination in some parts of these basins is such that the DEA may prohibit the unconfined openwater disposal of dredged sediment. The financial implications of alternate (*e.g.* on-land) sediment disposal will be significant.

Figure 6-2: Map of Richards Bay showing features and place names mentioned in the text

6.2.4 Dredge Disposal Site Baseline Assessment

The baseline assessment on all previous studies identified the following key factors:

- An estimated 28 million m³ sediment will result from the port expansion.
- Of this sediment, 37 % is sand and 63% is silt and clay.
- A small, but unknown volume is Level 1 and Level 2 copper and chromium contaminated.
- Available land for deposition is 5 million m³.

Currently, the sandy portion in dredge material is separated from finer silt and clay particles using a sand trap. Sandy material is discharged to the beach at Alkantstrand by means of pumping through a pipeline. Fine material which is unsuitable for discharge onto the beach

is disposed offshore by opening the bottom doors of the hopper above the offshore dump site. Sand separation of the 28 million m³ will result in 10.4 million m³ sand and 18 million m³ silt / clay.

Of the 10.4 million m³ sand, 5.6 million m³ can be used as permanent fill material for port expansion. The balance of 4.8 million m³ sand can be disposed of on the north beach (see Figure 6-3).

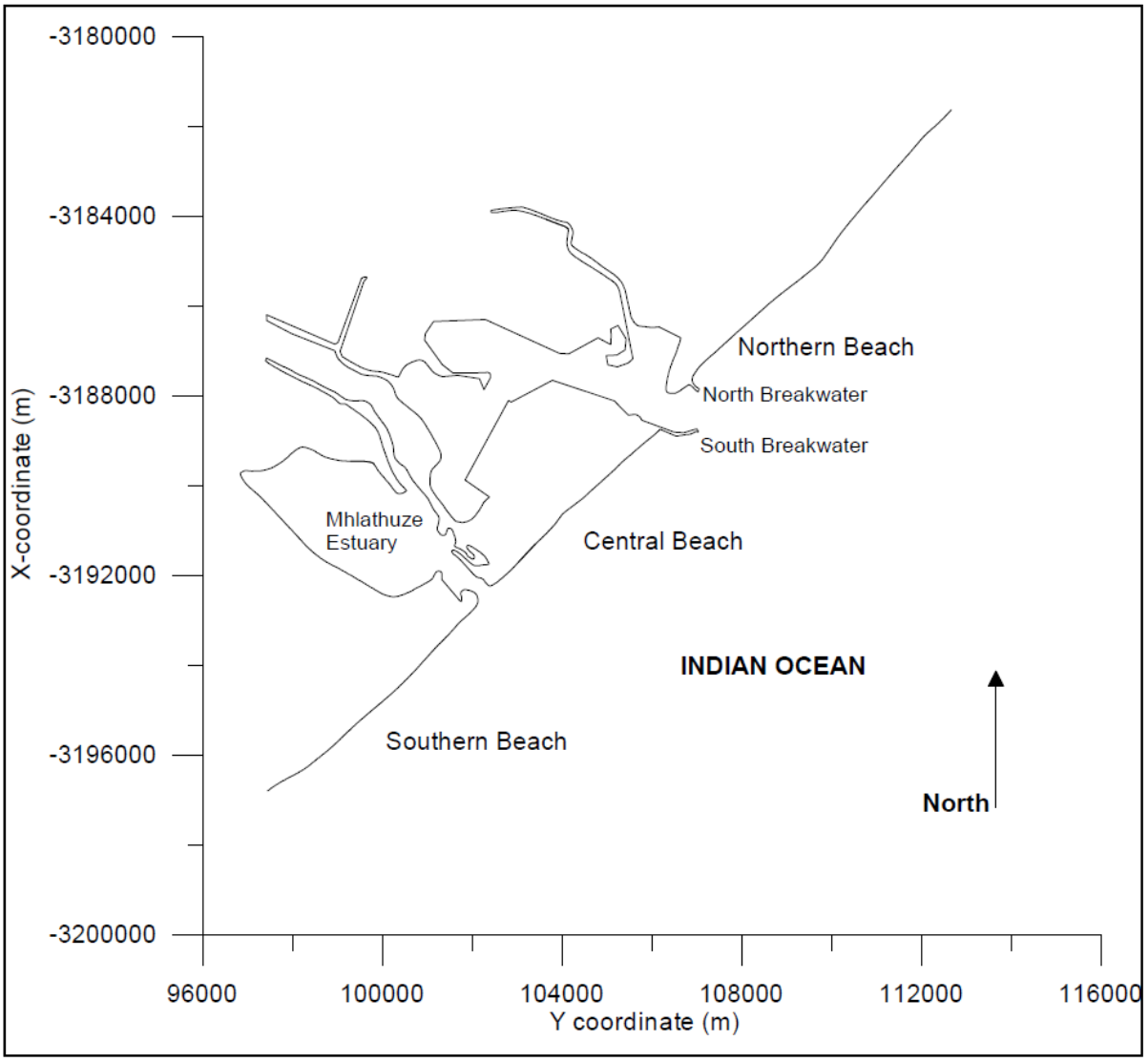

Figure 6-3: Map indicating position of beaches in relation to the Estuary and Port

The following options, or a combination thereof, can be considered for the 18 million m³ saline silt / clay.

- Off shore disposal (see Figure 6-4).
- On land disposal at one of the following sites (see Figure 6-5):

- Site 1: South of the uMhlathuze River with more than 5 million m^3 of permanent storage capacity.
- Site 2: Approximately 2km east of the N2 highway and 8-10km from the port, with approximately 29 million m^3 of permanent storage capacity.
- Site 3: The Ticor slimes dam is adjacent to the N2 highway and could be considered for disposal in the long term.

