

# CONSTRUCTION ENVIRONMENTAL MANAGEMENT PROGRAMME (CEMPR)

## BAY TERMINALS GROUP COEGA TANK FARM

DEDEAT Reference Number: ECm1/C/LN2/M/16-2018

**DRAFT FOR PUBLIC REVIEW**

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Bay Terminals Group.



**Report Compiled by:**



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# 1 INTRODUCTION

## 1.1 Overview

**Bay Terminals Group** proposes to develop a new bulk petrochemical fuel store with piping, custody metering and numerous tanks and road tanker loading at a new facility in the Coega Industrial Development Zone 7, near Port Elizabeth, on Erf 351 of Coega.

Two pipeline route alternatives were assessed as part of the Scoping and Environmental Impact Assessment (EIA) Process in addition to the No-Go Alternative. These included:

Two routes are proposed for the pipeline, from the battery limit (indicated on) to the BTG boundary. The proposed route is indicated in yellow and black and the alternative route in pink and black on Figure 1.

Coega Development Corporation approved the concept of the first route in principle. Both options are within a services corridor identified in the Open Space Management Plan of the Coega IDZ.

### **Proposed pipeline route:**

The proposed route was provided by the CDC and is approximately 1 300 m in length.

### **Alternative pipeline route:**

The alternative route will run alongside the Port of Ngqura Boundary to the south-east and then it will turn to the east and run alongside the road reserve after which it will turn south-east again to follow the same route from the site boundary to the point of connection with the proposed BTG tank farm. This pipeline will be approximately 1 100m in length and is therefore, slightly shorter than the proposed pipeline route. CDC need to confirm if this option is a feasible option in terms of available space within the services corridor and road reserve and practicality.

Bay Terminals Group has appointed Prism Environmental Management Services (Prism EMS) as the independent Environmental Assessment Practitioner (EAP) to compile the required environmental management programme required by a host of environmental legislation.

Based on the impact assessment undertaken as well as the findings of the specialist studies and the need for the project, it is the opinion of the EAP, that the **Proposed pipeline route be approved**. It should be noted that mitigation measures contained in this report apply to both alternatives.



## 1.2 Project Location

### 1.2.1 Proposal

The proposed development occurs in the Coega Industrial Development Zone 7, near Port Elizabeth, on Erf 351 of Coega, located along the Algoa Bay coastline to the north-east of the Port of Ngqura. The coordinates for the project are provided in Table 1.

**Table 1: Centre Coordinates**

	Coordinates	
Centre Point	33°46'24.67" S	25° 42'16.56" E

The Surveyor General 21-digit diagram number for Erf 351 of Coega Industrial Development Zone 7 is provided in Table 2 below.

**Table 2: Surveyor General Diagram Number**

Portion	Surveyor General Diagram number
Remainder of Portion 1	C07600230000035100000

An overview of the location of the development is provided in Figure 1.



**PROJECT:**  
Proposed BTG Coega  
Tank Farm  
Environmental Authorisation  
Application



**GENERAL NOTES:**  
Coordinate System: GCS WGS 1984  
Datum: WGS 1984  
Units: Degree  
**Locality Plan**

**Legend**  
 Project Boundary  
**Pipeline Routes**  
**Name**  
 Proposed Pipeline Route  
 Alternative Pipeline Route  
 CDC - Ervan Delineation

**REVISIONS:**  
Final

**CLIENT:**  
  
 SCALE: 1:50 000  
 DRAWING REF:  
21803\_Locality\_Map  
 DRAWING STATUS:  
FINAL

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Figure 1: Aerial Locality Map



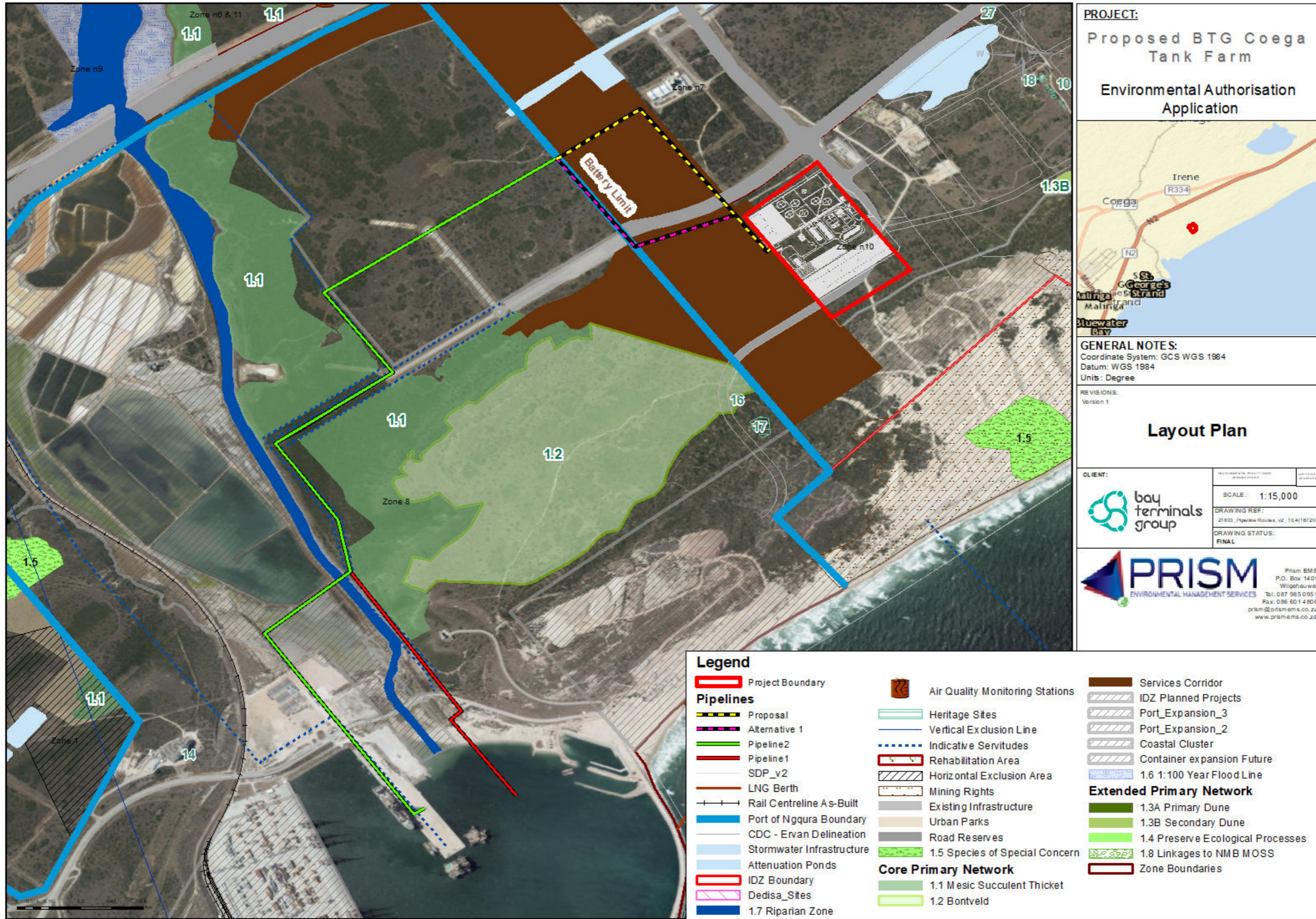


Figure 2: Pipeline Routes



## 2 EMPr REQUIREMENTS AND REPORT OUTLINE

The contents of this EMPr has been compiled according to the prescribed minimum legal requirements contained in Appendix 4 of the EIA Regulations, 2014 [as amended in 2017]. Refer to Table 3. Additional sections have been added to the report for purposes of best environmental practice.

**Table 3: Contents of EMPr**

Chapter Number	Chapter Name	Requirements included in Appendix 4 of 2014 EIA Regulations as amended in 2017:
1.	Introduction	-
2.	EMPr Requirements and Report Outline	-
3.	Details of EAP	(a) details of (i) the EAP who prepared the EMPr; and (ii) the expertise of that EAP to prepare an EMPr, including a curriculum vitae;
4.	Project Description and Activities, Aspects, and Impacts	(b) a detailed description of the aspects of the activity that are covered by the EMPr as identified by the project description.
5.	Environmental Sensitivity	(c) a map at an appropriate scale which superimposes the proposed activity, its associated structures, and infrastructure on the environmental sensitivities of the preferred site, indicating any areas that should be avoided, including buffers;
6.	Goals and Objectives	(d) a description of the impact management outcomes, including management statements, identifying the impacts and risks that need to be avoided, managed and mitigated as identified through the environmental impact assessment process for all phases of the development including- (i) planning and design; (ii) pre-construction activities; (iii) construction activities; (iv) rehabilitation of the environment after construction and where applicable post closure; and (v) where relevant, operation activities;
7.	General Roles and Responsibilities	(i) an indication of the persons who will be responsible for the implementation of the impact management actions
8.	Environmental Awareness Plan	(m) an environmental awareness plan describing the manner in which-

Chapter Number	Chapter Name	Requirements included in Appendix 4 of 2014 EIA Regulations as amended in 2017:
		<p>(i) the applicant intends to inform his or her employees of any environmental risk which may result from their work; and</p> <p>(ii) risks must be dealt with in order to avoid pollution or the degradation of the environment; and</p>
9.	Waste Management Plan	-
10.	Emergency Preparedness Plan	-
11.	Monitoring Programme	<p>(g) the method of monitoring the implementation of the impact management actions contemplated in paragraph (f);</p> <p>(h) the frequency of monitoring the implementation of the impact management actions contemplated in paragraph (f);</p> <p>(j) the time periods within which the impact management actions contemplated in paragraph (f) must be implemented;</p> <p>(k) the mechanism for monitoring compliance with the impact management actions contemplated in paragraph (f);</p> <p>(l) a program for reporting on compliance, taking into account the requirements as prescribed by the Regulations;</p>
12.	EMPr	<p>(f) a description of proposed impact management actions, identifying the manner in which the impact management outcomes contemplated in paragraphs (d) will be achieved, and must, where applicable, include actions to -</p> <p>(i) avoid, modify, remedy, control or stop any action, activity or process which causes pollution or environmental degradation;</p> <p>(ii) comply with any prescribed environmental management standards or practices;</p> <p>(iii) comply with any applicable provisions of the Act regarding closure, where applicable; and</p> <p>(iv) comply with any provisions of the Act regarding financial provisions for rehabilitation, where applicable;</p>

### 3 DETAILS OF THE EAP

Prism EMS have been appointed to undertake the required Environmental Authorisation process in terms of the 2014 Environmental Impact Assessment (EIA) Regulations as amended in 2017. Details and expertise of the Environmental Assessment Practitioner (EAP) who prepared the EMPr is provided in Table 4 and Curriculum Vitae is appended in Appendix I2 of the Basic Assessment Report.

**Table 4: Details of the EAP**

<b>EAP:</b>	Monica Niehof			
<b>Company:</b>	Prism Environmental Management Services			
<b>Qualifications:</b>	BSc. (Hons) Environmental Management			
<b>Experience:</b>	11 Years			
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<b>Designation</b>	<b>Name</b>	<b>Qualification</b>	<b>Professional Registration</b>	<b>Experience:</b>
Project Director	De Wet Botha	M.A. (Env.Man.) (PHED)	Founder Member of Environmental Assessment Practitioners Association of South Africa (EAPASA) Member of the International Association for Impact Assessors (IAIAsa)(1653) Member of the Gauteng Wetland Forum Member of the South African Wetland Society	15 Years
Project Principle	Vanessa Stippel	MSc. Ecology, Environment and Conservation	SACNASP– Pr. Sci. Nat.(116221).	7 Years

## 4 PROJECT DESCRIPTION AND ACTIVITIES, ASPECTS, AND IMPACTS

### 4.1 Project Description

#### 4.1.1 Background information

This process description was prepared at the preliminary engineering design stage with a view to inform the EIA specialists for the necessary Environmental studies and the Engineers to inform the preliminary cost estimate. It must be read in conjunction with the Site Development Plan (refer to Figure 3) and the Process Flow Diagram [PFD] (refer to Figure 4).

It should be noted that Bay Terminals Group is currently in negotiations with Oiltanking Grindrod Calulo (Pty) Ltd (OTGC) to provide the services of ship offloading of materials and transfer of materials from the Berth within the Port of Ngqura up to the battery limit indicated on Figure 2). Transnet has an environmental authorisation for a pipeline reserve of 30 m wide (DEA EIA Reference Number: 14/12/16/3/3/1/675 NEAS Reference Number: DEA/EIA/0001386/2012), to be used by OTGC. OTGC has an environmental authorisation for two pipeline alternatives of 30 m wide: DEDEAT EIA Reference Number: ECm1/LN2/M/11-57. These reserves run from the OTGC boundary to the existing and proposed berths locations within the Port. Figure 2 indicates the approved pipeline reserves from the battery limit at the port boundary to the Berths locations (green line indicates the Alternative route, if B100 Berth is utilised and the red line indicates the alternative route, if the A-series Berth is utilised).

#### 4.1.2 Project Activities

Bay Terminals Group (BTG) will be responsible for the pipeline from the battery limit to the BTG site boundary. The scope of the Construction Environmental Management Programme is therefore, for the proposed Coega Tank Farm and the pipeline from the BTG site boundary up to the battery limit.

#### 4.1.3 Site Overview

The Site Development Plan (Figure 3) shows the proposed tank farm layout, which has the following infrastructure components:

- 2,4m high security fence complete with truck entry / exit gates and emergency exits;
- Associated lighting and closed-circuit television (CCTV);
- Pigging Station;
- Import manifold;
- Four bunded storage areas containing;
  - 4 off Diesel tanks, combined working capacity 80 000 m<sup>3</sup>;
  - 4 off ULP tanks, combined working capacity 80 000 m<sup>3</sup>;
  - 2 off HFO tanks, combined working capacity 30 000 m<sup>3</sup>;

- 1 off JET tank working capacity 4 000 m<sup>3</sup>;
- 1 off Paraffin tank, capacity 4 000m<sup>3</sup>;
- A separate unbunded (open) area will contain 15 off LPG vessel vessels, with a combined working capacity of 15 000 m<sup>3</sup>.
- Road Tanker loading pump bays as follows:
  - Diesel – 4 off 2000 l/m pumps (3 operating, 1 standby);
  - ULP – 4 off 2000 l/m pumps (3 operating, 1 standby);
  - HFO – 3 off 2000 l/m pumps (2 operating, 1 standby);
  - Jet – 2 off 2000 l/m pumps (1 operating, 1 standby);
  - Paraffin – 2 off 1 l/m pumps (1 operating, 1 standby);
- Fire Water Tank with Fire / Foam pump Station;
- Vapour Recovery Unit (VRU);
- Necessary Buildings:
  - Admin Building 684m<sup>2</sup>;
  - Ablution and Rest Room 293 m<sup>2</sup>;
  - Store Room 293 m<sup>2</sup>;
  - Workshop 382 m<sup>2</sup>;
  - Warehouse 302 m<sup>2</sup>;
  - Electrical Sub Station 302 m<sup>2</sup>;
  - Security Building 130 m<sup>2</sup>;
  - Small laboratory for critical testing of the final product.
- Loading Gantries
  - 18 bays for liquid fuels (Diesel 3; ULP 3; HFO 2; JET 1; Paraffin 1);
  - 4 bays for LPG.
- Additive Bay
- Pump Bays
- Compressor Bay
- Generator Bay
- Boiler Room with Steam Reticulation System and dedicated Boiler Fuel Oil tank
- Tanker Wash Bay
- Effluent Handling
  - Drainage channels
  - Effluent Containment
  - Interceptor Oil-water Separator
- Slops Handling System:
  - 450m<sup>3</sup> Slops Tank (including freeboard);
- Pipe Racks, Pipe Bridges and inter connecting pipes
- Parking.



