

**Appendix B5 PLAN OF STUDY FOR ENVIRONMENTAL IMPACT ASSESSMENT**



# environment & tourism

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Dear Mr. Reddy

## PLAN OF STUDY FOR SCOPING: THE PROPOSED PHASE 2 EXPANSION OF THE SISHEN-SALDANHA IRON ORE EXPORT CORRIDOR, SALDANHA BAY, WESTERN CAPE

The above-mentioned application and Plan of Study refers. Please be advised that the Plan of Study for Scoping dated 26 June 2006, prepared by the Joint Venture of PD Naidoo and Associates and SRK Consulting is hereby accepted, subject to the following requirements/amendments:

1. The methodology to be employed for identifying issues must include, among others:
  - a) Desktop analysis and revision of existing information, data and environmental authorisations (records of decision for phases 1a and 1b)
  - b) Consultation with relevant monitoring and liaison committees such as the environmental monitoring committee (EMC) for the Phase 1a and/or 1b developments/expansions.
2. The following parties and/or sectors, among others (as listed on page 23 of the Plan of Study), must be consulted during scoping, and their written comments must be included in the scoping report
  - a) Surrounding, adjacent and immediate landowners, tenants or users.
  - b) Saldanha Bay Local Municipality
  - c) Department of Water Affairs and Forestry
  - d) Relevant Provincial Air Quality/Pollution Directorate
  - e) Chief Air Pollution Control Officer
  - f) Relevant Department of Health / Environmental Health
  - g) Heritage Western Cape / SAHRA / Dept. Cultural Affairs and Sport
  - h) Any communities (especially previously disadvantaged/marginalized) that may be directly or indirectly affected by the proposed activity.
  - i) National and/or Provincial Agricultural Authorities (if the affected properties are zoned agriculture or currently used for agricultural activities, or if any agricultural land or activity will be impacted on as a result of the development)
  - j) Eskom

Page 1 of 3

Muhasho wa zwa Vhupo na Vhuendalamashango • LITiko le Tesimondzawo netekuVakaasha • Isete lemiCimbi yakuetNgqongileyo noKhenketho Ndzawulo ya Tinnaka & Mbango • Departement: Omgewingsake en Toerieme • Lefapho la Tikoloho la Bohankhadi • Lefapha la Bojanala Kgoro ya Tikologo le Boeli • UmNyango wezeBhuduluko nokuVakalaha • Umnyango Wezemvelo Nokuvakaha

- k) Department of Minerals and Energy
  - l) Interested and affected mining companies and industries
  - m) Relevant Transnet Divisions inclusive of:
    - i. Spoomet
    - ii. National Ports Authority
    - iii. South African Port Operations
    - iv. Protekon
  - n) Provincial Coastal Management Directorate
  - o) Marine and Coastal Management (DEAT)
  - p) CapeNature
  - q) SANParks
  - r) Relevant Environmental NGO's
3. Impact assessment and specialist studies are not to be included in the scoping report, but during the impact assessment phase. However, input and preliminary comments from specialists, where necessary, would be advised during scoping.
  4. Cumulative environmental impacts in the area must be described.
  5. Feasible alternatives, as required by section 24(7) of the National Environmental Management Act, Act 107 of 1998, including the 'no go' alternative, must be considered, identified and investigated during scoping.
  6. Maps
    - a) All maps provided must be labelled and dated appropriately for reference purposes.
    - b) Layout maps and aerial or ortho-photos at an appropriate scale (preferably 1:5000) must be provided. These maps must indicate the following:
      - i. Major existing and proposed infrastructure (roads, railways etc.), adjacent land uses, as well as all sensitive environmental attributes (coastal areas, dunes, watercourses, wetlands, sensitive/indigenous vegetation & habitats etc); with the layout of the proposed activity superimposed or overlain thereon. Environmentally sensitive areas and/or areas of contention or concern must be provided in greater detail. In addition, protected areas and potential habitats of protected and endangered fauna and flora must be indicated on these maps.
      - ii. Location of historic, cultural or archaeological sites and/or resources.
      - iii. Immediate residential areas, and/or other sensitive receptors (villages, informal settlements schools, hospitals etc.)
      - iv. Location of current and future mining areas/concessions.
    - c) Alternative layouts/designs, where applicable and necessary should also follow the above guidelines.

You may proceed to submit a Scoping Report, which must meet the requirements of Government Notice No. R.1183 of 5 September 1997, as amended.

Please feel free to contact this department for further enquiries in this regard.

Yours sincerely



**Ms Pam Yako**

**Director - General**

**Department of Environmental Affairs and Tourism**

**Letter signed by: Ms. M. Ntene**

**Designation: Deputy Director: Environmental Impact Evaluation: National and Parastatals**

**Date: 25/08/2006**

**PHASE 2 EXPANSION OF THE TRANSNET IRON ORE  
HANDLING FACILITY,  
SALDANHA BAY, WESTERN CAPE**

*PLAN OF STUDY FOR EIA  
(DEAT APPLICATION NO. 12/12/20/806)*

DATE: May 2007

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**PHASE 2 EXPANSION OF THE TRANSNET IRON ORE HANDLING FACILITY,  
SALDANHA BAY, WESTERN CAPE**

**PLAN OF STUDY FOR ENVIRONMENTAL IMPACT ASSESSMENT**

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## EXECUTIVE SUMMARY

Transnet is nearing completion of the upgrade in capacity of the iron ore handling facility from 18 million tonnes of ore per year to 38 million tonnes per year (MTPA). Environmental approval has recently been granted for the expansion of the ore handling capacity to 45 MTPA (Phase 1B). Transnet is now applying to the Department of Environmental Affairs and Tourism (DEAT) for approval of the next phase (Phase 2) of the proposed expansion, which will increase the handling capacity from approximately 45 million tonnes of iron ore per year to 93 million tonnes per year. The planned expansion of the iron ore handling facility will be undertaken in two stages: i.e. expanding infrastructure to cater for 67 MTPA (Phase 2A), and to cater for 93 MTPA (Phase 2B).

As required by the EIA Regulations promulgated on 5 September 1997 in terms of the Environment Conservation Act (Act No. 73 of 1989), an Environmental Impact Assessment (EIA) must be undertaken to evaluate the potential impacts of the project. This document presents the Plan of Study for EIA for approval in terms of the EIA regulations.

The process, which is to be followed, will be in compliance with Section 26 of the Environment Conservation Act, 1989 (Act No. 73 of 1989). Based on the scope of works for the proposed Phase 2 expansion of the facility, the development comprises several listed activities, which may have significant detrimental effects on the environment, and thus require authorisation. These activities, as listed in Government Notice R1182 are:

*1(d) The construction or upgrading of roads, railways ...and associated structures;*

*1(e) The construction or upgrading of marinas, harbours and all structures below the high-watermark of the sea and marinas, harbours and associated structures on inland waters;*

*2(c) The change of land use from agricultural or zoned undetermined use or an equivalent zoning to any other land use;*

*7. The reclamation of land, including wetlands, below the high-water mark of the sea, and in inland waters;*

*9. Scheduled processes listed in the Second Schedule to the Atmospheric Pollution Prevention Act, 1965 (Act No. 45 of 1965);*

*Scheduled process 59: The bulk storage and handling of ore ...: That is to say, the storage and handling of ore ... at dumps designed to hold 100 000 tonnes or more and not situated on the premises of a mine or works as defined in the Mines and Works Act, 1956.*

*10. The cultivation or any other use of virgin ground.*

During the EIA phase, environmental aspects identified in the scoping phase are to be investigated in detail. The EIA phase will therefore focus on assessing the impacts through detailed specialist investigations, for which terms of reference have been proposed in this document. These detailed specialist investigations will inform the decision on whether the project can be undertaken.

The terms of reference for the EIA have been outlined as follows:

- Providing a detailed description of the potential impacts related to each alternative;
- Undertaking a comparative assessment of all reasonable alternatives to determine the most preferred option in each case;
- Assessing the cumulative and residual impacts of the expansion in the light of existing and future operations in the study area;
- Recommending a range of practicable alternatives for the various components of the development;
- Developing a list of practicable mitigation measures for the recommended alternatives, with an indication of the effectiveness of the mitigation proposed, i.e. whether the measures achieve acceptable levels of mitigation;
- Engaging all Interested and Affected Parties (I&AP's) identified in the scoping phase, and where necessary involving new I&AP's in the EIA process;
- Addressing all the issues and concerns raised by I&AP's, documenting these issues accordingly; and
- Proposing effective and practical environmental monitoring and management requirements that address all aspects of the development, including construction, operational and decommissioning phases. These will be included within the relevant Environmental Management Plan and Environmental Management System.

These terms of reference are based on the issues that have emerged from the public participation process to date, and the current knowledge of the impacts of operations. They are therefore the basis of the detailed investigations in the EIA.

A comprehensive Public Participation Process (PPP) will be undertaken throughout the EIA, building on the lessons learnt from the scoping phase. This process will include, *inter alia*, the dissemination of a Notification Letters, Press Advertisements in local, regional and national newspapers, Focus Group Meetings, Public Meetings and / or Open Days, Radio Advertisements, etc.

During the scoping process there has been formal and constructive interaction between the Applicant (Transnet Limited), the Consultant (PDNA/SRK Joint Venture), and the relevant authorities, as well as key stakeholder groups. Due to the relative proximity of the West Coast National Park and the Langebaan RAMSAR Site, the South African National Parks, Cape West Coast Biosphere Reserve and the Saldanha Bay Water Quality Forum, are some of the key stakeholder that have been involved in the consultative process. This approach of information sharing and interaction will be continued throughout the study. For the duration of the study there will be regular management meetings between the Transnet and The Joint Venture to bridge information gaps.

The full project proposal was briefly introduced to the authorities at a pre-application meeting which took place on 7 October 2005. Subsequently, a full briefing session for this application combined with a day-long site visit took place on 3 May 2006 (see Appendix 1). Follow-up meetings with the relevant authorities are planned to enhance information sharing and timely decision-making. A proposed programme of activities has been included, as an indication of the intended period of interaction with the relevant authorities (Appendix 2).

The project is now to proceed to a detailed impact assessment stage to further assess the impacts, to provide feasible mitigation measures and to choose alternatives that would allow these economic benefits to be realised without resulting in unacceptable damages to the environment.

This Plan of Study for the EIA Phase is submitted together with the Final Scoping report to both the national Department of Environmental Affairs and Tourism (DEAT) as the authorising body, as well as the provincial Department of Environmental Affairs and Development Planning (DEA&DP) as a commenting authority. The Plan of Study outlines the terms of reference for the specialist studies; it proposes a strategy to continue the public participation process during the impact assessment phase, and proposes a detailed impact assessment approach and methodology.

## Abbreviations used in this Document

<b>ASGISA</b>	Accelerated and Shared Growth Initiative of South Africa
<b>BID</b>	Background Information Document
<b>BTS</b>	Bulk Terminal Saldanha, which refers to the iron ore handling facility
<b>CAPCO</b>	Chief Air Pollution Control Officer at DEAT
<b>CBOs</b>	Community Based Organizations
<b>CV</b>	Conveyor
<b>DEA&amp;DP</b>	The Department of Environmental Affairs and Development Planning
<b>DEAT</b>	Department of Environmental Affairs and Tourism (of South Africa).
<b>DECAS</b>	Department of Environmental, Cultural Affairs and Sport (preceded DEA&DP)
<b>DSR</b>	Draft Scoping Report
<b>DWT</b>	Deadweight tonnage (typically reported in metric tonnes)
<b>ECA</b>	Environmental Conservation Act
<b>EIA</b>	Environmental Impact Assessment
<b>EMC</b>	Environmental Management Committee
<b>FSR</b>	Final Scoping Report
<b>HV</b>	High Voltage
<b>I&amp;APs</b>	Interested and Affected Parties
<b>ISO</b>	International Organisation for Standardisation.
<b>JIS</b>	Japanese Industrial Standard
<b>MPT</b>	Multi-purpose Terminal
<b>MTPA</b>	Million tonnes per annum
<b>NEMA</b>	National Environmental Management Act
<b>NGOs</b>	Non Governmental Organizations
<b>NPA</b>	National Ports Authority (of South Africa), a division of Transnet
<b>PDNA</b>	PD Naidoo and Associates
<b>PDNA/SRK-JV</b>	A Joint Venture of PD Naidoo & Associates and SRK Consulting
<b>PPP</b>	Public Participation Process
<b>PM10</b>	Particulate matter greater than 10 $\mu$ in size.
<b>ROD</b>	Record of Decision
<b>SANP</b>	South African National Parks
<b>SAPO</b>	South African Port Operations, a division of Transnet
<b>SRK</b>	SRK Consulting

## SECTION 1: INTRODUCTION

### 1.1 INTRODUCTION

Transnet Limited is a state owned enterprise (SOE) with the South African government as its sole shareholder. Transnet is a parastatal of the National Department of Public Enterprises (Public Finance Management Act, Act No. 29 of 1999). As the holding company behind some of South Africa's largest national freight transport businesses, Transnet is responsible for making sure that the country's freight transport industries operate to world-class standards and form an integral part of the overall economy (<http://www.transnet.co.za>, accessed 06/08/06). As part of the government driven "Accelerated and Shared Growth Initiative of South Africa" (ASGISA), Transnet has been allocated R65 billion to develop core assets such as ports, railways and pipelines. ASGISA, announced by President Thabo Mbeki in the "2006 - State of the Nation Address", is aimed at increasing the competitiveness of the South African economy and reducing levels of unemployment.

One of Transnet's core assets is its iron ore export corridor which has been operational since 1977. Ore is transported by rail from Sishen located in the Northern Cape Province to the Port of Saldanha, situated on the west coast of the Western Cape Province, where it is loaded into ships for delivery to foreign markets.

Global commodity demand forecasts suggest a significant increase in global demand for iron ore in the medium to long term. A portion of this global demand could be satisfied by an accessible supply of good quality ore available in the Northern Cape. Transnet, along with a few large mining companies, have identified an opportunity to increase their capacity to supply larger volumes of ore to satisfy increased demand in the future.

In order to increase the iron ore export capacity, Transnet has identified the need to expand the current capacity of the bulk iron ore handling facility at the Port of Saldanha (Figure 1). The extent of port and rail infrastructure included in this EIA application includes all infrastructure from the iron ore quay to the rail infrastructure at the Vredenburg bridge (including the Salkor rail yard, Figure 1). The expansion is to increase the capacity from approximately 39 million tonnes of iron ore per year (previously approved as Phases 1A and 1B respectively) to 93 million tonnes per year. The planned expansion of the iron ore handling facility will be undertaken in two stages: i.e. expanding infrastructure to cater for 67 MTPA (Phase 2A), and to cater for 93 MTPA (Phase 2B). This plan of study outlines the proposed impact assessment procedure for the full expansion (Phase 2), i.e. including Phases 2A and 2B. Therefore, all reference to Phase 2 in this document should be understood as including both stages 2A and 2B.

