GAS TO POWER PLANT ON A SITE WITHIN THE RICHARDS BAY INDUSTRIAL DEVELOPMENT ZONE, KWAZULU-NATAL PROVINCE

ENVIRONMENTAL MANAGEMENT PROGRAMME (EMPr)

DEA REF NO.: 14/12/16/3/3/2/867
Submitted as part of the EIA Report
May 2016

Prepared for

Richards Bay Gas Power 2 (Pty) Ltd
3 Pencarrow Crescent,
La Lucia Ridge Office Estate,
La Lucia,
4051

Prepared by

Savannah Environmental (Pty) Ltd

PO BOX 148, SUNNINGHILL, 2157
TEL: +27 (0)11 656 3237
FAX: +27 (0)86 684 0547
E-MAIL: INFO@SAVANNAHSA.COM

Savannah
ENVIRONMENTAL (PTY) LTD

PROJECT DETAILS

DEA Reference No.	:	14/12/16/3/3/2/867
Title	:	Environmental Impact Assessment Process Environmental Management Programme for the Gas to Power Plant on a Site within the Richards Bay Industrial Development Zone, KwaZulu-Natal Province
Authors	:	Savannah Environmental (Pty) Ltd Dilona Somai Jo-Anne Thomas
Specialists	:	uMoya-Nilu Eco-Pulse Candice Hunter (Savannah Environmental)
Client	:	Richards Bay Gas Power 2 (Pty) Ltd
Report Status	:	EMPr submitted as part of the Environmental Impact Assessment Report
Revision	:	0

When used as a reference this report should be cited as: Savannah Environmental (2016) Environmental Management Programme for the Gas to Power Plant on a Site within the Richards Bay Industrial Development Zone, KwaZulu-Natal Province

DEFINITIONS AND TERMINOLOGY

Alternatives: Alternatives are different means of meeting the general purpose and need of a proposed activity. Alternatives may include location or site alternatives, activity alternatives, process or technology alternatives, temporal alternatives or the 'do nothing' alternative.

Ambient sound level: The reading on an integrating impulse sound level meter taken at a measuring point in the absence of any alleged disturbing noise at the end of a total period of at least 10 minutes after such meter was put into operation.

Baseload Electricity: Energy output produced or capable of being produced at a constant or near constant rate by power stations that have high load factors.

Capacity factor: refers to the expected output of the plant over a specific time period as a ratio of the output if the plant operated at full rated capacity for the same time period.

Cumulative impacts: In relation to an activity, means the past, current and reasonably foreseeable future impact of an activity, considered together with the impact of activities associated with that activity, that in itself may not be significant, but may become significant when added to existing and reasonably foreseeable impacts eventuating from similar or diverse activities. The role of the cumulative assessment is to test if such impacts are relevant to the proposed project in the proposed location (i.e. whether the addition of the proposed project in the area will increase the impact). This section should address whether the construction of the proposed development will result in: (i) Unacceptable risk, (ii) Unacceptable loss, (iii) Complete or whole-scale changes to the environment or sense of place, and (iv) Unacceptable increase in impact.

Direct impacts: Impacts that are caused directly by the activity and generally occur at the same time and at the place of the activity (e.g. noise generated by blasting operations on the site of the activity). These impacts are usually associated with the construction, operation or maintenance of an activity and are generally obvious and quantifiable

Disturbing noise: A noise level that exceeds the ambient sound level measured continuously at the same measuring point by 7 dB or more.

'Do nothing' alternative: The 'do nothing' alternative is the option of not undertaking the proposed activity or any of its alternatives. The 'do nothing' alternative also provides the baseline against which the impacts of other alternatives should be compared.

Emergency plan: An emergency plan is a plan in writing that, on the basis of identified potential incidents at the installation together with their consequences, describes how such incidents and their consequences should be dealt with, both on site and off site.

Endangered species: Taxa in danger of extinction and whose survival is unlikely if the causal factors continue operating. Included here are taxa whose numbers of individuals have been reduced to a critical level or whose habitats have been so drastically reduced that they are deemed to be in immediate danger of extinction.

Endemic: An "endemic" is a species that grows in a particular area (is endemic to that region) and has a restricted distribution. It is only found in a particular place. Whether something is endemic or not depends on the geographical boundaries of the area in question and the area can be defined at different scales.

Environment: the surroundings within which humans exist and that are made up of:

i. the land, water and atmosphere of the earth;
ii. micro-organisms, plant and animal life;
iii. any part or combination of (i) and (ii) and the interrelationships among and between them; and
iv. the physical, chemical, aesthetic and cultural properties and conditions of the foregoing that influence human health and well-being.

Environmental Impact: An action or series of actions that have an effect on the environment.

Environmental impact assessment: Environmental Impact Assessment (EIA), as defined in the NEMA EIA Regulations and in relation to an application to which scoping must be applied, means the process of collecting, organising, analysing, interpreting and communicating information that is relevant to the consideration of that application.

Environmental management: Ensuring that environmental concerns are included in all stages of development, so that development is sustainable and does not exceed the carrying capacity of the environment.

Environmental management programme: A plan that organises and co-ordinates mitigation, rehabilitation and monitoring measures in order to guide the planning and implementation of a proposal and its ongoing maintenance and operation after implementation.

Flammable limits: Flammable limits are a range of gas or vapour amounts in the air that will burn or explode if a flame or other ignition source is present. The lower point of the range is called the Lower Flammable Limit. Likewise, the upper point of the range is called the Upper Flammable Limit.

General Waste: as defined in the NEM: Waste Amendment Act, 2014 (Act No. 26 of 2014)
Waste that does not pose an immediate hazard or threat to health or to the environment, and includes:
(a) domestic waste;
(b) building and demolition waste;
(c) business waste;
(d) inert waste; or
(e) any waste classified as non-hazardous waste in terms of the regulations made under section 69, and includes non-hazardous substances, materials or objects within the business, domestic, inert or building and demolition wastes

Greenhouse gases: These are gases which are emitted that trap energy radiated from the sun in Earth's atmosphere in turn producing the greenhouse (or warming) effect. Greenhouse gases include water vapour, carbon dioxide and methane.

Hazardous waste: as defined in the NEM: Waste Amendment Act, 2014 (Act No. 26 of 2014)
Any waste that contains organic or inorganic elements or compounds that may, owing to the inherent physical, chemical or toxicological characteristics of that waste, have a detrimental impact on health and the environment and includes hazardous substances, materials or objects within the business waste, residue deposits and residue stockpiles.

Indigenous: All biological organisms that occurred naturally within the study area prior to 1800.

Indirect impacts: Indirect or induced changes that may occur as a result of the activity (e.g. the reduction of water in a stream that supply water to a reservoir that supply water to the activity). These types of impacts include all the potential impacts that do not manifest immediately when the activity is undertaken or which occur at a different place as a result of the activity.

Interested and Affected Party: Individuals or groups concerned with or affected by an activity and its consequences. These include the authorities, local communities, investors, work force, consumers, environmental interest groups and the general public.

Integrated Resource Plan: Refers to the co-ordinated schedule for generation expansion and demand-side intervention programmes, taking into consideration multiple criteria to meet electricity demand.

Integrated Energy Plan: Refers to the over-arching co-ordinated energy plan combining the constraints and capabilities of alternative energy carriers to meet the country's energy needs.

Liquefied Natural Gas: Liquefied Natural Gas (LNG) is a super-cooled (cryogenic) liquid cooled between -120 and -170°C (usually around -162°C). The volume is 1/610th of natural gas

Mid-Merit Electricity: The energy output produced by generating units that load follow and provide most or all of their energy output at times when energy demand increases and which either turn off or cycle to a low minimum run level at other times so they can match the diurnal demand patterns.

Natural Gas Liquid: A group of hydrocarbons including ethane, propane, normal butane, iso-butane, and pentanes plus. It generally includes natural gas plant liquids, and all liquefied refinery gases, except olefins.

Perennial and non-perennial: Perennial systems contain flow or standing water for all or a large proportion of any given year, while non-perennial systems are episodic or ephemeral and thus contains flows for short periods, such as a few hours or days in the case of drainage lines.

Rare species: Taxa with small world populations that are not at present Endangered or Vulnerable, but are at risk as some unexpected threat could easily cause a critical decline. These taxa are usually localised within restricted geographical areas or habitats or are thinly scattered over a more extensive range. This category was termed Critically Rare by Hall and Veldhuis (1985) to distinguish it from the more generally used word "rare".

Red data species: Species listed in terms of the International Union for Conservation of Nature and Natural Resources (IUCN) Red List of Threatened Species, and/or in terms of the South African Red Data list. In terms of the South African Red Data list, species are classified as being extinct, endangered, vulnerable, rare, indeterminate, insufficiently known or not threatened (see other definitions within this glossary).

Significant impact: An impact that by its magnitude, duration, intensity or probability of occurrence may have a notable effect on one or more aspects of the environment.

Wetland: Land which is transitional between terrestrial and aquatic systems where the water table is usually at or near the surface, or the land is periodically covered with shallow water, and which under normal circumstances supports or would support vegetation typically adapted to life in saturated soil (National Water Act, Act No. 36 of 1998); land where an excess of water is the dominant factor determining the nature of the soil development and the types of plants and animals living at the soil surface (Cowardin et al., 1979).

Water course: as per the National Water Act (Act No. 36 of 1998) means -

(a) a river or spring;
(b) a natural channel in which water flows regularly or intermittently;
(c) a wetland, lake or dam into which, or from which, water flows; and
(d) any collection of water which the Minister may, by notice in the Gazette, declare to be a watercourse, and a reference to a watercourse includes, where relevant, its bed and banks.

Waste: as per the NEM: Waste Amendment Act, 2014 (Act No. 26 of 2014)
(a) any substance, material or object, that is unwanted, rejected, abandoned, discarded or disposed of, by the holder of the substance, material or object, whether or not such substance, material or object can be re-used, recycled or recovered and includes all wastes as defined in Schedule 3 of the Act; or
(b) any substance, material or object that is not included in Schedule 3 that may be defined as a waste by the Minister by notice in the Gazette, but any waste or portion of waste, referred to in paragraph (a) and (b) ceases to be a waste -

(i) once an application for its re-use, recycling or recovery has been approved or, after such approval, once it is, or has been re-used, recycled or recovered;
(ii) where approval is not required, once a waste is or has been re-used, recycled or recovered;
(iii) where the Minister has, in terms of section 74, exempted any waste or a portion of waste generated by a particular process from the definition of waste; or
(iv) where the Minister has, in the prescribed manner, excluded any waste stream or a portion of a waste stream from the definition of waste.