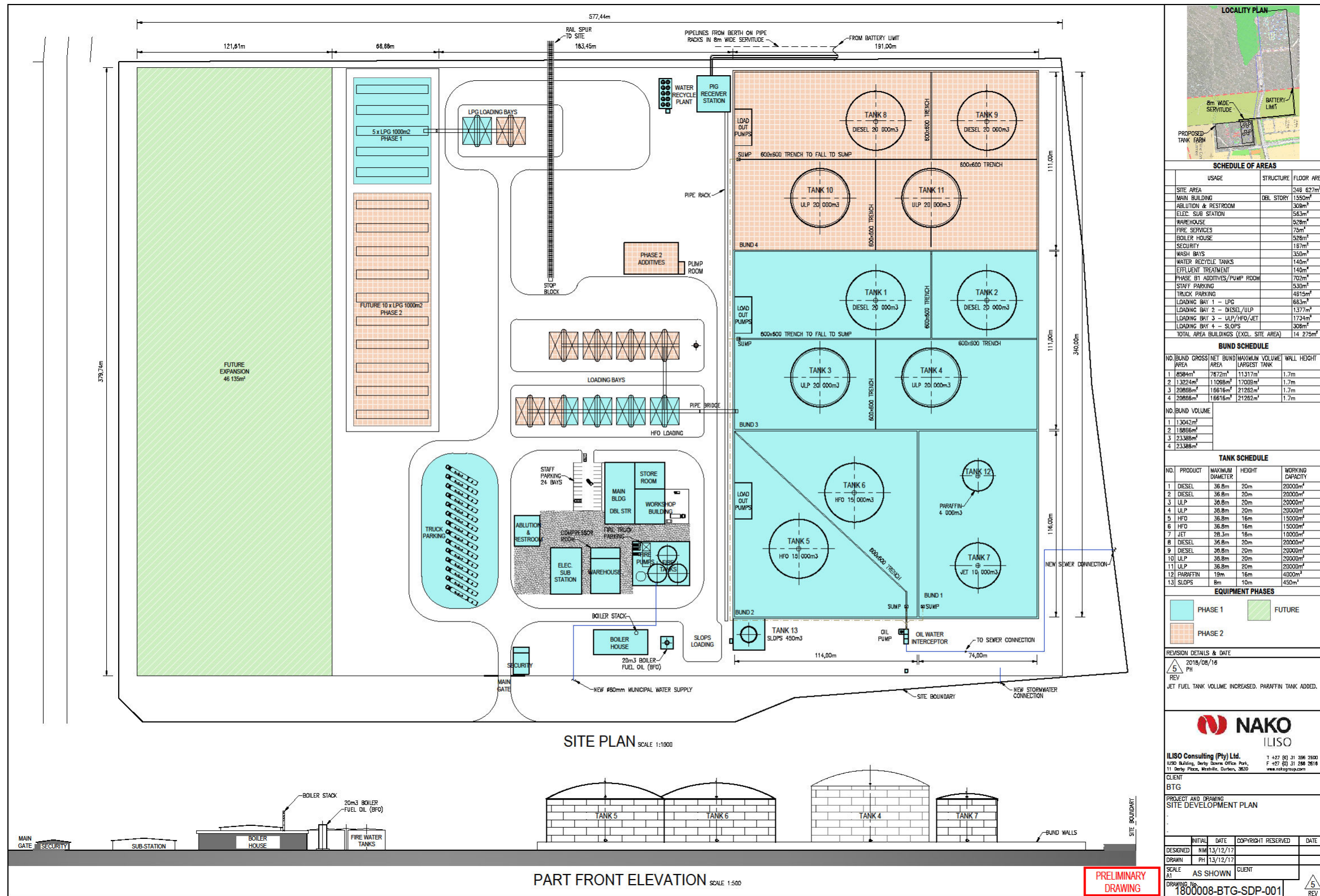


Figure 3: Proposed Draft Site Development Plan

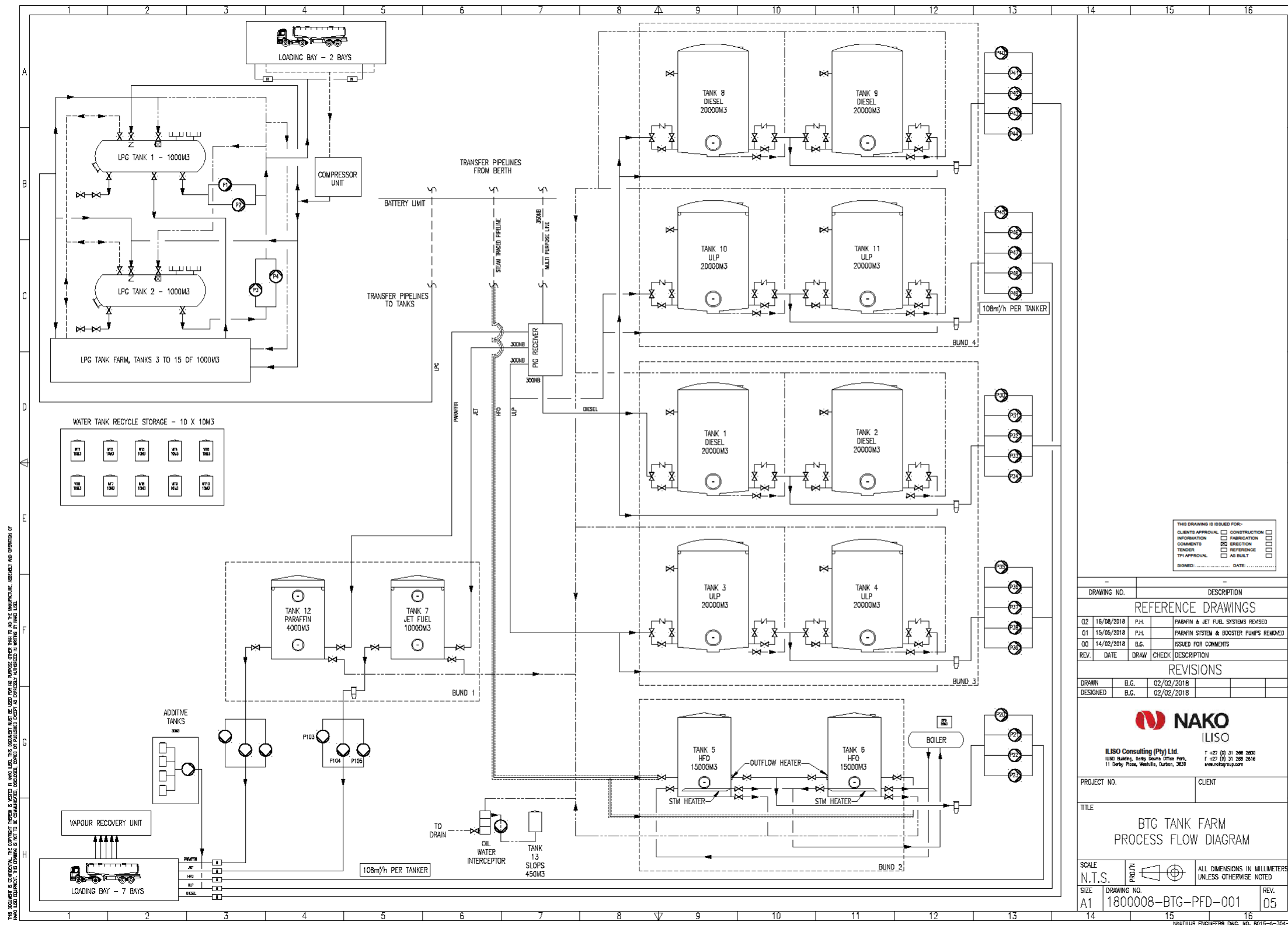


Figure 4: Proposed Coega Tank Farm Draft Process Flow Diagram

#### 4.1.4 Alternatives

Bay Terminals Group responded to a tender advertised by CDC for a tank farm in Zone 7 of the Coega Industrial Development Zone, which is earmarked for petro-chemical industrial development, and they were awarded this tender by CDC.

#### Pipeline route alternatives

Two routes are proposed for the pipeline, from the battery limit (indicated on Figure 2) to the BTG boundary wall. The proposed route is indicated in yellow and black and the alternative route in pink and black on the map. Coega Development Corporation approved the concept of the first route in principle.

#### 4.1.5 Timeframes

The proposed development will be constructed in line with the following timeframes, see Table 5.

**Table 5:** Operational hours for construction phases.

Period	Open	Close
Weekdays	07:00	18:00
Saturdays	07:00	15:00
Sunday	Only when required	
Public holidays	Only when required	

#### 4.1.6 Ancillary Infrastructure Required for Construction

No major infrastructure is required on site for the construction of the development. The required ancillary infrastructure for the purposes of supporting services is discussed below.

##### 4.1.6.1 Security

A construction camp will be erected on site for the duration of the construction. This camp will be fenced for security purposes. A security guard will also be posted on site during non-operational times. A fence will be erected around the property boundary as part of the development project.

##### 4.1.6.2 Sanitation

During the construction phase of the project, chemical toilets will be placed on site for the duration of the construction phase. Where possible, existing toilets that occur on site already will also be used.

#### **4.1.6.3 Construction Camp and Laydown Areas**

Designated areas will be established during the construction phase for construction equipment and vehicles.

## 5 ENVIRONMENTAL SENSITIVITY

Figure 5 provides an overview of overall sensitivity of the study area. Based on the findings of the Ecology Study (Scherman, Colloty & Associates), the various habitats within the Coega Industrial Development Zone were ranked in terms of their sensitivity to development, using the following criteria, listed in order of importance, i.e. the habitat or vegetation unit:

- Contained Species of Special Concern (SSC);
- Habitat was protected under a form of legislation;
- Exhibited a high degree of biodiversity;
- Exhibited a limited degree of degradation;
- A unique habitat that is not well represented within the region;
- Provided an important ecosystem role or support system, e.g. ecological corridor.

Therefore:

- Habitats containing SSC were rated as Very High;
- All the natural wetlands and blind river valleys were rated Very High, due the unique and important function in the landscape, coupled to the presence of SSC within the ecotones;
- All intact vegetation units, which contained protected flora or wetland habitat, were rated Medium – High;
- All unimproved vegetation types and modified wetlands were rated as Medium, i.e. these have been impacted upon, but are still able to contribute at the landscape level towards ecosystem function and / or assist in the maintenance of ecological corridors;
- All modified, transformed or man-made systems were rated as Low. These systems have limited restoration / rehabilitation potential, but still provide a form of habitat.

Most of the remaining intact habitat from a terrestrial point of view would be rated as Medium, including the proposed development site. The Medium rating is since the remaining thicket areas (Bontveld) still contains large numbers of protected plants and species, however the most sensitive (rated as High) have been avoided by the development area.



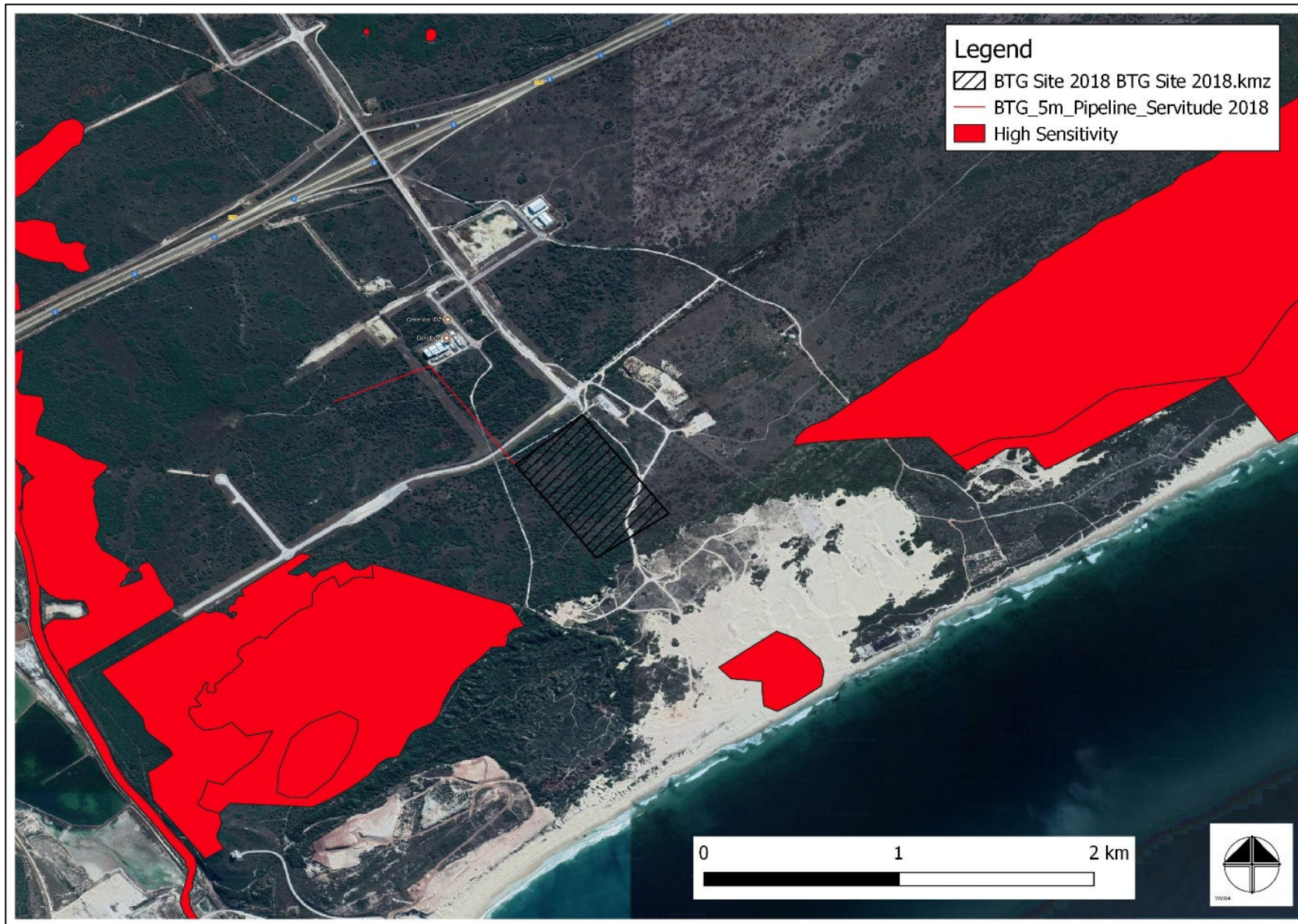


Figure 5: Overall Sensitivity Map (Scherman, Colloty and Associates)

## 6 GOALS AND OBJECTIVES

The **Construction EMPr** provides performance criteria required to address potential environmental impacts during the construction phase of the proposed development.

This document incorporates the relevant recommendations of the Scoping Report, Environmental Impact Assessment Report and other environmental studies and at a high level aims to provide the following:

- Establish **management objectives** for the construction phase of the proposed development to enhance benefits and minimise adverse environmental impacts;
- Describe **actions** required to achieve management objectives; and
- Outline institutional structures and roles required to implement the EMPr.