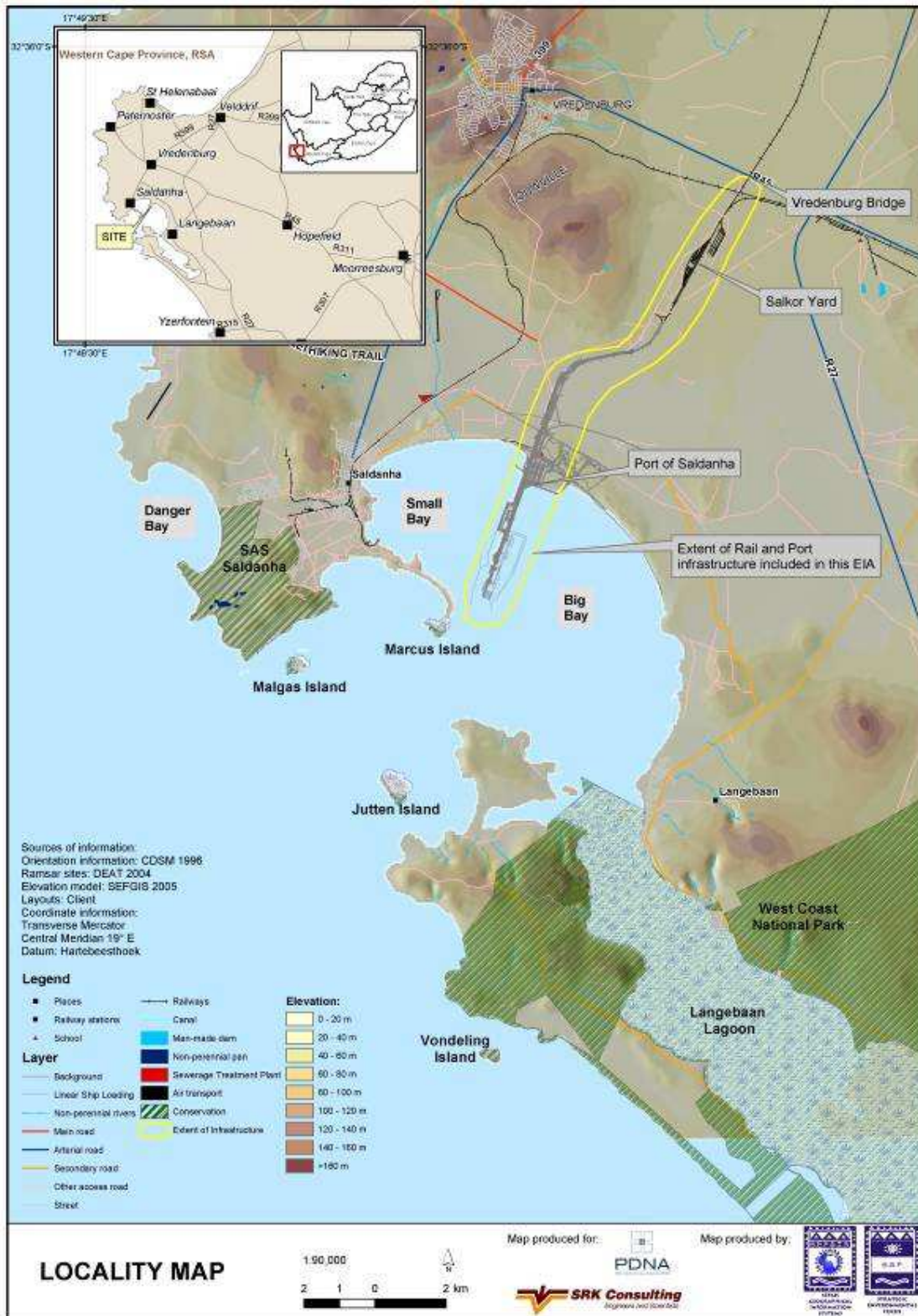


Figure 1: Locality map of the Port of Saldanha, showing the extent of port and rail infrastructure included in this EIA process

## 1.2 PURPOSE OF THE PLAN OF STUDY

Due to the nature of the planned upgrade, the Environment Conservation Act (Act No. 73 of 1989) (ECA)<sup>1</sup> requires that an environmental impact assessment (EIA) be undertaken, by an independent consultant, to evaluate the potential impacts and/or issues of the project.

A Joint Venture (PDNA/SRK-JV) of PD Naidoo & Associates (Pty) Ltd (PDNA) and SRK Consulting (SRK) has been appointed by Transnet to undertake the required EIA for the proposed expansion of the bulk iron ore handling infrastructure. This document presents the Plan of Study for the EIA phase of the assessment. It outlines the proposed approach, methods and criteria to be employed in the assessment of the impacts identified during the scoping phase.

## 1.3 BACKGROUND

The volume of ore currently processed from Sishen in the Northern Cape is approximately 32 million tonnes per annum (MTPA). The ore is transported to the facility by rail wagons, where it is stockpiled prior to loading onto bulk iron ore carrier ships for export. Transnet is nearing completion of the upgrade in capacity of the handling facility from 18 million tonnes of ore per year to 38 million tonnes per year (Phase 1A Record of Decision issued 22 March 2002, Ref: A24/16/226). Environmental authorisation has been issued for Phase 1B (final decision issued on 15 March 2007), i.e. the expansion of the ore handling capacity to 45 MTPA (DEAT Application No. 12/12/20/237).

Transnet now seeks to obtain environmental authorisation from the relevant authorities for the Phase 2 of the proposed expansion, which entails an upgrade of the iron ore terminal to cater for 93 MTPA. This Plan of Study therefore proposes to identify and assess all the impacts and issues potentially arising from the full expansion of the iron ore infrastructure to cater for 93 MTPA, i.e. Phase 2A and 2B. The current operations and proposed upgrades are outlined below.

Full details about the project description have been provided in Section 2 of the Final Scoping Report (FSR), which is being submitted to the authorities (DEAT) with this document. Therefore, the project description has been excluded from this document.

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<sup>1</sup> Although the EIA regulations in terms of the ECA have been repealed by EIA regulations in terms of the National Environmental Management Act (NEMA) as from 3 July 2006, this application is being dealt with in terms of the ECA, as the EIA process was started prior to the new regulations becoming applicable.

**Table 1: Summary of EIA authorisation process of the iron ore handling facility upgrades**

Phase	Authority Reference Numbers	Status	Maximum Throughput
1A	DECAS Record of Decisions (RoD) ref: A24/16/226 – March 2002	Construction phase nearing completion. Current throughput = 32 MTPA.	38 MTPA
1B	DEAT Application ref: 12/12/20/237 - March 2006	RoD was issued on 15 August 2006, but was appealed. The initial decision to authorise the project was upheld in the final decision of the Minister issued on 15 March 2007.	45 MTPA
2	DEAT Application ref: 12/12/20/806 – May 2006	Plan of Study for Scoping submitted to DEAT. Scoping completed and this document is being submitted as the Plan of Study for the EIA.	93 MTPA

#### 1.4 ENVIRONMENTAL PROCESS TO DATE

PDNA and SRK are acting as the independent environmental managers and impact assessors (Environmental Assessment Practitioners), who are facilitating the EIA procedure for the proposed Phase 2 of the expansion.

The process which has been followed is in compliance with Sections 21, 22 and 26 of the Environment Conservation Act, 1989 (Act No. 73 of 1989). In terms of the Act, the proposed development falls within the ambit of the activities listed in Schedule 1 of Government Notice R 1182 of 1997, and is therefore subject to an Environmental Impact Assessment (EIA). The Act identifies the proposed development as an activity, which may have significant detrimental effects on the environment. Based on the scope of works for the proposed Phase 2 expansion, several components of the project are 'listed activities' under Schedule 1 of Regulation 1182, the identified activities being:

*1(d) The construction or upgrading of roads, railways ... and associated structures;*

*1(e) The construction or upgrading of marinas, harbours and all structures below the high-watermark of the sea and marinas, harbours and associated structures on inland waters;*

*2(c) The change of land use from agricultural or zoned undetermined use or an equivalent zoning to any other land use;*

*7. The reclamation of land, including wetlands, below the high-water mark of the sea, and in inland waters;*

9. *Scheduled processes listed in the Second Schedule to the Atmospheric Pollution Prevention Act, 1965 (Act No. 45 of 1965):*

*Scheduled process 59: The bulk storage and handling of ore .... That is to say, the storage and handling of ore ... at dumps designed to hold 100 000 tonnes or more and not situated on the premises of a mine or works as defined in the Mines and Works Act, 1956; and*

10. *The cultivation or any other use of virgin ground.*

The proposed Phase 2 expansion is therefore subject to authorisation in terms of the Environment Conservation Act. An application was submitted through the Western Cape Department of Environmental Affairs and Development Planning (DEA&DP), to the Department of Environmental Affairs and Tourism (DEAT) for the authorisation of the Phase 2 component of the proposed expansion (DEAT Application No. 12/12/20/806) on 13 March 2006. Following acceptance of this application, a detailed Scoping Study has been undertaken, culminating in the submission of the Final Scoping Report to DEAT. This report identified key issues and concerns associated with the proposed development, viable alternatives for further assessment, as well as specialist studies and assessment required.

Based on The Joint Venture's past experience and knowledge base with regards to EIAs for similar infrastructural developments, as well as specialist knowledge of the study area, potential environmental issues have been identified by the EIA team. Key stakeholders who have assisted in the process of identifying issues include the existing Environmental Monitoring Committee for the Phase 1B Expansion of the Bulk Terminal Saldanha, the Saldanha Bay Forum, Cape West Coast Biosphere Reserve, local ratepayers associations, relevant authorities, etc. Preliminary engineering investigations have been conducted with a view to providing the preliminary technical information required to assess the potential issues and the impacts that could arise from the proposed development. These engineering studies will take into account the impacts identified in the previous expansion phases, as well as the current monitoring data available at the port.

The study team is appropriately equipped to assess the specific environmental issues and impacts associated with the construction and operation of port facilities. The Scoping Study that has been concluded was aimed at determining the scope of issues/impacts to be further investigated during the EIA phase. The goal was also to develop adequate terms of reference for the specialist studies to be undertaken during the EIA phase.

The EIA procedure will include, *inter alia*, undertaking the impact assessment process to assess the significance of the impacts, and address the issues or concerns identified in the Scoping phase. An intensive Public Participation Plan has also been developed to facilitate comprehensive and inclusive public participation throughout the EIA phase. This should also serve as an important mechanism for assessing the social impacts of development in the EIA process (see section 3.7.4).

#### **1.4.1 Issues Eliminated from EIA Study**

Certain issues raised during the scoping phase were sufficiently addressed using the available information and therefore do not require further investigation; they have thus been 'scoped out' or eliminated from the EIA process. These include issues for which sufficient information has been provided in the Issues and Response Table in the Scoping Report, such as lengthening of the quay, plans for an inland harbour, railway line upgrade, authorisation of the increased mining operations (at Sishen), independent peer review of specialists, etc (See Issues and Response Report: Appendix A10 of the Scoping Report).

## SECTION 2: KEY ISSUES FOR THE ENVIRONMENTAL IMPACT ASSESSMENT

### 2.1 ISSUES FOR THE EIA PHASE

The issues identified during the scoping phase were based on initial site investigations, including several visits, literature reviews, interaction with port officials and preliminary studies, as well as information gained from EIA processes related with previous expansion phases and issues raised through the public participation process. Several of these issues were scoped out, with suitable responses or explanations provided in the scoping report, while others were identified as significant issues to be examined and addressed during the detailed impact assessment phase. These issues were the basis for determining the terms of reference for the assessment procedure, as well as the specialist studies.

The following issues have been identified as those that require further consideration in the impact assessment phase.

#### *Biophysical issues:*

- Air quality, particularly iron ore dust (health impact and nuisance);
- Noise impacts on neighbouring residential areas; and
- Impact on groundwater quantity and quality.

#### *Ecological (terrestrial, avian, marine and botanical) impacts:*

- Fragmentation and isolation of sensitive dune systems;
- Loss of vegetation; and
- Loss of prime foraging habitats and disturbance of seabirds.

#### *Social issues:*

- Loss of cultural and heritage resources;
- Economic impacts, such as job creation, influx of job-seekers, etc;
- Social impacts, such as competition between locals and job seekers, etc; and
- Visual and aesthetic impacts on the tourism industry and local residents.

#### *Marine impacts:*

- Increased sediment loads (increased turbidity) and poor water quality;
- Impacts on marine biodiversity (loss of habitat, loss of species);
- Beach erosion and litter;
- Impact of dredging and disposal of dredged material; and
- Increased risk of shipping accidents and introduction of alien species through ballast water discharge.

#### *Infrastructure and services:*

- Lack of availability of water for port operations;
- Increased road traffic;

- Impacts of Stormwater, industrial effluent and waste water;
- Waste management; and
- Impacts on energy requirements.

These issues are considered to be sufficiently broad to encompass all the issues that emerged as a result of the nature of the project, the receiving environment, the legal policy and planning context, and the environmental priorities of the affected population. Should additional issues be raised during the EIA phase, these will also be addressed. The aim of the EIA is to ensure that all key issues identified during scoping are assessed in sufficient detail for the competent authorities to make an informed decision. The comprehensive list of specialist studies has been proposed such that all issues raised are to be addressed in at least one of these studies (Table 2 below).