ABBREVIATIONS AND ACRONYMS

CCGT	Combined Cycle Gas Turbines
CO_2	Carbon dioxide
COGTA	Cooperative Governance and Traditional Affairs
DAFF	Department of Forestry and Fishery
DEA	National Department of Environmental Affairs
DEDT	Kwazulu-Natal Department of Economic Development and Tourism
DMR	Department of Minerals Resources
DoE	Department of Energy
DoT	Department of Transport
DWS	Department of Water and Sanitation
EA	Environmental Authorisation
EAP	Environmental Assessment Practitioner
EIA	Environmental Impact Assessment
EMF	Environmental Management Framework
EMPr	Environmental Management Programme
EKZNW	Ezemvelo KwaZulu-Natal Wildlife
FPPs	Floating Power Plants
GHG	Greenhouse Gas
GIS	Geographical Information Systems
GG	Government Gazette
GN	Government Notice
GUMP	Gas Utilisation Master Plan
GW	Giga Watt
Ha	Hectare
HFO	Heavy Fuel Oil
I&AP	Interested and Affected Party
IDP	Integrated Development Plan
IDZ	Industrial Development Zone
IEP	Integrated Energy Planning
IPCC	Intergovernmental Panel on Climate Change
IPP	Independent Power Producer
IRP	Integrated Resource Plan
IUCN	International Union for Conservation of Nature
km	Kilometre
km^2	Square kilometres
km/hr	Kilometres per hour
kV	Kilovolt
KZN	KwaZulu-Natal
KWh	Kilowatt hours

LFO	Light Fuel Oil
LNG	Liquefied Natural Gas
LPG	Liquefied Petroleum Gas
m^2	Square meters
m^3	Cubic metres
m^3/h	Cubic metres per hour
m/s	Meters per second
MW	Mega Watt
NDP	National Development Plan
NEMA	National Environmental Management Act (Act No 107 of 1998)
NEM: AQA	National Environmental Management: Air Quality Act (Act No. 39 of 2004)
NEM: BA	National Environmental Management: Biodiversity Act (Act No. 10 of 2004)
NEM: WA	National Environmental Management: Waste Act (Act No. 59 of 2008)
NERSA	National Energy Regulator of South Africa
NHRA	National Heritage Resources Act (Act No 25 of 1999)
NG	Natural Gas
NGOs	Non-Governmental Organisations
NIRP	National Integrated Resource Planning
NOx	Nitrogen Oxides
NWA	National Water Act (Act No 36 of 1998)
OCGT	Open Cycle Gas Turbine
OECD	Organization for Economic Cooperation and Development
OHSA	Occupational Health and Safety Act (Act No. 85 of 1993)
PGDS	Provincial Growth and Development Strategy
RBIDZ	Richards Bay Industrial Development Zone
RSA	Republic of South Africa
SACNASP	South African Council of Natural Scientific Professions
SAHRA	South African Heritage Resources Agency
SANBI	South African National Biodiversity Institute
SANRAL	South African National Roads Agency Limited
SANAS	South African National Accreditation System
SANS	South African National Standard
SDF	Spatial Development Framework
SHE	Safety, Health and Environmental
SHEQ	Safety, Health, Environment and Quality
SOx	Sulphur Oxides
ULM	uMhlathuze Local Municipality
UDM	uThungulu District Municipality

TABLE OF CONTENTS

LIST OF APPENDICES

PROJECT DETAILS *CHAPTER 1*

Richards Bay Gas Power 2 (Pty) Ltd, an Independent Power Producer (IPP), is proposing the establishment of a gas to power plant and associated infrastructure on erven 17455, 17443 and 17442 located within the Richards Bay Industrial Development Zone (RBIDZ) Phase 1F, within the uMthlathuze Local Municipality in Kwazulu-Natal, South Africa. The proposed plant's net output, at International Standards Organisation (ISO) Reference Conditions, is expected to be up to 400MW, to be developed in two (2) phases to operate with liquid fuel such as diesel and/ or Liquefied Petroleum Gas (LPG) in Phase 1 and ultimately Liquid Natural Gas (LNG) or Natural Gas (NG) in Phase 2 of the development. It is anticipated that 300MW will be fuel/ gas generated energy and 100MW will be heat/ steam generated energy.

This project is to be developed in response to the Department of Energy's (DoE) request for projects to be developed by IPPs in order to provide alternative power generation technologies to meet the energy requirements of 10 000MW of additional electrical capacity by 2025, as identified in the National Development Plan (NDP).

The main infrastructure associated with the facility includes the following:

» Up to six (6) Gas Turbines (this is dependent on the DoE's Gas IPP Programme and the requirements of gas power stations to run at either base-load or mid-merit).
» 1-2 steam turbines utilising the heat from all the engines for power production in a steam cycle.
» The power plant will comprise multiple engine halls, each of ~60MW. Each engine hall will typically comprise one engine. Stacks associated with engine halls will be up to 20m in height.
» Access roads within project locality boundaries.
» Three (3) fuel tanks with a capacity of 2000m^3 each which will be used as an interim fuel storage facility until the gas infrastructure is constructed by the DoE and Transnet. Two (2) fuel unloading stations will be associated with these tanks.
» Water storage facilities for process water and fire-fighting purposes.
» An HV-Yard and Substation, adjacent to the power plant.
» A new 132kV power line to connect into the Municipal grid, connecting directly to the Indus Substation bordering the site.
» Guard house, admin building, workshops and a warehouse.

Water volumes of between 50 000m^3 and 270 000m^3 [1]per annum are expected to be required for the project. The volume of water required will be supplied via the Richards Bay IDZ water supply network that has an allotment from the local water authority.

[1] Exact water requirements are unconfirmed at this stage and are therefore best estimates. Once the final technology has been selected, water volumes will be confirmed.

Every effort is being made to reduce these volumes further, including the potential for recycling condensation from air cooled condensers if such equipment will form part of the final plant design. The Richards Bay IDZ has undertaken to provide the water to the site under its long-term lease agreement with Richards Bay Gas to Power 2 (Pty) Ltd. The Richards Bay IDZ have provided Richards Bay Gas to Power 2 (Pty) Ltd with a letter of confirmation that the volumes required would be supplied (refer to **Appendix A**).

The locality of the gas to power plant within the RBIDZ is shown at **Figure 1.1** (also refer to **Appendix B**).

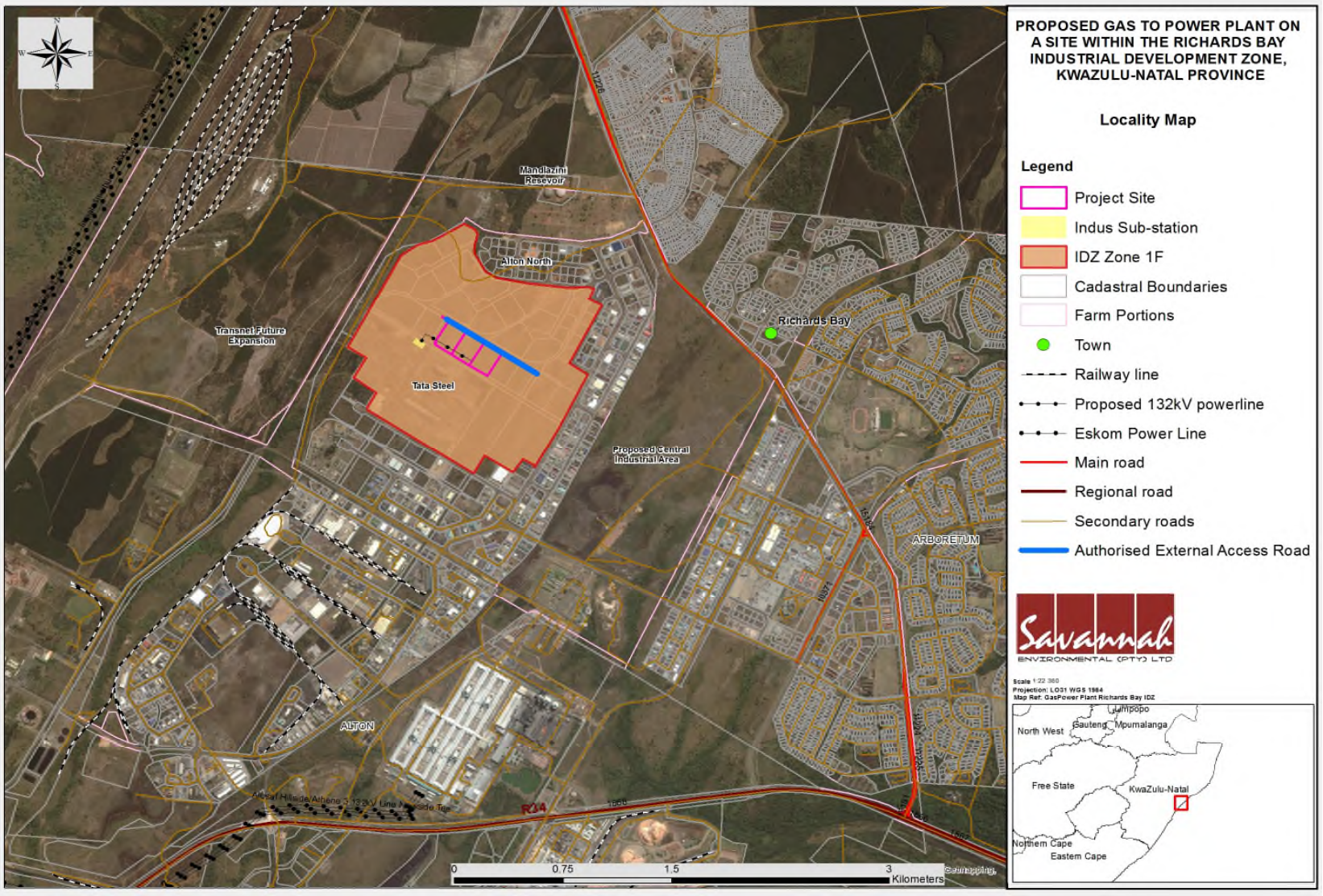


Figure 1.1: Locality Map (Refer to **Appendix B** for A3 Maps)

1.1 Activities Associated with the Gas to Power Plant

The main anticipated activities/components associated with the gas to power plant comprise the following:

Table 1.1: Activities anticipated Associated with Planning, Construction, Operation and Decommissioning of the Facility

Main Activity/Project Component	Components of Activity	Details
	Planning	
Conduct surveys	» Geotechnical survey by geotechnical engineer. » Site survey and confirmation of the substation footprint. » Survey of substation site and power line servitude. » Survey of internal access routes. » Environmental walk-through surveys.	» Surveys to be undertaken prior to initiating construction.
	Construction	
Establishment of access roads within the site	» Establish internal access roads: up to 6 m wide permanent roadway within the site for use during construction and operation phase.	» Access roads will be constructed in advance of any large scale components being delivered to site, and will remain in place after completion for future access and possibly access for replacement of parts if necessary, i.e. maintenance activities. » Access to the site will be via an already authorised 40m wide road. » The internal service road alignment is informed by the final layout of the facility (as well as by environmental walkthrough surveys undertaken by ecological specialists).
Undertake site preparation	» Clearance of vegetation at the footprint for infrastructure. » Site establishment of offices/ admin/ workshops with ablution facilities,	» These activities will require the stripping of topsoil, which will need to be stockpiled, backfilled, where necessary, and/or spread on site and where necessary used latter for rehabilitation.