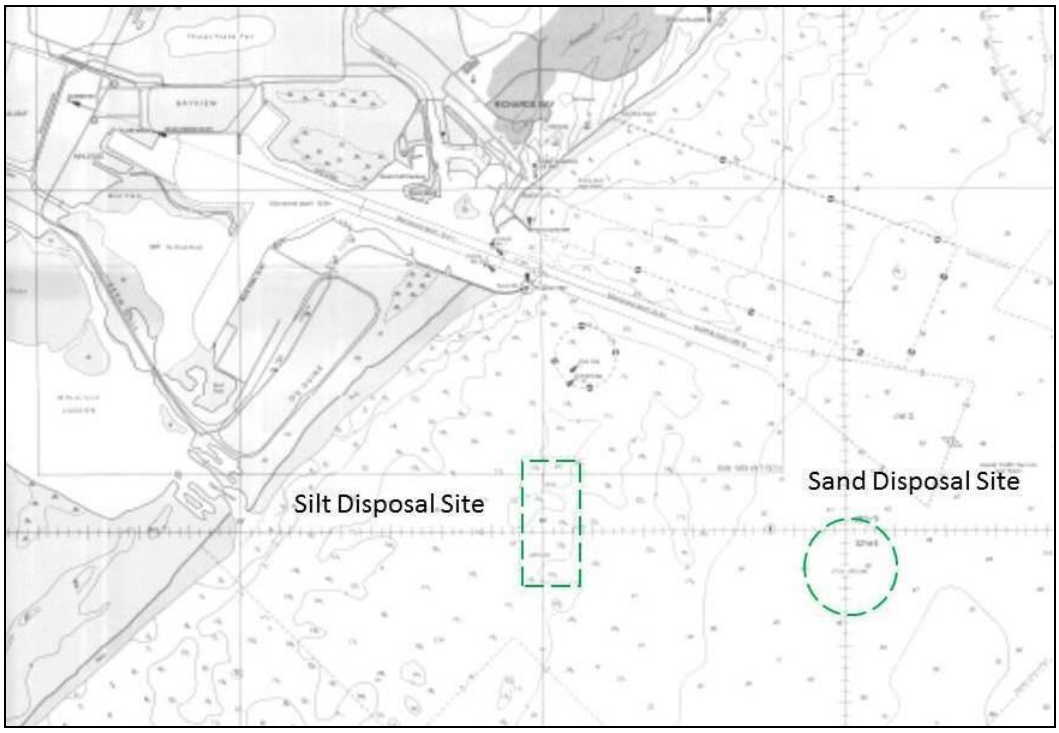

Figure 6-4: Map indicating off-shore silt and sand disposal areas

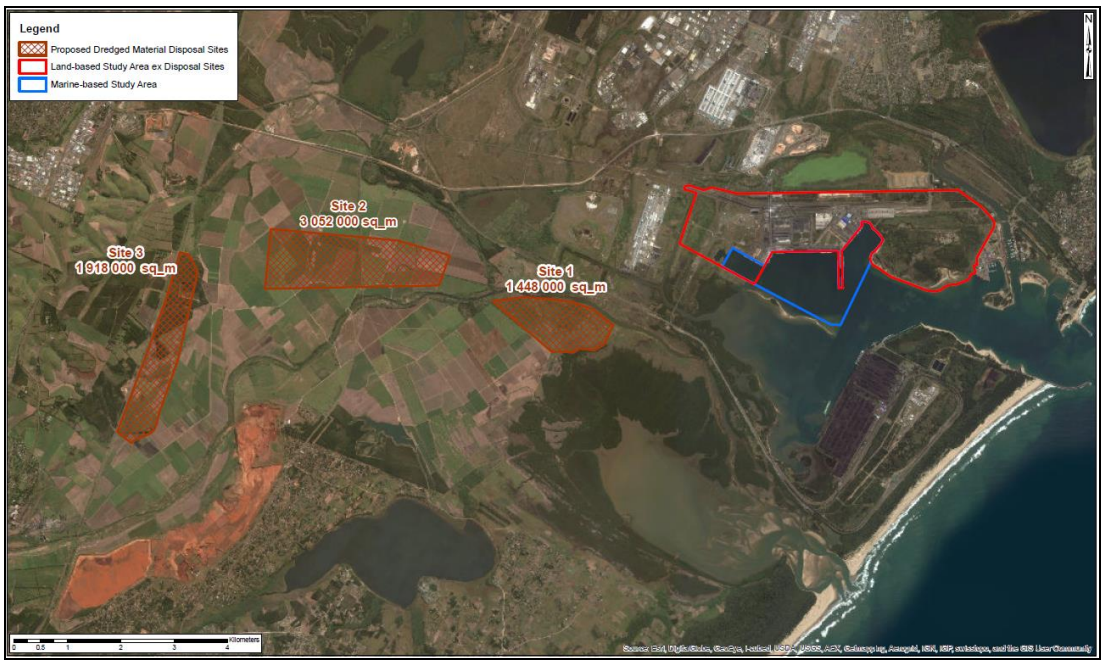

Figure 6-5: Proposed Sites for On-Shore Dredged Material Disposal Sites

6.2.5 Loss of Agricultural Soil

The potential impacts that are associated with the disposal of dredged material at the on-shore disposal sites include the loss of agricultural soil.

6.2.6 Climatological Impacts

Climate change refers to the change in the global temperature (global warming) and the resultant effect on the environment, which also includes the marine environment.

The impacts of climate change on the proposed development are namely;

- Atmospheric and Water Temperature.
- Winds.
- Ocean Waves.
- Rise in sea-level.
- Ocean currents.
- Rainfall.