### 6.1 Key Objectives of the EMPr

The key objectives of the EMPr for the construction of the proposed development are as follows:

- To ensure effective communication with stakeholders and regulatory authorities;
- To ensure good housekeeping practices and general neatness on site;
- To mitigate any possible negative impacts identified in the EMPr for the construction phase of the development;
- To prevent pollution to the receiving environment that may emanate directly or indirectly from the source (development activities) during the construction phase;
- To reduce/eliminate the risk of fire and or explosions as a result of construction activities;
- To preserve flora and fauna;
- To preserve topsoil for optimal rehabilitation and landscaping following construction;
- To control the establishment of alien invasive plants during the construction phase of the project, as well as following rehabilitation of designated construction camp areas within the site thereafter.
- To ensure water saving and recycling mechanisms are implemented and adhered to;
- To ensure that all legislative requirements are met by the proposed development.

Following each site visit an audit report must be compiled to relay any non-compliance issues that need to be addressed, as well as compliance matters.

### 6.2 Impact Management Outcomes

Through effective implementation of the environmental management measures, the following outcomes must be achieved:

- Planning and layout of construction site is undertaken responsibly to ensure protection of sensitive environmental features;
- Environmental awareness creation and training is undertaken throughout the construction phase in order to minimise environmental impacts and ensure compliance to relevant legislation and authorisations;
- Minimise environmental impacts associated with emergency procedures;
- A safe working environment for contractors/construction workers and the public is provided;
- Proper management of site clearing is undertaken to ensure minimal environmental disturbance;
- Minimise environmental impacts associated with site establishment;
- Ensure access to surrounding sensitive environmental features is restricted and proper access control is in place;
- Minimal disturbances to traffic due to delivery of construction material;
- Proper management of labour force is undertaken to ensure that:
  - There are no security-related issues or disturbance to tenants or landowners outside the construction footprint
  - There is optimal use of local labourers;
  - There is no disturbance to sensitive environmental features on or around the study area;
- Minimise environmental impacts associated with ablution facilities;
- Reduce the generation of waste by changing behaviours of contractors throughout the development;
- Re-use waste generated by the construction where possible thereby resulting in decreased waste disposal volumes;
- Waste separation and recycling must be undertaken as part of construction;
- Waste generated during the construction of the proposed development to be disposed of at licensed landfills;
- Minimal environmental impacts associated with waste;
- Effective and safe management of hazardous and non-hazardous materials on site, in order to minimise the impact of materials on the environment;
- Minimal environmental impacts associated with the management of temporary workshops and equipment;
- Ensure that all possible causes of pollution are mitigated as far as possible to minimise impacts to the surrounding environment;
- Prevent polluted water from entering the surface water;
- Minimise noise disturbance to surrounding areas;
- Preserve protected flora species outside of construction areas;
- Control alien plants and noxious weeds;
- Minimal impact to fauna species;
- To have no adverse impact on the historical inheritance of the area;
- The preservation and appropriate management of new findings should these be discovered during construction;



- Proper stormwater management as required by the Stormwater Management Plan to be implemented;
- Adequate reinstatement and rehabilitation of construction areas;
- Water conservation mechanisms to be implemented; and
- Energy conservation mechanisms to be implemented.

## 7 GENERAL ROLES AND RESPONSIBILITIES

There are various role players that are involved in responsible environmental management. An overview of the applicable role players and institutional arrangements are provided in Figure 6 Information on each role player is then provided in the subsections below.

### 7.1 Competent Authorities

The following competent authorities are involved in the decision-making process:

- The Eastern Cape Department of Economic Development, Environmental Affairs and Tourism with reference to activities triggered in terms of the:
  - National Environmental Management Act, 1998 (Act No. 107 of 1998) [as amended] (NEMA);  
and
- The Nelson Mandela Bay Metropolitan Municipality with reference to activities in terms of the:
  - National Environmental Management: Air Quality Act, 2004 (Act No. 39 of 2004) [as amended] (NEMAQA).

Amendments may be required to the EMPr, based on adaptive management to the site conditions and the technical requirements of the project. These amendments will need to be approved by DEDEAT.

### 7.2 Authorisation Holder

Bay Terminals Group is the applicant in terms of NEMA and NEMAQA and is ultimately responsible for the development and implementation of the EMPr and ensuring that the conditions in the EA are satisfied. The liability for non-compliance also rests with the Authorisation Holder. Details of the Authorisation holder are contained in Table 6

**Table 6: Details of the Applicant**

<b>Applicant:</b>	Bay Terminals Group
<b>Contact Person:</b>	Ms. T Mjacu

### 7.3 Consultants

#### 7.3.1 Project Manager

In order to ensure that the proposed development is constructed as per the relevant designs and requirements, a project manager will be responsible for managing the planning, design and construction phases of the project. The Project Manager will furthermore also be required to tend to any environmental matters at the request of the Environmental Control Officer (ECO). The Project Manager shall assist the

ECO where necessary and shall have the following responsibilities in terms of the implementation of the EMPr:

- Regular site inspections;
- Reviewing and approving the Contractor's Method Statements;
- Assisting the Contractor in finding environmentally responsible solutions to problems with input from the ECO where necessary; and
- Communicating all environmental issues to the ECO.

### **7.3.2 Resident Engineer**

The resident engineer that is employed by the Authorisation Holder will be responsible for the technical and contractual implementation, control and maintenance of the works to be undertaken. The responsibilities of the Engineer in terms of environmental matters include, but are not limited to:

- Supervising the installation of infrastructure, including pipelines to ensure as per approved designs and standards and codes;
- Inspecting all infrastructure on the tank farm for any engineering problems that may give rise to environmental pollution or safety incidents;
- Assisting the Project Manager in making decisions and finding solutions to environmental issues and risks;
- Review method statements from Contractors and Standard Operating Procedures;
- Order the removal of persons and equipment that are not complying with engineering specifications and operating procedures.

## **7.4 Contractors**

Contractors will be responsible for constructing the proposed Development and associated infrastructure. All contractor/s employed by the developer in respect of any aspect of the construction of the subject site, will be bound by all and any agreement between the developer and the contractor, to ensure compliance with the Environmental Authorisation, mitigating measures included in the Specialist Studies, as well as this EMPr. The responsibilities include:

- Taking full responsibility for each of his/her employees;
- Be familiar with the contents of the EMPr and the specifications contained herein;
- Comply with the Environmental Specifications contained in the EMPr and subsequent revisions;
- Confirm legislative requirements for the construction works and ensure that appropriate permissions and permits have been obtained before commencing activities;

- Prepare Method Statements, programme of activities and drawings/plans for submission to the ECO when requested;
- Undertake daily site inspections to monitor environmental performance and compliance with the Environmental Specifications;
- Notify the ECO immediately in the event of any accident or infringements of the Environmental Specifications and ensure appropriate remedial action is taken;
- Notify the ECO at least 10 working days in advance of any activity he has reason to believe may have significant adverse environmental impacts, with specific reference to blasting, so that mitigatory measures may be implemented timeously.

## 7.5 Independent ECO

A competent and independent ECO must be appointed and will undertake bi-monthly inspections with monthly reporting on site as well as bi-yearly auditing against the EMPr and EA. The aforementioned report must be submitted to Bay Terminals Group and DEDEAT for their records.

The ECO will also audit the following:

- The record of environmental incidents (spills, impacts, legal transgressions, etc.) as well as corrective and preventive actions taken;
- The public complaints register in which all complaints are recorded, as well as actions taken; and
- Results from the environmental monitoring programme (water quality etc.).

In terms of Audits, the ECO will be required to ensure the following:

- All documentation (e.g. audit/monitoring/compliance reports and notifications) required to be submitted to the Department in terms of the EA;
- The holder of the EA must submit an environmental audit report to the Department within 30 days of the completion of the construction phase (i.e. within 30 days of site handover) and within 30 days of completion of rehabilitation activities;
- The Environmental Audit Report must indicate the date of the audit, the name of the auditor and the outcome of the audit in terms of compliance with the EA conditions as well as the requirements of an approved EMPr;
- Records relating to monitoring and auditing must be kept on site and made available for inspection to any relevant and competent authority in respect of this development.

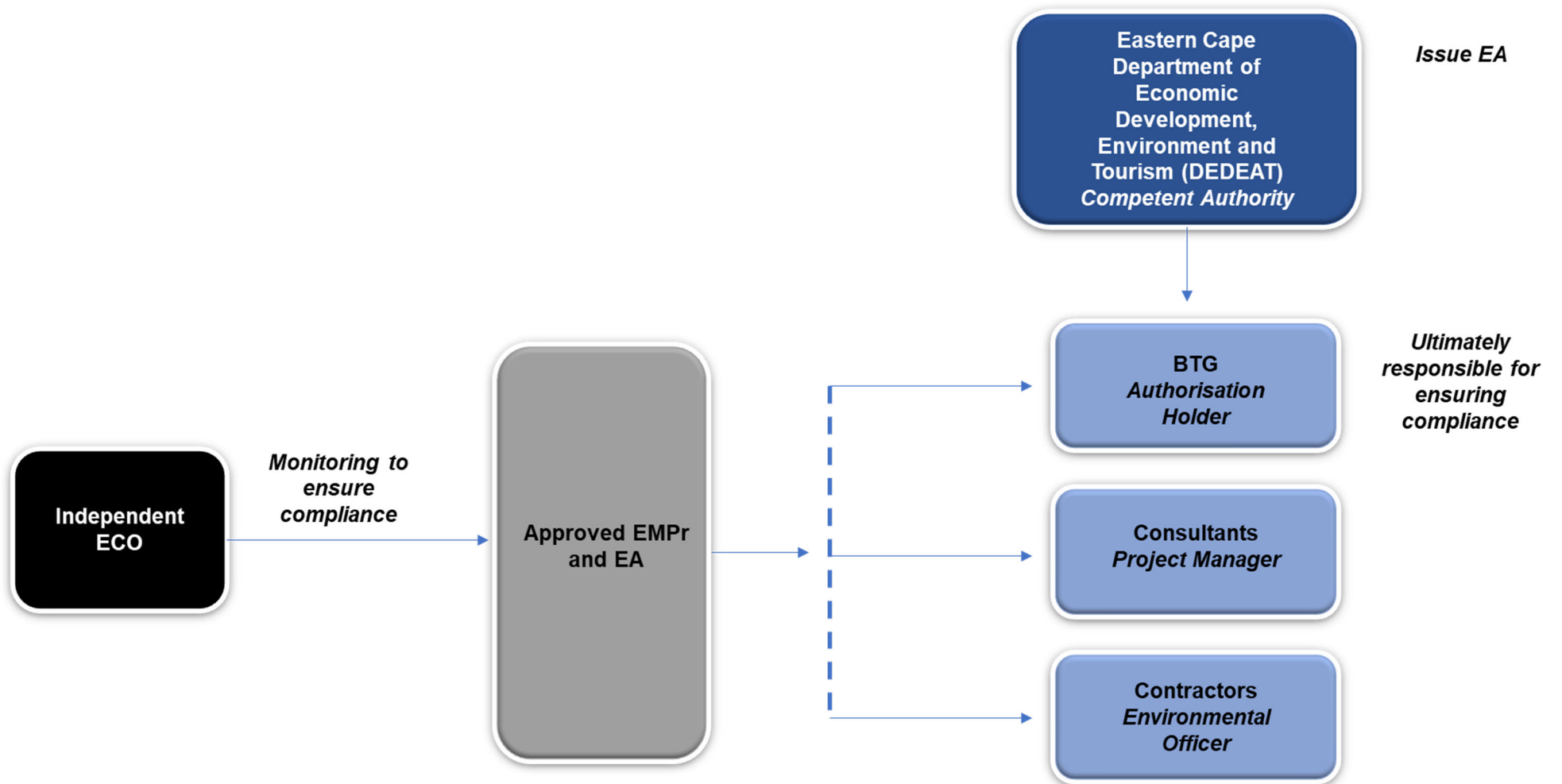


Figure 6: Roles and responsibilities

## 8 ENVIRONMENTAL AWARENESS PLAN

**Training** aims to create an understanding of environmental management obligations and prescriptive measures governing the execution of the project. It is generally geared towards project team members that require a higher-level of appreciation of the environmental management context and implementation framework for the project. In contrast, **Environmental Awareness Creation** strives to foster a general attentiveness amongst the construction workforce to sensitive environmental features and an understanding of implementing environmental best practices. The Environmental Awareness Plan for the Development incorporates both training and environmental awareness to ensure that the proposed development is implemented in line with the requirements of the EMPr and that environmental sensitivities on site are managed correctly.

As part of this, Bay Terminals Group is committed to remaining responsible and accountable for environmental practices on site. Being accountable for environmental practices undertaken during working tasks and activities remain the responsibility of both employer and employee awareness of the potential environmental impacts that could result from these activities.

All potential incidents to the environment may be effectively minimised through effective training and awareness of the employees using any of the following methods:

- Supervisory meetings (weekly);
- Induction training (annually);
- EMP Training (annually); and
- External environmental and/or health and safety courses (when applicable).

These methods are discussed below in more detail.

### 8.1 Meetings

Weekly supervisory meetings are ideal to facilitate awareness of specific environmental dangers pertaining to each week. Various topics may be discussed during these meetings and must be recorded or logged. All attendees at each meeting must sign an attendance register, these records must be kept on file at the administration office. Topics for discussion may include:

- Topics applicable to the entire operation;
- Area specific topics (e.g. heritage); and
- General environmental awareness:

- Waste management;
- Spillages;
- Saving water;
- Electricity consumption;
- Dust control;
- Noise generation;
- Housekeeping;
- Indigenous Vegetation;
- Fauna;
- Alien vegetation; and
- Fire-making

Should issues be identified by the ECO, these can also be addressed during these weekly meetings.

## **8.2 EMPr Training**

Aspects of the EMPr must be selected and discussed at training workshops at least annually. Such training topics may be focused around the incidents that are frequently reported during the previous year and may be focused around the following:

- Hydrocarbon spillages;
- Stormwater Control;
- Waste Management;
- Monitoring Protocols; and
- Safety topics.

Workers should be informed that they may refuse work that is harmful to human health and/or the environment.

## **8.3 Induction Training**

All new employees are required to undergo induction training prior to commencement of work. Returning and existing employees must undergo repeat induction training at least annually. Environmental awareness training must form part of the induction and must include the basic topics relating to the environment:

- Main environmental legislation (e.g. NEMA, NEMAQA; NEM:WA<sup>1</sup> or NWA<sup>2</sup>);
- Constitutional right pertaining to the environment;
- Waste Management hierarchy;
- Environmental, social and economic concerns;
- Sensitive environmental features; and
- Prevention of poaching.

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<sup>1</sup> National Environmental Management Waste Act (NEM:WA), 2008 (Act No. 59 of 2008)

<sup>2</sup> National Water Act (NWA), 1998, (Act No. 36 of 1998)



## 9 WASTE MANAGEMENT PLAN

In order to ensure waste is properly dealt with, waste management is included in the EMPr. In addition, a **Waste Management Plan** is discussed below.