**Table 2: List of proposed specialist studies**

<b>Issue and Impacts Identified to date</b>	<b>Specialist Study</b>	<b>Reviewers</b>
<b>BIOPHYSICAL ISSUES</b>		
Dust pollution and discoloration effect	<b>Air Quality</b>	Mr Demos Dracoulides (DDA)
	-Dispersion Modelling Study & Impact Assessment	
Dust effects on human health including nuisance effect	<b>Health Impact Assessment</b>	
Noise disturbance on neighbouring residential areas	<b>Noise Impact Assessment</b>	Mr Terry Mackenzie-Hoy
Impacts on groundwater – e.g. abstraction, contamination	<b>Groundwater Impact Assessment</b>	
<b>ECOLOGICAL ISSUES</b>		
Fragmentation & isolation of dune system, loss of vegetation	<b>Vegetation Impact Study</b>	
Impacts on marine birds	<b>Avi-faunal Assessment</b>	
Impacts on non-avian fauna	<b>Non-Avian Fauna Assessment</b>	
<b>SOCIAL ISSUES</b>		
Loss of cultural heritage	<b>Cultural Heritage</b>	
Potential benefits of job-creation, negative economic aspects of the influx of job-seekers, etc.	<b>Economic Impact Assessment</b>	
Social conflict due to competition between job-seekers and locals, etc.	<b>Social Impact Assessment</b>	
Visual impacts on surrounding areas of tourism e.g. West Coast National Park, residential areas.	<b>Visual Impact Assessment</b>	Prof. Ernie Oberholzer
<b>MARINE IMPACTS</b>		
Sediment loading	- Sediment Quality	Prof. Ron Cox (University of New South Wales)
	- Water Quality Assessment	
Increased Turbidity as a result of dredging	Turbidity Modelling	
Poor water quality	Water Quality Modelling	

<b>Issue and Impacts Identified to date</b>	<b>Specialist Study</b>	<b>Reviewers</b>
	- Ecological Assessment	Dr Barry Clarke (Anchor Environmental)
Impacts on marine biodiversity – loss of habitat and loss of species	Basic Ecological Assessment	
Introduction of alien species through ballast water discharge	Ballast Water Issues	
Poor ballast water management	Blasting Assessment	
Beach erosion	- Shoreline Stability	Mr Eddie Bosman (University of Stellenbosch)
Increased shipping accidents	- Incremental Shipping Risk Study	Dr John Zietsmann
Cumulative impacts of dredging, etc. on the marine environment as a whole	- Integrated Marine Impact Report	
<b>INFRASTRUCTURE &amp; SERVICES</b>		
Increased road traffic	<b>Traffic and Transportation</b>	
Lack of power supply for the expanded operations	<b>Energy Supply</b>	
Blasting and Vibrations Impact Assessment	<b>Blasting Method Statement</b>	
	<b>Integrated Water and Waste Management</b>	
Lack of availability of water for port operations: i.e. various sources such as recycled water, industrial water, desalination of sea water. Impacts on Stormwater control measures and impacts on current Stormwater management,	- Report Integration	
	- Potable Water	
	- Stormwater	
	- Sanitation	
Disposal of hazardous waste	- Hazardous Waste	
Disposal of construction waste	- Construction Waste	
Impacts of industrial effluent and waste water	- Industrial Effluent/Wastewater	

The potential issues have been identified by each of the specialists, through several site visits and an extensive review of the relevant literature. The environmental team has focussed on discipline-specific impacts, and developed detailed terms of reference for each specialist. These terms of reference were developed by taking full cognisance of the comments received during the public participation process, the present knowledge of the impacts and issues arising from current operations. These studies will form the basis of the detailed investigations to be undertaken during the EIA.

### 2.1.1 Alternatives Identified

In compliance with the EIA guidelines, a number of alternatives have been identified in an engineering screening study undertaken by Transnet (Appendix B3 of the Final Scoping Report). The alternatives have been identified in the following areas:

- Tippler location;
- Stockyard location;
- Berth location;
- Ship loader equipment; and

- Alternative water supply.

The following groups of criteria were used in the screening exercise (where applicable, a more detailed list of criteria was used for each group of alternatives):

- Infrastructure required – must be practically achievable;
- Impact on Operations - ease of integration with current operations and infrastructure to minimise stoppages both during construction and subsequent operations; and
- Environmental and Social impacts - minimise environmental damage by developing and implementing environmentally sensitive solutions.

Prior to commencement of the EIA, it was possible to eliminate a number of the alternatives addressed within these engineering screening studies. A summary of the options which will be taken forward as part of the EIA phase is given below:

- New Tippler Location – The ideal location for the position of the two new tipplers is considered to be approximately 760m north of the Langebaan/Saldanha provincial road, MR 559 and between the existing rail lines and the Mittal Steel boundary fence. This has been developed in conjunction with rail alignment studies.
- Stockyard Locations – Three alternative locations have been proposed. These include further reclamation of the existing stockyard area contained within the revetment bund, inland development into the dunes and reclamation of the existing stockyard area contained within the revetment bund combined with reclamation into Big Bay.
- New Berth Location – The ideal location for the position of the two new berths is considered to be alongside the existing iron ore quay on the Big Bay side.
- Ship loader equipment – Three alternative ship loaders have been proposed. These include the long travel shiploader (bridge type), the linear ship loader and the long travel shiploader (slewing type).
- Water supply alternatives – Reverse osmosis (desalination of seawater) is considered the preferred solution to the alternative water supply. Due to the urgent need for additional water supply for existing operations, the reverse osmosis plant will be subject to a separate EIA process that will run in parallel with the Phase 2 EIA.

Further alternatives will be discussed in the EIA Phase in terms of the no-development option, dredge material disposal options, timing alternatives and strategic alternatives.

## **SECTION 3: ENVIRONMENTAL IMPACT ASSESSMENT METHOD**

Following the identification of significant issues and viable alternatives through the scoping process, the purpose of the impact assessment phase is to assess and evaluate the significance of the potential impacts on the environment, as well as comparatively assess the project alternatives. The assessment of the significance of impacts, will be informed by detailed specialist studies, and will be discussed in terms of the nature, extent, duration, intensity, probability, and overall significance as prescribed by DEAT (1998; 2002). All specialists will be required to recommend the most suitable alternatives for the development. Continuous liaison with the relevant authorities as well as a thorough public participation process are proposed as central elements in the EIA.

### **3.1 TERMS OF REFERENCE FOR ENVIRONMENTAL IMPACT ASSESSMENT**

The purpose of the EIA is to provide the authorities with enough information regarding the potential impacts of the proposed development on the biophysical and socio-economic environment, to enable them to take an informed decision on whether or not to authorise the proposed upgrades. The terms of reference for the EIA specifically are as follows:

- Providing a detailed description of the potential impacts related to each alternative;
- Undertaking a comparative assessment of all reasonable alternatives to determine the most preferred option in each case;
- Assessing the cumulative and residual impacts of the expansion in the light of existing and future operations in the study area;
- Recommending a range of practicable alternatives for the various components of the development;
- Developing a list of practicable mitigation measures for the recommended alternatives, with an indication of the effectiveness of the mitigation proposed, i.e. whether the measures achieve acceptable levels of mitigation;
- Engaging all Interested and Affected Parties (I&AP's) identified in the scoping phase, and where necessary involving new I&AP's in the EIA process;
- Addressing all the issues and concerns raised by I&AP's, documenting these issues accordingly; and
- Proposing effective and practical environmental monitoring and management requirements that address all aspects of the development, including construction, operational and decommissioning phases. These will be included within the relevant Environmental Management Plan and Environmental Management System.

## **3.2 DESCRIPTION OF THE EIA PROCESS**

### **3.2.1 Approach**

The EIA process is to be undertaken in accordance with DEAT's guidelines for EIA as depicted in Figure 2. Once the Plan of Study and Scoping Report have been reviewed by DEAT and DEA&DP, an acceptance of the Scoping Report and Plan of Study for EIA will be issued by DEAT. The study approach will be modified to comply with any amendments suggested by DEAT on accepting the Plan of Study.

### **3.2.2 Phase 1: EIA Initiation**

Following the acceptance of the Final Scoping Report and the Plan of Study for the EIA by DEAT, I&APs will be notified of this acceptance. Thereafter, the EIA phase of the Public Participation Plan will commence (see section 3.7.4).

### **3.2.3 Phase 2: Specialist Studies**

The terms of reference for the specialist studies will be reviewed at this stage to ensure that any issues noted by the authorities in the approval of the Plan of Study are incorporated (see section 4.1). It is proposed that this phase be completed with an Integration Workshop, where the inputs from various specialist fields are incorporated into the EIA. The cumulative impacts of key issues such as dust emissions will be evaluated and effective mitigation developed on the basis of interactions between the EIA team, the specialists and the Proponent.

## **3.3 ENVIRONMENTAL IMPACT REPORT (EIR)**

An Environmental Impact Report (EIR) will be compiled, which will detail the process that was used to identify issues and alternatives, describe the impacts identified and how their significance was evaluated. The report will also indicate how issues have been addressed to date. A draft Environmental Management Plan (EMP) will be submitted together with the EIR, so that both documents can be reviewed simultaneously by the authorities. The EIR will describe the methods used to assess the key impacts that have been identified, which include:

- The Joint Venture's professional knowledge base and past experience (especially of the previous phases of this project);
- Specialist studies, covering various technical aspects of the project and the potentially significant impacts;
- The specialist integration workshop, which will enable the team synthesize the findings of various studies into the final outcome of the EIA; and

- A Public Participation Strategy, involving various forms of public consultation (see Section 3.7).

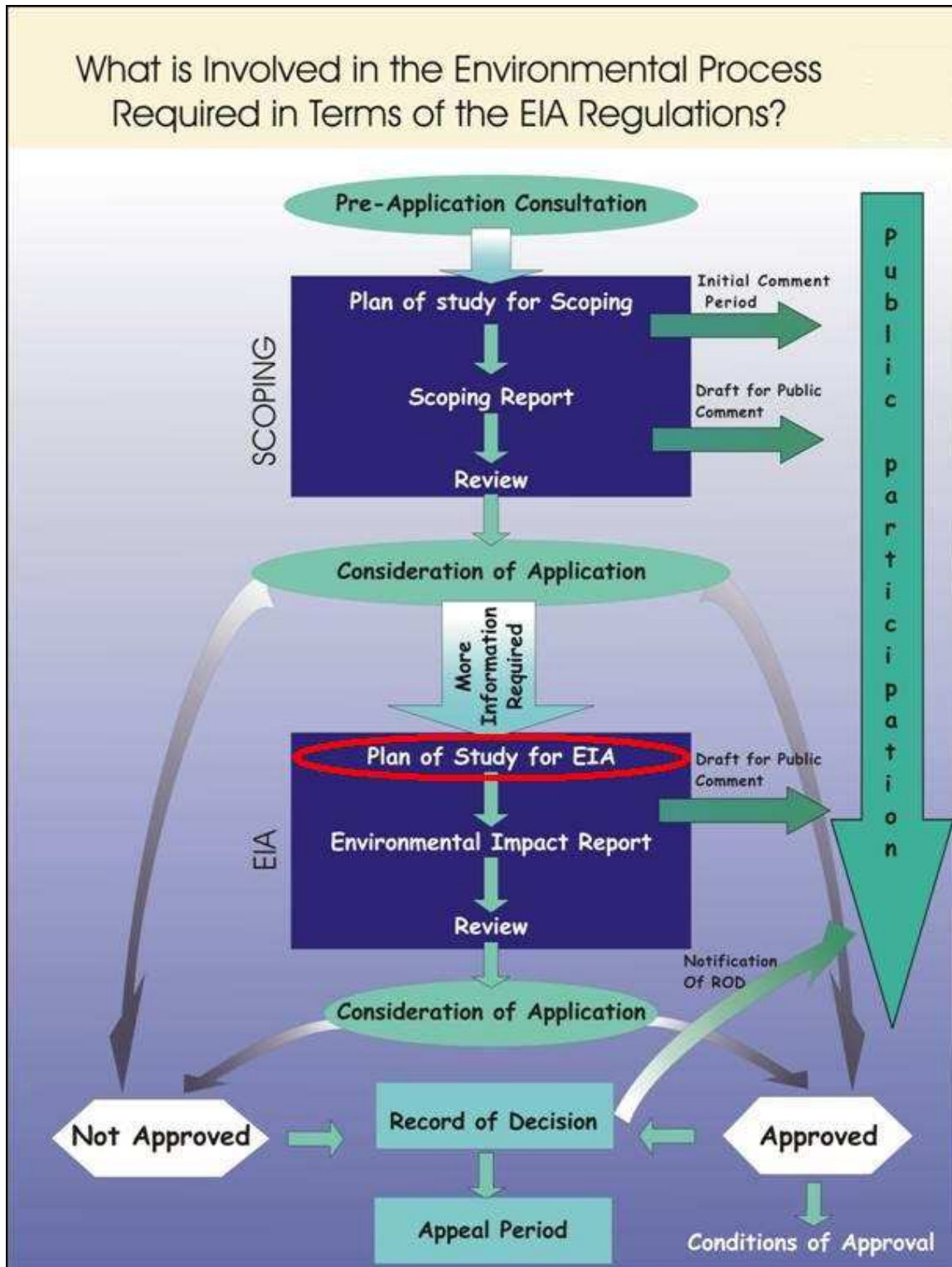


Figure 2: EIA process to be followed, indicating the plan of study stage of the process.

### 3.3.1 Description of the Affected Environment

A description of the affected environment will be provided in the EIR. A suitable baseline for assessing impacts will thus be determined. The baseline description of the affected environment will be informed by the specialist studies, each of which, in addition to the assessment of the relevant impacts, will also include a detailed description of the baseline conditions applicable to the specialist's field of expertise. Each specialist will thus define the study area from their own perspective. For instance, the study area for the Social Impact Assessment will extend to all the surrounding towns that could potentially be affected by the project, while the study area for the Noise Study will be delimited by the furthest point to which noise travels.

The EIA study must provide an indication of the sensitivity of the affected environment. Sensitivity, in this context, refers to the "inability" of an affected environment to tolerate disturbance, for example, if disturbance of the marine habitat results in the permanent loss of its biodiversity or introduction of alien species. The affected environment could be categorised as having a "low tolerance" to disturbance and is, therefore, termed a highly sensitive habitat. If, on the other hand, a habitat is able to withstand significant disturbance without a marked impact on its environmental quality, the affected environment could be categorised as having a high tolerance to disturbance (i.e. "low sensitivity" habitat).

### 3.3.2 Impact Assessment

Evaluating the significance of each impact will be based on an extensive literature review of past EIAs in the area and an understanding of the baseline or status quo of the receiving environment, which in some instances (e.g. air pollution), is already disturbed due to the existing impacts of the iron ore handling facility. The project's components will be divided into three phases in order to assess impacts related to the Construction, Operational and Decommissioning phases. Assessment of proposed activities will be undertaken in the following order:

- Analysis of the components of the proposed development;
- Undertaking the required specialist studies to determine and/or predict the significance of key impacts;
- Assessment of the potential impacts of the various components without mitigation;
- Analysis of the significance of impacts with mitigation, summarising these results in evaluation matrices; and
- Identification of effective mitigation measures (including management actions) that must be implemented to reduce or eliminate negative impacts and enhance positive aspects or benefits of the project.

### **3.4 COMPARATIVE ANALYSIS OF ALTERNATIVES**

In accordance with the Integrated Environmental Management (IEM) procedure the Scoping process has identified some feasible alternatives for the proposed development. Accordingly, a number of possible proposals or alternatives for accomplishing the overall objectives of the project objectives are being considered, and these will be evaluated in the EIR. Section 2.1.1 highlights those alternatives which will be assessed in the EIA phase. Further alternatives will be discussed in terms of the no-development option, dredge material disposal options, timing alternatives and strategic alternatives. It is probable that further alternatives will be identified in the EIA phase of the study. A detailed comparative analysis of the alternatives will be provided in the EIR, which will discuss environmental impacts, technical and economic constraints, operational procedure and efficiency (process alternatives), and any opinions or preference of the interested and affected parties.