Main Activity/Project Component	Components of Activity	Details
	parking, area for placement of gas turbines, water and fuel tanks, substation and power line, etc. » Excavations for foundations.	
Civil Works / construction of structures	» Concrete works for structures such as foundation, the production unit (which comprises a complete turbine, generator and an auxiliary module), stacks, and air cooler condensers. » Ancillary infrastructure such as guard house, admin building, workshops and a warehouse will be established. » Mechanical work will then follow.	» Civil work for all infrastructure would be required. » As construction is completed in an area, and as all construction equipment is removed from the site, the site will be rehabilitated where practical and reasonable.
Construct Substation and power line	» A 132 kV substation will be required to facilitate grid connection to the Indus Substation. » Substation components. » Security fencing around high-voltage (HV) Yard.	» The substation will be constructed within a high-voltage (HV) yard. » The substation would be constructed in the following simplified sequence: * Step 1: Survey of the site * Step 2: Site clearing and levelling and construction of access road to substation sites * Step 3: Construction of terrace and foundations * Step 4: Assembly, erection and installation of equipment * Step 5: Connection of conductors to equipment * Step 6: Rehabilitation of any disturbed areas and protection of erosion sensitive areas. » The power line would be constructed in the following simplified sequence: * Step 1: Survey of the route * Step 2: Determination of the conductor type * Step 3: Selection of best-suited conductor, towers,

Main Activity/Project Component	Components of Activity	Details
		insulators, foundations * Step 4: Final design of line and placement of towers * Step 5: Vegetation clearance and construction of access roads (where required) * Step 7: Tower pegging * Step 8: Construction of foundations * Step 9: Assembly and erection of towers * Step 10: Stringing of conductors * Step 11: Rehabilitation of disturbed area and protection of erosion sensitive areas * Step 12: Testing, commissioning and maintenance
Commissioning of the facility	» Gas to power plant commissioning.	» Prior to the start-up of the gas to power plant, a series of checks and tests will be carried out, including both static and dynamic tests to make sure the turbines are working within appropriate limits. » Grid interconnection and unit synchronisation will be undertaken to confirm the turbine and unit performance.
Undertake site rehabilitation	» Remove all construction equipment from the site. » Rehabilitation of temporarily disturbed areas where practical and reasonable.	» On full commissioning of the facility, any access points, access roads and laydown areas within the site which are not required during the operation phase will be closed and prepared for rehabilitation.
Operation		
Operation	» Operation of gas turbines within the power plant.	» Once operational, the gas power station will be monitored. Based on information provided by the Proponent, the project will employ up to 100 permanent employment opportunities as well as provide for further shorter term contract work. The operational phase is expected to last between 20-25 years. It is anticipated that there will be full time security, maintenance and control room staff required on site. » Each gas turbine in the facility will be operational, except

Main Activity/Project Component	Components of Activity	Details
		under circumstances of mechanical breakdown, extreme weather conditions or maintenance activities. » Fuel purchased locally will be supplied to the power plant by fuel tankers, by road. At this stage it is anticipated that 52 fuel trucks will deliver fuel on a daily basis if the power plant is to run at base load and 18 fuel trucks daily if the power plant is to run at mid-merit. » Water volumes of between 50 000m^3 and 270 000m^3 [2]per annum are expected to be required for the project.
Maintenance	» Oil and grease – turbines. » Transformer oil – substation. » Waste product disposal.	» The gas turbines will be subject to periodic maintenance and inspection. Periodic oil changes will be required and any waste products (e.g. oil) will be disposed of in accordance with relevant waste management legislation. » The gas turbine infrastructure is expected to have a lifespan of approximately 20 - 25 years, with maintenance.
Decommissioning		
Site preparation, disassembly of production units and associated infrastructure and demolishing of buildings and stacks.	» Confirming the integrity of the access to the site to accommodate required equipment. » Preparation of the site (e.g. lay down areas, construction platform) » Mobilisation of construction equipment	» Equipment associated with this facility would only be decommissioned once it has reached the end of its economic life. This may be longer than the 20-25 year envisaged life. This would include the disassembly of the production units and ancillary infrastructure, demolishing of buildings and stacks, removal of waste from the site and rehabilitation to the desired end-use.

[2] Exact water requirements are unconfirmed at this stage and are therefore best estimates. Once the final technology has been selected, water volumes will be confirmed.

1.2 Findings of the Environmental Impact Assessment

The preceding chapters of this report together with the specialist studies contained within **Appendices F – H** provide a detailed assessment of the environmental impacts on the social and biophysical environment as a result of the proposed project. This chapter concludes the EIA Report by providing a summary of the conclusions of the assessment of the proposed site for the gas to power plant and the associated infrastructure. In so doing, it draws on the information gathered as part of the EIA process and the knowledge gained by the environmental team during the course of the EIA and presents an informed opinion of the environmental impacts associated with the proposed project.

1.2.1. Impacts on Ecology

The significance of potential pre-construction and construction related ecological impacts are estimated to range from **Low to Medium** ecological significance with mitigation; with the direct disturbance/degradation and loss of vegetation/habitat during pre-construction stripping and clearing of vegetation being the most significant. The spread of Invasive Alien Plants (IAPs), weeds and other undesirable plants post-construction (due to disturbance created) is likely to be of a **Medium** ecological significance and will affect areas adjacent to the facility over the operational life-span of the project. During the decommissioning phase of the project, impacts are unlikely to be of much significance, with the potential of the project to have a net positive ecological impact on the habitat and biodiversity when the artificial infrastructure is removed and the grassland vegetation/habitat is properly reinstated at the site.

Cumulative impacts associated with the development were identified and assessed, in the context of past historic disturbance at the site and future industrial expansion within the broader Phase 1F site. Cumulative impacts on ecosystem conservation targets, loss of ecological functioning and ecosystem services supply, and impacts to species of conservation concern ranged from **Medium to High** significance in light of the threat status and irreplaceability value of the Maputaland Wooded Grassland vegetation type and the presence of protected/threatened plant species at the site. Cumulative impacts are likely to remain Moderately-High to High even when considering these impacts without the planned gas power plant development (due to the extensive industrial development planned for the Phase 1 F area).

With adequate mitigation and impact management, most direct and indirect impacts can be effectively managed and reduced to estimated low significance levels. The cumulative loss of threatened/protected species can be effectively managed by rescuing and translocating species to suitable conservation sites outside of the developable area, reducing the impact on the local population of these species to a low significance level. Other on-site impacts can be quite easily mitigated through appropriate practical on-site

impact mitigation and best practice management measures which have been outlined in this report. These include the implementation of an alien plant management programme and revegetation/rehabilitation plan for areas disturbed during construction. The cumulative, permanent and irreversible loss of vegetation and habitat will be difficult to mitigate, and the consequences in terms of meeting targets set for Maputaland Wooded Grassland (Endangered vegetation type) as well as the resultant loss of ecosystem functioning, goods and services will be unavoidable. In order to compensate for the loss of habitat and ecosystem functioning/services supply, an investigation into the need and desirability for biodiversity offsets is recommended for the broader IDZ Phase 1F development project and the Richards Bay Industrial Development Zone Company should consult further with Ezemvelo KZN Wildlife in this regard.

1.2.2. Impacts on Air Quality

From an air quality perspective it is concluded that the project is supported, but that mitigation measures should be implemented and adhered to. Negative air quality impacts associated with the generation of dust and emissions have been identified. However, the assessment of the key issues indicated that there are no negative impacts that can be classified as fatal flaws and which are of such significance that they cannot be successfully mitigated.

In this study, direct impacts will result from exposure to dust generated from the construction and decommissioning phase of the proposed gas to power plant. Direct impacts will also result from the inhalation of SO_2, NO_2, PM_{10}, CO and benzene emitted during the operational phase of the proposed gas to power plant.

Indirect impacts resulting from emissions of SO_2 and NO_2 from power plants include their contribution to acidification in both dry and wet (acid rain) deposition, during the operational phase. Further indirect effects during the operational phase are associated emissions of CO and CO_2. CO_2 is a GHG, adding to the global concentrations. CO is not considered a GHG, but is a strong precursor in the formation of ozone in the troposphere.

Ambient air quality in Richards Bay is influenced by a number of sources of air pollution, including large and smaller industry, transportation, agricultural burning, mining and the long range transport of pollutants from the interior. The proposed gas to power plant is located in an area where there are many notable sources of SO_2, NO_2, PM_{10}, CO and benzene (to a lesser extent) in the immediate vicinity of the site.

According to the model results, the 99^{th} percentile of the predicted 1-hour and 24-hour and annual average SO_2, NO_2, PM_{10}, CO and benzene concentrations from the proposed gas to power plant are well below the respective National Ambient Air Quality Standards

(NAAQS) and World Health Organisation (WHO) guidelines for Scenario 1 and Scenario 2. Predicted ambient concentrations are localised and very low for the modelled scenarios. The contribution to ambient concentrations beyond the immediate vicinity of the proposed gas to power plant is therefore small. The additive effect of these concentrations to the ambient environment is therefore highly unlikely to make a significant contribution to the cumulative impacts of SO_2, NO_2, PM_{10}, CO and benzene in the ambient environment. Impacts in terms of predicted concentrations of SO_2, NO_2, PM_{10}, CO and benzene from the operational scenarios will however last for the full period of the proposed gas to power plant. The duration of direct, indirect and cumulative impacts from the operational scenarios are therefore expected to be long-term. The significance of all impacts for the two operational scenarios is **low**.

Construction and decommissioning activities will result in the emission of low quantities of terrestrial and construction dust, not expected to pose a health risk. Furthermore, dust emissions will not travel over vast distances, but will most likely settle within 100m to 1km of the proposed development site. A temporary nuisance impact may be experienced in parts of the RBIDZ Zone 1F, the property on which the site is to be constructed. Construction and decommissioning impacts will last for a relatively short period as these activities occur for the duration of these activities only. It is predicted that the significance of all impacts during the construction and decommissioning phase is **low**. No mitigation is necessary, however, measures are suggested to minimise the nuisance impacts arising from these activities.

In this assessment, two NO_X emission mitigation strategies have been tested for the proposed gas to power plant. These include the water-steam injection and lean-premix mechanism. If NO_X mitigation strategies are implemented at the proposed gas to power plant, this will result in significantly lower NO_2 concentrations during the operational phase for all scenarios. Impacts from SO_2 emissions can be further reduced by decreasing the sulphur content of the diesel and LNG. However, this is not necessary since the modelling results have demonstrated that the resultant ambient concentrations at the current SO_2 content levels are already low. Due to the low predicted impacts, no mitigation measures are suggested for operational activities, in other words, mitigation measures to control SO_2 and NO_X, or even PM_{10}, CO and benzene are not necessary for the normal operations of the proposed gas to power plant. The significance rating will remain **low** during the operational phase for all scenarios, with or without mitigation.

The operation of the proposed gas to power plant is a Listed Activity in terms of the NEM: AQA. Requirements for environmental management will be dictated by the conditions in the Atmospheric Emission License (AEL). These are likely to include:

i. Annual emission measurements to assess compliance with the Minimum Emission Standards for Listed Activities (Government Gazette 37054, Notice No. 893 of 22 November 2013);
ii. The maintenance of an emission inventory with registration on the National Atmospheric Emission Inventory System (NAEIS) and annual reporting of emissions to the NAEIS (Government Gazette 38633, Notice No. R 283 of 2 April 2015).

Further environmental management requirements should address the control of emissions during operations through routine maintenance and operation according to specification.

According to the dispersion modelling results and air quality impact assessment, the site operations is expected to generate low emissions, low ambient concentrations, and low environmental impacts for both Scenario 1 and Scenario 2. It is therefore recommended that the proposed mitigation measures for the construction, operation and decommissioning phases are implemented to limit the negative impacts.

1.2.3. Impacts on the Social Environment

From a social perspective it is concluded that the project is supported, but that mitigation measures should be implemented and adhered to. Positive and negative social impacts have been identified. The assessment of the key issues indicated that there are no negative impacts that can be classified as fatal flaws and which are of such significance that they cannot be successfully mitigated. Positive impacts could be enhanced by implementing appropriate enhancement measures and through careful planning. Based on the social assessment, the following general conclusions and findings have been made:

» The potential negative social impacts are primarily associated with the traffic impacts on daily living and movement patterns during the construction phase and operation phase; and can be reduced with the implementation of the mitigation measures proposed.
» Employment opportunities will be created in the construction and operation phase and the impact is rated as positive even if only a small number of individuals benefit in this regard.
» The proposed project could assist the local economy in creating entrepreneurial development, especially if local business could be involved in the provision of general material and services during the construction and operational phases.
» Capacity building and skills training among employees are critical and would be highly beneficial to those involved, especially if they receive portable skills to enable them to also find work elsewhere and in other sectors.