6.2.7 Waste Impacts

The impacts that will be associated with there being no transfer station situated at the port for storing of waste. Skips and 210 litre drums are placed randomly on site for storage of waste. During breakages of conveyor belts, spillage of raw material may occur resulting in mixed waste or contamination. Waste or contamination can also be caused by poor maintenance of the conveyor belts. Dredging spoils from the port basin may be contaminated by sewage, oils and heavy metals from workshops and other industry around the port area. Disposal of dredging spoils at sea, if not carefully planned, can be damaging to the marine environment - affecting aquatic life. Discolouration of near shore water could result in adverse effects on beach recreation and tourism.

6.2.8 Infrastructure Impacts

The impacts associated with the design of a surge dam to contain the first 10 mm of flush events and the impacts that is associated with the design of the collection sumps to contain the first 10 mm flush event for 1 hour storm duration.

7. ENVIRONMENTAL IMPACT ASSESSMENT PROCESS

7.1 STUDY APPROACH

The EIA process is a planning and decision making tool that identifies the potential negative and positive impacts of a proposed development. It also recommends ways to enhance the positive impacts and to minimize the negative ones. The environmental studies that will be undertaken, will address the impacts associated with the proposed development, and provide an assessment in terms of the biophysical, social, cultural-historic and economic environments. This will assist both the DEA and Transnet Capital Projects in making decisions regarding implementation of the proposed project. The environmental assessment will be undertaken in compliance with the NEMA, specifically EIA Regulations GNR No. 543, 544, 545 and 546 of 18 June 2010. Cognisance will also be taken of related guideline documents and other relevant legislation.

7.2 SCOPING PHASE

The aim of the scoping phase of the project is to identify and define the issues that need to be addressed in the impact assessment phase. An environmental scoping site visit was undertaken on 16 January 2014.

During the PPP, I&APs are identified and are given the opportunity to identify issues and concerns relating to the proposed project and study area. A first round of stakeholder engagement will been undertaken as documented in **Section 7.3**.

Input from the technical team, the authorities and I&APs have been considered and integrated into the Scoping Report, the document at hand. The Final Scoping Report will incorporate all comments that will be received during the 40 day public review period before it will be made available for a further 21 day public review and submitted to the KZN DAEA for comment and to the DEA for consideration.

7.3 PUBLIC PARTICIPATION PROCESS IN THE SCOPING PHASE

The PPP is an integral requirement of the NEMA EIA Regulations. The process followed has taken into account all aspects of the public participation as stipulated in the related legislation. The objectives of the PPP are to:

a) Inform identified I&APs of and provide sufficient background and technical information regarding the proposed development.

b) Create networks and feedback mechanisms whereby I&APs could participate and raise their viewpoints (issues, comments and concerns) with regard to the proposed project.

c) Assist in identifying potential environmental (biophysical and social) impacts using on-the-ground information through the I&APs' experience.

The PPP would thus ensure that the views of the I&APs would be reflected and considered by Transnet Capital Projects. All I&APs are given equal opportunity to comment and raise any issue relating to the impact of the proposed development on the biophysical, social and economic environment. Refer to **Addendum B** for the PPP Report.

7.3.1 Identification and Registration of I&APs on a Register

The public were invited to register as I&APs in order for them to comment or raise issues on the proposed project. The following key stakeholders have been identified for engagement on any issues that may transpire during the EIA process for the proposed project:

a) Richards Bay Rate Payers and Residents Association.

b) The Port of Richards Bay Tenants Association.

c) Ward Councillor for Ward 2.

d) Department of Water Affairs (DWA).

e) Department of Mineral Resources (DMR).

f) Department of Agriculture, Forestry and Fisheries (DAFF).

g) KZN Department of Agriculture and Environmental Affairs (KZN DAEA).

h) Ezemvelo KZN Wildlife.

i) Uthungulu District Municipality.

j) uMhlathuze Local Municipality.

k) South African Heritage Resources Authority (SAHRA).

l) KwaZulu Natal Provincial Heritage Agency, Amafa.

m) Transnet National Ports Authority (TNP).

A register (**Addendum B**) of I&APs has been compiled and will be updated throughout the EIA process, should additional stakeholders or I&APs be identified.

7.3.2 Project Announcement

The announcement of the project included the following:

a) Newspaper advertisement appeared in the Mercury Newspaper on 31 January 2014 and in the Zululand Observer on 30 January 2014.
b) Eleven A2-sized site notices were placed in the project area.
c) Written notifications (Background Information Documents (BID)) were distributed to identified stakeholders, including land owners on 14 March 2014.

Refer to **Addendum B** for copies of the notifications and BID sent to identified stakeholders (including land owners) as well as copies of the newspaper advertisement and site notices.

7.3.3 Issues Raised

All issues and concerns indicated by I&APs were noted and collated into an Issues and Response Report (IRR). This indicates the form and scope of the issues to be addressed in the EIA phase. The IRR provides a list of issues raised with regards to the process and proposed project as well as a response from the project team.

Refer to **Addendum B** for the IRR and copies of the comment sheets and correspondence sent to the I&APs.

7.3.4 Draft Scoping Report Review Period

The purpose of the Draft Scoping Report is to enable the registered I&APs to verify that their contributions have been captured, understood and correctly interpreted. The Draft Scoping Report will be available for a 40 day review period by registered I&APs from 17 March 2014 – 30 April 2014. The objective of the public comment period is for I&APs to raise issues about the information presented in the report and for them to raise any other issues related to the proposed project.