### **3.5 ASSESSMENT CRITERIA**

#### **3.5.1 Method of Assessing Impact Significance**

The proposed method of assessing the significance of impacts will follow the DEAT (1998) guidelines, whereby a succinct description of the nature, extent, duration, intensity, probability of the impact will be provided (as described in Appendix 3). The significance of the impacts will then be determined through a synthesis of these criteria, rating and ranking them as: low, medium or high significance.

The specialists will make a clear statement on the significance and ranking of the environmental impacts of the construction, operation and maintenance of the proposed expansion. As far as possible, the specialists will examine the potential environmental impacts and evaluate their significance within the context of existing impacts and the sensitivity of the receiving environment. The EIA team has developed detailed terms of reference for all specialist studies which are based on the results of the scoping phase.

#### **3.5.2 Mitigation**

Mitigation for the proposed expansion will be aimed at addressing the cumulative impacts, and enhancing positive benefits of the project. Mitigation measures will be proposed by all the specialists involved in the project.

In order to mitigate the impacts sufficiently, the necessary planning and management measures to address operational aspects that require improvements will also be outlined. The potential to mitigate each negative impact will include descriptions of the measure and the extent to which such measures will effectively reduce the significance and status of each impact. Various mitigation options will be explored, such as alternative designs or processes, monitoring and management, biodiversity offsets or other tradeoffs.

### **3.6 LIAISON WITH AUTHORITIES**

Transnet is a major public entity in terms of Schedule 2 of the Public Finance Management Act, 1999 (Act No. 1 of 1999). Government Regulations 1183 4 (3)d stipulate that "...the provincial authority must refer the application to the Minister for consideration... where a national government department, the relevant provincial authority or a statutory body is the applicant "... Therefore, the approving authority for the project will be the Department of Environmental Affairs and Tourism (DEAT). As the project is being undertaken in the Western Cape, the Western Cape Department of Environmental Affairs and Development Planning (DEA&DP) will provide comments on the project, which are to be taken into account in DEAT's review of the application. Consultation with relevant authorities will form part of the public participation process.

There has already been formal and constructive interaction between the Applicant, the Consultant, DEAT, DEA&DP, South African National Parks (SANP), CapeNature and CAPCO. Due to the relative proximity to the West Coast National Park and the Langebaan RAMSAR Site, SANP will be involved in the consultation process. This approach of information sharing and interaction will be followed throughout the project. For the duration of the project there will be regular management meetings between Transnet and The Joint Venture to bridge information gaps, as shown in the project programme. This proposal has been discussed at a pre-application meeting with the relevant authorities, which took place on 7 October 2005. A follow-up meeting and site visit with these authorities took place on 3 May 2006 to enhance information sharing and timely decision-making. Appendix 2 contains a proposed programme of activities for the EIA, and provides an indication of the intended period of interaction with the relevant authorities.

### **3.7 PUBLIC PARTICIPATION STRATEGY AND PLAN**

#### **3.7.1 Introduction and Background**

This section provides details of the proposed Public Participation Process (PPP) to be undertaken as part of the Impact Assessment Phase of the EIA. The proposed activities will seek to build on the steps that have been taken in the public consultation process thus far (during the Scoping Phase) and are described in the Final Scoping Report (FSR).

#### **3.7.2 Aims and Objectives of Public Participation during EIA**

Public participation is an integral part of any EIA process and should aim to 'Meaningfully engage stakeholders at all levels throughout the project, to ensure that the public's views on the project are taken into consideration by decision-makers.' Public Participation is recognised as an important mechanism for assessing the social impacts of development (DECAS, 2001). The aim of the proposed public participation process is therefore to:

- Promote a responsible and transparent approach to the proposed project;
- Ensure the consideration of stakeholder input in the decision-making process; and

- Lay a foundation for ongoing consultation throughout the lifespan of the iron ore handling and export operations in the area.

The specific public participation objectives for this EIA are to:

- Provide appropriate opportunities and forums to enable all stakeholders to raise issues, concerns and queries regarding the proposed project and EIA process;
- Facilitate information dissemination using the appropriate means in order to keep all stakeholders informed about the progress of the project and to give feedback and responses regarding questions and concerns;
- Draw on local knowledge and skills to improve and enhance the EIA process and investigations/reports;
- Provide an opportunity for stakeholders to give comment and input into the specialist studies conducted as part of the EIA;
- Provide an opportunity for stakeholders' input to be considered in the decision-making process; and
- Establish relationships and channels of communication to facilitate ongoing stakeholder liaison, throughout the life cycle of the proposed development.

### **3.7.3 Best Practice Public Participation Techniques**

A number of consultation techniques will be used to engage with stakeholders throughout the EIA process. These are based on current best practice methods in public participation as described in Table 3 below. Details on how these will be used in this project are provided in Section 3.7.4.

**Table 3: Best Practice Techniques in Public Participation Process**

Technique	Description
Public meetings and open days	Held with larger stakeholder groups, such as interested and affected communities and the general public, to facilitate the dissemination of information and provide a forum for stakeholders to discuss ideas, raise concerns and ask questions, without having to submit written comment/questions.
Focus group meetings	Held with smaller groups of similar stakeholders or smaller community groups. As well as being a means of effective information sharing, focus group meetings are also seen as an appropriate starting-point for community liaison. Meetings with community leaders are valuable insofar as leaders act as “go-betweens” between the community and consultants.
One-on-one meetings	One-on-one meetings are a very effective and often more flexible means of communication and are particularly important in consultation with authorities and key NGO’s. They provide the opportunity to facilitate more focussed discussion and input concerning issues that are of particular concern to the specific stakeholder.
Media	Newspaper and radio adverts can be effectively used to inform the broader community of key milestones in the EIA process. Adverts are brief and are not intended to communicate detailed information about the project, but rather to create awareness about the project and the opportunities for involvement in the EIA process.
The distribution of Executive Summaries	The distribution of non-technical Executive Summaries is an important means of providing all stakeholders with summary information regarding the project. These documents are a useful means of providing comprehensive but accessible information on which stakeholders can comment. These documents will be made available to stakeholders in the appropriate language (Executive Summaries will be available in English, Afrikaans & Xhosa)
Feedback on comments received	It is critical that all comments and questions expressed by stakeholders both verbally and in writing are captured and recorded. It is essential to adequately address and answer these concerns and to meaningfully apply and integrate comments into reports where appropriate. It is equally important to ensure that information is fed back to stakeholders so that they understand how their concerns have been addressed or at least have been considered and recorded.

### 3.7.4 Proposed Public Participation Process

It should be noted that public participation is a dynamic process and that the proposed process should be flexible and allow any additional steps and/or changes to the proposed steps, based on the specific requirements of the stakeholders in the affected areas.

#### 3.7.4.1 Identification of Stakeholders / I&AP’s

Stakeholder identification is an ongoing process throughout the life of the project. At completion of the Scoping Phase of the EIA, approximately 500 Interested and/or Affected Parties (I&AP’s) had been identified and registered on the project database. All of the registered I&AP’s had been provided with an opportunity to provide comment on the proposed project and the EIA process. The database includes, but is not limited to, the following stakeholder groups:

- National, provincial and local authorities, including town councils;

- Local environmental and community forums;
- International, national and local conservation authorities and action groups;
- Local Non-Government Organisations (NGOs) and Community Based Organisations (CBOs);
- Surrounding and adjacent land owners and users;
- Representatives or managers of surrounding nature conservation areas (national parks, nature reserves, etc.);
- Residents of the towns (and suburbs) of Saldanha, Vredenburg and Langebaan;
- Surrounding and adjacent land owners and users; and
- Marine and coastal management (a division of DEAT).

#### 3.7.4.2 Release of the Draft Environmental Impact Report (EIR) for public comment

The Executive Summary of the Draft Environmental Impact Report (EIR) will be distributed to all I&AP's on the project database. The document will be distributed in English and Afrikaans with Xhosa versions available on request. Distribution of the document will be done via post, fax and/or e-mail and will be accompanied by a cover letter inviting I&AP's to public meetings (see below) and to submit written comments on the document. Copies of the complete Draft EIR will be made available for public scrutiny at the following locations:

- Saldanha Public Library;
- Diazville Public Library;
- Vredenburg Public Library;
- Louwville Public Library;
- Langebaan Public Library;
- City of Cape Town Public Library; and
- The Blue Bay Lodge.

#### 3.7.4.3 Advertising

The availability of the Draft EIR and the proposed public meetings will be advertised with large block advertisements in the main body of the appropriate national, regional and local newspapers as per Table 4. The possibility of using the local radio station (Radio West Coast) to broadcast an announcement about the availability of the Draft EIR and the scheduled public meetings (see below) will be considered.

**Table 4: Newspapers Proposed for Advertising**

Newspaper	Languages	Frequency	Area of distribution
Sunday Times	English	Weekly on Sundays	National
Rapport	Afrikaans	Weekly on Sundays	National
Cape Times	English	Daily	Western Cape
Cape Argus	English	Daily	Western Cape

Newspaper	Languages	Frequency	Area of distribution
Die Burger	Afrikaans	Daily	Western Cape
Die Weslander	Afrikaans & English	Weekly on Fridays	Saldanha, Vredenburg, Paternoster, Stompneus, St Helenabaai, Laaiplek, Velddrif, Langebaanweg, Hopefield and Langebaan
Swartland & Weskus Herald	Afrikaans	Weekly on Thursdays	Malmesbury, Mooresburg, Piketberg, Porterville, Riebeeck West, Riebeeck Kasteel, Darling, Yzerfontein, Aurora, Eendekuil, Velddrif, Vredeberg, Saldanha, Langebaan, Citrusdal

Advertisements will be placed during the course of one week so that they appear every day for a week in daily newspapers and once in weekly papers.

#### 3.7.4.4 Public comment period

The public comment period will be at least four weeks long and a closing date for public comments will be clearly stated in the I&AP letter and the advertisement. It should be noted that public comment periods may need to be extended, if public and school holidays occur during the period. Public and school holidays will be excluded from the comment period according to authority guidelines as well as best practice (DEAT, 1998, DECAS, 2001).

#### 3.7.4.5 Public meetings

Public open days and/or public meetings will be held in order to engage the widest range of I&AP's as possible. Open days are often a better forum for quality engagement between stakeholders and the EIA team, especially when there is a large volume of information to be conveyed. However, it is proposed that open days should be supplemented with a formal presentation of the main findings of the EIA, followed by a facilitated questions and answers session. It is proposed to conduct these open days and/or public meetings in Saldanha, Vredenburg and Langebaan.

During the open days, information posters about the findings of the EIA will be displayed and members of the project team will be present to discuss the project and answer any questions that may be raised by attendees. The subsequent public meetings will entail a short presentation by the project team, including up-to-date information about the proposed project and the main findings of the EIA, followed by a question and answer session. Meetings will be chaired and facilitated by a member of the EIA team, with presentations by the relevant members of the project team.

#### 3.7.4.6 One-on-one and Focus Group Meetings

One-on-one meetings with key stakeholders and facilitated focus group meetings with stakeholder groups are the core technique used in the public consultation process. Key stakeholders and stakeholder groups in the areas surrounding the proposed activities at the Port of Saldanha will be consulted telephonically, in focus groups meetings or one-on-one meetings. These forums facilitate the circulation of information about the proposed project to the communities and stakeholder groups that these key stakeholders represent.

Key stakeholders / stakeholder groups will include, but not be limited to, representatives of:

- Saldanha Bay Local Municipality;
- Saldanha Bay Forum;
- SAPO Environmental Management Committee;
- Residents of the suburb of Blue Water Bay;
- Local ratepayers associations;
- Relevant authorities (e.g. Marine and Coastal Management, etc.); and
- Environmental organisations (e.g. WESSA) and conservation bodies (e.g. CapeNature, SANParks, Cape West Coast Biosphere Reserve, etc).

#### 3.7.4.7 Recording of Comments and Issues Raised by I&APs

Notes will be taken of all the public, focus group and one-on-one meetings and these notes will be included in the EIA documentation. In addition, I&APs will also be encouraged to submit written comments and, in order to facilitate this, Comments Forms will be distributed at all meetings and along with the Executive Summary of the Draft EIR.

#### 3.7.4.8 Feedback on Comments and Issues Raised

The Final EIR will contain a Comments Report, including an issues and responses table which will list all of the issues raised and provide responses from the proponent and the project team. Copies of the meeting notes and of all written submissions received from I&AP's will be included in the Comments Report.

#### 3.7.4.9 Ongoing Consultation During the EIA

All I&AP's on the project database will be informed about the submission of the Final EIR to the authorities for decision-making and copies of the Final EIR will be made available for public scrutiny. Once a decision has been made, all I&AP's will be informed about the decision and about the statutory appeal period.

## SECTION 4: TERMS OF REFERENCE FOR SPECIALIST STUDIES

### 4.1 TERMS OF REFERENCE FOR SPECIALIST STUDIES

Central to the EIA phase is the completion of the specialist studies to assist in the assessment of the residual and cumulative impacts of the expansion. In order to assess the specific impacts and issues identified in detail, a number of specialist studies are proposed. The specialist investigations will include studies to address the potential issues and impacts outlined in Section 2.1 of this report. Each specialist will be required to assess the impacts without mitigation, with mitigation and comment on impacts related to the construction, operational and decommissioning phases of the project. The assessments will be according to the standard impact assessment methods (see Appendix 3). The proposed approach and terms of reference for each of these studies is outlined as follows.

#### 4.1.1 Air Quality and Health Impact Studies

The following terms of reference are required to assess the impact that the proposed expansion of the facility will have on air quality and to provide management and mitigation measures where necessary:

- Conduct a site inspection and baseline information collection;
- Review baseline data and gap analysis;
- Preparation of an emissions inventory;
- Quantification of emissions, particularly the nuisance effects of iron ore dust, such as discoloration;
- Model ambient PM10 dust - baseline conditions;
- Model ambient PM10 dust for the proposed expansion without mitigation;
- Model ambient PM10 for proposed expansion with mitigation;
- Liaise with the other specialists to determine other impacts of dust on biodiversity and marine life;
- Assess and compare the air quality scenarios for the various stockyard layout options;
- Comment on the levels of anticipated dust emissions with regard to legal limits, social norms (including nuisance threshold) and environmentally acceptable limits;
- Recommend mitigations measures, including technical solutions to reduce dust emissions and limit the air quality impacts of proposed expansion;
- Identify improvements that would enhance or complement the current air quality monitoring systems; and
- Compile an impact assessment report, which specifically evaluates the cumulative effects of the proposed expansion.