» The proposed development also represents an investment in infrastructure for the generation energy, which represents a positive social benefit for society as a whole.

1.2.4. Overall Conclusion (Impact Statement)

The Integrated Resource Plan (IRP) 2010-2030 developed by the Department of Energy (DoE) projected that an additional capacity of up to 56 539MW of generation capacity will be required to support the country's economic development and ensure adequate reserves over the next twenty years. The required expansion is more than two times the size of the existing capacity of the system. In order to meet this required generation capacity, the IRP includes a mix of generation technologies, including a nuclear fleet of 9.6 GW; 6.3 GW of coal; 17.8 GW of renewables; and 8.9 GW of other generation sources, including gas. Although liquefied natural gas (LNG)-fuelled combined cycle gas turbines is considered to be one of the alternative baseload power generation options in the least-cost Base Case presented in the IRP, the potential to develop these plants has been constrained by the availability of fuel and the capacity to build. The Department of Energy's Independent Power Producer (IPP) office, together with Transnet, is working together to help expedite the 3126 MW Ministerial determination for Gas IPPs. It is in response to this initiative that this project is being proposed.

South Africa is a country with an economy dependent on coal for the majority of its electricity, an energy-intensive industrial sector and an energy sector responsible for 82% of total GHG emissions, making it the 12th highest world emitter of GHG[3]. Adding to the challenge is the need to address energy poverty, which manifests in the lack of access to affordable, adequate, reliable, safe and environmentally benign energy services. At the same time, economic growth is needed for development, in order to create employment. Traditionally economic growth has implied the increased use of finite resources and increased energy use. However, energy also has the potential to act as an engine of inclusive and sustainable growth. This is why moving towards a sustainable and low-carbon approach is a priority, and tracking energy consumption is essential to map the transition to a lower carbon future. In this regard, the Intergovernmental Panel on Climate Change (IPCC) fifth assessment report identified cities as being major players in reducing global emissions.

The South African Government recognises the need to diversify the mix of energy generation technologies within the country and to reduce the country's reliance on fossil fuels which contribute towards climate change and are therefore not environmentally friendly. This is in accordance with the prescriptions of the United Nations Convention on Climate Change 1994 (UNFCCC) and its associated Kyoto protocol of 1997. South Africa has put in place a long term mitigation scenario (LTMS) by which the country

[3] Greenhouse Gas Inventory for South Africa: 2000-2010

aims to develop a plan of action which is economically viable and internationally aligned to the world effort on climate change. During this period (2003-2050) South Africa will aim to take action to mitigate greenhouse gas emissions by 30% - 40% by the year 2050. This is a reduction of between 9 000 and 17 500 tons of CO_2 by 2050. Consequently, the South African Government has recognised the need to move towards cleaner energy and has therefore set targets for cleaner energy technologies (including gas-generated energy) by 2030 (IRP, 2011).

In December 2015, the Paris Agreement was launched, with a long-term objective of the agreement to make sure global warming stays "well below" 2 degrees Celsius (3.6 degrees Fahrenheit) and to "pursue efforts" to limit the temperature rise to 1.5 degrees Celsius (2.7 degrees Fahrenheit). In order to reach the long-term goal, countries, including South Africa, agreed to set national targets for reducing greenhouse gas emissions every five (5) years. Only developed countries are expected to slash their emissions in absolute terms; developing nations (such as South Africa) are encouraged to do so as their capabilities evolve over time. Until then, they are expected only to rein in the growth of emissions as their economies develop. The proposed gas to power plant will assist in reducing the country's CO_2 emissions associated with energy supply relative to other fossil fuels (e.g. coal). From a climate change perspective, the benefits arising from the use of natural gas as a source of energy instead of coal include:

» Reduced carbon dioxide emissions relative to equivalent energy from other fossil fuels;
» Lower particulate emissions relative to coal;
» High energy efficiency in combined-cycle applications;
» Negligible sulphur content in regional deposits; and
» Gas-fired generation plants require less space than conventional coal-fired plants of the same capacity[4].

Based on the nature and extent of the proposed project, the local level of disturbance predicted as a result of the construction and operation of the facility and associated infrastructure, the findings of the EIA, and the understanding of the significance level of potential environmental impacts, it is the opinion of the EIA project team that the impacts associated with the development of the Ilanga CSP 5 facility can be managed and mitigated to an acceptable level. In terms of this conclusion, the EIA project team support the decision for environmental authorisation.

The following mitigation measures provided in the EIA Report and Air Quality Impact Assessment are proposed:

» Two (2) species of plant identified which are 'specially protected plant species' in terms of the Natal Conservation Ordinance No. 15 of 1974. These are *Crinum*

[4] White Paper on Energy Policy, 1998

delagoense (Candy striped Crinum, 'Declining' threat status) and the SA Endemic *Ledebouria ovatifolia*. These are protected under Schedule 12 (Specially Protected Indigenous Plants) of the Natal Conservation Ordinance No. 15 of 1974. A permit needs to be applied for with regards to relocating any of these species.

» Undertake plant rescue and translocation prior to any clearing/ disturbance of the site occurring, in line with the requirements and recommendations of the Plant Rescue Translocation and Protection Plan (refer to Appendix H and Appendix I).

» Where access is required to areas surrounding the development site, a 2m buffer may be used for access. Where possible, cut vegetation to ground-level rather than removing it completely, leaving root systems intact to ensure rapid re-colonization in areas that are not to be permanently hardened.

» Vegetation clearing should ideally proceed mainly during the dry, winter months where possible in order to minimise the risk of soil erosion linked to high stormwater runoff rates.

» Vegetation/soil clearing activities must only be undertaken during agreed working (negotiated between the contractor and ECO) times and permitted weather conditions. If heavy rains are expected, clearing activities should be put on hold. In this regard, the contractor must be aware of weather forecasts.

» Schedule vegetation clearing such that this is completed immediately before construction in an area to avoid prolonged exposure of the soil to weather elements.

» All vehicles accessing the site should adhere to a low speed limit (30km/h is recommended) to avoid collisions with susceptible species such as reptiles (snakes and lizards).

» Limit construction activities, site camps and equipment lay-down areas to disturbed areas within the development footprint and alongside the existing Tata steel north perimeter fence firebreak to the south of the site. No construction camps, etc. to be located within natural grassland areas in areas adjacent to the development site.

» An appropriate SUDS (Sustainable Urban Drainage System) should be implemented, characterized by a combination of open, grass-lined channels/swales and stone-filled infiltration ditches that will encourage infiltration across the site, provide for the filtration and removal of pollutants and provide for some degree of flow attenuation by reducing the energy and velocity of storm water flows.

» Semi-pervious materials must be used for roads that allow for some infiltration rather than using totally impermeable tarred road surfaces, as this will assist with reducing storm water runoff.

» Implement traffic control measures to limit vehicle-entrained dust from unpaved roads by limiting vehicle speeds (i.e. 30km/h) and by restricting traffic volumes.

» Limit access to construction site to construction vehicles only.

» Loading and unloading bulk construction material should be in areas protected from the wind or carried out in calm conditions.

» Loads on vehicles carrying dusty construction materials should be covered.

» Vehicles carrying dusty materials should be cleaned before leaving the site.

- Unpaved road surfaces should be sprayed with a surfactant to ensure high moisture content which will bind the silt or maintain high moisture content on exposed surfaces and roads by spraying with water.
- Stabilise open areas with dust palliative, gravel or similar.
- If NO_X mitigation strategies are implemented at the proposed gas to power plant, this will result in significantly lower NO_2 concentrations during the operational phase. However, this is not necessary since the modelling results have demonstrated that the resultant ambient concentrations at the current NO_2 levels are already low and compliant with the NAAQS.
- Impacts from SO_2 emissions can be further reduced by decreasing the sulphur content of the diesel fuel. However, this is also not necessary since the modelling results have demonstrated that the resultant ambient concentrations at the current SO_2 levels are already low and compliant with the NAAQS.
- The EPC contractor should appoint a designated staff member to assist with the management of social impacts and to deal with any community issues.
- In terms of employment related impacts, it is important to consider that job opportunities for the unskilled and semi-skilled in the study area could create competition among the local unemployed. Introducing an outside workforce will therefore most likely worsen local endeavours to obtain jobs and provoke discontent as well as put pressure on the local services available. It is imperative that local labour be sourced, wherever possible, to ensure that benefits accrue to the local communities. Efforts should be made to involve local businesses during the construction activities where possible. Local procurement of labour and services/products would greatly benefit the community during the construction and operational phases of the project.
- Local procurement of services and equipment where possible in order to enhance the multiplier effect. This would serve to mitigate other subsequent negative impacts such as those associated with the inflow of outsiders to the area, the increased pressure on the infrastructure and services in the area, as well as the safety and security concerns.
- Involve the community in the process as far as possible (encourage co-operative decision making and partnerships with local entrepreneurs).
- Implement mitigation measures to reduce and avoid negative impacts.
- It is important that the mitigation measures relating to traffic impacts (daily living and movement patterns) are implemented to reduce the negative impacts.

1.3 Applicable Legislation and Guidelines

Please refer to **Appendix K** for the detailed list of applicable legislation and guidelines that have informed the scope and content of this EMPr.

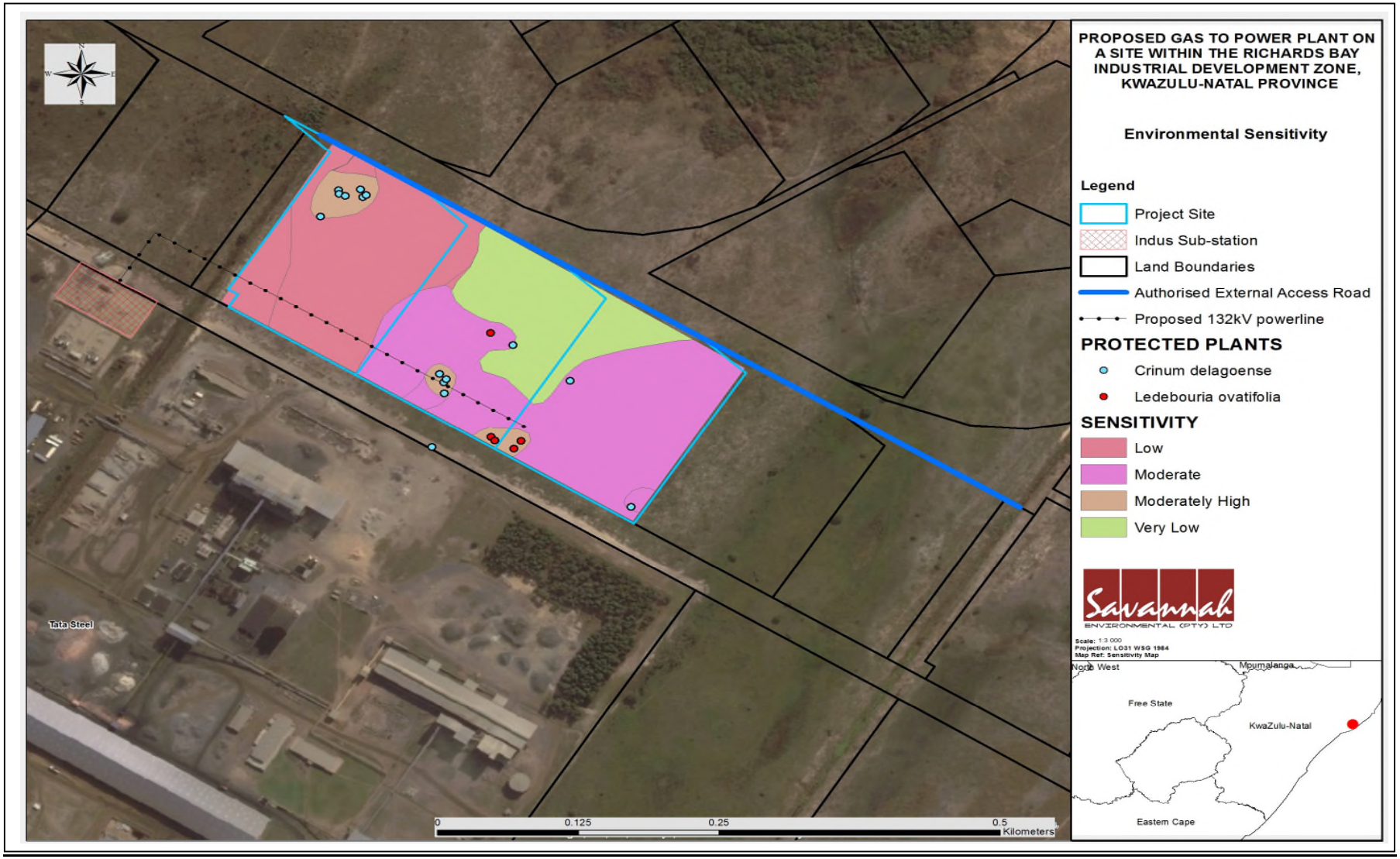


Figure 2.2: Environmental sensitivity map for the project study area illustrating ecologically sensitive areas in relation to the gas to power plant as well as the location of protected plant species (Refer to **Appendix B** for A3 maps)