### 9.1 Legal Requirements

Section 16 of the National Environmental Management: Waste Act, 2008 (Act No. 59 of 2008), as amended states that –

*“A holder of waste must, within the holder’s power, take all reasonable measures to –*

- *Avoid the generation of waste and where such generation cannot be avoided, to minimise the toxicity and amounts of waste that are generated;*
- **Reduce, reuse, recycle and recover waste;**
- *Where waste must be disposed of, ensure that the waste is treated and disposed of in an environmentally sound manner;*
- *Manage the waste in such a manner that it does not endanger health or the environment or cause a nuisance through noise, odour or visual impacts;*
- *Prevent any employee or any person under his or her supervision from contravening this Act;*
- *Prevent the waste from being used for any unauthorised purpose.*

Only temporary storage of waste is allowed (once of storage of waste for a period less than 90 days). The volume of material should be limited to less than 100m<sup>3</sup> of general waste and less than 80m<sup>3</sup> of hazardous waste. Should this be exceeded the Norms and Standards for the Storage of Waste will need to be complied with.

### 9.2 Waste Hierarchy

Management objectives provided in this EMPr are aligned to the waste management hierarchy indicated in Figure 7.

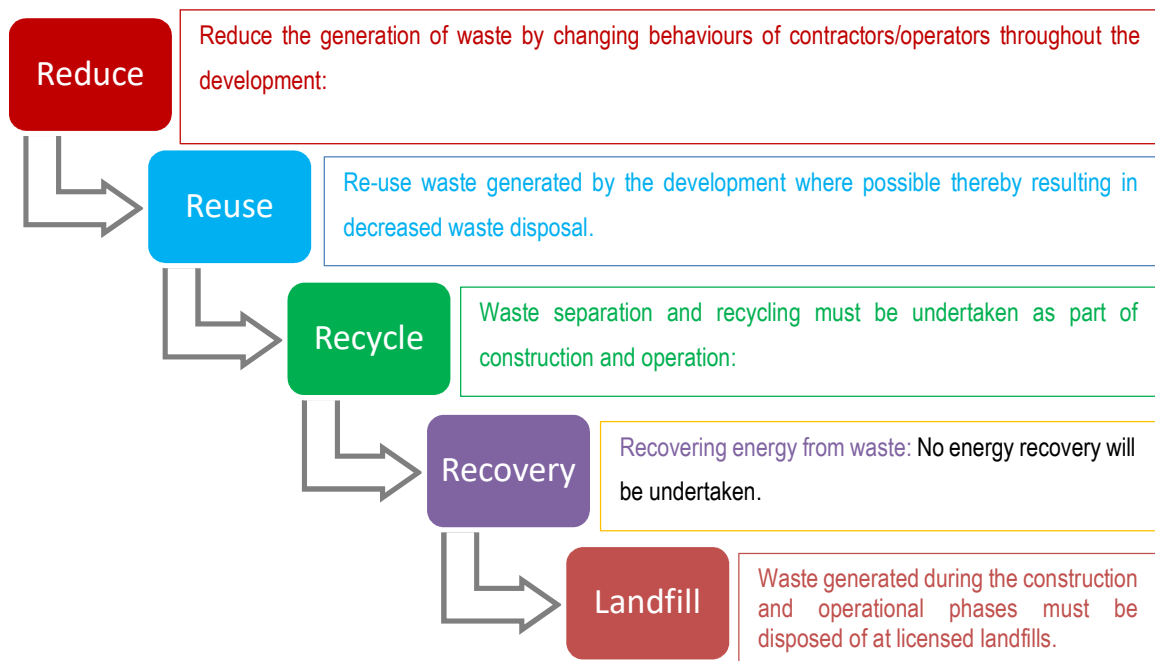


Figure 7: Waste Hierarchy

### 9.3 Waste Management Actions

The following waste management actions must be implemented in order to ensure the objectives included in the waste hierarchy above are met.

#### 9.3.1 Waste Avoidance and Reduction

Avoidance and reduction should be practiced wherever possible. Recommended actions include: but are not limited to:

- Bulk buying of materials to reduce the volume of packaging required;
- Avoidance of materials/items/brands that are heavily packaged, have a short lifespan or are low quality;
- Buying items that last longer and can be repaired;
- Buying items in refillable containers;
- Environmental awareness training should focus on management of waste and all construction workers should be aware of the importance of waste minimisation and avoidance.

### 9.3.2 Recycling

Recycling should be practiced whenever waste prevention or reuse is not possible, provided that any such recycling is cost effective, taking into consideration environmental benefits, financial costs and community interests.

Potential priority recyclable waste streams include:

- Used Oil;
- Paper;
- Glass;
- Tyres;
- Plastics;
- Timber;
- Building rubble; and
- Electronic waste.

The following actions must be implemented:

- To reduce or avoid the need for sorting after collection, the categories of distinctively marked waste receptacles must be provided in order to receive waste as it is generated.
- These receptacles shall be fitted with a tight cover;
- All types of waste collection receptacles shall be clearly marked with the type of waste they are receiving;
- Obtain and label recycling containers for office waste, aluminium, steel, glass, ferrous metals, nonferrous metals, waste timber;
- Locate these containers within office buildings and trailers;
- Establish a recycled material collection schedule; and
- Arrange full bins to be hauled away.

### 9.3.3 Waste Disposal

The contractor is responsible for removal of all waste from the site, generated through the contractor's activities. The contractor shall ensure that all waste is removed to an appropriately licensed waste management facilities (the following source may be utilised – [www.sawic.org.za](http://www.sawic.org.za)). During operation, waste that is not collected for recycling must be collected by the municipality or by a municipality approved 3<sup>rd</sup> party collector.

In addition, it should be noted that the classification of waste determines the handling methods and the ultimate disposal of the material. All **hazardous waste** that may be generated by construction must be managed as follows:

- Characterise the waste to determine if it is general or hazardous (Use the Appendix 1 of the Norms and Standards for the Classification of Waste for landfill to determine whether additional classification is required);
- Obtain and provide an acceptable container with a label;
- Place hazardous waste material in the container;
- Inspect the container on a regular basis;
- Haul the full container to the licenced and correct disposal site;
- Provide documentary evidence of proper disposal of the waste.

In addition, the following actions must also be undertaken:

- Provide waste skips on site. These skips should be sufficient in number, the skip storage area should be kept clean, skips should be emptied and replaced before overflowing or spillage occurs;
- Skips should be covered to prevent waste blowing away;
- Vermin / weatherproof bins will be provided in sufficient numbers and capacity to store domestic waste. These bins must be kept closed to reduce odour build-up and emptied regularly to avoid overfilling and other associated nuisances;
- Ensure that solid waste is transported so as to avoid waste spills en-route;
- No waste shall be buried or burned anywhere on the site;
- Permits to transport/dispose of waste must be in place.

## 10 EMERGENCY PREPAREDNESS PLAN

### 10.1 Potential Emergencies

The following potential emergencies that may occur on site include:

- Environmental Incidents:
  - Fuel and hydrocarbon spillages;
  - Sewage spillages from the Chemical Toilets; and
  - Fire Hazards.
- Safety Incidents:
  - Injuries related to operation of heavy machinery such as Front-End Loaders, Excavators, Mobile Crushers etc. during construction;
  - Driving related accidents and incidents from Trucks on site during construction;
  - Accidents during earth moving, levelling and rehabilitation activities; and
  - Criminal incidents such as theft or potential violent crime during construction and operation.

### 10.2 Emergency Plan

#### 10.2.1 Emergency Assemblage Area

A central area on site must be demarcated with appropriate signage for the gathering of all employees and visitors on site in the event of an emergency.

#### 10.2.2 Emergency Procedures

The following procedures must be compiled in order for the identified potential emergencies to be managed effectively:

- Drill and evacuation procedure for any emergency related incidents containing information on the following:
  - Reporting structure for all incidents;
  - Emergency contact information (e.g. telephone numbers);
  - Procedure to be followed for the specific emergency;
  - First Aid information;
- Spillages of fuel and hydrocarbons:
  - Immediate action plan (e.g. use of spill kits) to prevent spill for spreading;
  - Reporting of incident to manager and supervisor to advise on next steps;

- Procedure for Theft and Crime:
  - Details on security system on site;
  - Emergency response units;
  - Panic alarms;
  - Details of community response units.

### 10.2.3 Emergency Contact Information

A list of potential emergency contact centers specific to the area must be drawn up and displayed on common notice boards for all employees to access. The following emergency centers must be sourced:

- Nationwide emergency response;
- Cell phone Emergency;
- Ambulance;
- Hospitals;
- Fire Response; and
- Police.

This list must be checked and updated at least quarterly to ensure that the information remains up to date.

## 11 MONITORING PROGRAMME

Monitoring is required to ensure that the receiving environment at the proposed Development is suitably safeguarded against the identified potential impacts, and to ensure that the environmental management requirements are adequately implemented and adhered to during the execution of the project.

The method of monitoring the implementation of the management and mitigation measures stipulated within the EMPr are indicated in Table 7.

**Table 7: Method of monitoring implementation of Construction EMPr**

Method	Frequency	Responsibility	Main Topics	Outcome
Internal Inspections	Daily – Weekly	Project Manager	<ul style="list-style-type: none"> <li>Observe housekeeping practices</li> <li>Check for spillages, leaks or any other sources of pollution</li> <li>Observe waste management</li> <li>Observe stormwater control</li> </ul>	<ul style="list-style-type: none"> <li>Based on observations identify need for protocols / procedures and compile where needed in order to comply with EMPr;</li> <li>Verbally inform employees on any identified issues.</li> </ul>
External Inspections	Bi-monthly	ECO	<ul style="list-style-type: none"> <li>Check compliance with management measures in EMPr</li> </ul>	<ul style="list-style-type: none"> <li>Based on observations identify need for protocols / procedures and compile where needed in order to comply with EMPr;</li> <li>Verbally inform employees on any identified issues;</li> <li>Information from inspections will be used to compile monthly report;</li> <li>Photos from inspections to be utilised in monthly reporting.</li> </ul>
External audits	Bi-yearly	External Auditor	<ul style="list-style-type: none"> <li>Check compliance with management measures in EMPr</li> </ul>	<ul style="list-style-type: none"> <li>Compile audit report with recommendations / actions where non-compliance was identified.</li> </ul>

Method	Frequency	Responsibility	Main Topics	Outcome
Management Meetings	Quarterly – Bi-annually	Management	<ul style="list-style-type: none"> <li>Discuss (problem solve) recurring issues or actions that require management intervention</li> </ul>	<ul style="list-style-type: none"> <li>Record minutes of main points of discussion;</li> <li>Implement outcome actions of meeting.</li> </ul>

## 11.1 Compliance Monitoring and Auditing

### 11.1.1 Environmental Audits

The mechanism for monitoring compliance with the management and mitigation measures stipulated within the EMPr must include an audit undertaken by an independent Environmental Control Officer (ECO) as discussed in Section 7.5.

The objective of the environmental audit is to:

- Report on the level of compliance with the conditions of the environmental authorisation and the management and mitigation measures stipulated within the EMPr;
- The extent to which the avoidance, management and mitigation measures provided in Section 12 achieve the objectives and outcomes in Section 6;
- Identify and assess new impacts and risks as a result of undertaking the activities;
- Evaluate the effectiveness of the management and mitigation measures generated in the EMPr;
- Identify shortcomings in the EMPr;
- Identify the need for any changes to the avoidance, management and mitigation measures provided for in the EMPr.

### 11.1.2 Procedure

The following methodology or procedure is to be used for assessment of the management and mitigation measures of the EMPr:

- **Pre-site preparation:** prior to the site inspection a review of the management measures contained in the EMPr, and a checklist must be drawn up;
- **Site inspection:** The Development must be traversed on foot and must include an assessment of each major component of the facility;
- **Documentation review:** after the site inspection a documentation review must be undertaken by requesting specific key documentation relating to the proposed development.



### 11.1.3 Evaluation Criteria

During evaluation of the EMPr, the following criteria must be used:

- Management measures stipulated in the plan;
- Environmental monitoring required;
- Legal requirements; and
- Best practice observations.

Where any indication of non-compliance is determined, recommended actions will be provided.

### 11.1.4 Reporting

All inspections undertaken as part of internal / external auditing must be provided in the form of a report. Internal and / or external audit reports will be compiled in accordance with Appendix 7 of the EIA Regulations, 2014 (as amended in 2017) and will be submitted to the competent authority as required by the Regulations.

## 11.2 Penalties

In order to ensure that there is adequate motivation for the contractor to comply with the conditions set out in the EMPr, the following applies with regards to penalties:

- The Contractor will comply with the environmental requirements on an ongoing basis, and any failure on their part to do so will entitle the Project Manager, in consultation with the Environmental Manager and ECO, to certify the imposition of a fine subject to the details set out in the EMPr;
- The Project Manager, Environmental Manager and any other specific personnel as designated by the Project Manager may alter the Schedule of Fines for this specific project;
- Fines may be issued per incident at the discretion of the Project Manager. Such fines will be issued in addition to any remedial costs incurred as a result of non-compliance with the requirements of the EMPr and documents supporting thereof. Fines may be omitted from construction guarantees as supplied by the contractor;
- The Project Manager and ECO will be the judge as to what constitutes a transgression in terms of the above clause. Further, note that in the event that transgressions continue to an unacceptable level the client may cancel the contract;
- Where the Contractor inflicts non-repairable damage upon the environment or fails to comply with any of the environmental requirements, he will be liable to pay a penalty fine over and above any other contractual consequence. This may also lead into a Rectification Application in terms of Section 24G of the NEMA, which could lead to certain fines and / or prosecution;
- The Contractor is deemed NOT to have complied with this specification if:-

- Within the boundaries of the site, site extensions and access roads there is evidence of contravention of the requirements of the EMPr;
- Environmental damage ensues due to negligence;
- The Contractor fails to respond adequately to complaints from the public; and
- Legal action is instituted against the developer in terms of Environmental laws due to any action / activities undertaken by the Contractor;
- Payment of any fines in terms of the contract will not absolve the offender from being liable from prosecution in terms of any law;
- A record of penalties will be maintained within the procurement department and may influence later commissions awarded to the contractor.

## 12 EMPr

### 12.1 Pre-Construction

General requirements during the pre-construction phase include the following:

- Design to consider and incorporate environmental requirements;
- Define and communicate roles and responsibilities for the implementation of the EMPr;
- Ensure that all structures within the construction area are identified and recorded;
- Determine and document the road conditions; and
- Develop and implement an environmental awareness programme.