The Draft Scoping Report will be available at the Richards Bay Library for the public and at the Transnet Port Authority offices in the Bayview Centre inside the Port of Richards Bay for the port tenants. CD and electronic copies will also be provided to I&APs on request. Should I&APs wish to register during this period, they would be allowed to. Comments and issues raised during the public review period will be incorporated in the Final Scoping Report, for submission to the DEA.

Two (2) hard copies and two (2) electronic copies of the Draft Scoping Report will be submitted to the DEA for comment and distribution to the relevant state departments as required by EIA Regulations, 2010, prior to the public review period (i.e. 25 March – 6 May 2014).

Copies of the Draft Scoping Report will be submitted to the following departments or organisations for comment:

a) Department of Water Affairs (DWA).

b) Department of Agriculture, Forestry and Fisheries (DAFF).

c) KZN Department of Agriculture and Environmental Affairs (KZN DAEA).

d) Ezemvelo KZN Wildlife.

e) uMhlathuze Local Municipality.

f) KwaZulu Natal Provincial Heritage Agency, Amafa.

7.4 ENVIRONMENTAL IMPACT ASSESSMENT PHASE

The EIA for the proposed project is being conducted in accordance with the process as described in Section 26 to 35 of the EIA Regulations (2010) as promulgated in terms of section 24(5) of the NEMA. AECOM is responsible for the process and collation of information from the specialists reports including the issues raised from the PPP.

7.5 DECISION MAKING PHASE

The Final EIA Report and Draft EMPr will be submitted to the DEA for its consideration and approval. The DEA will make a decision based on the recommendations of the EAP in the EIA Report.

7.6 PUBLIC PARTICIPATION IN THE AUTHORISATION PHASE

Subsequent to the issue of the environmental authorisation, all registered I&APs will be informed by e-mail, fax or post of the availability of the environmental authorisation, upon request. In addition, the registered I&APs will be informed of the procedure to lodge an appeal of the environmental authorisation, should they wish to do so.

8. PLAN OF STUDY FOR EIA

8.1 INTRODUCTION TO EIA PHASE

A Plan of Study for the EIA has been prepared according to the process as described in Section 26 to 35 of the EIA Regulations (2010) promulgated in terms of section 24(5) of the NEMA, to provide the DEA with adequate information in order to obtain authorisation, and proceed with the proposed activity.

The Plan of Study for EIA includes a description of the environmental issues that have been identified during the Scoping Phase and which will require further investigation and assessment.

8.2 SPECIALIST STUDIES

The EIA phase will include the following specialist studies:

a) A Sediment Quality Monitoring Study.

b) A Turbidity Modelling Study.

c) A Marine and Land-Based Ecological and Biodiversity Assessment.

d) An Air Quality Impact Assessment (AQIA).

e) A Noise Impact Assessment (NIA).

f) A Phase I Heritage Impact Assessment (HIA) with specific reference to a Paleontological Impact Assessment (PIA).

Specialist studies will be undertaken in compliance with Regulation 32(3) of GNR No. 543, and include:

'(a) details of –

(i) the person who prepared the report; and

(ii) the expertise of that person to carry out the specialist study or specialised process;

(b) a declaration that the person is independent in a form as may be specified by the competent authority;

(c) an indication of the scope of, and the purpose for which, the report was prepared;

(d) a description of the methodology adopted in preparing the report or carrying out the specialised process;

(e) a description of any assumptions made and any uncertainties or gaps in knowledge;

(f) a description of the findings and potential implications of such findings on the impact of the proposed activity, including identified alternatives, on the environment;

(g) recommendations in respect of any mitigation measures that should be considered by the applicant and the competent authority;

(h) a description of any consultation process that was undertaken during the course of carrying out the study;

(i) a summary and copies of any comments that were received during any consultation process; and

(j) any other information requested by the competent authority.'

8.3 TERMS OF REFERENCE FOR TURBIDITY MODELLING STUDY

At present there is too little data to define turbidity and total suspended solids baselines for all areas of Richards Bay. This is the situation for other South African ports and stems, in part, from the fact that turbidity and total suspended solids are usually not measured coincidentally and turbidity is far more frequently measured compared to total suspended solids. Most of the turbidity and total suspended solids concentration data for Richards Bay is for the Mudflats area, but the conditions in this area are atypical of the rest of the Bay. This is due to the water column being shallow over the Mudflats with the result that bottom sediment is frequently disturbed into suspension by wind induced turbulence. Consequently, turbidity and total suspended solids concentrations in the water column over the Mudflats are frequently higher compared to other areas of the Bay. Baselines defined for stations on the Mudflats for the Richards Bay Coal Terminal expansion dredging compliance monitoring programme can still be used for this area of the Bay, but cannot be used as baselines for other areas.

For other areas of the Bay there are far fewer measurements, typically in the region of three to four per area. This is insufficient for the establishment of baselines, which as a rule of thumb requires 25 measurements and the bulk of the measurements should approximate a normal distribution.

Due to the limited data for much of the proposed expansion footprint, monitoring/research will be required for the definition of baselines and to estimate the potential ecological risks associated with dredging.

The Coastal Research Group of the CSIR proposes for establishing baselines for turbidity and total suspended solids concentrations for compliance monitoring during the dredging component of the expansion programme. The need for this research is that dredging induced increases in turbidity and total suspended solids are likely to present one of the

most significant adverse ecological impacts of the dredging component of the expansion programme.