PURPOSE & OBJECTIVES OF THE EMPR CHAPTER 2

An Environmental Management Programme (EMPr) is defined as "an environmental management tool used to ensure that undue or reasonably avoidable adverse impacts of the construction, operation and decommissioning of a project are prevented or mitigated, and that the positive benefits of the projects are enhanced"[5]. The objective of this Environmental Management Programme is to provide consistent information and guidance for implementing the management and monitoring measures established in the permitting process and help achieve environmental policy goals. The purpose of an EMPr is to help ensure compliance with recommendations and conditions specified through an EIA process, as well as to ensure continuous improvement of environmental performance, reducing negative impacts and enhancing positive effects during the construction and operation of the facility. An effective EMPr is concerned with both the immediate outcome as well as the long-term impacts of the project.

The EMPr provides specific environmental guidance for the construction, operational and decommissioning phases of a project, and is intended to manage and mitigate construction and operational activities so that unnecessary or preventable environmental impacts do not result. These impacts range from those incurred during start up (site clearing and site establishment) through those incurred during the construction activities themselves (erosion, noise, dust) to those incurred during site rehabilitation (soil stabilisation, re-vegetation) and operation. The EMPr also defines monitoring requirements in order to ensure that the specified objectives are met.

The EMPr has been developed as a set of environmental specifications (i.e. principles of environmental management for the proposed gas to power plant), which are appropriately contextualised to provide clear guidance in terms of the on-site implementation of these specifications (i.e. on-site contextualisation is provided through the inclusion of various monitoring and implementation for use of the EMPr by the project implementer as well as compliance monitors).

The EMPr has the following objectives:

» To outline mitigation measures and environmental specifications which are required to be implemented for the planning, construction, rehabilitation and operation phases of the project in order to minimise the extent of environmental impacts, and to manage environmental impacts associated with the gas to power plant.

[5] Provincial Government Western Cape, Department of Environmental Affairs and Development Planning: *Guideline for Environmental Management Plans,* 2005.

- To ensure that the construction, operational and decommissioning phases do not result in undue or reasonably avoidable adverse environmental impacts, and ensure that any potential environmental benefits are enhanced.
- To identify entities who will be responsible for the implementation of the measures and outline functions and responsibilities.
- To propose mechanisms for monitoring compliance, and preventing long-term or permanent environmental degradation.
- To facilitate appropriate and proactive responses to unforeseen events or changes in project implementation that was not considered in the EIA process.

The mitigation measures identified within the EIA process are systematically addressed in the EMPr, ensuring the minimisation of adverse environmental impacts to an acceptable level.

Richards Bay Gas Power 2 (Pty) Ltd must ensure that the implementation of the project complies with the requirements of any and all Environmental Authorisations and permits (once issued), as well as with obligations emanating from all relevant environmental legislation. This obligation is partly met through the development of the EMPr, and the implementation of the EMPr through its integration into the contract documentation for activities associated with both construction and operation. Since this EMPr is part of the EIA process undertaken for the proposed gas to power plant, it is important that this guideline document be read together with the Final Scoping Report (January 2016) and EIA Report (May 2016). This will contextualise the EMPr and enable a thorough understanding of its role and purpose in the integrated environmental process. This EMPr for pre-construction, construction, operational and decommissioning activities has been compiled in accordance with Appendix 4 of the EIA Regulations (2014).

To achieve effective environmental management, it is important that Contractors are aware of their responsibilities in terms of the relevant environmental legislation and the contents of this EMPr. The Contractor is responsible for informing employees and sub-contractors of their environmental obligations in terms of the environmental specifications, and for ensuring that employees are adequately experienced and properly trained in order to execute the works in a manner that will minimise environmental impacts. The Contractors obligations in this regard include the following:

- Ensuring that employees have a basic understanding of the key environmental features of the construction site and the surrounding environment.
- Ensuring that a copy of the EMPr is readily available on-site, and that all site staff are aware of the location and have access to the document. Employees must be familiar with the requirements of the EMPr and the environmental specifications as they apply to the construction of the facility.
- Ensuring that, prior to commencing any site works, all employees and sub-contractors have attended an appropriate Environmental Awareness Training course.

The course must provide the site staff with an appreciation of the project's environmental requirements, the EMPr specifications, and how they are to be implemented.

» Basic training in the identification of archaeological sites/objects, and protected or Red List flora and fauna that may be encountered on the site.
» Awareness of any other environmental matters, which are deemed to be necessary by the Environmental Control Officer (ECO).

The EMPr is a dynamic document, which must be updated when required. It is considered critical that the final EMPr be updated to include site-specific information and specifications as required throughout the life-cycle of the facility. This will ensure that the project activities are planned and implemented taking sensitive environmental features into account.

STRUCTURE OF THIS EMPR CHAPTER 3

The first three chapters provide background to the EMPr and the proposed project. The chapters which follow consider the:

» Planning and design activities;
» Construction activities;
» Operation activities; and
» Decommissioning activities.

These chapters set out the procedures necessary for Richards Bay Gas Power 2 (Pty) Ltd, as the Proponent to achieve environmental compliance. For each of the phases for the proposed development, an over-arching environmental **goal** is stated. In order to meet this goal, a number of **objectives** are listed. The management plan has been structured in table format in order to show the links between the goals for each phase and their associated objectives, activities/risk sources, mitigation actions monitoring requirements and performance indicators. A specific Environmental Management Programme table has been established for each environmental objective. The information provided within the EMPr table for each objective is illustrated below:

OBJECTIVE: Description of the objective, which is necessary in order to meet the overall goals; these take into account the findings of the environmental impact assessment specialist studies

Project component/s	List of project components affecting the objective, e.g.: » Gas turbines; » Steam turbines; » Engine halls and stacks; » HV-Yard and substation » 132kV powerline; » Internal access roads; » Fuel tanks and unloading stations; » Water storage facilities (demineralisation, raw and fire water and partially treated water tanks); » Guard house, admin building, workshops and a warehouse; and » Associated infrastructures.
Potential Impact	Brief description of potential environmental impact if objective is not met.
Activity/risk source	Description of activities which could impact on achieving objective.
Mitigation: Target/Objective	Description of the target; include quantitative measures and/or dates of completion.

Mitigation: Action/control	Responsibility	Timeframe
List specific action(s) required to meet the mitigation target/objective described above.	Who is responsible for the measures	Time periods for implementation of measures.

Performance Indicator	Description of key indicator(s) that track progress/indicate the effectiveness of the management plan.
Monitoring and Reporting	Mechanisms for monitoring compliance; the key monitoring actions required to check whether the objectives are being achieved, taking into consideration responsibility, frequency, methods and reporting.

The objectives and EMPr tables are required to be reviewed and possibly modified whenever changes, e.g. the following, occur:

» Planned activities change (i.e. in terms of the components of the power plant).
» Modification to or addition to environmental objectives and targets.
» Additional or unforeseen environmental impacts are identified and additional measures are required to be included in the EMPr to prevent deterioration or further deterioration of the environment.
» Relevant legal or other requirements are changed or introduced.
» Significant progress has been made on achieving an objective or target such that it should be re-examined to determine if it is still relevant, should be modified, etc.

The table below specifies plans required for the proposed project as specified by the DEA in the acceptance of the scoping report.

Table 3.1: Management plans for the proposed project

Plans required	Location in report
Plant Rescue and Protection Plan	**Appendix C**
Revegetation and Rehabilitation Plan	**Appendix D**
Traffic Management Plan	**Appendix E**
Storm Water Management Plan	**Appendix F**
Erosion Management Plan	**Appendix G**
Alien Invasive and Open Space Management Plan	**Appendix J**
Emergency preparedness and Response Plan	**Appendix K**

3.1 Project Team

This EMPr was compiled by:

EMPr Compilers	
Dilona Somai	Savannah Environmental
Jo-Anne	Savannah Environmental
Input from Specialists	
Ecology	Adam Teixeira-Leite of Eco-Pulse
Air Quality	Mark Zunckel and Atham Raghunandan of uMoya-Nilu
Social	Candice Hunter of Savannah Environmental (with external review by Neville Bews)

The Savannah Environmental team have extensive knowledge and experience in environmental impact assessment and environmental management, and have managed and drafted Environmental Management Programmes for other energy-generating facilities (such as solar and wind) projects throughout South Africa. In addition, they have been involved in compliance monitoring of major construction projects in South Africa.

MANAGEMENT PROGRAMME FOR THE GAS TO POWER PLANT: PLANNING & DESIGN CHAPTER 4

4.1 Goal for Pre-Construction

Overall Goal for Pre-Construction (Planning and Design): Undertake the pre-construction (planning and design) phase of the power plant in a way that:

» Ensures that the design of the power plant responds to the identified environmental constraints and opportunities.
» Ensures that pre-construction activities are undertaken in accordance with all relevant legislative requirements and avoids sensitive environmental areas as far as practically possible.
» Ensures that adequate regard has been taken of any landowner and community concerns and that these are appropriately addressed through design and planning (where appropriate).
» Ensures that the best environmental options are selected for the power plant.
» Enables the power plant construction activities to be undertaken without significant disruption to other land uses in the area.

In order to meet this goal, the following objectives have been identified, together with necessary actions and monitoring requirements.

4.2 Planning and Design

OBJECTIVE 1 : To ensure that the design of the power plant responds to the identified environmental constraints and opportunities

Subject to finalisation of the design and layout (placement of infrastructure within the Project site) and subsequent acceptance from DEA, the preferred layout (i.e. baseload or mid-merit) must be implemented. There are no no go areas identified within the project site. However, areas of sensitivity identified should be taken into consideration when finalising the facility design.