The terms of reference for the Health Impact Assessment will entail:

- Identify and prioritise chemicals of concern, including additives for dust control;
- Provide a conceptual model of potential exposure pathways;
- Identify primary exposure pathways of key receptors and broad categories of key receptors;
- Review the literature for records of medical ailments that could be associated with the advent of industrial emissions in the study area;
- Review the literature review to identify standards and/or risk based concentrations to assess health impact;
- Investigate the nuisance threshold of iron ore dust on human health and recommend monitoring measures in collaboration with the air quality study;
- Conduct a comprehensive ecotoxicological and/or human health risk assessment;
- Conduct an epidemiological study, to assess the health risk of iron ore dust and investigate the potential for iron ore dust inhalation to cause ailments such as asthma, hay fever, eye irritations, bronchitis, sinusitis, etc; and
- Compile a health impact assessment report; recommending mitigatory measures as required, based on the findings of the study.

#### 4.1.1.1 *Methodology for Air quality and health studies*

For air quality a detailed desktop study as well as a site visit to collect data will be undertaken. This data will form part of the baseline information. Once the baseline information has been gathered it will be reviewed and a gap analysis will be produced. Any emissions will be quantified to give the report validity. Air emissions will be modelled to address 3 scenarios; namely:

- Baseline conditions,
- Dust emissions for the proposed expansion without mitigation; and
- Dust emissions for proposed expansion with mitigation.

Hourly meteorological data including wind speed, wind direction, temperature, rainfall, humidity (if available); and cloud cover (if available) will be taken into consideration during the modulation of the information. The data will be overlaid on a GIS system as well as a 1:10 000 aerial photographs.

The health study will closely incorporate information from various other specialists e.g. noise, air pollution, visual impact etc. The specialist will undertake a site visit to collect baseline information and interrogation workshops with the community members as well as doctor's rooms and hospitals in the region. The preparation of an emissions inventory to determine the following:

- Baseline conditions,

- The impact of the proposed expansion on health without mitigation; and
- Impact of the proposed expansion with mitigation on health.

#### 4.1.2 Avian and Terrestrial Fauna

The terms of reference for Avifaunal assessment will entail the following:

- Review existing information concerning the status and sensitivity of bird communities within the Saldanha Bay region through a desktop and literature survey of the affected environment (collation of baseline information). The study will also focus on the preferred foraging grounds, flight routes from roosting sites to foraging grounds and vice versa;
- Conduct a site visit to assess the status quo and possible risks associated with the proposed activity on the nesting and foraging activities of bird populations and their associated habitat. It is not considered necessary to conduct concise bird population studies or counts since the area has been well documented by studies in the past;
- Review and analyse current shipping volumes (traffic volumes) including anticipated volumes after commissioning. Such a review will provide the necessary information regarding the impacts (or direct disturbances) associated with passing ships on bird populations of the region;
- Assess and predict the impacts/risk associated with oil/metal spillage/re-sedimentation on important foraging habitat, and to identify areas that are of great risk;
- Liaise with other specialists, such as Botanist, marine Ecologists and Shipping Traffic expert, particularly with regard to shoreline habitats and impacts on sea bird populations;
- Provide practical recommendations and mitigation measures to minimise negative impacts and maximise positive impacts; and
- Assess the impact of overhead power lines and other electrical infrastructure on the bird populations in the study area.

The terms of reference for terrestrial fauna assessment will entail the following:

- Review existing information concerning the status and sensitivity of the non-avian faunal community (focussing on mammals) within the Saldanha Bay region through a desktop and literature survey of the affected environment. The study will include a Red Data scan;
- Initiate a site visit to assess the status quo and possible risks associated with the proposed activity on the foraging and roosting activities of faunal populations and terrestrial (land-based) faunal habitat;
- Review and analyse current shipping volumes (traffic volumes) including anticipated volumes after commissioning. Such a review will provide the necessary information regarding the impacts (or direct disturbances) associated with passing ships on mammal populations of the region;

- Assess the risks associated with possible alien faunal introductions from foreign ships that may impact on the indigenous faunal populations;
- Assess and predict the impacts/risk associated with oil spillage/re-sedimentation on important foraging habitat, and to identify areas that are of great risk;
- Obtain collection permits for the purpose of conducting this study; and
- Provide practical recommendations and mitigation measures to minimise negative impacts and maximise positive impacts.

#### 4.1.2.1 Methodology

The method will entail a review of existing information concerning the status and sensitivity of bird communities as well as mammal species on land within the Saldanha Bay region through a desktop and literature survey of the affected environment (collation of baseline information). The baseline study will focus on various aspects e.g. preferred foraging grounds, flight routes from roosting sites. The study will include a Red Data scan of both bird and mammal species. The current (status quo) will be compared with the proposed impacts of the development on the sensitive communities.

In addition, to address some of the above issues it will be necessary to trap/catch small mammals, invertebrates and herpetofauna by means of a small mammal trapping/pitfall trap session. This will entail the following:

- Acquiring the necessary collection permits from Cape Nature Conservation;
- The strategic placement of collection traps for a least three trapping nights; and
- These areas will also be surveyed during times of non-daylight (to assess the occurrence of amphibians/nocturnal fauna).

#### 4.1.3 Cultural Heritage

The terms of reference for the Cultural Heritage impact assessment are as follows:

- Conduct a literature review and desktop study on land- and marine-based heritage in the study area; priority should be given to identifying and reviewing reliable published sources with respect to maritime heritage;
- Conduct a field survey in those parts of the study area that could be affected by land based expansion, such as the adjacent dunes;
- Compile an inventory of historical and archaeological material in the area;
- Identify heritage issues, that could be affected by the project, such as historical sites, and fossil remains;

- Investigate maritime archaeology in consultation with maritime archaeologists experts at both the National Maritime Survey and Iziko Museum, and by consulting the SAHRA database of maritime heritage;
- Liaise with relevant parties at the West Coast Fossil Park, e.g. Pippa Haarhoff. This should be done in order to make use of relevant information from the local community;
- Investigate the need to undertake a maritime survey, making specific recommendations as to whether this survey is required;
- Specify the relevant authorizations or permits that may be required in terms of the National Heritage Resources Act;
- Assess the heritage impacts based on the impact assessment methodology; and
- Compile a Heritage Impact Report, which proposes mitigation measures as required.

#### 4.1.3.1 Methodology

A detailed literature review will be used to establish the kinds of heritage material that could be affected by the proposed activities. In order to do the required work for the Cultural Heritage study, a site visit to collect land-base information is required. The fieldwork will entail, as standard practice, recording of any heritage material, establishing position using a hand-held GPS receiver. The adjacent dunes will be searched by qualified archaeologists. Maritime archaeology issues will initially be dealt with by means of a desktop study and through consultation with the National Maritime Archaeological Survey, SAHRA. A maritime survey may be required – either a dive survey or proton magnetometer/side scan sonar survey. Focus areas for the study at this point in time are: predicted hydrodynamic impacts with respect to dredging; reclamation; and landfill.

#### 4.1.4 Social Impact Assessment (SIA)

The purpose of this study will be to assess the social impacts associated with the expansion of the export iron ore terminal at the Port of Saldanha. This scope of this study will entail the following:

- A baseline socio-economic description of the affected environment (Saldanha, Vredenburg; Langebaan; White City; Diazville, Hopefield, and Paternoster);
- Identify and assess potential social change processes that may occur as a result of the project;
- Identify and assess potential negative social impacts; such as crime, influx of job seekers, decline in tourism, pressures on social infrastructure and local amenities, etc;
- Identify and assess potential benefits and/or positive impacts of the project such as job creation;
- Identify of mitigation measures;

- Make recommendations regarding the most suitable alternatives from a social impact perspective;
- Liaise with other specialists, particularly the economic impact specialist to determine the socio-economic impacts of the project;
- Investigate potential social offsets that could alleviate the impacts on rural landowners, and curtailed commercial activities arising from dust impacts; and
- Compile a comprehensive Social Impact Assessment report.

#### 4.1.4.1 Methodology for the SIA

The SIA will involve an in-depth baseline study to determine the actual state of the community. This study will make use of desktop studies of existing literature and reports, statistical data and in-depth interviews with key people in the community, as well as participating in focus group discussions held during the Public Participation Process (PPP). The purpose of the SIA is to determine the impact of the proposed development on the Saldanha community, whether it be positive or negative. The outcome of the study will include mitigatory actions to minimise the impact of negative outcomes.

#### 4.1.5 Economic Impact Assessment

The terms of reference for this study will entail describing the current economic environment and describing in detail the potential impacts of the project on economic activity at the national, regional and local (municipal) scales.

The terms of reference will entail:

- Conduct a broad level cost-benefit review of the justification and financial projections for the project with a particular emphasis on highlighting risk factors that are important to the project's success;
- Identify and assess potential impacts (positive and negative) on commercial activity in nearby commercial nodes, with particular attention given to the nature of the project and its surroundings – impacts on sectors such as tourism and agriculture (including fishing) will be assessed in this regard;
- Assess the impacts on other activities in the area (incl. impacts on other businesses sectors, nodes and amenity);
- Assess the impact on the economy in longer term due to skills development arising from project;
- Assess the impact of ongoing supply of services and goods to the expanded operation including supply to ships and services to ships and their staff;
- Assess potential impacts on direct employment and household income associated with the proponent's expenditure on the site will be analysed based on experience at similar developments and past expansions of the port;

- Assess impacts on employment, which should give detailed figures on job-creation and job security) and incomes from development expenditure;
- Indirect impacts will be discussed qualitatively to the extent possible, but local impact analysis would focus on direct impacts;
- Assess the impact of the project on property values and rates income;
- Review the strategic justification and financial sustainability of the project and how this may change if viewed from a societal costs and benefits perspective; this must be seen in the context of the scale of the project and its location;
- Determine the degree of fit with the economic development visions for the area; and
- Compile an economic impact report that makes relevant recommendations on how the economic benefits of the project could be enhanced, while limiting negative economic impacts.

#### 4.1.5.1 Methodology for the economic impact assessment

The existing economic environment affected by the project will be established using the following sources:

- Information on current operations and the need for expansion;
- Information generated in the economic specialist study forming part of the EIA for previous expansion (conducted by Hugo Van Zyl);
- Information generated during consultations with the public and authorities;
- Statistical databases such as Census information;
- Local economic development and planning documents; such as the Integrated Development Plan (IDP); and
- The socio-economic review in support of the findings of the social impact study.

A review of the strategic justification and financial sustainability of the project and how this may change if viewed from a societal costs and benefits perspective will be undertaken. The methodology used for this study will focus mainly on reviewing and evaluating the economic implications of the results of other specialist studies e.g. Air quality, Visual impact Assessment, Traffic and Transportation, Noise, all the Marine studies as well as Groundwater studies.

There are two groups of stakeholders that the first of which oppose the planned development and upgrade based on the aesthetic impact as well as other issues. The second group view the proposed development positively based on the economical boost it will give for future economical progress in the community. The two groups also assess impacts on property values and rates income differently and this will have to be compared to arrive as an objective conclusion.

#### 4.1.6 Vegetation

The objectives of this specialist vegetation study are to:

- Establish the baseline condition of potentially affected vegetation communities and species found on the proposed project areas and investigate the changes that have occurred to date;
- Determine the impacts of the proposed expansion on the existing plant communities; and
- Suggest measures to manage/mitigate negative impacts and enhance the positive impacts identified during the study.

The proposed terms of reference for the specialist vegetation study is outlined below.

- Literature review: review existing data concerning the extent and conservation status of the flora in the Saldanha Bay area.
- Field survey: A field survey will be undertaken during the last week of September. Saldanha is located in a winter rainfall region and September is thus an appropriate time to undertake a field survey for this area as it is late spring and all the geophytes and annuals should be flowering allowing for a more comprehensive vegetation survey. Based on current information the field survey will cover the following three areas:
  - the dunes behind the lagoon (approximately 1 km) in the vicinity of the proposed expansion;
  - Salkor yard and loop one of the railway line; and
  - Additional railway spur of approximately 5km: although this is proposed within the existing servitude the servitude may be extended.

The following activities will be included in the scope of field survey and subsequent reporting:

- Description of the biotic environment of the project area, including the following as a minimum:
  - Edaphic and structural characteristics of plant communities identified;
  - Species composition of each distinct community (identification of dominant species of each community);
  - Identification of rare and endangered plant species and photographic record of each such species (to be included in an appendix to the report);
  - Identification of exotic invader species, if present, and photographic record of each species;
  - Comment on the conservation status and conservation importance of the vegetation communities and habitats and state whether there are any sensitive habitats and/or landscapes on the proposed project area;
  - Describe any risks to the deterioration of the vegetation status; and

- Comment on plants of cultural, commercial or recreational significance and the medicinal value of plant species present where possible.

The vegetation communities identified on site will be depicted on a topographical map. Should plant species identifications need to be verified this will be done by the Kirstenbosch herbarium.

The Impact assessment report will provide details on the following aspects:

- A description of important ecological relationships between fauna and flora (and where possible comment will be provided on the integrity of these ecological processes on site);
- The present ecological “successional status” of the habitats in the study area, in relation to human impact on them will be described;
- Identification of impacts and provide management recommendations including future monitoring requirements and rehabilitation procedures. The impact assessment should take into consideration cumulative impacts and assess the local, regional and national effect of the proposed upgrade project on the flora, taking into consideration the technical details of the project and the conservation significance of the affected species and communities (e.g. the endemic dune system). This should include the potential for dust emissions and water contamination to affect on-site and neighbouring flora/fauna communities (including livestock and game);
- Conservation priorities will be identified for the project; this may include a review of the Saldanha fine-scale plan being undertaken under the auspices of the CAPE project, and a sub-regional conservation plan/linkage proposed as part of the assessment. As the fine scale plan is not complete, it could be excluded from the current assessment, but should be consulted if available before the final EIR is completed;
- A detailed discussion and feasible proposal on suitable biodiversity offsets; particularly with regard to recommendations made for the Phase 1A expansion;
- Assessment of the impacts on the terrestrial-marine interface and a review of the CapeNature Biodiversity Management Plan for the Saldanha Bay area;
- Where necessary, recommendations will be provided for the relocation and subsequent protection of selected indigenous plants for conservation purposes;
- A list of potential plant species to be propagated in nurseries from seed, root stock or cuttings etc, will be provided; this is for the rescue of potential key species for rehabilitation and/or conservation purposes;
- Comment will be provided on the appropriateness of the legal requirements in light of site-specific factors; and

- An indication of additional legal and other requirements that will need to be followed should disturbance to protected or sensitive species, communities, habitats and landscapes be unavoidable. This will include a review of the most recent biodiversity and related conservation legislation.