Specific management measures related to the identified environmental aspects follow:

**Table 8: Management measures to be implemented during pre-construction**

Potential Impact	Management Objective	Proposed Mitigation Measures/Management Actions	Frequency	Institutional Responsibility
<b>LEGISLATIVE REQUIREMENTS AND DOCUMENT CONTROL</b>				
General Requirements	All relevant authorisations, licences and approvals are in place prior to the commencement of construction.	<ul style="list-style-type: none"> <li>Approvals to be in place prior to construction.</li> </ul>	Once off prior to construction	Project Manager
	A formal document control system is in place to ensure all relevant documents are in place prior to commencement.	<ul style="list-style-type: none"> <li>An environmental file/document control system must be designed and put in place.</li> <li>Prior to construction, the following documents must be included in the file:                             <ul style="list-style-type: none"> <li>Construction EMPr;</li> <li>Environmental Authorisation (EA);</li> <li>Stormwater management plan – approved;</li> <li>Relevant permits for the removal of plant species of special conservation concern.</li> </ul> </li> </ul>	Once off prior to construction	Project Manager
	Nelson Mandela Metropolitan Municipality (NMBM) requirements regarding notification have been met.	<ul style="list-style-type: none"> <li>A copy of the EA should be provided to NMBM;</li> <li>NMBM should be notified of the commencement of construction.</li> </ul>	Once off prior to construction	Project Manager/ECO

Potential Impact	Management Objective	Proposed Mitigation Measures/Management Actions	Frequency	Institutional Responsibility
	Eastern Cape Department of Economic Development, Environment and Tourism (EC DEDEAT) requirements regarding notification have been met.	<ul style="list-style-type: none"> <li>• A copy of the Atmospheric Emissions License should be provided to DEDEAT;</li> <li>• DEDEAT should be notified of the commencement of construction.</li> </ul>	Once off prior to construction	Project Manager/ECO
	Site specific method statements are compiled and approved.	<ul style="list-style-type: none"> <li>• Based on the EMPr, the contractor must compile specific method statements which must be approved by the Project manager prior to construction. At a minimum this should include:                             <ul style="list-style-type: none"> <li>○ Method Statement for Search and Rescue of plants that were identified as Species of Special conservation Concern (SSC);</li> <li>○ Method Statement for site clearing;</li> <li>○ Method Statement for establishing the construction camp;</li> <li>○ Method Statement regarding waste and wastewater management;</li> <li>○ Method Statement to show procedures for dealing with possible emergencies that can occur, such as fire and accidental leaks and spillage of carbon fuels and oils;</li> </ul> </li> </ul>	Prior to construction	EO to compile Project manager to approve

Potential Impact	Management Objective	Proposed Mitigation Measures/Management Actions	Frequency	Institutional Responsibility
		<ul style="list-style-type: none"> <li>○ Method Statement for dust control;</li> <li>○ Method Statement for the storage and handling of hazardous substances;</li> <li>○ Method Statement for controlling alien invasive species and noxious weeds; and</li> <li>○ Method Statement for rehabilitation of construction footprint.</li> </ul>		
<b>SENSITIVE SPECIES</b>				
Loss/disturbance of sensitive species	Proper management of sensitive species through identification, rescue and relocation.	<ul style="list-style-type: none"> <li>• Note: Several sensitive species were identified during the ecological study. Particular species include: <ul style="list-style-type: none"> <li>○ <i>Aloe striata</i></li> <li>○ <i>Haworthia translucens</i></li> <li>○ <i>Cyrtanthus clavatus</i></li> <li>○ <i>Cyrtanthus spiralis</i></li> <li>○ <i>Bergeranthus addoensis</i></li> <li>○ <i>Bergeranthus longisepalus</i></li> <li>○ <i>Bergeranthus scapiger</i></li> <li>○ <i>Trichodiadema bulbosum</i></li> <li>○ <i>Cotyledon orbiculata var. flanaganii</i></li> <li>○ <i>Euphorbia globose</i>;</li> </ul> </li> <li>• Table 1 of the Ecological Specialist Study indicates the species that will require permits for removal or destruction prior to construction commencing. These species, where possible, should then be relocated to the suitable nursery</li> </ul>	Once off prior to construction	ECO

Potential Impact	Management Objective	Proposed Mitigation Measures/Management Actions	Frequency	Institutional Responsibility
		<p>being established for use in other parts of the IDZ or to revegetate the pipeline servitude area;</p> <ul style="list-style-type: none"> <li>• Before the removal of any of these species, a permit must be obtained;</li> <li>• The plant rescue and protection plan* which allows for the transplantation of conservation important species from areas to be transformed must be implemented prior to construction;</li> <li>• Procedures for conducting search &amp; rescue (S&amp;R): The appointed contractors for the development have to draft and submit method statements, required as part of the CDC's Construction Environmental Specifications for the IDZ (construction EMP). A method statement for S&amp;R is required. The method statement would need to stipulate how the S&amp;R will be conducted and where the plants will be taken. Options are that the plants will be reused in the landscaping and rehabilitation of the Bay Terminals site, or used in the rehabilitation of specific areas in the IDZ, or held in the CDC's plant nursery for later reuse by the investor;</li> <li>• In addition to the plant rescue and protection plan, all the conditions of the relevant permits, must be complied with.</li> </ul>		

Potential Impact	Management Objective	Proposed Mitigation Measures/Management Actions	Frequency	Institutional Responsibility
<b>SITE PLANNING AND LAYOUT</b>				
Loss/disturbance of sensitive features	Planning and layout of construction site is undertaken responsibly to ensure protection of sensitive environmental features.	<ul style="list-style-type: none"> <li>• Contractor to submit a site plan to the ECO and Project Manager for comment. The site plan must be approved by the Project Manager prior to the establishment of the site. The plan must show the following):               <ul style="list-style-type: none"> <li>○ Sensitive environmental features;</li> <li>○ Buildings and structures;</li> <li>○ Contractors' camp and lay down areas;</li> <li>○ Site offices;</li> <li>○ Roads and access routes;</li> <li>○ Temporary waste storage areas</li> <li>○ Site toilets and ablutions;</li> <li>○ Topsoil stockpiles areas;</li> <li>○ Construction materials stores areas;</li> <li>○ Workshops; and</li> <li>○ Hazardous substance stores.</li> </ul> </li> <li>• Authorised construction footprint to be pegged</li> <li>• Ablution facilities must be located at least 100m away from wetlands.</li> </ul>	Once off prior to construction	Contractor to compile plan, ECO to comment, Project Manager to approve.



Potential Impact	Management Objective	Proposed Mitigation Measures/Management Actions	Frequency	Institutional Responsibility
<b>ENVIRONMENTAL AWARENESS CREATION – INDUCTION</b>				
General Requirements	Environmental awareness creation and training is undertaken prior to construction commencement to minimise environmental impacts and ensure compliance to relevant legislation and authorisations.	<ul style="list-style-type: none"> <li>ECO to induct relevant contractor managers at the start of the project. This induction should provide an overview of the authorisation and the CEMPr. The environmental awareness training course for management shall include all management and foremen.</li> <li>The Contractor must arrange that all of his employees and those of his sub-contractor go through the project specific environmental awareness induction before the commencement of construction and as and when new staff or sub-contractors are brought on site.</li> <li>A system must be in place to ensure all new employees have received training.</li> <li>All attendees shall remain for the duration of the course and sign an attendance register that clearly indicates participant's names on completion. A copy of the attendance register is to be retained by the ECO/Project Manager.</li> </ul>	Once off prior to construction	ECO to induct construction managers/ Environmental officer (EO) Contractor to induct all workers
<b>STORMWATER MANAGEMENT PLAN</b>				
General Requirements	Nelson Mandela Metropolitan Municipality requirements regarding Stormwater management are considered.	<ul style="list-style-type: none"> <li>The design of storm water management systems should be based on Sustainable Urban Drainage Systems (SUDS) and Water Sensitive Urban Design approaches (WSUDS) which enhance natural drainage through permeable surfacing and which integrate landscaping with stormwater in line with the best practice stormwater management.</li> </ul>	Once off prior to construction	Authorisation Holder Project Manager Resident Engineer

Potential Impact	Management Objective	Proposed Mitigation Measures/Management Actions	Frequency	Institutional Responsibility
		<ul style="list-style-type: none"> <li>• A Stormwater Management Plan should be developed and submitted to NMBM/CDC for approval prior to development.</li> <li>• All the terms and conditions of the approval must be implemented.</li> <li>• Management of stormwater will also need to be designed in such a manner as to prevent negative impacts such as erosion and sedimentation, and to ensure environmental protection of downstream areas. Such plan would be required to meet the following criteria/standards.:               <ul style="list-style-type: none"> <li>○ Peak discharge: no increase in discharge for any event of any duration up to the 25-year RI event,</li> <li>○ Volume of runoff - no increase up to the annual 10-year rainfall.</li> <li>○ Runoff frequency - no surface runoff for the 1-year RI event of any duration.</li> <li>○ Water quality - no deterioration.</li> </ul> </li> </ul>		

Potential Impact	Management Objective	Proposed Mitigation Measures/Management Actions	Frequency	Institutional Responsibility
<b>RISK ASSESSMENT CONDITIONS</b>				
General Requirements: Prevention of pollution and fire and explosions.	NEMA Risk Assessment conditions are implemented.	<ul style="list-style-type: none"> <li>• Correct designs to relevant standards and codes as per NEMA and MHI Risk Assessment;</li> <li>• Major Hazard Installation risk assessment which should be completed prior to construction of the terminal;</li> <li>• Compliance with all statutory requirements, i.e. pressure vessel designs;</li> <li>• Compliance with applicable SANS codes, i.e. SANS 10087, SANS 10089, SANS 10108, etc.;</li> <li>• Demonstration that preventative measures are in place to prevent the above ground pipelines from being damaged from road vehicles;</li> <li>• Demonstration that above ground pipelines are protected from vegetation fires below or near the pipelines and cannot be damaged or exceed the design ratings of the pipelines, under such circumstances;</li> <li>• Demonstration that the pipelines will not exceed the design pressure when not in use, due to thermal expansion;</li> <li>• LPG vessels to be mounded, or detailed justification provided for non-mounding vessels, with adequate mitigation provided to prevent a major incident;</li> <li>• Incorporation of applicable guidelines or equivalent international recognised codes of good design and practice into the designs;</li> </ul>	Once off prior to construction	Authorisation Holder Project Manager Resident Engineer

Potential Impact	Management Objective	Proposed Mitigation Measures/Management Actions	Frequency	Institutional Responsibility
		<ul style="list-style-type: none"> <li>• Completion of a recognised process hazard analysis (such as a HAZOP study, FMEA, etc.) on the proposed facility prior to construction to ensure design and operational hazards have been identified and adequate mitigation put in place;</li> <li>• Full compliance with IEC 61508 and IEC 61511 (Safety Instrument Systems) standards or equivalent to ensure that adequate protective instrumentation is included in the design and would remain valid for the full life cycle of the tank farm:               <ul style="list-style-type: none"> <li>○ Including demonstration from the designer that sufficient and reliable instrumentation would be specified and installed at the facility;</li> </ul> </li> <li>• Preparation and issue of a safety document detailing safety and design features reducing the impacts from fires, explosions and flammable atmospheres to the MHI assessment body at the time of the MHI assessment:               <ul style="list-style-type: none"> <li>○ Including compliance to statutory laws, applicable codes and standards and world’s best practice;</li> <li>○ Including the listing of statutory and non-statutory inspections, giving frequency of inspections;</li> <li>○ Including the auditing of the built facility against the safety document;</li> <li>○ Noting that codes such as IEC 61511 can be used to achieve these requirements;</li> </ul> </li> </ul>		

Potential Impact	Management Objective	Proposed Mitigation Measures/Management Actions	Frequency	Institutional Responsibility
		<ul style="list-style-type: none"> <li>• Demonstration by BTG or their contractor that the final designs would reduce the risks posed by the installation to internationally acceptable guidelines;</li> <li>• Signature of all terminal designs by a professional engineer registered in South Africa in accordance with the Professional Engineers Act, who takes responsibility for suitable designs;</li> <li>• Completion of an emergency preparedness and response document for on-site and off-site scenarios prior to initiating the MHI risk assessment (with input from local authorities);</li> <li>• Permission not being granted for increases to the product list or product inventories without redoing part of or the full EIA;</li> <li>• Final acceptance of the facility risks with an MHI risk assessment that must be completed in accordance to the MHI regulations:               <ul style="list-style-type: none"> <li>○ Basing such a risk assessment on the final design and including engineering mitigation.</li> </ul> </li> </ul>		

### **\*Proposed “Rescue and Relocation” Plan**

#### Step 1:

An appropriate service provider must be appointed to conduct and manage the operation.

#### Step 2:

Locate with a GPS and physically mark the positions of individuals of the various species before vegetation clearing commences. If a species is represented by too many individuals to make a relocation of the entire population feasible, plants should be taken from different parts of the site and from different habitats. Both young and old individuals should be selected as well as any individuals reflecting variability in the population (for example, flower colour or leaf size) to ensure that translocation will express the broadest genetic variation and the plants will have the maximum chance of survival.

#### Step 3:

Many of the Species of Special Conservation Concern (SSC) are plants that cannot be successfully uprooted and replanted at all. The best chance of successfully relocating these species will be to collect seeds or possibly small cuttings and establish them under nursery conditions. Healthy cultivated individuals will then be able to be introduced to carefully chosen localities. Options are to be reused in the landscaping and rehabilitation of the Bay Terminals site or used in the rehabilitation of specific areas in the IDZ or held in the CDC’s plant nursery for later reuse by the investor.

Plants should be translocated in the most appropriate form. This implies that not only whole plants will be moved but also seeds, bulbs and cuttings. Private individual and / or nurseries should also be given the opportunity to collect plants that will not be relocated (in other words, they will be destroyed).

Step 4:

A list with numbers of all species collected, and the Zone in the IDZ where the plants were rescued from, together with their GPS co-ordinates, should be forwarded to this office after each search and rescue operation of the operator appointed by the CDC to undertake this task.

## 12.2 Construction

Mitigation measures for all activities related to construction are provided below. The mitigation measures included in the all the specialist studies and the Environmental Impact Assessment Report (EIR) have also been incorporated below. Management actions are linked to a specific impact and overall management objective. Information on the institutional responsibilities and the frequency of the actions is also provided.



**Table 9: Management measures to be implemented during construction**

Potential Impact	Project Activities	Management Objective	Proposed Mitigation Measures/Management Actions	Frequency	Institutional Responsibility
<b>ATMOSPHERIC EMISSIONS</b>					
Dust emissions	Site Clearing General construction Driving on gravel roads	Ensure that all possible causes of dust are mitigated as far as possible to minimise impacts to the surrounding environment	<ul style="list-style-type: none"> <li>A speed limit of 20km/h must be maintained on all dirt roads;</li> <li>Dust suppression measures by means of either water or biodegradable chemical agent will be implemented during the construction phase to minimise dust generated by construction activities. Recycled water to be used, instead of potable water, to save water.</li> </ul>	Daily	Contractor to implement actions ECO to monitor
Emissions from vehicles and equipment (CO <sub>2</sub> , NO <sub>x</sub> , SO <sub>x</sub> , VOC's etc.)	Use of vehicles and plant during construction	All vehicles and machinery on site must be properly maintained to reduce emission sources.	<ul style="list-style-type: none"> <li>All construction vehicles and machinery will be maintained such as to operate efficiently. Idling times of vehicles and machinery to be minimised;</li> <li>In terms of transportation of workers and materials, collective transportation arrangements should be made to reduce individual car journeys where possible;</li> <li>All vehicles used during the project should be properly maintained and in good working order;</li> <li>All vehicles and other machinery should comply with road worthy requirements and comply with legislation in terms of allowable emissions.</li> </ul>	Daily and as required by maintenance schedule	Contractor to implement actions ECO to monitor

Potential Impact	Project Activities	Management Objective	Proposed Mitigation Measures/Management Actions	Frequency	Institutional Responsibility
Noise increase due to construction activities	General construction activities	Ensure that noise disturbance to surrounding areas are minimised and that construction activities comply with the Noise Control Regulations and the provisions of South African National Standards; Environmental, Health and Safety (EHS) Guidelines, World Health Organisation (WHO, 2002).	<ul style="list-style-type: none"> <li>• The provisions of SANS 10103:2008 will apply to all areas within audible distance of residents or adjacent landowners;</li> <li>• Equipment and/or machinery which will be used must comply with the manufacturer's specifications on acceptable noise levels;</li> <li>• Construction activities should be limited to daytime only;</li> <li>• Noise monitoring should be undertaken as spot checks;</li> <li>• When required noise mufflers should be utilised to reduced noise;</li> <li>• It is important to keep an open channel of communication between all stakeholders and keep record of any concerns raised.</li> </ul>	Daily	Contractor to implement actions ECO to monitor
<b>WATER IMPACTS (SURFACE AND GROUNDWATER)</b>					
Liquid waste including sewage may cause stormwater and groundwater pollution if not managed and	Sewage management Waste water management	Construction activities are managed correctly to ensure no negative impacts to water quality is incurred. This includes proper management of	<ul style="list-style-type: none"> <li>• Management of Ablution Facilities:                             <ul style="list-style-type: none"> <li>○ Chemical toilets will be placed on site for the duration of the construction phase;</li> <li>○ Ablution facilities (chemical toilets) are to be provided by the Contractor, at a ratio of 1:10;</li> </ul> </li> </ul>	Daily and/or as and when required (removal of waste)	Contractor to implement actions ECO to monitor