Project component/s	» Gas turbines; » Steam turbines; » Engine halls and stacks; » HV-Yard and substation; » 132kV power line; » Internal access roads; » Fuel tanks and unloading stations;

	» Water storage facilities (demineralisation, raw and fire water and partially treated water tanks); » Guard house, admin building, workshops and a warehouse; and » Associated infrastructures.
Potential Impact	» Design fails to respond optimally to the environmental considerations.
Activities/risk sources	» Positioning of all Project Components (listed above) » Pre-construction activities, e.g. geotechnical investigations, site surveys of substation footprint, power line servitude and internal access roads and environmental walk-through surveys.
Mitigation: Target/Objective	» To ensure that the design of the power plant responds to the identified environmental constraints and opportunities. » To ensure that pre-construction activities are undertaken in an environmentally friendly manner by e.g. avoiding identified sensitive areas. » To ensure that the design of the power plant responds to the identified constraints identified through pre-construction surveys.

Mitigation: Action/control	Responsibility	Timeframe
The developer to finalise layout of all components, and submit to DEA for approval prior to commencement of construction.	Proponent	Prior to construction
Plan and conduct pre-construction activities (all surveys) in an environmentally acceptable manner.	Proponent and specialists	Prior to construction
Obtain any additional environmental permits required (e.g. permit to remove protected plant species/ species of conservation concern) prior to the commencement of construction.	Proponent and specialist	Prior to construction
External access point and internal access road to be carefully planned to maximise road user safety.	Proponent	Prior to construction
The EMPr should form part of the contract with the Contractors appointed to construct the power plant, and must be used to ensure compliance with environmental specifications and management measures. The implementation of this EMPr for all life cycle phases of the proposed project is considered to be key in achieving the appropriate environmental management standards as detailed for this project.	Proponent / Contractor(s)	Tender Design and Design Review Stage
Obtain abnormal load permits for transportation of project components to site (if required).	Contractor(s)/ Transport Contractor	Design phase
All employees handling fuels and other hazardous materials are to be properly trained in	Contractor and EO	Prior to construction

Mitigation: Action/control	Responsibility	Timeframe
their safe use, environmental restrictions and methods for proper disposal.		occurring and during duration of contract
Ensure that all workers on site are aware of the proper procedure in case of a fire occurring on site (refer to the Emergency Preparedness and Response Plan at **Appendix J**).	Contractor and EO	Prior to construction occurring and during duration of contract
Potential water constraints: Where feasible, use of closed circuit dry cooling system (e.g., air cooled condensers) should be planned for to prevent unacceptable adverse impacts.	Design Engineer and Proponent	Design and planning
Project design to include measures for adequate water collection, spill control and leakage control system.	Design Engineer and Proponent	Design and planning
Consider the use of treated waste water within the power generation process to be included in project design processes.	Design Engineer and Proponent	Design and planning
If feasible, the proponent should consider the installation of self-closing taps, automatic shut-off valves, spray nozzles, pressure reducing valves, and water conserving fixtures (e.g. low flow shower heads, faucets, toilets, urinals; and spring loaded or sensored faucets).	Design Engineer and Proponent	Design and planning
The proponent should consider the installation of water-saving equipment in lavatories, such as low-flow toilets.	Design Engineer and Proponent	Design and planning
Design considerations for electrical hazards: » Consider installation of hazard warning lights inside electrical equipment enclosures to warn of inadvertent energization which can lead to fires. » Deactivation and proper grounding of live power equipment and distribution lines according to applicable legislation and guidelines whenever possible before work is performed on or proximal to them. » Provision of specialized electrical safety training to those workers working with or around exposed components of electric	Design Engineer and Proponent	Design and planning, training to be provided during pre-construction and regularly (e.g. every 6 months or annually) for the duration of the contract.

Mitigation: Action/control	Responsibility	Timeframe
circuits. This training should include, but not be limited to, training in basic electrical theory, proper safe work procedures, hazard awareness and identification, proper use of Personal Protective Equipment, proper lockout/tagout procedures, first aid including CPR, and proper rescue procedures. Provisions should be made for periodic retraining as necessary.		
Consider the use of automated systems such as temperature gauges or carbon monoxide sensors to survey solid fuel storage area to detect fires caused by self-ignition and to identify risk points.	Design Engineer and Proponent	Design and planning
Plan the facility to be equipped with fire detectors, alarm systems, and fire-fighting equipment. The equipment should be maintained in good working order and be readily accessible. It should be adequate for the dimensions and use of the premises, equipment installed, physical and chemical properties of substances present, and the maximum number of people present.	Proponent / O&M Operator	Design and planning
Design considerations for fuel storage: » Store flammables away from ignition sources and oxidizing materials. Further, flammables storage area should be: » Remote from entry and exit points into buildings » Away from facility ventilation intakes or vents » Have natural or passive floor and ceiling level ventilation and explosion venting » Use spark-proof fixtures » Be equipped with fire extinguishing devices and self-closing doors, and constructed of materials made to withstand flame impingement for a moderate period of time	Design Engineer and Proponent	Design and planning
Providing specific worker training in handling of flammable materials, and in fire prevention or suppression.	Proponent / O&M Operator	Design and planning, training to be provided during pre-construction and regularly

Mitigation: Action/control	Responsibility	Timeframe
		(e.g. every 6 months or annually) for the duration of the contract.

Performance Indicator	» Design meets objectives and does not unnecessarily degrade the environment. » Design and layouts etc. respond to the mitigation measures and recommendations in the EIA and walkthrough reports.
Monitoring and Reporting	» Ensure that the design implemented meets the objectives and mitigation measures in the EIA Report through review of the design by the Project Manager, ECO, Contractor and the Environmental Officer (EO) prior to the commencement of construction.

OBJECTIVE 2: To ensure effective communication mechanisms

On-going communication with affected and surrounding landowners is important to maintain during the construction and operational phases of the power plant. Any issues and concerns raised should be addressed as far as possible in as short a timeframe as possible.

Project component/s	» Gas turbines; » Steam turbines; » Engine halls and stacks; » HV-Yard and substation; » 132kV power line; » Internal access roads; » Fuel tanks and unloading stations; » Water storage facilities (demineralisation, raw and fire water and partially treated water tanks); » Guard house, admin building, workshops and a warehouse; and » Associated infrastructures.
Potential Impact	» Impacts on affected and surrounding landowners and land uses
Activity/risk source	» Activities associated with pre-construction activities » Activities associated with construction of the power plant and associated infrastructure » Activities associated with operation of the power plant
Mitigation: Target/Objective	» Effective communication with affected and surrounding landowners » Addressing of any issues and concerns raised as far as possible in as short a timeframe as possible

Mitigation: Action/control	Responsibility	Timeframe
Compile and implement a grievance mechanism procedure for the public (using **Appendix H**) to be implemented during both the construction and operational phases of the power plant and if applicable during decommissioning. This procedure should include details of the contact person who will be receiving issues raised by interested and affected parties, and the process that will be followed to address issues.	Proponent and/or Contractor(s)	Pre-construction (construction procedure) Pre-operation (operation procedure)
Develop and implement a grievance mechanism for the construction, operational and decommissioning/ closure phases of the project for all employees, contractors, subcontractors and site personnel. This procedure should be in line with the South African Labour Law.	Proponent and/or Contractor(s)	Pre-construction (construction procedure) Pre-operation (operation procedure)
Liaison with the landowner (RBIDZ) is to be undertaken prior to the commencement of construction in order to agree on landowner-specific conditions during construction and operations.	Proponent and/or Contractor(s)	Pre-construction
An incident reporting system must be developed and used to record non-conformances to the EMPr.	Contractor(s)/ EO	Pre-construction Duration of construction
The Proponent /O&M Operator must provide specific detailed waste management plans/ method statements to deal with all waste streams for the operation phase.	Proponent/ O&M Operator	Pre-construction, duration of operation.

Performance Indicator	» Effective communication procedures in place for all phases as required.
Monitoring	» An incident reporting system should be used to record non-conformances to the EMPr. Grievance mechanism procedures should be implemented. » Public complaints register must be developed and maintained.

OBJECTIVE 3: Minimise storm water runoff (guideline for storm water plan)

Management of storm water will be required during the construction and operational phases of the power plant and associated infrastructure. A detailed storm water management plan is required to be compiled as part of the final design to ensure compliance with applicable regulations and to prevent off-site migration of contaminated storm water. The section below provides a guideline for the management of storm water on site and will need to be supplemented with the relevant method statements

during the construction and operation phases of the power plant and associated infrastructure.

Project component/s	» All hardened surfaces for the power plant and associated infrastructure.
Potential Impact	» Poor storm water management and off-site migration of contaminated storm water
Activity/risk source	» Activities associated with construction of the power plant and associated infrastructure » Activities associated with operation of the power plant
Mitigation: Target/Objective	» Appropriate management of storm water to minimise impacts on the environment.

Mitigation: Action/control	Responsibility	Timeframe
A Method Statement for the management of storm water which also considers the recommendations below is to be submitted to the ECO prior to the commencement of construction. This Method Statement must be approved by the Site Manager/ Site Engineer prior to implementation.	Proponent	Pre-construction
Reduce the potential increase in surface flow velocities and the resultant impact on the localised drainage system through increased sedimentation.	Proponent	Planning and design
Design measures for storm water management needed to allow for surface and subsurface movement of water along drainage lines so as not to impede natural surface and subsurface flows off-site.	Design engineer and Proponent	Planning and design
Develop an operational storm water management plan to manage surface runoff from hardened surfaces without causing increased peak discharge, soil saturation in non-wetland areas and erosion and sedimentation. Storm water management systems should be characterized by a combination of open, grass-lined channels/swales and stone-filled infiltration ditches that will encourage infiltration across the site, provide for the filtration and removal of pollutants and provide for some degree of flow attenuation by reducing the energy and velocity of storm water flows. A "first flush" treatment system should be considered in the storm water design to	Design engineer and Proponent	Planning and design

Mitigation: Action/control	Responsibility	Timeframe
ensure that the initial flux of polluted surface runoff is contained, tested and treated before being discharged to the environment. Storm water outlets should be designed in the form of multiple smaller storm water outlets rather than a few large outlets in order spread out surface flow and avoid flow concentration as far as possible. Storm water management systems should be designed with longevity in mind and should require little maintenance by catering for silting.		
The site should be well graded to permit water to readily drain away and to prevent ponding of water anywhere on the surface of the ground.	Project Engineer and Proponent	Design
Semi-pervious materials should be considered for roads that allow for some infiltration rather than using totally impermeable tarred road surfaces, as this will assist with reducing storm water runoff. The provision of swales/mini ponds adjacent to roads is recommended to provide additional attenuation capacity where necessary.	Project Engineer and Proponent	Design
Development design can also promote the conservation and efficient utilisation of water, implement rainwater harvesting measures, the recycling / re-use through grey water systems and using water efficient fittings. Rainwater harvesting and storage should be promoted on-site by installing appropriate systems to collect rainwater from roofs/gutters, etc. in closed-top tanks or landscaped features for irrigation and non-potable purposes.	Project Engineer and Proponent	Design

Performance Indicator	» Appropriate storm water management measures included within the design for the power plant and associated infrastructure. » Sound water quality and quantity management during construction and operation of the power plant.
Monitoring	» Maintain a monitoring plan for storm water discharge.

OBJECTIVE 4: Minimise emissions to air

SO_2, NO_2, PM_{10}, CO and benzene emissions are anticipated from the operation of the gas turbines, therefore during the pre-construction phase the gas to power plant will need to be designed in order to minimise emissions during operation.

Project component/s	» Power generation technology (i.e. combined cycle gas turbines) » Fuel type » Stacks » Fuel storage tanks
Potential Impact	» Increased emissions during operation of the power plant
Activity/risk source	» Activities associated with operation of the power plant
Mitigation: Target/Objective	» Appropriate management of emissions to minimise impacts on the ambient air quality.