#### 4.1.6.1 *Methodology for the vegetation study*

The study will include desk top studies as well as site visits to collect plant samples. The information will be collated and the baseline information will direct the rest of the vegetation study.

Air quality studies will be assessed to determine whether the quality of air has an impact on plant mortality/ reduced functioning due to high dust levels from wind-blown iron ore dust. Various other specialist studies will have to be incorporated into this study e.g. the marine study conducted by the CSIR as well as meteorological information to establish wind direction and speed. It is necessary to determine though plume dispersal the effect of wind-blown iron ore dust on vegetation. Through modelling of the air quality information gathered, the effect of the extra stockpiles as well as the height of the stockpiles can be determined, as well as the effect of this on the surrounding vegetation.

#### 4.1.7 **Traffic and Transportation Impact**

The terms of reference for the Traffic Impact Study will consist of the following:

- Undertake a Traffic Impact Assessment (TIA) to understand construction traffic and also impact on the public roads due to the additional railway lines and general in increase in traffic;
- Liaise with provincial and municipal road authorities in determining road network upgrades/plans that could be impacted by the project;
- Determine what road improvements are required to alleviate potential impacts if any are identified;
- Assess the impacts of increased traffic on current traffic in the area; and
- Compile a Traffic Impact Report.

##### 4.1.7.1 *Methodology*

This study will firstly determine the impact of the increase in development traffic on the surrounding community. A further important aspect will be the impact on the public roads due to the additional railway lines and general in increase in traffic.

The study will involve desktop studies, site visits as well as participation in public participation meetings to gather information from local knowledge. The current traffic volumes will be compared with the proposed influx of development vehicles and this will be plotted and graphs will be generated.

#### **4.1.8 Energy Supply**

The terms of reference for the energy supply study will consist of the following:

- Liaise closely with Eskom and local authority in order to develop an understanding of the capacity of overhead lines, possible need for additional lines, their location and impact on other studies;
- Describe the current electrical regime and future scenario with respect to power quality and blackouts in the light of the energy requirements of the proposed expansion;
- Establish the effect on local authority of increased fault levels if applicable;
- Analyse the means of integration into existing infrastructure for the required power supply upgrade;
- Investigate opportunities for Green Power;
- Liaise closely with specialists on avian study and also on visual quality regarding night glow; light pollution; power line visual impact;
- Establish emergency power requirements of iron ore facility;
- Establish bulk fuel requirements of iron ore facility during the construction and operational phases;
- Establish communication tower requirements; and
- Compile a report that outlines the energy requirements of the project, indicating what the impacts on local supply could be. This report should make recommendations on sustainable power supply for the upgrade.

##### *4.1.8.1 Methodology for energy supply study*

For this study the approach will be to liaise closely with Eskom and the local authority to understand the capacity of overhead lines, possible need for additional lines, their location and impact on other studies. The power supply requirements for the upgrade will also be determined in liaison with the proponent. The study will focus on possible means to analyse the integration of the required power supply upgrade into existing infrastructure. To perform these functions a desktop study of existing infrastructure and information gathering from the local community will be necessary.

Close liaison will be required with other specialists regarding night glow; light pollution; power line visual impact, as well as an analytic study of the effect of increased power supply infrastructure, bulk fuel and communication towers. The specific environmental impacts will however be analysed by the relevant specialists.

#### **4.1.9 Visual Impact Assessment (VIA)**

A level four VIA is usually required for large scale infrastructure that could have a high visual impact. Therefore, the VIA will conform to the requirements of a level four assessment which requires the realisation of the following objectives (adapted from Oberholzer (2005)):

- Determine the extent of the study area;
- Describe the proposed project and the receiving environment;
- Identify and describe the landscape character of the study area;
- Identify the elements of particular visual value and quality that could be affected by the proposed project;
- Identify landscape and visual receptors in the study area that will be affected by the proposed project and assess their sensitivity;
- Indicate potential landscape- and visual impacts;
- Assess the significance of the landscape- and visual impacts;
- Assess the sensitivity of the landscape- and visual receptors;
- Determine the severity of the landscape- and visual impacts;
- Assess the significance of the visual and landscape impacts;
- Recommend mitigation measures to reduce and/or alleviate the potential adverse landscape- and visual impacts; and
- Document the findings of the study in a VIA.

The VIA will give particular importance to assessing impacts that could arise during the construction phase, such as are those associated with the dredging activities. These include:

- Visual (or aesthetic) impact: due to large turbidity plumes that could be associated with the dredging operations;
- Visual and aesthetic impact of dust due to discoloration;
- Visual impact of extra machinery during construction and operational phase of the project;
- Visual impact of more iron ore stockpiles in harbour area; and
- Visual impact of more trains entering and exiting the harbour area.

#### 4.1.9.1 Methodology

The study will include a desktop information gathering phase where information regarding the expansion of the volume and area of the footprint for the iron ore handling infrastructure will be determined.

The extent of visual influence will be determined by performing a visibility analysis for both an elevated point that is representative of the height (20 m) of a typical iron ore stockpile and additional linear lines that is representative of the additional berths. A Digital Elevation Model (DEM) with a resolution of 90 m will be utilised together with a Geographical Information System (ArcGIS 9.2 and the Spatial Analyst Extension of ESRI) to perform the visibility analyses.

The software are internationally recognised software that enable different scenarios to be realised and tested in order to optimise layouts of potentially visually disturbing activities, industrial plants and equipment, as well as test the effect of potential mitigation measures.

The study will determine the visual and aesthetic impacts of current operations that have a potential impact on the environment. These will include sources and operations such as: the Tippler, Stacker Reclaimers, light pollution from the site, etc.

#### **4.1.10 Noise Impact Study**

The terms of reference for the noise impact study will be as follows:

- Determine the process and locations of each existing and proposed facility that potentially causes a noise impact. This will cover infrastructure and operations at the site such as, the Tippler building; Stacker Reclaimers, shunting of train trucks, Conveyors, trains, dredging, construction works during reclamation, and Ship loaders;
- Determine ambient noise levels at selected locations within the boundaries and along the perimeter of the site, as well as at selected sensitive locations within the noise exposed communities such as Blue Water Bay and Saldanha;
- Model the movement of noise waves taking into account planned positions of the machinery, potential noise barriers, meteorological conditions, etc;
- Model the resulting ambient noise levels after the expansion of the port, at selected locations within the boundaries and along the perimeter of the site, as well as at selected locations within the noise-sensitive communities, such as Blue Water Bay and Saldanha;
- Assess the noise impact of the proposed expansion on the relevant affected communities;
- Determine the cumulative impacts of the proposed expansion, especially in light of previous expansions and current environmental issues at the port;
- Assess the “no development” alternative and indicate whether the sites/options proposed are environmentally acceptable or unacceptable for the Phase 2 expansion as proposed in terms of the impacts assessed;
- Indicate the environmentally most preferred alternatives;
- Set acceptable noise limits, should the noise control regulations be deemed inadequate to address local noise concerns;
- Recommend appropriate and practical mitigation measures to minimise the negative impacts and maximise the potential benefits associated with the various options. This should include measures such as noise barriers to protect noise sensitive receptors (communities); and
- Compile an impact assessment report based on local regulated noise limits, SANS 10103: 2003, The Environmental Conservation Act, 1989 (Act No. 73 of 1989), Noise Control regulations, as well as WHO guidelines.

#### 4.1.10.1 Methodology

The modelling study will be performed using the internationally recognised software MITHRA. This noise model is capable of predicting 3-dimensional noise contours for ground and elevated noise sources. It enables different scenarios to be realised and tested in order to optimise layouts of potentially noisy activities, industrial plants and equipment, as well as test the effect of potential mitigation measures.

In addition, equipment noise power databases and the consultant's noise measurements from similar operations will be used for the equipment that is not currently operational. The capacity increase will introduce new equipment similar to that already existing. The estimation of the cumulative noise levels will be accomplished by adding the appropriate new noise sources and utilising the relevant estimated power spectra for each source. The modelling will also take into account the planned positions of the machinery and the potential screening of the existing ground, as well as the meteorological conditions in the area and the type of ground for noise propagation and noise reflection, such as the sea surface.

The baseline noise study is to be based on noise measurements in accordance with the SANS 10103: 2003, SABS 0328:2001, SABS 0357:2000, and any specific in-house or industry-related standards required. Measurements will be performed at the noise-sensitive receptor areas in order to establish the current noise levels.

#### 4.1.11 Groundwater impact study

The terms of reference for this study will be to:

- Collate, process and evaluate all existing groundwater information (reports, maps and National Groundwater Database) for the Site and its immediate surrounds (1 km radius);
- Undertake a hydrocensus and sample existing monitoring boreholes for an independent chemical analysis (This will be aimed at identifying potential areas from which groundwater could be abstracted);
- Map any interpreted lineaments and potential groundwater-bearing formations and structures using aerial photographs and existing geological maps;
- Conduct a feasibility study to drill and test exploration boreholes;
- Consider the (direct and cumulative) effects of abstraction on the environment, adjacent water bodies and other groundwater users; and
- Compile a groundwater impact assessment report for inclusion into the EIR. The potential of bulk water supply from groundwater resources will be discussed.

#### 4.1.11.1 Methodology

The study will be conducted by means of a literature review and a hydrocensus of existing groundwater users within a 1 km radius around the site. Other methods to be employed will include chemical analyses of groundwater sampled at the Site, aerial photograph and satellite imagery interpretation; and professional judgement based on experience gained in the area and with similar projects.

#### 4.1.12 Waste Management

The specialist study will include all waste streams such as construction waste, domestic – non hazardous waste, hazardous waste and medical waste (health care risk waste). The above categories will also include the following specific waste generation areas:

- Surface marine sediments to be removed during dredging (construction phase);
- The brine concentrate from the proposed desalination plant (operational phase);
- Identified iron ore waste material (operational phase);
- Residue from the dust filtering system (operational phase);
- General waste from ships including medical waste; and
- The sludge from the Stormwater settling dams (operational phase).

The purpose and brief of the waste management specialist study will be largely threefold, i.e. to:

- Assess the potential impact that the current waste management system is likely to have on the receiving environment. This could be considered an audit of the waste management practices;
- Using the baseline information obtained to develop an understanding of the potential impacts the additional waste materials that are likely to be generated during construction and future site operations could have and thereby propose suitable mitigation measures; and
- To prepare a basic waste management plan in parallel to this assessment and integrate this plan with the Water and Waste Management Plan as requested by the Department of Water Affairs and Forestry. This plan needs to reflect the shortcomings of the current waste management system and how these shortfalls are going to be addressed as a form of mitigating potential future environmental impacts.

The assessment-audit and waste planning phases of this study will provide clarity on those areas where potential impacts are likely to occur should the appropriate mitigation measures including possible site engineering changes not be put in place. The mitigation measures will focus on key waste handling areas.

#### 4.1.12.1 Hazardous Waste (including medical waste)

The terms of reference for the hazardous waste stream will involve the following tasks:

- Develop an understanding of the current Waste Management Plan of the site. Review Integrated Waste Management Plan of local authority. Develop an understanding of current processes, also at Saldanha Steel and other relevant industries, and identify opportunities for cooperation;
- Seek to understand the waste from operations including health care waste and waste from ships;
- Review existing practices;
- Review and comment on temporary storage facilities and procedures, contingencies, contractors and safe disposal procedures;
- Confirm waste types and relevant classification;
- Understand disposal constraints – hazardous and de-listed waste types;
- Liaise with relevant authorities in the study area, including municipal staff; and
- Compare broadly the costs, risks and cumulative impacts of the proposed management and mitigation measures.

#### 4.1.12.2 Construction Waste

This component of the study will investigate the handling of excess concrete, wash water from concreting activities, demolition waste, on-site fuel, oil and diesel. The specialist will be required to develop an Environmental Construction Management Plan (ECMP), which will inform the Environmental Management Plan for the Construction and Operational phases of the project.

#### 4.1.12.3 Methodology

This study will be conducted by means of a desktop study and a site visit to investigate industrial waste practices and identify areas for improvement. The assessment will take cognisance of the EIA regulations, the relevant supporting legislation as presented in NEMA, the Environment Conservation Act (Act No. 73 of 1989): Section 20 (permitting of waste disposal, handling and treatment facilities) and the National Water Act (Act No. 36 of 1998). Relevant guideline documents would be the Second Edition of the Minimum Requirements for Waste Management by Landfill, 1998. This guideline document can be used as a benchmark for all waste handling and treatment facilities.

#### 4.1.13 Stormwater Management

This study will entail the following tasks:

- Determine the current status quo with regards to Stormwater management at the site;

- Review existing rainfall records particularly autographic records to establish time and extent of periodic storms;
- Review catchment areas and hydrology studies to establish the risk of the capacity of existing and proposed Stormwater retention ponds being exceeded;
- Review the appropriateness of storm return periods adopted in view of the risk;
- Review the appropriateness of the methods used in the estimation of runoff;
- Review the infiltration scenario in conjunction with the Groundwater specialist;
- Review the proposed short term and long term maintenance programmes; and
- Recommend mitigation measures to address potential stormwater issues.

#### 4.1.13.1 Methodology

Considering the way in which water will be used and its disposal managed in practice, it will be logical to consider water items grouped together as follows:-

- a) Foul Sewerage routed to disposal works; and
- b) Surface Water being Stormwater, wash down water and water from all other sources (excluding sea water) gravitating to a collection system routed to treatment plants before recycling or discharge either to the sea or to the river system.

Stormwater will be assessed as part of the Integrated Waste and Water Management Plan (IWWMP) that forms an integral part of Phase 2 upgrade of the Port of Saldanha.

#### 4.1.14 Integrated Waste and Water Management Plan

Developing the IWWMP will entail synthesizing the information from various specialist reports dealing with waste and water issues as discussed above. In addition, the requirements of Regulation 704 (Government Gazette 20118, 4 June 1999) and the Operational Policy for the disposal of land-derived water containing waste to the marine environment of South Africa (Edition 1, 2004) will be addressed.

The IWWMP team will undertake the following:

- A site visit;
- Review the specialist studies to ensure that all the requirements of DWAF, Regulation 704 and the Operational Policy for the disposal of land-derived water containing waste to the marine environment of South Africa have been addressed;
- Collate the specialist studies into an IWWMP;

- Liaise with the project engineers and specialists to obtain any additional information required;
- Develop a site water balance;
- Complete a draft IWWMP;
- Complete the final IWWMP for submission to DWAF; and
- Maintain contact with the various DWAF representatives during the approval process to ensure that missing data or misunderstandings do not delay the approval process – an allowance has been made for two meetings with DWAF (one at site and one at the regional office).