The objective of the Turbidity Modelling Study, which is based on the recommendations made in the Turbidity and Total Suspended Solids Baseline Report, will be to define the relationship between turbidity and total suspended solids under simulated dredging conditions, for the purpose of providing data for the numerical modelling of turbidity in Richards Bay for the EIA process. The relationship will also be beneficial for calibrating instruments that might be used to monitor turbidity in the field during compliance monitoring. The purpose and need for this study is threefold. First, the dredging induced turbidity and total suspended solids concentrations usually far exceed those which occur naturally in the water column of Richards Bay. Second, the material disturbed into suspension during dredging sometimes has a different composition to that typically found in the water column. This makes it difficult to apply a predictive model for turbidity and total suspended solids defined from natural conditions to dredging conditions. Third, turbidity is far easier, quicker and cheaper to monitor compared to suspended solids. By establishing a relationship between turbidity and total suspended solids, the suspended solids concentration can be estimated from in situ turbidity measurements using the relationship. This will provide information within the timeframes necessary to take corrective action for ecological protection.

To generate the turbidity versus total suspended solids relationship surface sediment will be collected from the same stations identified for the turbidity and total suspended solids baseline definition monitoring. In the laboratory a volume of the sediment from each station will be added to a known volume of water in a settling column. The water used for this purpose will be collected from Richards Bay. At defined periods aliquots of water will be removed from the settling column and its turbidity and total suspended solids concentration measured. The relationship between turbidity and total suspended solids concentration will then be determined through some form of regression analysis (most probably linear regression analysis).

The baseline conducted will be adequate to allow for the assessment of environmental impacts for Option 3A of the Port Expansion programme.

The modelling baseline that will be undertaken for the Port Expansion will comprise the present day port layout. It is proposed that Option 3A (see Figure 8-1 below) of the Port Expansion programme be modelled as one development, which will constitute one dredge description.

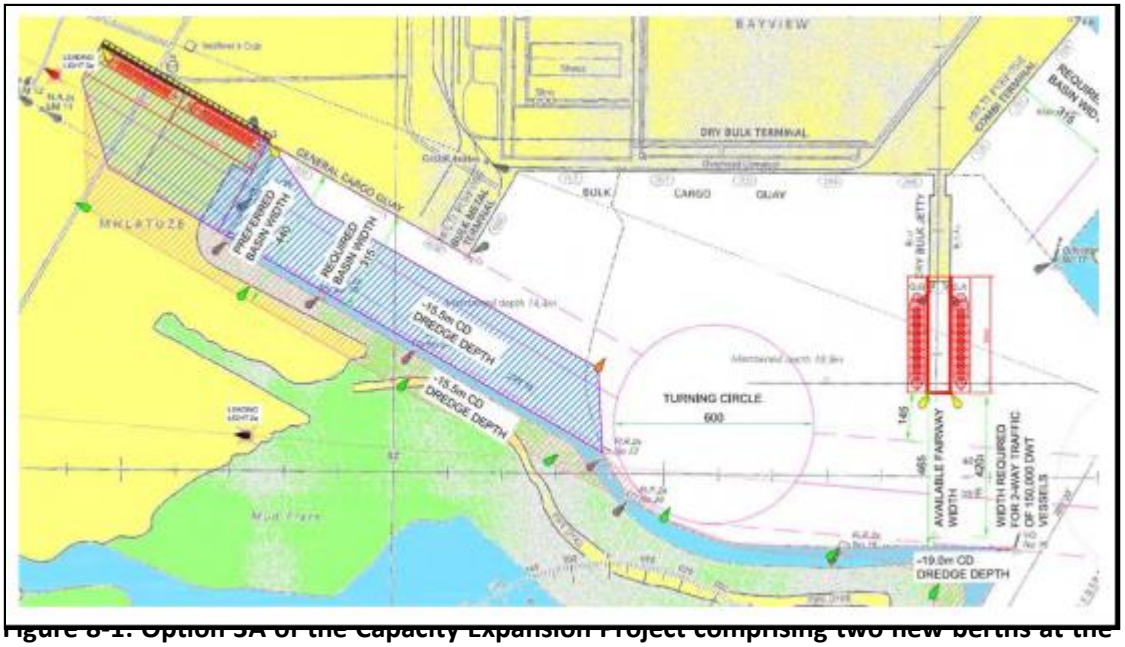

Figure 8-1: Option 3A of the Capacity Expansion Project comprising two new berths at the 600 series berths and two new berths at the finger jetty

The CSIR (2013) determined the metal contamination of sediment in the Richards Bay port and the implications for dredging this material. They found that the Inner Basin Complex (for the purposes of the CSIR's study comprising Inner Basin 1, Inner Basin 2 and Inner Basin 3) contains heavy metals that exceed limits of Warning levels, Level I and Level II of sediment quality guidelines as defined by the DEA, who define sediment quality guidelines for the purpose of determining whether sediment identified for dredging in South African ports is of a suitable quality for unconfined openwater disposal (unreferenced in CSIR, 2013).

8.4 TERMS OF REFERENCE FOR THE MARINE AND LAND BASED ECOLOGICAL IMPACT ASSESSMENT

During this phase the specialist will conduct directed ecological surveys pertinent to Option 3A (see Figure 8-2). This will allow us to provide clear descriptions of all the surveyed habitats characteristics and current status. The specialist report will also include assumptions, constraints, opportunities and limitations of the design and proposed layouts for the following habitats:

- Estuary.
- Freshwater wetlands
- Habitat /biodiversity significance and anticipated change, mitigation, offset possibilities.
- Terrestrial habitats.
- Habitat and rare species occurrence, significance and change, including bird faunal habitat and requirements

- Wetland investigations – this will involve surveys and assessment by a frog specialist, plant taxonomist and wetland ecologist.