Potential Impact	Project Activities	Management Objective	Proposed Mitigation Measures/Management Actions	Frequency	Institutional Responsibility
disposed of correctly.		ablution facilities and waste water.	<ul style="list-style-type: none"> <li>○ Ablution facilities (chemical toilets) must be erected within 100m from all workplaces but within the development footprint;</li> <li>○ Toilets are to be secured to the ground and must have a closing mechanism;</li> <li>○ Toilet paper must be provided at these facilities and must be serviced once per week;</li> <li>○ Certified contractors to maintain and empty chemical toilets regularly;</li> <li>○ Safe disposal certificates to be kept in the site file;</li> <li>○ The contractor must ensure that spillage does not occur when toilets are cleaned/serviced, and contents must be properly stored and disposed of properly;</li> <li>○ Discharge of waste into the environment and/or burial of waste are strictly prohibited;</li> <li>○ Sanitary arrangements must be to the satisfaction of the PM, ECO, the local authorities and the applicable legal requirements.</li> </ul> <ul style="list-style-type: none"> <li>● Management of waste water: <ul style="list-style-type: none"> <li>○ The contractor is to ensure that clean run-off water is diverted away from potentially contaminated areas of the construction site;</li> </ul> </li> </ul>		

Potential Impact	Project Activities	Management Objective	Proposed Mitigation Measures/Management Actions	Frequency	Institutional Responsibility
			<ul style="list-style-type: none"> <li>○ Contaminated liquids and soil from the site must be disposed of at a permitted disposal site;</li> <li>○ Safe disposal certificates to be kept in the site file.</li> </ul>		
Impact of changes to water quality through construction materials such as sediments, topsoil/soil, diesel, oils and cement may pose a threat to the instream and adjacent vegetated areas, if by chance it is dispersed via surface run-off or allowed to permeate groundwater.	<p>Construction activities</p> <p>Clearing of vegetation</p> <p>Earthworks</p> <p>Site camp</p> <p>Concrete mixing</p> <p>Workshop and equipment</p> <p>Storage of hazardous substances;</p> <p>Construction vehicles</p>	<p>Ensure no spillages through proper management of site clearing, earthworks, site camp, concrete mixing, workshop and equipment.</p> <p>Ensure stormwater is properly managed during construction.</p> <p>Effective and safe management of hazardous materials on site, to minimise the impact of materials on the environment.</p>	<ul style="list-style-type: none"> <li>● The following best practise measures in terms of erosion apply:                             <ul style="list-style-type: none"> <li>○ Instability and erosion of steep slopes must be stabilised immediately. Re-vegetation in consultation with landscape architect and ECO should be done if required;</li> <li>○ To reduce the loss of material by erosion, causing sedimentation, disturbance must be kept to a minimum;</li> <li>○ If clearing of slopes occur within the rainy season, earth berms must be created along the up-slope side of the construction area;</li> <li>○ Where possible, natural vegetation should be retained to reduce the risk of erosion;</li> <li>○ Should erosion occur due to negligence on the part of the Contractor to apply the above measures, the Contractor will be responsible for reinstatement of the eroded area to its former state at his own expense. Any surface water pollution occurring as a result of this negligence will be cleaned up by the</li> </ul> </li> </ul>	Daily	Contractor to implement actions ECO to monitor

Potential Impact	Project Activities	Management Objective	Proposed Mitigation Measures/Management Actions	Frequency	Institutional Responsibility
			<p>Contractor or a nominated clean up organisation at the expenses of the Contractor;</p> <ul style="list-style-type: none"> <li>○ Proper Stormwater management must be implemented;</li> <li>○ Run-off containing high sedimentation loads must not be released into natural or municipal drainage systems;</li> <li>○ Silt fences must be used to stabilise the site, reduce erosion and silt entering the natural environment. No unchecked silt may enter the natural environment.;</li> <li>○ Silt fences must be fit for purpose, effective and regularly maintained.</li> </ul>		
			<ul style="list-style-type: none"> <li>● Management of workshop and equipment: <ul style="list-style-type: none"> <li>○ Maintenance of equipment and vehicles is not allowed at the construction site. Faulty equipment must be removed from site and repaired at a workshop.</li> <li>○ A designated vehicle wash bay must be put in place and must meet the following requirements: <ul style="list-style-type: none"> <li>▪ Must have an impermeable surface.</li> <li>▪ Must have drainage measures in place to direct contaminated water towards the oil separator.</li> </ul> </li> </ul> </li> </ul>	Daily	Contractor to implement actions ECO to monitor

Potential Impact	Project Activities	Management Objective	Proposed Mitigation Measures/Management Actions	Frequency	Institutional Responsibility
			<ul style="list-style-type: none"> <li>▪ Quality of water to be tested prior to release. If not safe then contaminated water must be disposed of as hazardous waste at a licensed waste disposal facility. Safe disposal certificates to be obtained from the final disposal facility.</li> <li>▪ Emergency spill kit</li> <li>○ No washing of plant outside of designated wash bay.</li> <li>○ Drip trays will be provided for the stationary plant and for the "parked" plant.</li> <li>○ All vehicles and equipment will be kept in good working order and serviced regularly. Leaking equipment will be repaired immediately or removed from the site.</li> <li>• Management of concrete mixing:               <ul style="list-style-type: none"> <li>○ Cement mixing to take place on an impervious surface (e.g. plastic or cement mixing pit).</li> <li>○ Unused cement bags will be stored in an area not exposed to the weather and packed neatly to prevent hardening or leakage of cement.</li> </ul> </li> <li>• Prevention of spillages and spill management;               <ul style="list-style-type: none"> <li>○ Drip trays must be placed under all vehicles when immobile for longer than 24 hours. Vehicles</li> </ul> </li> </ul>		

Potential Impact	Project Activities	Management Objective	Proposed Mitigation Measures/Management Actions	Frequency	Institutional Responsibility
			<p>suspected of leaking must be monitored and conduct a pre start-up inspection checklist.</p> <ul style="list-style-type: none"> <li>○ Drip trays must be checked and replaced for vehicles standing (parked) for prolonged periods.</li> <li>○ Drip trays must be of a sufficient size and volume to collect any hydrocarbon leakages from a stationary vehicle.</li> <li>○ Spill kits (absorbent material) must be available on site and in all vehicles that transport hydrocarbons for dispensing to other vehicles on the construction site.</li> <li>○ Spilled substances must be contained in impermeable containers for removal to a licensed hazardous waste site.</li> <li>○ Significant spills should be reported to the Project Manager or Contractors Manager and ECO who should report this to the relevant authority.</li> </ul>		
			<ul style="list-style-type: none"> <li>• Storm water management during construction will be implemented however, as the proposed development does not cross any watercourses and is not in close proximity to any wetlands, minimal impacts are expected. Further, as a precaution, the following measures should be implemented:</li> </ul>	Once off (design and approval) Implementation – ongoing	Contractor to implement actions ECO to monitor

Potential Impact	Project Activities	Management Objective	Proposed Mitigation Measures/Management Actions	Frequency	Institutional Responsibility
			<ul style="list-style-type: none"> <li>○ Compile and implement proper stormwater management plan;</li> <li>○ Increased run-off during construction should be managed using berms, temporary cut-off drains, attenuation ponds or other suitable structures, in consultation with the ECO and resident Engineer;</li> <li>○ Cut off drains may not cause additional harm to environment. Care must be taken to consider their position and the receiving environment;</li> <li>○ Stormwater management system is to be installed as soon as possible following site establishment, to attenuate stormwater during the construction phase, as well as during the operational phase;</li> <li>● Surface-water run-off and stormwater must be directed away from trenches and areas of excavation.</li> </ul>		
			<p>Management of Hazardous Substances:</p> <ul style="list-style-type: none"> <li>● The proposed development does not cross any watercourses and is not in close proximity to any wetlands as such minimal impacts apply. Further, the following measures must be implemented:</li> <li>● Proper storage of hazardous material                             <ul style="list-style-type: none"> <li>○ Hazardous materials to be suitably stored to prevent environmental contamination and visual impacts. Storage requirements to be determined</li> </ul> </li> </ul>	Daily	Contractor to implement actions ECO to monitor



Potential Impact	Project Activities	Management Objective	Proposed Mitigation Measures/Management Actions	Frequency	Institutional Responsibility
			<p>based on chemical qualities of material and Material Safety Data Sheets (MSDS). At a minimum, hazardous chemical substances (HCS) must be stored at a designated area that meets the following requirements:</p> <ul style="list-style-type: none"> <li>▪ Earthed;</li> <li>▪ Fire extinguisher must be present;</li> <li>▪ Relevant signage to be displayed including No Smoking/ No open flames; Hazardous Chemical Substance Store; Type of HCS (e.g. Diesel); Maximum contents volume and Fire extinguisher</li> </ul> <ul style="list-style-type: none"> <li>○ Storage areas should be located 100m from the edge of wetlands or drainage lines;</li> <li>○ Hazardous substances must be stored and handled in accordance with the appropriate legislation and standards, which include the Hazardous Substances Act (Act No. 15 of 1973), the Occupational Health and Safety Act (No. 85 of 1993), relevant associated Regulations, and applicable SANS and international standards.</li> <li>○ Any hazardous materials (apart from fuel) must be stored within a lockable store with a sealed floor. Suitable ventilation to be provided.</li> </ul>		

Potential Impact	Project Activities	Management Objective	Proposed Mitigation Measures/Management Actions	Frequency	Institutional Responsibility
			<ul style="list-style-type: none"> <li>○ All storage tanks containing hazardous materials must be placed in bunded containment areas with impermeable surfaces. The bunded area must be able to contain 110% of the total volume of the stored hazardous material.</li> <li>● Spillages               <ul style="list-style-type: none"> <li>○ In the event of spillages of hazardous substances, the appropriate clean up and disposal measures are to be implemented.</li> <li>○ The contractor must ensure that necessary materials and equipment are available on site to deal with spills of any hazardous materials present</li> <li>○ The ECO and Project Manager must be notified of all significant spillages.</li> </ul> </li> <li>● Training               <ul style="list-style-type: none"> <li>○ Staff that will be handling hazardous materials must be trained to do so.</li> </ul> </li> <li>● General               <ul style="list-style-type: none"> <li>○ Drip trays must be placed under all vehicles when immobile for longer than 24 hours. Vehicles suspected of leaking must be monitored and conduct a pre-start-up inspection checklist.</li> <li>○ Drip trays must be checked and replaced for vehicles standing (parked) for prolonged periods.</li> </ul> </li> </ul>		

Potential Impact	Project Activities	Management Objective	Proposed Mitigation Measures/Management Actions	Frequency	Institutional Responsibility
			<ul style="list-style-type: none"> <li>○ Drip trays must be of a sufficient size and volume to collect any hydrocarbon leakages from a stationary vehicle.</li> <li>○ Spill kits (absorbent material) must be available on site and in all vehicles that transport hydrocarbons for dispensing to other vehicles on the construction site.</li> <li>○ Spilled substances must be contained in impermeable containers for removal to a licensed hazardous waste site.</li> <li>● Contaminated wastewater to be contained, and removed to a registered site, to ensure water bodies on site are not contaminated.</li> </ul>		
<b>WASTE GENERATION</b>					
Domestic Waste	Waste generation, storage and disposal	Domestic waste must be managed properly to ensure minimal impacts.	<ul style="list-style-type: none"> <li>● Waste recycling to be put in place.</li> <li>● Domestic waste must be stored in containers labelled or colour coded for general waste.</li> <li>● Vermin / weatherproof bins will be provided in sufficient numbers and capacity to store domestic waste.</li> <li>● Containers must be emptied frequently before reaching capacity</li> <li>● Solid waste shall only be stored in the designated general waste storage area which must be enclosed and impermeable.</li> </ul>	Daily	Contractor to implement actions ECO to monitor

Potential Impact	Project Activities	Management Objective	Proposed Mitigation Measures/Management Actions	Frequency	Institutional Responsibility
			<ul style="list-style-type: none"> <li>No waste shall be buried or burned anywhere on the construction site.</li> <li>All solid waste shall be disposed of by a certified contractor, off-site, at an approved landfill site if no municipal services is available. The Contractor shall supply the ECO with a certificate of disposal for auditing purposes.</li> <li>Avoidance, reduction and reuse should be practiced wherever possible – see waste management plan.</li> <li>Waste may not cause any nuisance (e.g. odour)</li> <li>Records of waste manifest documents must be retained at the administration office</li> </ul>		
Construction Waste	Waste generation, storage and disposal	Construction waste must be managed properly to ensure minimal impacts.	<ul style="list-style-type: none"> <li>Construction waste must be collected and put into suitable closed bins on a daily basis.</li> <li>Provide waste skips on site. These skips should be sufficient in number, the skip storage area should be kept clean, skips should be emptied and replaced before overflowing or spillage occurs. Skips should be covered to prevent waste blowing away.</li> <li>Construction rubble must be disposed of at a registered landfill site.</li> <li>Avoidance, reduction, and reuse should be practiced wherever possible – see waste management plan.</li> </ul>	Daily	Contractor to implement actions ECO to monitor

Potential Impact	Project Activities	Management Objective	Proposed Mitigation Measures/Management Actions	Frequency	Institutional Responsibility
			<ul style="list-style-type: none"> <li>Records of waste manifest documents must be retained at the administration office.</li> </ul>		
Hazardous waste	Waste generation, storage and disposal	Hazardous waste must be managed properly to ensure minimal impacts.	<ul style="list-style-type: none"> <li>The classification of waste determines the handling methods and the ultimate disposal of the material. The contractor shall manage hazardous waste that are anticipated to be generated by his operations as follows:                             <ul style="list-style-type: none"> <li>Characterise the waste to determine if it is general or hazardous (Use the Appendix 1 of the Norms and Standards for the Classification of Waste for landfill to determine whether additional classification is required).</li> <li>Obtain and provide an acceptable container with a label.</li> <li>Place hazardous waste material in the container.</li> <li>Inspect the container on a regular basis</li> <li>Haul the full container to the licenced and correct disposal site.</li> <li>Provide documentary evidence of proper disposal of the waste.</li> </ul> </li> <li>Only temporary storage of waste is allowed (once of storage of waste for a period less than 90 days). The volume of material should be limited to less than 80m<sup>3</sup> of hazardous waste. Should this be exceeded the Norms and</li> </ul>	Daily	Contractor to implement actions ECO to monitor