#### 4.1.14.1 Methodology

The IWWMP will be compiled by synthesizing the findings and recommendations from the various specialist studies relevant to water and waste issues: Water Supply; Groundwater; Stormwater; Sanitation; Domestic Waste; Hazardous Waste; Construction Waste; Industrial Effluent/Wastewater and Marine and Benthic Ecology. Once these studies have been completed it will be scrutinised and collated into an IWWMP report to DWAF.

The study will entail a desktop investigation as well as a Hydrocensus of the existing boreholes in the vicinity of Saldanha Port (this area includes the big Bay, small Bay, Langebaan Lagoon as well as Langebaan and Club Mykonos). Once this has been completed the information will be analysed and a report will be generated. The studies will include detail studies on Potable water, Sanitation and Industrial effluent. A review the proposed Stormwater management systems to ensure compliance with Regulation 704 is required as part of the licensing section. Discussions with DWAF to discuss the water management system as well as the licensing will occur regularly.

#### 4.1.15 Marine Studies

A number of marine studies have been identified as necessary in order to enable the EIA team to assess the potential impacts of port expansion components which are to be undertaken in the marine environment. The terms of reference for these studies are discussed below.

The approach proposed is that existing data be utilised to provide the necessary baseline description of hydrodynamics, water quality, sediment biogeochemistry, ecology and designated uses in the bay (e.g. mariculture, etc). Such a baseline description will form part of the various specialist studies to the degree required.

Studies that need to be undertaken for assessing the potential impacts in the marine environment due to both construction activities and long-term water quality and ecosystem changes and shoreline stability, are detailed below:

- Sediment Quality or London Convention Compliance Study;
- Turbidity Modelling Study;
- Water Quality Assessment;

- Modelling of long-term the changes in water quality;
- Assessment of ecological impacts, including those due to blasting and ballast water risks;
- Assessment of impacts associated with shoreline erosion; and
- Incremental shipping risk study.

For the disposal of dredge spoil offshore as opposed to onshore disposal, an additional suite of studies will be required for selection and of a suitable disposal site and assessment of potential impacts associated with dredge disposal. The EIA requires as a minimum that:

- One or more sites is selected based on existing topographic data and a screening survey of the physical parameters (rock and sand) of potential benthic habitats;
- A survey be undertaken to establish an biogeochemical and ecological baseline of the sites for the purposes of an EIA assessment and dredge permitting; and
- Appropriate modelling studies to assess potential impacts associated with the disposal of the dredge material at the designated disposal site (i.e. studies indicating the likely “footprint” of the disposed dredge material over time and its likely ecological impacts, as well as potential aesthetic impacts during dredge disposal).

In addition to the above, a quantitative baseline survey comprising an accurate survey of bathymetry and bottom types ultimately will be required for the dredge disposal permitting process.

These terms of reference include the additional suite of studies required for selection and of a suitable disposal site and assessment of potential impacts associated with dredge disposal. Details on each of these studies are provided below.

#### 4.1.15.1 *London Convention Compliance Study*

The terms of reference for the study will be to assess the dredge sediment properties in terms of particle size distributions, contaminant concentrations, and toxic condition. Ideally the material to be dredged needs to be assessed with sufficient spatial resolution in both the horizontal and vertical profiles.

The purpose of the London Convention compliance assessment will be to provide the baseline information on sediments and potential associated toxicants contained within these sediments that may be released during dredging activities. In addition, grain size analyses are proposed as part of this study to provide the necessary characterisations of the sediments to be dredged, which are essential for the detailed turbidity modelling studies and subsequent ecological assessments. These data will also be required should there be a requirement for offshore disposal of dredge spoil, both in terms of the environmental impact assessment and the dredge dumping permit application procedures.

This study will entail the compilation of a report to assess changes in water quality during construction activities against the environmental quality objectives as set out the Water Quality Management Plan for the Bay. This report will include dredge plume modelling and the assessment of the quality of sediments to be dredged. The assessment of sediment quality is required as part of the dredge dumping permitting process in terms of the Marine and Coastal Management's requirements (in compliance with the London Convention).

#### 4.1.15.2 Water Quality Assessment

The water quality assessment comprises three components, namely:

- Turbidity and sediment modelling;
- Detailed Water Quality modelling; and
- Detailed Ecological assessment due to modelled changes in hydrodynamics and water quality.

##### Turbidity and sediment modelling:

The terms of reference for this study will be to accurately simulate water column turbidity and likely deposition scenarios of dredge-derived sediments in the Bay for the proposed dredging activities. This information, together with that from the sediment quality assessments will be used in both the detailed water quality modelling and associated ecological impact assessment.

The modelling will be based on a representative hydrodynamic database that includes wave and current impacts on sediment plume advection and deposition of sediments on the seabed. The hydrodynamic data base will be developed based on existing wave, current and water column stratification data. The turbidity modelling will be based on the hydrodynamic database, information on the characteristics of sediments to be dredged and the nature of dredging operations.

The modelling will thus cover a range of representative environmental conditions (scenarios) and will include processes that describe the transport and behaviour of sediments in the marine environment as well as the behaviour of any toxic constituents dissolved in the water column (treated as a conservative tracer).

The model output will include magnitude, frequency and extent of turbidity plumes experienced both at the time of dredge disposal as well as subsequently due to re-suspension events (to the extent applicable). Also provided will be information on the accumulation of sediments on the seabed. The focus will be on the fines that are the most likely to result in turbidity plumes and also are those components of the sediments most likely to contain toxic components (i.e. trace metals, etc). Suspended sediment concentrations will be simulated for identified sensitive sites.

Allowance has been made for providing advice on recommended dredge methods and mitigation measures, etc that may be required to minimise the dredging impacts.

#### Detailed Water Quality modelling

The terms of Reference for the detailed water quality modelling study would be to assess likely changes in water quality and the ecosystem state variables that would exceed those considered to be acceptable in terms of water quality management plans for the bay. The model outputs will need to be adequate as input to a robust ecological assessment of both short-term (those due to construction activities) and long-term (those due to structural changes) impacts associated with the proposed development.

Detailed modelling of water quality and the ecosystem state variables described above will be undertaken using Delft3D-WAQ (Van Ballegooyen *et al.*, 2005). The modelling will be based on the hydrodynamic database and scenarios developed for the turbidity modelling study and detail of the proposed changes in port layout.

The following specific issues will be considered within the context of Saldanha Bay:

- Assessment of the potential changes in water quality associated with dredging activities and changes in port layout within the generally accepted management framework developed for multi-user marine environments such as Saldanha Bay in line with the specific management plans and recommended thresholds of change for Saldanha Bay (as per the requirements of the Saldanha Bay Water Quality Forum);
- The specific thresholds for specific ecosystem state variables to be used over and above the specified water quality criteria for the region are: phytoplankton biomass, as mg C/m<sup>3</sup>, dissolved oxygen as ml O<sub>2</sub>/l and particulate organic carbon (POC) in deposition areas as mg C/m<sup>2</sup>. These reflect the overall productivity of the Saldanha Bay system and its biogeochemical status;
- Threshold levels for these variables are set at changes of 10% (or more) over the ambient condition that extend for a period of 7 days or longer; the purpose being to be able to reliably show whether there is any net change in the system due to the proposed development and associated changes in water quality (Monteiro and Kemp, 2004); and
- If the analyses of the proposed discharge indicate that the identified system indicator levels are to be exceeded the potential ecological consequences would need to be assessed in more detail, i.e. the exceedance of a 10% change for more than 7 days acts as a “red flag”. The assessment of potential exceedance of these thresholds requires that detailed water quality modelling be undertaken. The detailed modelling

will also provide a much firmer scientific basis for the ecological assessment than would otherwise be available.

#### Detailed Ecological assessment

The ecological assessment will investigate the anticipated impacts during the construction, namely those associated with the dredging activities. These include:

- Visual (or aesthetic) impact: Due to large turbidity plumes associated with the dredging operations;
- Mariculture activities – potential smothering caused by large quantities of particulate matter and potentially reduced growth rates;
- Ecosystem functioning/benthic community structure – changes in light conditions can lead to reduction in primary productivity while smothering can cause significant changes in benthic community structure; and

While the aesthetic impacts will be assessed as part of the turbidity modelling study, the remaining impacts indicated above will form part of this Ecological Impact Assessment.

The following terms of reference apply to the study:

- Identify the nature of risks posed to the Saldanha Bay ecosystem and ecosystem services dependant on this marine environment;
- Qualify the risks that the proposed operations may pose in terms of accepted water and sediment quality guidelines, including any water quality management plans of relevance to the bay. If water/sediment quality guidelines are exceeded, quantify the risks in terms of the proportions of biological populations under threat and qualify these in terms of ecological consequences;
- Where required, identify the need for mitigation and suggest methods to achieve this; and
- Devise a practical monitoring programme that will, firstly, allow real time control of project activities to reduce environmental risks and, secondly, facilitate a qualitative determination of actual versus predicted project impacts.

The assessment will be based on existing baseline data, data and experience from other similar operations as well as the outputs of both the turbidity and water quality modelling studies proposed above. This information, together with specialist knowledge of ecosystem impact thresholds, i.e. for mariculture activities and the benthic community, will be used to predict likely dredging impacts and long term changes in water quality. For example benthic invertebrate communities could respond to impacts from construction and operation by showing different biomass and species abundance, usually as a result of deposition of large amounts of material that was suspended during dredging and construction.

The potential impacts will be assessed both against existing environmental quality objectives for the bay that include water quality guidelines and acceptable thresholds of changes in ecosystem function as proposed for the Saldanha Bay Water Quality Management Plan and potential impacts on the benthic ecology.

#### 4.1.15.3 Shoreline Stability Impact Assessment

The potential changes in the shoreline have been and will be subject to extensive studies during the engineering feasibility phase of the project. The scope of this study includes an assessment of the marine specialist studies comprising the engineering feasibility and technical studies required for the EIA study and will entail:

- Assessment/interpretation of other marine studies, which address issues pertinent to shoreline erosion;
- Provision of descriptive impact tables, with associated discussion (e.g. on why and how the various ratings (high, medium, low etc) are predicted. This would require an indication of what is acceptable in terms of erosion – the other marine studies should provide the necessary background for this assessment;
- Estimation of the impact of the proposed new port configuration on Langebaan beaches and lagoon, as well as on Small Bay and summarising the findings in impact tables. The differences in wave, current and sediment transport patterns determined in the engineering shoreline study will be used;
- Modelling will be conducted for the area south of Club Mykonos (including Langebaan). Prediction of impacts on this area will be also be corroborated by relying on work done previously in the greater bay;
- The impact of the proposed new port configuration on the beach between Club Mykonos and the causeway will be determined and listed in impact tables;
- Possible mitigation measures to limit shoreline erosion or to select an alternative layout that allows accretion where required in the bay, will be identified; and
- A recommendation will be made regarding monitoring of the shoreline before and after the expansion of the iron ore terminal.

This study will also be required to assess the potential impacts of offshore disposal on shoreline stability. The approach assumes that:

- The pre-defined dumping method ensures that no localised sediment accumulations of more than 10 to 30 centimetres in the vertical profile will occur. A single, pre-defined dumping method (and associated timing) will be applied, i.e. one disposal scenario and dredge disposal sediment configuration. The objective of the study is not to inform or refine the dumping method;

- No assessment of the effects of sea-level rise is anticipated in this study. In the event that undesirable erosion is predicted, it may be necessary to investigate the additional impact of sea-level rise; and
- No assessment of mitigation measures is included in this study; however, if there are shoreline stability effects, the proposed dump site will need to be relocated to increasingly greater depths until the shoreline effects are considered negligible.

#### 4.1.15.4 Incremental Shipping Traffic

The terms of reference for this specialist incremental shipping traffic risk study has been formulated as follows:

- Confirm the ship size range and assess the increase in number of ships for the increase of iron ore export from 45 to 93 MTPA. This will be based on international shipping data and trends, as derived from international publications. Discuss the findings with the maritime staff of NPA at Saldanha;
- Discuss specific aspects related to shipping procedures and safety in the Port of Saldanha with the local maritime staff. This would concern pilotage, tug boat support, turning, berthing and mooring procedures, passing of moored ships, other maritime traffic in the port, etc. It will include an assessment of the availability and operational procedures of tugs for the present and required future port conditions (number, type, bollard pull, limiting operational sea state conditions, etc.), pilotage procedures and channel marker identification, port operational procedures and shipping traffic guidance systems, procedures and guidelines;
- Use the results of an available wave refraction study for Saldanha Bay, to obtain the wave climate in the ship manoeuvring area of Saldanha Bay, for the modified layout of the port. Analyse the wave conditions in the manoeuvring area, together with the local wind and current conditions, to assess any related increases in shipping risks;
- Identify potential sources of environmental risk due to increased shipping. These will include risks like shipping accidents, grounding, collisions, oil spills, pollution, ballast water discharge, accidental or illegal discharges (the actual impact of the increased volumes of ballast water discharge is part of the Water Quality Assessment);
- This study is to include the risks during the construction phase, e.g. during dredging and revetment construction operations;
- Determine the frequency and conditions under which possible risks associated with increased shipping traffic could occur;
- Assess the potential risks and possible impacts, particularly in terms of pollution, that could result from the risk sources identified, such as insufficient disaster management contingency plans; and

- Provide recommendations to reduce the potential risks associated with increased shipping traffic in Saldanha Bay, including implications for management systems and management controls for shipping in the area.

The above aspects will be detailed in a comprehensive report on risks of incremental shipping traffic. The basic information for this study will be mainly derived from earlier reports related to shipping in Saldanha Bay (CSIR, 2000 and CSIR, 2005) and from information obtained from Transnet and NPA Saldanha. The affected environment and relevant information will be evaluated and risk components related to shipping traffic will be identified.

#### 4.1.15.5 *Marine Studies specific to dredge disposal impacts*

A study was commissioned to identify several possible dredge disposal sites. This study was aimed at conducting the necessary site characterisation studies as well as sediment quality investigations. Preliminary results from the investigations have resulted in the postponement of further studies on dredge disposal at sea (Van den Bosshe and Ramsay, 2007). The final choice of the disposal site at sea or land will be based on the feasibility of in-land disposal. The appropriate permits for dumping/disposal will be obtained once the disposal site has been selected. Direct liaison with Marine and Coastal Management is central to this exercise, and will be coordinated by the EIA team. The proposed specialist studies (specific to dredge disposal and dumpsite selection and assessment are listed below:

- Field Survey of Dump-sites;
- Biological and chemical analyses of field survey data;
- Shoreline Stability Assessment (discussed above); and
- Turbidity modelling study extension to include assessment of dredge disposal.