Figure 8-2: Focus Areas for the Marine and Land Based Ecological Impact Assessment

Specialist reports synthesizing the methods and findings of the biodiversity baseline surveys and ecological assessment will be compiled comprising:

- Literature survey and first order environmental assessment to identify issues, impacts and opportunities;
- Present status of the different habitats within or affected by the proposed development;
- Existing disturbance within each unit;
- Photographs of the verified key habitats, flora and fauna, impacting activities where possible and landscape character;
- Detailed description and identification of specific habitat issues, impacts and opportunities;
- Clear description of possible constraints, extent of impact and impact management requirements (mitigation and activity management);
- Input to project team where appropriate to assist with alternative design layouts to mitigate or enhance;
- Environmental risks minimized for more detailed phases; and
- Wetland assessment and offset recommendations.

All assessments and recommendations will take on board, International Best Practice methods and techniques as well as the statutory requirements of municipal, provincial and national legislation and international policies and conventions.

8.5 TERMS OF REFERENCE FOR THE AIR QUALITY ASSESSMENT

The SO_2 plume from existing shipping and anticipated increases in traffic modelled using potential emission modelling will be undertaken using Cambridge Environmental Research Consultants (CERC)'s latest generation model, the Atmospheric Dispersion Modelling System (ADMS 4). Other modelling options include the US EPA's AERMOD.

Input data is a combination of field data and estimates generated using the Australian National Pollution Inventory (NPI) Emission Estimation Technique Manual and the US EPA's AP-42 emissions estimation manual. Meteorological data is sourced from the South African Weather Services (SAWS).

8.6 TERMS OF REFERENCE FOR THE NOISE IMPACT ASSESSMENT

The protocol/methodology that M^2ENCO would follow is defined in SANS 10328:2008 and includes:

- Noise Propagation Modelling for both the Construction, Operational and Closure phases with the resulting total future predicted sound levels projected on a topographical map. The CRN (UK, 1995) model is recommended for the rail loop, while the CONCAWE and ISO models are recommended for the other noise sources of significance;
- The calculated noise levels LA_{eq} will be compared against the measured Ambient Sound level as well as the appropriate SANS rating level to determine the potential impact on the surrounding environment, focusing on potential sensitive receptors; and
- The compilation of a Noise Impact Assessment Specialist Report for Option 3A as per SANS 10328:2008.

8.7 TERMS OF REFERENCE FOR THE HERITAGE IMPACT ASSESSMENT

The Heritage Impact Assessment (HIA) will be undertaken by Mr Len van Schalkwyk, Ms Elizabeth Wahl and the Paleontological Impact Assessment by Dr Maria Ovechkina from eThembeni Cultural Heritage.

The NHRA defines a heritage resource as any place or object of cultural significance i.e. of aesthetic, architectural, historical, scientific, social, spiritual, linguistic or technological value or significance. This includes, but is not limited to, the following wide range of places and objects:

a) Ecofacts (non-artefactual organic or environmental remains that may reveal aspects of past human activity).

b) Places, buildings, structures and equipment.

c) Places to which oral traditions are attached or which are associated with living heritage.

d) Historical settlements and townscapes.

e) Landscapes and natural features.

f) Geological sites of scientific or cultural importance.

g) Archaeological and palaeontological sites.

h) Graves and burial grounds.

i) Public monuments and memorials.

j) Sites of significance relating to the history of slavery in South Africa.

k) Battlefields.

Reports in fulfilment of Section 38(3) of the NHRA must include the following information:

a) The identification and mapping of all heritage resources in the area affected.

b) An assessment of the significance of such resources in terms of the heritage assessment criteria set out in regulations.

c) An assessment of the impact of the development on such heritage resources.

d) An evaluation of the impact of the development on heritage resources relative to the sustainable social and economic benefits to be derived from the development.

e) The results of consultation with communities affected by the proposed development and other interested parties regarding the impact of the development on heritage resources.

f) If heritage resources will be adversely affected by the proposed development, the consideration of alternatives.

g) Plans for mitigation of any adverse effects during and after completion of the proposed development.

8.8 ENVIRONMENTAL IMPACT REPORT

Once the specialist investigations have been completed and the findings and recommendations integrated, an EIA Report will be prepared according to Government Notice R543, Regulation 31(2) and will include the following:

a) details and expertise of the EAP who prepared the report;

b) an updated detailed description of the proposed activity;

c) an updated description of the property on which the activity is to be undertaken and the location of the activity on the property as well as an updated description of the activity (i.e. the housing development);

d) an updated description of the environment that may be affected by the activity and the manner in which the physical, biological, social, economic and cultural aspects of the environment may be affected by the proposed activity;

e) a description of the PPP that was undertaken during the EIA Phase;

f) an updated description of the need and desirability of the project;

g) a description of identified potential alternatives to the proposed activity, including advantages and disadvantages that the proposed activity or alternatives may have on the environment and the community that may be affected by the activity;

h) an indication of the methodology used to determine significance of potential environmental impacts;

i) a comparative assessment of all alternatives (including the do-nothing alternative);

j) a summary of the findings and recommendations of the specialist studies;

k) a description and assessment of each potentially significant impact;

l) a description of any assumptions, uncertainties and gaps in knowledge;

m) an opinion of whether the activity should be authorised or not, and if it should be authorised, any conditions that should be made in respect of the authorisation;

n) an environmental impact statement; and

o) a draft environmental management programme for the planning and design, pre-construction and construction activities, operation or undertaking of the activity and rehabilitation of the environment.

8.9 IMPACT ASSESSMENT METHODOLOGY

8.9.1 Impact Assessment Criteria

The criteria used for the assessment of the potential impacts of the proposed project are described in **Table 8-1**. Cumulative impacts will be included as part of the impact assessment process.