Potential Impact	Project Activities	Management Objective	Proposed Mitigation Measures/Management Actions	Frequency	Institutional Responsibility
			<p>Standards for the Storage of Waste will need to be complied with.</p> <ul style="list-style-type: none"> <li>Containers must be emptied frequently before reaching capacity</li> <li>All hazardous waste must be disposed of at the nearest hazardous landfill</li> <li>Waste may not cause any nuisance (e.g. contamination)</li> <li>Records of waste manifest documents must be retained at the administration office</li> <li>Certificates of registration must be retained for transporters of hazardous waste and retained in record at the administration office.</li> </ul>		
<b>SOIL ALTERATION</b>					
Alteration of topography	Site clearing Landscaping Construction activities	Changes to topography to be planned properly to prevent negative impacts.	<ul style="list-style-type: none"> <li>Changes to topography must be properly designed and landscaped.</li> <li>Stormwater management measures must be implemented to ensure these changes to not impact on stormwater.</li> </ul>	Ongoing	Contractor to implement actions ECO to monitor
Loss of topsoil	Site clearing	Effective management of topsoil, in order to minimise the impact of construction activities.	<ul style="list-style-type: none"> <li>During site preparation, topsoil and subsoil must be stripped separately from each other and must be stored separately from spoil material for use in the rehabilitation phase.</li> <li>Topsoil should be protected from wind and rain, as well as contamination from diesel, concrete or wastewater. Topsoil</li> </ul>	At start of construction. Checks to occur on a monthly basis	Contractor to implement actions ECO to monitor

Potential Impact	Project Activities	Management Objective	Proposed Mitigation Measures/Management Actions	Frequency	Institutional Responsibility
			<p>stockpiles should be checked on a monthly basis to ensure that this is the case.</p> <ul style="list-style-type: none"> <li>• Topsoil should be used in landscaping and rehabilitation where possible.</li> </ul>		
Soil erosion	Site clearing Landscaping Construction activities	Ensure that all possible causes of erosion are mitigated as far as possible to minimise impacts to the site and surrounding environment	<ul style="list-style-type: none"> <li>• Instability and erosion of steep slopes must be stabilised immediately. Re-vegetation in consultation with landscape architect and ECO should be done if required.</li> <li>• To reduce the loss of material by erosion, disturbance must be kept to a minimum.</li> <li>• If clearing of slopes occur within the rainy season, earth berms must be created along the up-slope side of the construction area.</li> <li>• Where possible, natural vegetation should be retained to reduce the risk of erosion.</li> <li>• Should erosion occur due to negligence on the part of the Contractor, the Contractor will be responsible for reinstatement of the eroded area to its former state at his own expense. Any surface water pollution occurring as a result of this negligence will be cleaned up by the Contractor or a nominated clean up organisation at the expenses of the Contractor.</li> </ul>	Ongoing	Contractor to implement actions ECO to monitor

Potential Impact	Project Activities	Management Objective	Proposed Mitigation Measures/Management Actions	Frequency	Institutional Responsibility
Solid waste from construction activities may cause soil pollution if not managed and disposed of correctly.	Site camp Storage of waste Construction activities	Ensure that all possible causes of soil pollution are mitigated as far as possible to minimise impacts to the site and surrounding environment	<ul style="list-style-type: none"> <li>• Construction waste must be collected and put into suitable closed bins on a daily basis.</li> <li>• Provide waste skips on site. These skips should be sufficient in number, the skip storage area should be kept clean, skips should be emptied and replaced before overflowing or spillage occurs. Skips should be covered to prevent waste blowing away.</li> <li>• Construction rubble must be disposed of at a registered landfill site.</li> <li>• Avoidance, reduction, and reuse should be practiced wherever possible – see waste management plan.</li> <li>• Records of waste manifest documents must be retained at the administration office.</li> </ul>	Daily	Contractor to implement actions ECO to monitor
Liquid waste including sewage may cause soil pollution if not managed and disposed of correctly.	Site camp Storage of waste Construction activities Waste water Ablution facilities	Ensure that all possible causes of soil pollution are mitigated as far as possible to minimise impacts to the site and surrounding environment	<ul style="list-style-type: none"> <li>• Management of Ablution Facilities: <ul style="list-style-type: none"> <li>○ Chemical toilets will be placed on site for the duration of the construction phase;</li> <li>○ Ablution facilities (chemical toilets) are to be provided by the Contractor, at a ratio of 1:10;</li> <li>○ Ablution facilities (chemical toilets) must be erected within 100m from all workplaces but within the development footprint;</li> <li>○ Toilets are to be secured to the ground and must have a closing mechanism;</li> </ul> </li> </ul>	Daily	Contractor to implement actions ECO to monitor



Potential Impact	Project Activities	Management Objective	Proposed Mitigation Measures/Management Actions	Frequency	Institutional Responsibility
			<ul style="list-style-type: none"> <li>○ Toilet paper must be provided at these facilities and must be serviced once per week;</li> <li>○ Certified contractors to maintain and empty chemical toilets regularly;</li> <li>○ Safe disposal certificates to be kept in the site file;</li> <li>○ The contractor must ensure that spillage does not occur when toilets are cleaned/serviced, and contents must be properly stored and disposed of properly;</li> <li>○ Discharge of waste into the environment and/or burial of waste are strictly prohibited;</li> <li>○ Sanitary arrangements must be to the satisfaction of the PM, ECO, the local authorities and the applicable legal requirements.</li> </ul> <ul style="list-style-type: none"> <li>● Management of waste water: <ul style="list-style-type: none"> <li>○ The contractor is to ensure that clean run-off water is diverted away from potentially contaminated areas of the construction site;</li> <li>○ Contaminated liquids and soil from the site must be disposed of at a permitted disposal site;</li> <li>○ Safe disposal certificates to be kept in the site file.</li> </ul> </li> </ul>		

Potential Impact	Project Activities	Management Objective	Proposed Mitigation Measures/Management Actions	Frequency	Institutional Responsibility
<b>RESOURCE CONSUMPTION</b>					
Electricity consumption	General site activities	Electricity reduction mechanisms to be implemented.	<ul style="list-style-type: none"> <li>Enforce electricity reduction strategies;</li> <li>Environmental awareness training.</li> </ul>	Ongoing	Contractor to implement actions ECO to monitor
Water consumption	General site activities	Water conservation mechanisms to be implemented.	<ul style="list-style-type: none"> <li>Enforce water saving strategies including design of recycling and reuse, rainwater harvesting etc.;</li> <li>Environmental awareness training.</li> </ul>	Ongoing	Contractor to implement actions ECO to monitor
Fuel consumption	Fuelling of plant, vehicles and generators	Fuel conservation mechanisms to be implemented.	<ul style="list-style-type: none"> <li>Record and monitor fuel consumption regularly;</li> <li>Reduce theft of fuel (increase security).</li> </ul>	Ongoing	Contractor to implement actions ECO to monitor
Raw materials consumption	General construction activities requiring raw materials	Raw materials conservation mechanisms to be implemented.	<ul style="list-style-type: none"> <li>Promote effective use of raw materials;</li> <li>Recycling will be implemented on applicable waste streams.</li> </ul>	Ongoing	Contractor to implement actions ECO to monitor

Potential Impact	Project Activities	Management Objective	Proposed Mitigation Measures/Management Actions	Frequency	Institutional Responsibility
<b>EFFECTS ON BIODIVERSITY</b>					
Loss of vegetation and open space management habitat.	Site clearing Construction activities.	No loss of habitat outside the approved footprint.	<ul style="list-style-type: none"> <li>• Proper management of site establishment:                             <ul style="list-style-type: none"> <li>○ Locate construction camp in area where sensitive environmental features will not be impacted on. The location should be approved by the ECO, Project Manager and EO.</li> <li>○ Construction camp should be fenced, and access control should be exercised.</li> <li>○ The extent of the site should by all means be limited, to avoid any additional clearance of vegetation.</li> </ul> </li> <li>• Proper management of site clearing:                             <ul style="list-style-type: none"> <li>○ Restrict site clearing activities to construction area /domain.</li> <li>○ Clearing of vegetation to be conducted in a phased manner (where possible).</li> </ul> </li> <li>• The natural areas surrounding the Project area should be declared 'no-go' area's during the construction and operational phases and all efforts must be made to prevent access to these areas from construction workers, machinery and the general public;</li> <li>• All laydown, storage areas etc should be restricted to within the Project area and all access roads must be kept within this area or from existing access roads.</li> </ul>	Ongoing	Contractor to implement actions ECO to monitor

Potential Impact	Project Activities	Management Objective	Proposed Mitigation Measures/Management Actions	Frequency	Institutional Responsibility
			<ul style="list-style-type: none"> <li>A qualified environmental control officer must be on site when construction begins to identify species that will be directly disturbed and to relocate fauna/flora that is found during construction (including all reptiles and amphibians).</li> <li>Areas that are denuded during construction need to be re-vegetated with indigenous vegetation to prevent erosion during flood events. This will also reduce the likelihood of encroachment by alien invasive plant species.</li> <li>A condition of the Environmental Authorisation issued by the Department of Environmental Affairs to the Coega Development Corporation for the removal of vegetation within the Coega IDZ area indicate that an Alien Invasive Species monitoring and control plan must be implemented. The CDC has such a plan, called “Invasive species monitoring, control and eradication plan for the Coega SEZ”, dated 9 February 2017. This plan must be implemented on site and along the pipeline reserve.</li> </ul>		
Increased risk of alien plant invasion.	Construction activities Earthworks Site Camp	To ensure alien plants are eradicated and controlled, to prevent invasion.	<ul style="list-style-type: none"> <li>Areas that are denuded during construction need to be re-vegetated with indigenous vegetation to prevent erosion during flood events. This will also reduce the likelihood of encroachment by alien invasive plant species;</li> <li>A condition of the Environmental Authorisation issued by the Department of Environmental Affairs to the Coega Development Corporation for the removal of vegetation</li> </ul>	Ongoing	Contractor to implement actions ECO to monitor.

Potential Impact	Project Activities	Management Objective	Proposed Mitigation Measures/Management Actions	Frequency	Institutional Responsibility
			within the Coega IDZ area indicate that an Alien Invasive Species monitoring and control plan must be implemented. The CDC has such a plan, called “Invasive species monitoring, control and eradication plan for the Coega SEZ”, dated 9 February 2017. This plan must be implemented on site and along the pipeline reserve.		
Loss of faunal species community composition and diversity.	Site clearing Construction activities.	Minimal disturbance to fauna occurs during construction.	<ul style="list-style-type: none"> <li>Comply with the requirements of the National Environmental Management: Biodiversity Act (No. 10 of 2004), Natal Nature Conservation Ordinance 15 of 1974 and Animal Protection Act (No. 71 of 1962);</li> <li>All domesticated animals are forbidden within the entire Project area (especially feral cats);</li> <li>The use of “migratory friendly” property borders, such as palisade fencing or wire fencing with large gaps, should be considered along the pipeline, as this will allow for the ongoing survival of most species presently inhabiting the property. This will allow for the free movement of small mobile organisms (such as rodents).</li> </ul>	Ongoing	Contractor to implement actions ECO to monitor
Hunting, trapping and killing of animals.	Site clearing Construction activities.	Minimal disturbance to fauna occurs during construction.	<ul style="list-style-type: none"> <li>If any faunal species are recorded during construction, activities should temporarily cease, and an appropriate specialist should be consulted to identify the correct course of action;</li> </ul>	Ongoing	Contractor to implement actions ECO to monitor

Potential Impact	Project Activities	Management Objective	Proposed Mitigation Measures/Management Actions	Frequency	Institutional Responsibility
			<ul style="list-style-type: none"> <li>• Environmental awareness training should be provided to contractors regarding disturbance to animals. Particular emphasis should be placed on talks regarding snakes;</li> <li>• No poaching or killing of animals to be allowed whatsoever;</li> <li>• No wilful harm to any animals, unless a direct threat is posed to a worker's health or safety;</li> <li>• Animals residing within the designated area shall not be unnecessarily disturbed;</li> <li>• Before construction starts, construction workers must be educated with regards to littering and poaching;</li> <li>• No trapping or snaring of wild animals if any. Nesting sites should not be disturbed;</li> <li>• If the development is approved, construction contractors, sub-contractors and operators must ensure that no fauna taxa are unduly disturbed, trapped, hunted or killed;</li> <li>• All workers will undergo environmental awareness training to address potential human and wildlife interaction and the permissible reactions to this interaction;</li> <li>• Environmental awareness training should include this aspect.</li> </ul>		
Increased animal road mortality.	Construction activities Construction vehicles.	Ensure no accidental deaths of fauna on the roads.	<ul style="list-style-type: none"> <li>• Speed limits to be adhered to.</li> <li>• Environmental awareness training to all visitors to the site, especially drivers to include this aspect.</li> </ul>	Ongoing	Contractor to implement actions ECO to monitor

Potential Impact	Project Activities	Management Objective	Proposed Mitigation Measures/Management Actions	Frequency	Institutional Responsibility
Changes to migration corridors.	Construction activities	Ensure that minimal disturbance of ecological systems and natural corridors takes place during construction.	<ul style="list-style-type: none"> <li>The use of “migratory friendly” property borders, such as palisade fencing or wire fencing with large gaps, should be considered along the pipeline, as this will allow for the ongoing survival of most species presently inhabiting the property. This will allow for the free movement of small mobile organisms (such as rodents).</li> </ul>	Ongoing	Contractor to implement actions ECO to monitor
<b>INCIDENTS, ACCIDENTS, AND POTENTIAL EMERGENCY SITUATIONS</b>					
Pollution incidents	Workshop Site Camp Storage of Hazardous material Use of plant and vehicles	Minimise potential pollution incidents due to construction.	<ul style="list-style-type: none"> <li>Proper emergency response procedure to be in place for dealing with spill or leaks at the construction site;</li> <li>Ensure that the necessary materials and equipment for dealing with spills and leaks are available on site, where practicable;</li> <li>Remediation of the spill areas will be undertaken to the satisfaction of the Project Manager;</li> <li>In the event of a hydrocarbon spill, the source of the spillage will be isolated and contained. The area will be cordoned off and secured;</li> <li>The Contractor will ensure that there is always a supply of an appropriate absorbent material readily available to</li> </ul>	Daily	Contractor to implement actions ECO to monitor

Potential Impact	Project Activities	Management Objective	Proposed Mitigation Measures/Management Actions	Frequency	Institutional Responsibility
			<p>absorb, breakdown and where possible, encapsulate a minor hydrocarbon spillage;</p> <ul style="list-style-type: none"> <li>All staff on site will be made aware of actions to be taken in case of a spillage;</li> <li>Provide contact details of person to be notified in a case of spillages – signage to be displayed at strategic points within the construction domain (e.g. workshop, fuel storage area, hazardous material containers).</li> </ul>		
Health and safety incidents e.g. injury to workers or visitors to the site.	General construction activities	A safe working environment for contractors/construction workers and the public is provided.	<ul style="list-style-type: none"> <li>Appoint Safety Agent;</li> <li>Contractor to submit a Health and Safety Plan, prepared in accordance with the Health and Safety Specification, for approval prior to the commencement of work;</li> <li>All construction personal must be clearly identifiable. All employees must also be issued with employee cards for identification purposes;</li> <li>All workers will be supplied with the required Personal Protective Equipment as per the Occupational Health and Safety Act (Act No. 85 of 1993);</li> <li>Fencing and barriers will be in place in accordance with the Occupational Health and Safety Act (Act No. 85 of 1993);</li> <li>Applicable notice boards and hazard warning notices will be put in place and secured. Night hazards will be indicated suitably (e.g. reflectors, lighting, traffic signage);</li> </ul>	Appointment and Plan – once off at start, other actions, ongoing	Contractor to implement actions ECO to monitor