#### 4.1.15.6 *Integrated Marine Impact Report*

As the suite of studies required to assess the range of marine impacts are of a specialised scientific nature, the findings are expected to be technical and may not be readily comprehensible to the general public. Therefore the need has been identified for an Integrated Marine Impact Report in order to summarise the potential impacts during both the operation and construction phases of the project. The marine impact report will contextualise and address all the marine issues and impacts that have been identified to date in the EIA scoping procedure for the proposed expansion, as well as previous studies (i.e. Phase 1A, 1B, etc). The report will be required to:

- Provide a baseline description of the hydrodynamics, water quality, sediment biogeochemistry, ecology and designated uses in the bay (e.g. mariculture, etc), as well as shoreline stability;
- Assess changes in water quality during construction activities against the environmental quality objectives as set out the Water Quality Management Plan for the Bay. This will include dredge plume modelling and the assessment of the quality of sediments (London Convention compliance study) to be dredged; and
- Assess the potential changes in hydrodynamics and associated water quality and ecosystem function due to changes in port layout. This will be based on both modelling studies and assessment of benthic ecology. The existing data and knowledge of potential impacts on the benthic ecology associated with dredge plume and long-term hydrodynamic changes and water quality functioning associated with changes in port layout.

The report will further be required to answer key questions on issues including, but not limited to the impact of the dredging and port expansion on:

- Shoreline stability in Saldanha Bay;
- Beach litter: i.e. the potential for aggravating current problems;
- Beach erosion at specific beaches, particularly Langebaan, Lynch Point and Club Mykonos;
- Incremental shipping traffic, expanded stockyards, larger tonnages of ore throughput, etc) on the general function and integrity of the bay, i.e. the entire Saldanha Bay system: neighbouring beaches in Big Bay, Small Bay, and the Langebaan Lagoon;
- Marine disturbances such as dredging, underwater blasting and construction on water quality and turbidity standards in terms of the provisions of the London Convention; and
- The potential impact of climate change effects, such as global warming and sea-level rises, the impact on the frequency and pattern of waves and currents in the bay.

The Integrated Marine Impact Report must assess the potential changes in hydrodynamics and associated water quality and ecosystem function due to changes in the port layout. This will be based on both modelling studies and assessment of benthic ecology, based on existing data, and knowledge of potential impacts on the benthic ecology associated with dredge plume and long-term hydrodynamic changes in water quality functioning.

**SECTION 5: CONCLUSION**

Care has been taken to describe the process as clearly as possible and it is not envisaged that any major changes to the approach will be necessary. However, should any additional information become available or additional consultation be required, the process will be adapted accordingly. All additional activities and information will be described in the Final EIR.

I certify that the information provided is to the best of my knowledge true and correct.

Signed:.....Date:.....

## SECTION 6: REFERENCES

Atmospheric Pollution Prevention Act (1965) Act No 45 of 1965, Second Schedule.

DEAT (1998) Environmental Impact Management, Guideline Document on EIA Regulations: Sections 21, 22 and 26 of the Environment Conservation Act, Department of Environmental Affairs and Tourism (DEAT), April 1998.

DEAT (2002) Scoping, Integrated Environmental Management, Information Series 2, Department of Environmental Affairs and Tourism (DEAT), Pretoria.

DEAT (2002) Stakeholder Engagement, Integrated Environmental Management, Information Series 3, Department of Environmental Affairs and Tourism (2002), Pretoria.

DEAT (2002) Specialist Studies, Integrated Environmental Management, Information Series 4, Department of Environmental Affairs and Tourism (DEAT), Pretoria.

DEAT (2002) Impact Significance, Integrated Environmental Management, Information Series 5, Department of Environmental Affairs and Tourism (DEAT), Pretoria.

Department of Environmental and Cultural Affairs and Sport, Western Cape, Directorate of Environmental Management (2001). Guideline for Public Participation for the EIA Process September 2001.

Department of Environmental and Cultural Affairs and Sport, Western Cape, Directorate of Environmental Management (2001). Guideline for the Plan of Study for EIA, November 2001.

Department of Environmental and Cultural Affairs and Sport, Western Cape, Directorate of Environmental Management (2001). Information Document on Requirements with respect to the EIA Regulations, January 2003.

Environmental Impact Assessment Regulations (1997). Environment Conservation Act (1989), Act No. 73 of 1989, Regulations No. 1183, Government Gazette No. 5999, dated 5 September 1997.

**APPENDIX 1: CORRESPONDENCE WITH AUTHORITIES**

**APPENDIX 2: PROGRAMME FOR THE EIA**

**APPENDIX 3: DETAILED ASSESSMENT CRITERIA**

## **ASSESSMENT CRITERIA**

The following assessment procedure will be followed during the impact phase of the project: The terms of reference for the specialist study include criteria for the description and assessment of environmental impacts. These criteria are drawn from the document by the Department of Environmental Affairs and Tourism (2002) Impact significance, Integrated Environmental Management, Information Series 5:

### *Nature of the impact*

This is an appraisal of the type of effect the proposed upgrade could have on the affected environment. This description should include what is to be affected and how.

### *Extent of the impact*

The specialist must describe whether the impact will be: local - limited to the site and its immediate surroundings (extending only as far as the Port of Saldanha); or will have an impact on the region; or will have an impact on a national scale.

### *Duration of the impact*

The specialist must indicate whether the lifespan of the impact would be short-term (0-5 years), medium-term (6-10 years), long-term (>10 years) or permanent.

### *Intensity*

The specialist should establish whether the impact is destructive or benign and should be qualified as low, medium or high. The specialist study must attempt to quantify the magnitude of the impacts and outline the rationale used.

### *Probability of occurrence*

The specialist should describe the probability of the impact actually occurring and should be described as improbable (low likelihood), probable (distinct possibility), highly probable (most likely) or definite (impact will occur regardless of any prevention measures).

### *Status of the impact*

The specialist should determine whether the impacts are negative, positive or insignificant. The impacts are to be assessed in terms of their effect on the project and the environment. For example, a positive economic impact of the proposed Port of Saldanha Phase 2 upgrade may be negative for the environment. It is important that this distinction is made in the analysis.

### *Degree of confidence in predictions*

The specialist should state what degree of confidence (low, medium or high) there is in the predictions, based on the available information and level of knowledge and expertise.

### *Overall Significance*

Based on a synthesis of the information contained in the foregoing procedure, the specialist is required to assess the potential impacts in terms of the following significance criteria:

- No significance – the impact does not influence the Saldanha Bay environment in any way;
- Low significance – the impacts will have a minor influence on the biophysical and socio-economic environment. These impacts do not require modification of the project design or alternatives modification.
- Moderate significance – the impacts will have a moderate influence on the biophysical and socio-economic environment. The impacts can be ameliorated by modification in the project design or implementation of effective mitigation measures.
- High significance – the impacts will have a major influence the biophysical and socio-economic environment. These impacts could result in portions of the proposed development being considered to be “fatally flawed” regardless of any mitigation measures that could be implemented.

In order to assess impacts that relate to more than one element of the environment (e.g. visual quality and land use), certain specialists may require information obtained from other specialists. The collated terms of reference of all specialist studies associated with this EIA has been forwarded to all specialists to ensure that specialists and the applicant have a common understanding of the receiving environment and issues related to the project are addressed in a synergistic manner.

For each of the two main project phases (construction and operation), the existing and potential future impacts and benefits (associated only with the proposed development) should be described using the criteria listed above – for example: extent (spatial scale), duration, intensity, etc. The impacts must then be assessed in terms of their significance (low, medium, or high) etc, and the degree of assessment confidence stated.

In order to maintain consistency in the impact assessment it is suggested that all potential impacts to the environment (or component of the environment under review) should be listed in a table similar to the example (Table 5) shown below (more than one table will be required if impacts require assessment at more than one spatial scale). The assessment parameters used in the table should be applied to all of the impacts and a brief descriptive review of the impacts and their significance can then be provided in the text of the specialist reports and consequently in the EIR.

Note: the impact assessment in this section should highlight the potential development consequences if no measures are applied to mitigate the impacts.

**Table 5: Impacts on STUDY SUBJECT with and without management / mitigation actions**

Nature		Status	- +
Impact source(s)			
Affected stakeholders			
Magnitude	<i>Extent</i>		
	<i>Intensity</i>		
	<i>Duration</i>		
	<i>Probability</i>		
Significance	<i>Without mitigation</i>		<b>H</b>
	<i>With mitigation</i>		<b>M</b>
Confidence			

Key to symbols: - negative impact; + positive impact, H, M, L: high, medium or low impacts.

ID	Task Name	Duration	Start	Finish	Predecessors	01/01	29/01	26/02	26/03	23/04	21/05	18/06	16/07	13/08	10/09	08/10	05/11	03/12	2008	31/12	28/01	25/02	24/03	21/04	19/05	16/06	14/07						
1	<b>Environmental Impact Assessment Process: Phase 2 Expansion of the Iron Ore Handling Facility, Saldanha Bay</b>	<b>376 days</b>	<b>Mon 15/01/07</b>	<b>Mon 21/07/08</b>		[Gantt bar]																											
2	<b>Conclusion of Scoping Phase</b>	<b>43 days</b>	<b>Thu 31/05/07</b>	<b>Mon 30/07/07</b>		[Gantt bar]																											
3	<b>Submission of Scoping Report &amp; Plan of Study for EIA</b>	<b>43 days</b>	<b>Thu 31/05/07</b>	<b>Mon 30/07/07</b>		[Gantt bar]																											
4	<b>Submission of Final Scoping Report &amp; Plan of Study (EIA) to DEAT &amp; DEADP</b>	2 days	Thu 31/05/07	Fri 01/06/07		[Gantt bar]																											
5	Discussion meeting with DEADP	0 days	Fri 15/06/07	Fri 15/06/07	4FS+10 days	[Gantt bar]																											
6	Discussion meeting with DEAT	0 days	Fri 22/06/07	Fri 22/06/07	4FS+15 days	[Gantt bar]																											
7	DEA&DP Review of Scoping Report (forecast)	25 days	Mon 04/06/07	Fri 06/07/07	4	[Gantt bar]																											
8	DEAT Review of Scoping Report (forecast)	15 days	Mon 09/07/07	Fri 27/07/07	7	[Gantt bar]																											
9	<b>Approval of Scoping Report &amp; Plan of Study for EIA (forecast)</b>	0 days	Fri 27/07/07	Fri 27/07/07	8	[Gantt bar]																											
10	<b>Notify IAP's of approval of Scoping Report &amp; Plan of Study by letter (forecast)</b>	1 day	Mon 30/07/07	Mon 30/07/07	9	[Gantt bar]																											
11	<b>EIA Phase</b>	<b>376 days</b>	<b>Mon 15/01/07</b>	<b>Mon 21/07/08</b>		[Gantt bar]																											
12	<b>Phase 1: EIA Initiation</b>	<b>0 days</b>	<b>Fri 27/07/07</b>	<b>Fri 27/07/07</b>	9	[Gantt bar]																											
13	<b>Approval of Final Scoping Report and Plan of Study.</b>	0 days	Fri 27/07/07	Fri 27/07/07	9	[Gantt bar]																											
14	<b>Phase 2: Specialist Studies</b>	<b>183 days</b>	<b>Mon 15/01/07</b>	<b>Wed 26/09/07</b>		[Gantt bar]																											
15	<b>Commissioning of Specialist Studies</b>	<b>183 days</b>	<b>Mon 15/01/07</b>	<b>Wed 26/09/07</b>		[Gantt bar]																											
16	<b>Completion of Specialist Studies</b>	183 days	Mon 15/01/07	Wed 26/09/07	9	[Gantt bar]																											
17	<b>Phase 3: Compilation &amp; Public Review of EIA Report</b>	<b>193 days</b>	<b>Thu 27/09/07</b>	<b>Mon 21/07/08</b>		[Gantt bar]																											
18	<b>Compile Draft EIA Report</b>	37 days	Thu 27/09/07	Fri 16/11/07	16	[Gantt bar]																											
19	<b>EIA Phase Public Participation</b>	<b>72 days</b>	<b>Mon 19/11/07</b>	<b>Tue 25/03/08</b>		[Gantt bar]																											
20	<b>(School holidays)</b>	<b>15 days</b>	<b>Tue 04/12/07</b>	<b>Mon 21/01/08</b>		[Gantt bar]																											
21	<b>Notify I&amp;AP's of availability of Draft EIA Report by letter &amp; advertising if required</b>	5 days	Mon 19/11/07	Fri 23/11/07	18	[Gantt bar]																											
22	Feedback Public Meetings / Open Days	5 days	Tue 22/01/08	Mon 28/01/08	21FS+10 days	[Gantt bar]																											
23	Feedback Focus Group Meetings	35 days	Mon 26/11/07	Fri 08/02/08	21	[Gantt bar]																											
24	IAP review of draft EIA Report (Comment period)	50 days	Mon 26/11/07	Fri 29/02/08	21	[Gantt bar]																											
25	Incorporating IAP issues into EIA Report	10 days	Wed 12/03/08	Tue 25/03/08	24	[Gantt bar]																											
26	<b>Submission of EIA Report</b>	<b>62 days</b>	<b>Fri 25/04/08</b>	<b>Mon 21/07/08</b>		[Gantt bar]																											
27	<b>Submission of EIA report to DEAT &amp; DEADP</b>	<b>1 day</b>	<b>Fri 25/04/08</b>	<b>Fri 25/04/08</b>		[Gantt bar]																											
28	Notification on Submission of Final EIR	1 day	Mon 28/04/08	Mon 28/04/08	27	[Gantt bar]																											
29	Meetings with DEAT & DEADP	2 days	Mon 12/05/08	Tue 13/05/08	27FS+10 days	[Gantt bar]																											
30	DEADP Review of EIA Report (forecast)	40 days	Mon 28/04/08	Fri 20/06/08	27	[Gantt bar]																											
31	DEAT Review of EIA Report (forecast)	20 days	Mon 23/06/08	Fri 18/07/08	30	[Gantt bar]																											
32	<b>Authority issue of Record of Decision (ROD) (forecast)</b>	<b>0 days</b>	<b>Fri 18/07/08</b>	<b>Fri 18/07/08</b>	31	[Gantt bar]																											
33	<b>Publicize ROD (forecast)</b>	1 day	Mon 21/07/08	Mon 21/07/08	32	[Gantt bar]																											

Project: SALDANHA DETAILED PROG  
Date: Mon 04/06/07

Task: [Blue box] Milestone: [Black diamond] Rolled Up Task: [Blue box with diamond] Rolled Up Progress: [Black bar] External Tasks: [Grey bar] Group By Summary: [Black bar]

Progress: [Black bar] Summary: [Black bar] Rolled Up Milestone: [White diamond] Split: [Dotted line] Project Summary: [Grey bar] Deadline: [Green arrow]