Table 8-1: Impact Assessment Criteria

Criteria	Description
Nature	Includes a description of what causes the effect, what will be affected and how it will be affected.
Extent	The physical and spatial scale of the impact.
Duration	The lifetime of the impact is measured in relation to the lifetime of the proposed

Criteria	Description
	development.
Intensity	Examining whether the impact is destructive or benign, whether it destroys the impacted environment, alters its functioning, or slightly alters the environment itself.
Probability	This describes the likelihood of the impacts actually occurring. The impact may occur for any length of time during the lifecycle of the activity, and not at any given time.
Status	Description of the impact as positive, negative or neutral.
Significance	A synthesis of the characteristics described above and assessed as low, medium or high. A distinction will be made for the significance rating without the implementation of mitigation measures and with the implementation of mitigation measures.

8.9.2 Extent

The physical and spatial scale of the impact is classified in **Table 8-2**.

Table 8-2: Extent

Description	Explanation	Scoring
Footprint	The impacted area extends only as far as the activity, such as footprint occurring within the total site area.	**1**
Site	The impact could affect the whole, or a significant portion of the site.	**2**
Local	The impact could affect the area around the site including neighbouring farms, transport routes and adjoining towns.	**3**
Regional	The impact could have an effect that expands throughout the region of the Eastern Cape Province.	**4**
National	The impact could have an effect that expands throughout the country.	**5**

8.9.3 Duration

The lifetime of the impact is measured in relation to the lifetime of the proposed project, as per **Table 8-3**.

Table 8-3: Duration

Description	Explanation	Scoring
Short term	The impact will either disappear with mitigation or will be mitigated through a natural process in a period shorter than any of the development phases.	**1**
Medium term	The impact will be relevant through to the end of the construction phase.	**2**
Long term	The impact will continue or last for the entire operational lifetime of the development, but will be mitigated by direct human action or by natural processes thereafter.	**3**
Permanent	This is the only class of impact that will be non-transitory. Mitigation either by man or natural process will not occur in such a way or in such a time span that the impact can be considered transient.	**4**

8.9.4 Intensity

This will be a relative evaluation within the context of all the activities and the other impacts within the framework of the project, as per **Table 8-4**.

Table 8-4: Intensity

Description	Explanation	Scoring
Low	The impact alters the affected environment in such a way that the natural processes or functions are not affected.	**2**
Low-Medium	The impact alters the affected environment in such a way that the natural processes or functions are slightly affected.	**4**
Medium	The affected environment is altered, but functions and processes continue, albeit in a modified way.	**6**
Medium-High	The affected environment is altered, and the functions and processes are modified immensely.	**8**
High	Function or process of the affected environment is disturbed to the extent where the function or process temporarily or permanently ceases.	**10**

8.9.5 Probability

This describes the likelihood of the impacts actually occurring. The impact may occur for any length of time during the lifecycle of the activity, and not at any given time. The probability classes are rated in **Table 8-5**.

Table 8-5: Probability

Description	Explanation	Scoring
Improbable	The possibility of the impact occurring is none, due either to the circumstances, design or experience. The chance of this impact occurring is thus zero (0%).	**1**
Possible	The possibility of the impact occurring is very low, either due to the circumstances, design or experience. The chances of this impact occurring is defined as 25%.	**2**
Likely	There is a possibility that the impact will occur to the extent that provisions must therefore be made. The chances of this impact occurring is defined as 50%.	**3**
Highly likely	It is most likely that the impacts will occur at some stage of the development. Plans must be drawn up before carrying out the activity. The chances of this impact occurring is defined as 75%.	**4**
Definite	The impact will take place regardless of any prevention plans, and only mitigation actions or contingency plans to contain the effect can be relied upon. The chance of this impact occurring is defined as 100%.	**5**

8.9.6 Confidence

The level of knowledge the EAP or a specialist had in their judgement and is rated in **Table 8-6**.

Table 8-6: Confidence

Description	Explanation
Low	The judgement is based on intuition and not on knowledge or information.
Medium	The judgement is based on common sense and general knowledge.
High	The judgement is based on scientific and/or proven information.

8.9.7 Level of Significance

Based on the above criteria, the significance of issues will be determined. The following formula will be used to determine the Level of Significance:

Significance = (Scale + Duration + Intensity) × Probability

This is the importance of the impact in terms of physical extent and time scale, as per **Table 8-7**.

Table 8-7: Level of Significance

Description	Explanation	Scoring
No Impact	There is no impact.	**0-10**
Low	The impacts are less important, but some mitigation is required to reduce the negative impacts.	**11-30**
Medium	The impacts are important and require attention; mitigation is required to reduce the negative impacts.	**31-60**
High	The impacts are of high importance and mitigation is essential to reduce the negative impacts.	**61-89**
Fatal Flaw	The impacts present a fatal flaw, and alternatives must be considered.	**90-100**

8.10 Identification of Mitigation Measures

The mitigation measures describe the possible actions for the mitigation of the significant negative environmental impacts identified in the assessment. The philosophy of identifying mitigation measures for negative impacts is based on the reduction of the impact at source, the management of the impact through monitoring and control, and the involvement of the I&APs in consideration of mitigating measures, where appropriate.

8.11 Cumulative Impacts

The possible cumulative impacts will also be considered. Cumulative impact, in relation to an activity, means the impact of an activity that by itself may not be significant, but may become significant when added to the existing and potential impacts eventuating from similar or diverse activities or undertakings in the area.

8.12 Maximisation of Positive Impacts

The philosophy that is followed focuses on maximising the benefits to the local environment, the local community as well as the potential enhancement of rehabilitation measures.