Potential Impact	Project Activities	Management Objective	Proposed Mitigation Measures/Management Actions	Frequency	Institutional Responsibility
			<ul style="list-style-type: none"> <li>• Maintain access control to prevent access of the public to the construction areas, as far as practicable;</li> <li>• 24-hour security and access control;</li> <li>• Health and Safety awareness training;</li> <li>• A Dedicated Occupational Health and Safety system to be implemented by Contractor's Safety Officer. To be monitored and audited by the Client's Safety Agent, in terms of the Construction Regulations (2003).</li> </ul>		
Spillage and accidents and injury caused by the inappropriate storage of hydrocarbons and other hazardous material.	Storage of fuel Site Camp Workshop areas	Effective and safe storage of hydrocarbons on site, in order to minimise the impact of hydrocarbons on the environment	<ul style="list-style-type: none"> <li>• Proper storage of hydrocarbons                             <ul style="list-style-type: none"> <li>○ Storage requirements to be determined based on chemical qualities of material and Safety Data Sheets (SDS). As a minimum, hazardous chemical substances (HCS) must be stored at a designated area that meets the following requirements:                                     <ul style="list-style-type: none"> <li>▪ Earthed;</li> <li>▪ Fire extinguisher must be present;</li> <li>▪ Relevant signage to be displayed including No Smoking/ No open flames; Hazardous Chemical Substance Store; Type of HCS (e.g. Diesel); Maximum contents volume and Fire extinguisher;</li> </ul> </li> </ul> </li> <li>• Storage areas should be located 100m from the edge of wetlands;</li> </ul>	Ongoing	Contractor to implement actions ECO to monitor

Potential Impact	Project Activities	Management Objective	Proposed Mitigation Measures/Management Actions	Frequency	Institutional Responsibility
			<ul style="list-style-type: none"> <li>• Hazardous substances must be stored and handled in accordance with the appropriate legislation and standards, which include the Hazardous Substances Act (Act No. 15 of 1973), the Occupational Health and Safety Act (No. 85 of 1993), relevant associated Regulations, and applicable SANS and international standards;</li> <li>• Any hazardous materials (apart from fuel) must be stored within a lockable store with a sealed floor. Suitable ventilation to be provided;</li> <li>• All storage tanks containing hazardous materials must be placed in bunded containment areas with impermeable surfaces. The bunded area must be able to contain 110% of the total volume of the stored hazardous material.</li> <li>• Spillages:               <ul style="list-style-type: none"> <li>○ In the event of spillages of hazardous substances, the appropriate clean up and disposal measures are to be implemented;</li> <li>○ The contractor must ensure that necessary materials and equipment are available on site to deal with spills of any hazardous materials present;</li> <li>○ The ECO and Project Manager must be notified of all significant spillages.</li> </ul> </li> </ul>		

Potential Impact	Project Activities	Management Objective	Proposed Mitigation Measures/Management Actions	Frequency	Institutional Responsibility
Fire and or explosions and resultant injury, death and damage to property.	Storage of fuel Site Camp Workshop areas General Construction Activities	Minimise potential fire incidents during construction.	<ul style="list-style-type: none"> <li>• Appropriate emergency response to be in place for dealing with fire at the construction site;</li> <li>• All fire control mechanisms (firefighting equipment) will be routinely inspected by a qualified investigator for efficacy thereof and be approved by local fire services;</li> <li>• All staff on site will be made aware of general fire prevention and control methods, and the name of the responsible person to alert to the presence of a fire;</li> <li>• Burning of waste is not permitted;</li> <li>• Suitable precautions will be taken (e.g. suitable fire extinguishers, water bowsers, welding curtains) when working with welding or grinding equipment;</li> <li>• Designated smoking areas should be provided, with special bins for discarding of cigarette butts;</li> <li>• All recommendations of the NEMA Risk Assessment, to be implemented.</li> <li>• All recommendations of the MHI Risk Assessment to be implemented.</li> </ul>	Ongoing	Contractor to implement actions ECO to monitor Resident engineer to monitor installation of infrastructure
<b>SOCIAL</b>					
Visual impact through site clearing and construction camp and activities.	General Construction activities Site camp	Proper management of construction activities to minimise disturbance to visual environment.	<ul style="list-style-type: none"> <li>• Suitable screening to be put in place during construction to minimise visual impacts;</li> <li>• No littering to be allowed;</li> <li>• Good housekeeping practices to be followed.</li> </ul>	Ongoing	Contractor to implement actions ECO to monitor

Potential Impact	Project Activities	Management Objective	Proposed Mitigation Measures/Management Actions	Frequency	Institutional Responsibility
Safety and security: Potential influx of work seekers. Unauthorised access.	General construction activities	Proper management of labour force is undertaken to ensure that there are no security-related issues or disturbance to tenants or landowners outside the construction footprint.	<ul style="list-style-type: none"> <li>24-hour access control to the site and 24-hour security.</li> <li>Workers found to be engaging in activities such as excessive consumption of alcohol, drug use or selling of any such items on site must be disciplined.</li> </ul>	Ongoing	Contractor to implement actions ECO to monitor
Traffic disruptions	General construction activities	Minimal disturbances to traffic due to construction activities.	<ul style="list-style-type: none"> <li>Traffic warning and calming measures will be put in place when construction activities may impact on traffic flow;</li> <li>Integration with other planned construction activities must be implemented, communication channels to be kept open between developers, contractors and the CDC.</li> </ul>	Ongoing	Contractor to implement actions ECO to monitor
Impact on road safety due to heavy vehicles during construction.	Construction vehicles	No accidents or incidents occurring on roads.	<ul style="list-style-type: none"> <li>Traffic warning and calming measures will be put in place when construction activities may impact on traffic flow;</li> <li>A speed limits to be clearly marked and adhered to on and around the study area. Environmental awareness training to all workers and visitors to the site, especially drivers to include this aspect.</li> </ul>	Ongoing	Contractor to implement actions ECO to monitor
Impact on road infrastructure due to	Construction vehicles	Minimal disturbances to road infrastructure.	<ul style="list-style-type: none"> <li>Detailed planning to be implemented to avoid unnecessary trips;</li> </ul>	Ongoing	Contractor to implement actions

Potential Impact	Project Activities	Management Objective	Proposed Mitigation Measures/Management Actions	Frequency	Institutional Responsibility
heavy vehicles during construction.			<ul style="list-style-type: none"> <li>• In terms of transportation of workers and materials, collective transportation arrangements should be made to reduce individual car journeys where possible;</li> <li>• All construction vehicles to be maintained.</li> </ul>		ECO to monitor
Potential loss of archaeological heritage.	General Construction activities Site clearing	No adverse impact on the historical and cultural inheritance of the area.	<ul style="list-style-type: none"> <li>• No heritage resources were identified on site.                             <ul style="list-style-type: none"> <li>○ Chance find procedure:                                     <ul style="list-style-type: none"> <li>▪ If during the construction phase of this project, any person employed by the developer, one of its subsidiaries, contractors and subcontractors, or service provider, finds any artefact of cultural significance or heritage site, this person must cease work at the site of the find and report this find to their immediate supervisor, and through their supervisor to the senior on-site manager;</li> <li>▪ It is the responsibility of the senior on-site Manager to make an initial assessment of the extent of the find and confirm the extent of the work stoppage in that area.</li> <li>▪ The senior on-site Manager will inform the ECO of the chance find and its immediate impact on operations. The ECO will then contact a professional archaeologist for an</li> </ul> </li> </ul> </li> </ul>	Ongoing	Contractor to implement actions ECO to monitor

Potential Impact	Project Activities	Management Objective	Proposed Mitigation Measures/Management Actions	Frequency	Institutional Responsibility
			assessment of the finds who will notify the SAHRA and ECPHRA.		
Potential loss of palaeontological heritage.			<ul style="list-style-type: none"> <li>• No heritage resources were identified on site. <ul style="list-style-type: none"> <li>○ Chance find procedure: <ul style="list-style-type: none"> <li>▪ If during the construction phase of this project, any person employed by the developer, one of its subsidiaries, contractors and subcontractors, or service provider, finds any sign of palaeontological significance, this person must cease work at the site of the find and report this find to their immediate supervisor, and through their supervisor to the senior on-site manager;</li> <li>▪ It is the responsibility of the senior on-site Manager to make an initial assessment of the extent of the find and confirm the extent of the work stoppage in that area.</li> </ul> </li> </ul> </li> <li>• The senior on-site Manager will inform the ECO of the chance find and its immediate impact on operations. The ECO will then contact a professional archaeologist for an assessment of the finds who will notify the SAHRA and ECPHRA.</li> </ul>		

Potential Impact	Project Activities	Management Objective	Proposed Mitigation Measures/Management Actions	Frequency	Institutional Responsibility
Loss of rural/cultural sense of place	General Construction activities Site camp	Proper management of construction activities to minimise disturbance to sense of place.	<ul style="list-style-type: none"> <li>The development should be designed in line with future planning documents, CDC's architectural guidelines and existing and planned surrounding land uses.</li> </ul>	Ongoing	Contractor to implement actions ECO to monitor
<b>ECONOMIC</b>					
Decline/increase in economy	Supplier and contractor selection	Preferential use of local contractors and suppliers.	<ul style="list-style-type: none"> <li>Local contractors and suppliers to be used during the construction phase as far as possible.</li> </ul>	Ongoing	Contractor to implement actions ECO to monitor
Employment	Employment of construction workers	Proper management of labour force is undertaken to ensure that there is optimal use of local labourers and local contractors.	<ul style="list-style-type: none"> <li>Wherever possible labour, materials and services must be sourced locally.</li> </ul>	Ongoing	Contractor to implement actions ECO to monitor

Potential Impact	Project Activities	Management Objective	Proposed Mitigation Measures/Management Actions	Frequency	Institutional Responsibility
<b>REHABILITATION AND LANDSCAPING</b>					
General	Rehabilitation and landscaping activities	Adequate reinstatement and rehabilitation of construction areas	<ul style="list-style-type: none"> <li>• In line with the requirements the National Environmental Management: Biodiversity Act (Alien and Invasive Species Regulations, 2014), the following must be undertaken:                             <ul style="list-style-type: none"> <li>○ Eradicate all Listed Invasive Species (Category 1a), if present;</li> <li>○ Control all Listed Invasive Species (Category 1b), if present;</li> <li>○ Apply for a permit for all Listed Invasive Species (Category 2), if present;</li> <li>○ Apply for exemption for all Listed Invasive Species (Category 3), if present.</li> </ul> </li> <li>• After the construction phase, the area to be reinstated to the same or better condition than it was prior to construction.</li> <li>• Clear and completely remove from site all construction plant, equipment, storage containers, temporary fencing, temporary services, and fixtures</li> <li>• Ensure that all access roads utilised during construction are returned to a usable state and/or a state no worse than prior to construction.</li> <li>• Inert waste and rubble                             <ul style="list-style-type: none"> <li>○ Clear the site of all inert waste and rubble, including surplus rock, foundations and batching</li> </ul> </li> </ul>	Ongoing	Contractor to implement actions ECO to monitor



Potential Impact	Project Activities	Management Objective	Proposed Mitigation Measures/Management Actions	Frequency	Institutional Responsibility
			<p>plant aggregates. After the material has been removed, the site shall be re-instated and rehabilitated.</p> <ul style="list-style-type: none"> <li>○ Remove from site all domestic waste and dispose of in the approved manner at a registered waste disposal site, or with a registered service provider.</li> <li>● Hazardous waste and pollution control <ul style="list-style-type: none"> <li>○ Remove from site all pollution containment structures.</li> <li>○ Remove from site all temporary sanitary infrastructure and waste water disposal systems.</li> <li>○ Take care to avoid leaks, overflows and spills and dispose of any waste in the approved manner</li> </ul> </li> <li>● Control of Invasive Plant species: <ul style="list-style-type: none"> <li>○ Control invasive plant species and noxious weeds by means of extraction, cutting or other approved methods.</li> <li>○ Encroachment of alien vegetation should be monitored regularly and controlled; the area must be kept clear of all invader plants as per the Conservation of Agricultural Resources Act, 1983 (Act No 43 of 1983). Rehabilitation measures must be employed until such a time as indigenous species is established.</li> </ul> </li> </ul>		

Potential Impact	Project Activities	Management Objective	Proposed Mitigation Measures/Management Actions	Frequency	Institutional Responsibility
			<ul style="list-style-type: none"> <li>○ As much vegetation growth as possible should be promoted within the proposed replacement in order to protect soils and to reduce the percentage of the surface area which is left as bare ground. In this regard special mention is made of the need to use indigenous vegetation species as the first choice during landscaping</li> <li>● Landscaping               <ul style="list-style-type: none"> <li>○ Make safe all excavations outside of the construction area by backfilling and grading, as required.</li> <li>○ In general, no slopes steeper than 1(V):3(H) are permitted in cut-and-fill areas, unless otherwise specified by the landscaping plan.</li> <li>○ Programme the backfill of excavations so that subsoil is deposited first, followed by the topsoil.</li> <li>○ Monitor backfilled areas for subsidence (as the backfill settles) and fill depressions using available material.</li> <li>○ Shape the area surrounding the development to blend in with the surrounding landscape, where possible. Landscaping shall be done through the use of indigenous plant species, following water conscious design principles.</li> </ul> </li> </ul>		

Potential Impact	Project Activities	Management Objective	Proposed Mitigation Measures/Management Actions	Frequency	Institutional Responsibility
			<ul style="list-style-type: none"> <li>○ Ensure that no excavated material or stockpiles are left on site and that all material remaining after backfilling is landscaped to blend in with the surrounding landscape.</li> <li>● Topsoil replacement and soil amelioration               <ul style="list-style-type: none"> <li>○ Execute top soiling activity prior to the rainy season or any expected wet weather conditions.</li> <li>○ Execute topsoil placement only after all construction work has ceased.</li> <li>○ Replace and redistribute stockpiled topsoil together with herbaceous vegetation, overlying grass and other fine organic matter in all disturbed areas of the construction site, including temporary access routes. Replace topsoil to the original depth.</li> <li>○ Place topsoil in the same area from where it was stripped. If there is insufficient topsoil available from a particular soil zone to produce the minimum specified depth, topsoil of similar quality may be brought from other areas of similar quality.</li> <li>○ The suitability of substitute material will be determined by means of a soil analysis addressing soil fraction, fertility, pH and drainage.</li> </ul> </li> </ul>		

Potential Impact	Project Activities	Management Objective	Proposed Mitigation Measures/Management Actions	Frequency	Institutional Responsibility
			<ul style="list-style-type: none"> <li>○ Do not use topsoil suspected to be contaminated with the seed of alien vegetation. Alternatively, the soil is to be appropriately treated.</li> <li>○ Ensure that storm water run-off is not channelled alongside the gentle mounding, but that it is taken diagonally across it.</li> <li>○ Shape remaining stockpiled topsoil not utilised elsewhere in an acceptable manner so as to blend in with the local surrounding area.</li> <li>○ After topsoil placement is complete, spread available stripped vegetation randomly by hand over the top-soiled area</li> <li>● Ripping and scarifying               <ul style="list-style-type: none"> <li>○ Rip and/or scarify all areas following the application of topsoil to facilitate mixing of the upper most layers. Whether ripping and/or scarifying is necessary will be determined based on the site conditions immediately before these works begin.</li> <li>○ Rip and/or scarify all disturbed areas (and other specified)</li> </ul> </li> </ul>		