Mitigation: Action/control	Responsibility	Timeframe
The proponent must select the best power generation technology for the fuel chosen to balance the environmental and economic benefits. Some examples include the use of higher energy-efficient systems such as combined cycle gas turbine system for LNG and NG.	Proponent	Pre-construction (planning and design / final technology choice)
The developer must consider the use of the cleanest fuel economically available (natural gas is preferable to oil, which is preferable to coal). In this case, diesel and LNG would be preferred over LFO and HFO in Phase 1. The developer should switch over to LNG as soon as possible once this fuel is available.	Proponent	Pre-construction (planning and design / final technology choice) and duration of operation
The stack heights must be designed according to Good International Industry Practice (GIIP) to avoid excessive ground level concentrations and minimize impacts. For specific guidance on calculating stack height refer to Annexure 1.1.3 of the IFC General EHS Guidelines (www.ifc.org/ehsguidelines). Raising stack height should not be used to allow more emissions. Typical examples of GIIP stack heights are up to 100m for gas-fired	Proponent and Design Engineer	Pre-construction (planning and design)

Mitigation: Action/control	Responsibility	Timeframe
combined cycle gas turbine power plants. Final selection of the stack height must consider the terrain of the surrounding areas, nearby buildings, meteorological conditions, predicted incremental impacts and the location of existing and future receptors.		
Sulphur Dioxide: » Consider the use of fuels with a lower content of sulphur where economically feasible.	Proponent	Planning and design
Nitrogen Oxides: » Consider the use of dry low-NO_X combustors for combustion turbines burning LNG / NG. » Optimisation of operational parameters for existing reciprocating engines burning LNG/ NG to reduce NO_x emissions.	Proponent	Planning and design
Fugitive Emissions (Volatile Organic Compounds (VOCs) and particulate matter (PM)): » Design and operate transport systems for the delivery of fuel to site to minimise the generation and transport of dust on site. » Maintain stable tank pressure and vapour space during the operation phase by: * Consider using white or other colour paints with low heat absorption properties on exteriors of storage tanks for lighter distillate such as gasoline, ethanol, and methanol to reduce heat absorption. Potential for visual impacts from reflection of light off tanks should be considered; * Selecting and designing storage tanks in accordance with internationally accepted standards to minimize storage and working losses considering, for example, storage capacity and the vapour pressure of materials being stored; * Consider the use of supply and return systems, vapour recovery	Proponent	Planning and design

Mitigation: Action/control	Responsibility	Timeframe
hoses, and vapour-tight trucks / railcars / vessels during loading and unloading of transport vehicles; * Where vapour emissions contribute or result in ambient air quality levels in excess of health based standards, install secondary emissions controls, such as vapour condensing and recovery units, catalytic oxidizers, vapour combustion units, or gas adsorption media.		
Venting and Flaring of LNG/ NG: Venting and flaring are an important operational and safety measure used in natural gas processing facilities to ensure gas is safely disposed of in the event of an emergency, power or equipment failure, or other plant upset conditions. » The proponent must consider the optimisation of plant controls to increase the reaction conversion rates; » Provide back-up systems to achieve as high a plant reliability as practical; and » Locate the flaring system at a safe distance from residential areas or other potential receptors, and maintain the system to achieve high efficiency.	Proponent and Design Engineer	Planning and design

Performance Indicator	» Appropriate emissions management measures included within the power plant and associated infrastructure design.
Monitoring	» Annual Stack Emission Testing for SO_2, NO_x and PM during the operation phase to monitor efficiency of mitigation measures » Emission monitoring for NO_x and SO_2 during the operation phase to monitor efficiency of mitigation measures

MANAGEMENT PROGRAMME FOR THE GAS TO POWER PLANT:

CONSTRUCTION CHAPTER 5

5.1. Overall Goal for Construction

Overall Goal: Undertake the construction phase in a way that:

» Ensures that construction activities are appropriately managed in respect of environmental aspects and impacts.
» Enables construction activities to be undertaken without significant disruption to other land uses and activities in the area, in particular concerning noise impacts, traffic and road use.
» Minimises the impact on the indigenous natural vegetation, and habitats of ecological value.
» Minimises impacts on fauna in the study area.
» Minimises the impact on heritage sites should they be uncovered.
» Establishes an environmental baseline during construction activities on the site, where possible.

5.2. Institutional Arrangements: Roles and Responsibilities for the Construction Phase of the Gas to Power Plant

As the proponent, Richards Bay Gas Power 2 (Pty) Ltd must ensure that the construction of the power plant and associated infrastructure complies with the requirements of any and all environmental authorisations and permits, as well as with obligations emanating from relevant environmental legislation. This obligation is partly met through the development of the EMPr, and the implementation of the EMPr through its integration into the contract documentation. These are outlined below. The Proponent will retain various key and facilitation roles and responsibilities during the construction of the power plant and associated infrastructure, however, the Contractor(s) will be responsible for implementing the conditions of the EMPr.

OBJECTIVE 1: Establish clear reporting, communication, and responsibilities in relation to overall implementation of the EMPr

Formal responsibilities are necessary to ensure that key procedures are executed. Specific responsibilities of the Project Manager, Site Manager, Contractor's Environmental Officer (EO), ECO and Contractor for the construction phase of this project are as detailed below. Formal responsibilities are necessary to ensure that key procedures are executed.

Construction Manager will:

» Ensure all specifications and legal constraints specifically with regards to the environment are highlighted to the Contractor(s) so that they are aware of these.
» Ensure that Richards Bay Gas Power 2 (Pty) Ltd and its Contractor(s) are made aware of all stipulations within the EMPr.
» Coordinate the correct implementation of the EMPr throughout the project by means of site inspections and meetings. This will be documented as part of the site meeting minutes through input from the independent ECO.
» Be fully knowledgeable with the EIA Report (including amendments) for the project, the EMPr, the conditions of the Environmental Authorisation, and all relevant environmental legislation.
» Be fully knowledgeable with the contents of all relevant licences and permits.

Site Manager (EPC Contractor's on-site Representative) will:

» Be fully knowledgeable with the contents of the EIA Report and risk management.
» Be fully knowledgeable with the contents and conditions of the Environmental Authorisation and related amendments.
» Be fully knowledgeable with the contents of the EMPr.
» Be fully knowledgeable with the contents of all relevant environmental legislation, and ensure compliance with these.
» Have overall responsibility of the EMPr and its implementation.
» Ensure that audits are conducted to ensure compliance to the EMPr.
» Ensure there is communication with the Project Manager, the ECO, the EO, and relevant discipline engineers on matters concerning the environmental compliance.
» Be fully knowledgeable with the contents of all project licences and permits.
» Ensure that no actions are taken which will harm or may indirectly cause harm to the environment, and take steps to prevent pollution on the site.
» Confine activities to the demarcated construction site.

An independent **Environmental Control Officer (ECO)** must be appointed by the project proponent prior to the commencement of any authorised activities and will be responsible for monitoring, reviewing and verifying compliance by the EPC Contractor with the environmental specifications of the EMPr and the conditions of the Environmental Authorisation. Accordingly, the ECO will:

» Be fully knowledgeable with the contents of the EIA Report.
» Be fully knowledgeable with the contents and with the conditions of the Environmental Authorisation including all subsequent amendments.
» Be fully knowledgeable with the contents of the EMPr.

- » Be fully knowledgeable of all the project licences and permits issued to the site and ensure communication to the relevant personnel on the conditions contained therein.
- » Be fully knowledgeable with the contents of all relevant environmental legislation, and ensure compliance with them.
- » Ensure that the contents of this document are communicated to the Contractor(s) site staff and that the Site Manager and Contractors are constantly made aware of the contents through discussion.
- » Ensure that the compliance of the EMPr, EA and legislative is monitored through regular and comprehensive inspection of the site and surrounding areas.
- » Ensure that if the EMPr, EA and/or the legislation conditions, regulations or specifications are not followed then appropriate measures are undertaken to address any non-compliances (for example an ECO may cease an activity to prevent a non-compliance from continuing, if reasonable (i.e. if all other options have been exhausted)).
- » Monitoring and verification must be implemented to ensure that environmental impacts are kept to a minimum, as far as possible.
- » Ensure that the Site Manager has input into the review and acceptance of construction methods and method statements.
- » Visit the site regularly so as to ensure that activities on site comply with all relevant environmental legislation.
- » Ensure that appropriate measures are undertaken to address any non-compliances recorded. The Method Statements must include the timelines to close out the identified non-conformances.
- » Ensure that a removal is ordered of any person(s) and/or equipment responsible for any contravention of the specifications of the EMPr and/or project permits.
- » Keep record of all environmental activities on site, problems identified, transgressions noted and a task schedule of tasks undertaken by the ECO.
- » Ensure that the compilation of progress reports for submission to the Proponent, with input from the Site Manager, takes place on a regular basis, e.g. weekly, Monthly Reports including Final Post-Construction Audit Reports.
- » Ensure that there is regular communication with the Site Manager regarding the monitoring of the site.
- » Ensure that any non-compliance or remedial measures that need to be applied are reported and recorded.
- » Independently report to the Department of Environment (National & Provincial) in terms of compliance with the specifications of the EMPr and conditions of the EA (once issued) if and when requested.
- » Submit independent reports to the DEA and other regulating authorities regarding compliance with the requirements of the EMPr, EA and other environmental permits.

The ECO shall remain employed until all rehabilitation measures, as required for implementation due to construction damage, are completed and the site handed over for operation.

Contractor(s) and their Service Providers/ Sub-Contractors: The Contractor(s) is responsible for the overall execution of the activities envisioned in the construction phase including the implementation and compliance with recommendations and conditions of the EMPr. It is important that the Contractor(s) is fully aware of the responsibilities in terms of the relevant environmental legislation and the contents of this EMPr. The Contractor(s) is responsible for informing employees and sub-contractors of their environmental obligations in terms of the environmental specifications, and for ensuring that employees are adequately experienced and properly trained in order to execute the works in a manner that will minimise environmental impacts. The Contractor(s)'s obligations in this regard include the following:

» Ensure implementation and compliance with the EMPr at all times during construction activities.
» Responsible for the implementation of corrective actions enforced by the ECO/ EO for non-conformances recorded within a reasonable period of time. The Method Statement must indicate the turn-around time for closing out the non-conformances.
» Ensuring that a report is tabled at each site meeting, which will document all incidents that have occurred during the period before the site meeting.
» Employees must be provided with a basic understanding of the key environmental features of the construction site and the surrounding environment by the Contractor's Environmental Officer.
» A copy of the EMPr must be easily accessible to all on-site staff members.
» Employees must be familiar with the requirements of this EMPr and the environmental specifications as they apply to the construction of the proposed facility.
» Prior to commencing any site works, all employees and sub-contractors must have attended an environmental awareness training course which must provide staff with an appreciation of the project's environmental requirements, and how they are to be implemented. The training is to be conducted by the Environmental Officer.
» Staff will be informed of environmental issues as deemed necessary by the ECO/ EO.

All contractors (including sub-contractors and staff) and service providers are ultimately responsible for:

» Ensuring adherence to the EMPr.
» Ensuring that Method Statements are submitted to the Site Manager and ECO for approval/acceptance before any work is undertaken.
» Any lack of adherence to the above will be considered as non-compliance to the specifications of the EMPr.

» Ensuring that any instructions issued by the Site Manager on the advice of the ECO are adhered to.
» Ensuring that a register is kept in the site office, which lists all transgressions issued by the ECO/ EO.
» Ensuring that a register of all public complaints is maintained.
» Ensuring that all employees, including those of sub-contractors receive training before the commencement of construction in order that they can constructively contribute towards the successful implementation of the EMPr (i.e. ensure their staff are appropriately trained as to the environmental obligations).