8.13 Environmental Management Programme

A site-specific Environmental Management Programme (EMPr) will be included as part of the EIA Report, which will be based on the generic TCP Construction Environmental Management Plan (ENV-STD-001 Rev01) for the construction related aspects and the TCP

Standard Environmental Specifications (ENV-STD-002 Rev01) (for the operational aspects. The EMPr will outline the impacts and mitigation measures for the planning and design, construction, rehabilitation and operational phases of the project. The EMPr will comprise the following:

a) Summary of Impacts: The identified negative environmental impacts for which mitigation is required are summarised. Positive impacts requiring enhancement will also be listed.

b) Description of mitigation measures: The EMPr identifies feasible and cost effective mitigation measures to reduce significant negative environmental impacts to acceptable and legal levels. Mitigation measures are described in detail and accompanied by designs, equipment descriptions, and operating procedures, where appropriate. The technical aspects of implementing the mitigation measures are also described.

c) Description of a monitoring programme: Environmental performance monitoring is designed to ensure that mitigation measures are implemented. The monitoring programme clearly indicates the linkages between impacts, indicators to be measured, measurement methods and definition of thresholds that will signal the need for corrective actions.

d) The institutional arrangements depict and define the responsibilities for mitigation and monitoring actions.

e) Legal enforceability: The key legal considerations with respect to the EMPr are:

   i. Legal framework for environmental protection.

   ii. Legal basis for mitigation.

f) The implementation schedule and reporting procedures that specify the timing, frequency, and duration of the mitigation measures.

g) A description of requirements for record keeping, reporting, review, auditing and updating of the EMPr will be provided.

8.14 PUBLIC PARTICIPATION IN EIA PHASE

The objective of the PPP in the EIA phase of the project is to present the findings of the investigations to the stakeholders and to provide them with an opportunity to comment on these.

The consultation process initiated during the Scoping Phase will continue during the EIA phase. The consultation events in this phase will consist of a focus group meeting, finalisation of the issues and comments register as well as the public participation report.

One feedback public meeting will be arranged during the public review period of the Draft EIA Reports to explain the processes followed, discuss the findings of the EIA Reports, the AEL and any other permits that will be applied for, and obtain inputs and comments on the findings and recommendations. All registered I&APs will be invited to the public meeting. The PPP Report will be completed and finalised after the public meeting and the end of the public review period.

The Draft EIA Reports will be made available to the public and state departments for their perusal and comment over a 40-day review period from 22 July - 2 September 2014. CD copies of the report will also be given to stakeholders on request. I&APs registered on the project register will be notified of the availability of this report for comment and review. Comments from the stakeholders and I&APs will be obtained and integrated into the Final EIA Reports for submission to the DEA.

8.15 EIA PHASE PROGRAMME

The key dates for the EIA process are listed in **Table 8-8**.

Table 8-8: Key Dates in the EIA Process

Date	Activity
12 December 2013	Submission of Application Form to DEA
25- March – 6 May 2014	**State Departments and Public Review of Draft Scoping Report**
14 May 2014	Submission of Final Scoping Report to DEA
30 May – 30 June 2014	DEA Review of Final Scoping Report
25 March – 16 June 2014	Specialist Studies
22 July – 2 September 2014	State Departments and Public Review of Draft EIA Report
16 September – 17 September 2014	Submission of Final EIA Report to DEA
18 September – 01 December 2014	DEA Review of EIA Report
2 December 2014	Environmental Authorisation Issued
2 December 2014	Notification of Environmental Authorisation

9. CONCLUSION AND RECOMMENDATIONS

9.1 CONCLUSION

The potential impacts that have been identified during the Scoping Phase will be investigated during the EIA Phase of the project, with appropriate mitigation measures included in the EMPr. These impacts are summarised in **Table 9-1**.

Table 9-1: Potential Identified Impacts

Potential Identified Impacts	
Socio-Economic Impacts	Noise Impact
	Impact on Air Quality
	Impact on Heritage Resources
Bio-Physical Impacts	Increased Turbidity and Suspended Solids Concentration
	Biodiversity Impact on Development
	Impact on Water Quality
	Dredge Disposal Site Assessment
	Impact on soil and erosion
	Climatological Impacts
Engineering Impacts	Waste Impacts
	Infrastructure Impacts

9.2 RECOMMENDATIONS

A number of potentially significant issues have been highlighted for further investigation in order to assess their significance, and to determine the need for the implementation of mitigation measures in order for the overall project to be environmentally sustainable. It is, therefore, recommended that additional, comprehensive studies be conducted for the proposed project in the EIA Phase, as described in the Plan of Study for EIA.

AECOM recommends that the Scoping Report be approved by the DEA, and that permission be granted to continue with the EIA Phase of the process.

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ADDENDUM A:

ENVIRONMENTAL AUTHORITY CORRESPONDENCE

ADDENDUM B:

PUBLIC PARTICIPATION REPORT

APPENDIX A

SPECIALIST BASELINE STUDIES

APPENDIX A1

Air Quality Baseline Study

APPENDIX A2

Richards Bay Expansion Programme: Metal Contamination of Sediment and Implications for Dredging

APPENDIX A3

Traffic Baseline Study

APPENDIX A4

Acoustical Baseline study on the Ambient Sound Levels for the Proposed Richards Bay Port Expansion, KZN

APPENDIX A5

Baseline Heritage Study

APPENDIX A6

Dredging Baseline Study

APPENDIX A7

Port of Richards Bay Expansion Programme: Turbidity and Total Suspended Solids

APPENDIX A8

Port of Richards Bay Expansion Programme: Implications of a Basic Water Quality Survey

APPENDIX A9

Baseline Assessment for the Port of Richards Bay Expansion Programme – Selected Aquatic and Terrestrial Habitats