Contractor's EO and Environment Representative[6]: The EO will be responsible for implementation of this EMPr and should be appointed prior to any commencement of the activities.

The Contractor's EO/ Environmental Representative should:

» Be well versed with all the project documentation and general environmental matters.
» Understand the relevant environmental legislation and processes and the implementation thereof.
» Understand the hierarchy of Environmental Compliance Reporting, and the implications of Non-Compliance.
» Know the background of the project and understand the implementation programme.
» Be able to resolve conflicts and make recommendations on site in terms of the requirements of this Specification.
» Keep accurate and detailed records of all EMPr-related activities on site. The EO shall keep a daily diary for monitoring the site specific activities as per project schedule.
» As a general mitigation strategy, the EO should supervise any flora relocation and faunal rescue activities that may need to take place during the site clearing (i.e. during site establishment, and excavation of foundations) and therefore needs the relevant training/ experience. The EO will have overall responsibility for environmental management and implementation of the required mitigation.
» The EO is responsible for managing the day-to-day on-site implementation of this EMPr and other Project Permits/Authorisations,
» Ensure or otherwise train and induct all contractor's employees prior to commencement of any works;
» Compilation of Weekly and Monthly Monitoring Reports to be submitted to the ECO and Site Manager.

[6] This refers to the Contractor's designated environmental site representative. The person might have a different title, e.g. Safety, Health and Environmental officer, but their core mandate will be as is described in this EMPr.

» In addition, the EO/ Environmental Representative must act as project liaison and advisor on all environmental and related issues and ensure that any complaints received from the public are duly recorded and forwarded to the Site Manager, ECO and Contractor(s).

5.3. Objectives for the Construction EMPr

In order to meet the goal for construction, the following objectives have been identified, together with necessary actions and monitoring requirements.

OBJECTIVE 2 : Securing the site and site establishment

The Contractor(s) must take all reasonable measures to ensure the safety of the public in the surrounding area. Where the public could be exposed to danger by any of the works or site activities, the Contractor(s) must, as appropriate, provide suitable flagmen, barriers and/or warning signs in English and any other relevant indigenous languages, all to the approval of the Site Manager. All unattended open excavations shall be adequately demarcated and/or fenced (fencing shall consist of a minimum of three strands of wire wrapped with danger tape). Adequate protective measures must be implemented to prevent unauthorised access to the working area and the internal access/haul routes.

Project component/s	» Gas turbines; » Steam turbines; » Engine halls and stacks; » HV-Yard and substation » 132kV power line; » Internal access roads; » Fuel tanks and unloading stations; » Water storage facilities (demineralisation, raw and fire water and partially treated water tanks); » Guard house, admin building, workshops and a warehouse; and » Associated infrastructures.
Potential Impact	» Hazards to landowners surrounding the site and public » Security of materials » Substantially increased damage to natural vegetation and sensitive environmental areas, due largely to unawareness of where such areas are located. » Loss of species of conservation concern » Potential impact on fauna
Activities/risk sources	» Open excavations (foundations) » Movement of construction employee and vehicles in the area and on-site
Mitigation:	» To secure the site against unauthorised entry

Target/Objective	» To protect members of the public/landowners/residents » To avoid the loss of or damage to sensitive vegetation in areas outside the immediate development footprint.

Mitigation: Action/control	**Responsibility**	**Timeframe**
Secure site, working areas and excavations in an appropriate manner.	Contractor(s) and EO	During site establishment Maintenance: for duration of Contract.
Where necessary to control access, fence and secure area using appropriate means and implement access control procedures. This will prevent authorised access to the working areas and internal access routes.	Contractor(s)	During site establishment Maintenance: for duration of Contract.
Fence and secure the site and the Contractor's equipment camp.	Contractor(s)	Erection: during site establishment Maintenance: for duration of Contract.
Develop and implement an efficient access control system which allows for the identification of all people on-site.	Contractor(s)	During site establishment Implement for duration of contract
All unattended open excavations must be adequately demarcated and/or appropriately fenced.	Contractor(s)	During site establishment
Establish appropriately bunded areas for storage of hazardous materials (i.e. fuel to be required during construction). Bunds must be constructed in order to accommodate 110% of the volume of the substance stored.	Contractor(s)	During site establishment and during construction
Establish the necessary ablution facilities with chemical toilets and provide adequate sanitation facilities and ablutions for construction workers (1 toilet per every 15 workers) at appropriate locations on site.	Contractor(s)	During site establishment and during construction
Ablution or sanitation facilities should not be located within 100m from a 1:100 year flood line or within 32m of a watercourse if the 1:100 year flood line is unknown/uncertain.	Contractor(s)	Site establishment, and duration of construction
Supply adequate waste collection bins at site where construction is being undertaken. Separate bins should be provided for general and hazardous waste. As far as possible, provision should be made for separation of	Contractor (s)	Site establishment, and duration of construction

Mitigation: Action/control	Responsibility	Timeframe
waste for recycling.		

Performance Indicator	» Site is secure and there is no unauthorised entry. » No members of the public/ landowners injured as a result of construction activities. » Fauna and flora is protected as far as practically possible » Appropriate and adequate waste management and sanitation facilities provided at construction site.
Monitoring and Reporting	» Regular visual inspection of fence for signs of deterioration/forced access. » An incident reporting system used to record non-conformances to the EMPr. » Public complaints register used to record complaints received. » EO to monitor all construction areas on a continuous basis until all construction is completed; immediate report backs to site manager. » EO to address any infringements with responsible contractors as soon as these are recorded.

OBJECTIVE 3: Rescue and translocate Protected Plants occurring within the development footprint and any adjacent areas likely to be disturbed by vegetation clearing and construction site preparation

Project component/s	» Vegetation clearing and land preparation.
Potential Impact	» Destruction of protected plants/plants of conservation importance.
Activity/risk source	» Vegetation clearing and stripping construction within the development footprint and surrounding/adjacent areas.
Mitigation: Target/Objective	» Rescue and translocation of all protected plants recorded within the development footprint prior to any construction or vegetation clearing taking place.

Mitigation: Action/control	Responsibility	Timeframe
Undertake plant rescue and translocation prior to any clearing/disturbance of the site occurring, in line with the requirements and recommendations of the Plant Rescue Translocation and Protection Plan (refer to **Appendix C**), which includes the following: » A suitable patch of similar natural sandy terrestrial coastal grassland (preferably 1ha or larger) will need to be identified outside of the construction/developed	Specialist	Prior to any vegetation clearing activities occurring, once permits have been obtained for removing plants

Mitigation: Action/control	Responsibility	Timeframe
footprint (also bearing in mind future development within the RBIDZ Phase 1F area – these areas are to be excluded from potential relocation sites) » Intact habitat is a prerequisite, with limited ecological disruptions to prevent further disturbance of translocated plant populations. » The identified suitable habitat should meet the candidate species' total biotic and abiotic needs through space and time and for all life stages. » Immediately after being transplanted, species should be adequately watered. » It is recommended that relocated plants be monitored for a period of at least a month post-translocation to identify any additional plant requirements. » Additional steps to be taken to protect rescued and translocated plants from further disturbance in order to aid/ facilitate their re-establishment at the new site may include fencing off, signage, monitoring, etc.		

Performance Indicator	» All protected plants occurring on the site which can be translocated have been successfully rescued and translocated from the grassland habitat at the development site. » The success rate of plant translocations (i.e. survival of individual relocated plants) is high.
Monitoring	» The appointed botanist or other suitable plant rescue and translocation specialist will need to be tasked with monitoring the following: * Have the correct permits been obtained for translocating protected plants at the site. * The number of protected plants rescued from the site is to be monitored by recording/documenting this, together with photos, GPS locations and a map showing where plants have been rescued. * The number of plants successfully translocated to the chosen site outside of the development footprint. * The number of plants that have survived relocation (plant survival/mortalities to be documented).

OBJECTIVE 4: Implement mitigation measures to minimise impacts to remaining natural grassland habitat outside of the physical development footprint to be cleared of vegetation and prepared during the construction phase

Project component/s	» Vegetation clearing and land preparation.
Potential Impact	» Destruction or disturbance of natural vegetation and habitat outside of the physical development footprint to be cleared of vegetation pre-construction.
Activity/risk source	» Vegetation clearing and stripping during construction within the development footprint and surrounding/adjacent areas, general access of vehicles and workers within natural areas adjacent to the development during construction vegetation clearing and site preparation.
Mitigation: Target/Objective	» Restrict construction activities that could physically destroy/disturb vegetation and habitat in natural areas beyond the development footprint, reduce the risk of unnecessary disturbance and unauthorised access into adjacent sensitive natural areas during construction vegetation clearing and site preparation.

Mitigation: Action/control	Responsibility	Timeframe
Physically demarcate the construction zone to be cleared of vegetation and prepared using suitable measures (including pegs, fences, orange bonnox fencing, hazard tape, etc.).	Contractor with the assistance of the EO	To be undertaken and completed prior to any site preparation/ vegetation clearing activities commencing
Restrict vegetation clearing to the development footprint only through appropriate project design and specifying and supervising access control areas.	Contractor with the assistance of the EO	Duration of the construction period
Manage the extent of disturbance by supervising clearing activities during pre-construction to ensure these are limited to the designated development zone only. The EO is to provide supervision and oversight of vegetation clearing activities and other activities which may cause damage to the environment at the initiation of the project.	Contractor with the assistance of the EO	Duration of the construction period
Where access is required to areas surrounding the development site, a 2m buffer may be used for access. Where possible, cut vegetation to ground-level rather than removing it completely, leaving	Contractor with the assistance of the EO	Duration of the construction period

Mitigation: Action/control	Responsibility	Timeframe
root systems intact to ensure rapid re-colonization in areas that are not to be permanently hardened.		
No harvesting of plants for firewood, medical purposes or other uses is to be permitted.	Contractor and EO	Duration of the construction period
No open fires to be permitted on the site and in surrounding areas.	Contractor and EO	Duration of the construction period
An appropriate fining system should be developed and implemented for any infringements to the EMPr.	Contractor and EO	Duration of the construction period
Any disturbed natural areas outside of the area to be developed must be re-vegetated as soon as practically possible to prevent erosion of bare/exposed soils, as per the relevant rehabilitation guidelines contained in Section 4.4.4 of the specialist terrestrial ecological report (refer to Appendix H of the EIA Report).	Contractor under the guidance of the EO and with the support of a rehabilitation specialist where appointed	Duration of the construction period

Performance Indicator	» Records indicate that all staff have undergone environmental induction training. » A copy of the EMPr is located at the site at all times. » Access and work within natural areas adjacent to the site have been minimised to a 2m buffer and have been appropriately managed. » Site inspection reports indicate situations of non-compliance and corrective actions have been implemented and if not, the reason why. » A fines system has been implemented for any major infringements to the conditions of the EMPr. » Rehabilitation of any natural areas disturbed outside of the development footprint have been adequately rehabilitated as per the specialist rehabilitation guidelines contained in the terrestrial ecological report.
Monitoring	» Regular site visits and compliance audits to be undertaken by the ECO and EO. » An incident reporting system must be implemented by the EO with the support of the ECO to record any non-issues of non-compliance with the requirements of the EMPr and identify corrective actions to be actioned to address incidents and ensure compliance is achieved. » Records of environmental inductions and staff attendance to be maintained by the EO.

OBJECTIVE 5: Manage bare/exposed soils during and after vegetation clearing to limit the risk of eroding top soils and causing sedimentation within adjacent natural areas during the pre-construction phase

Project component/s	» Vegetation clearing and land preparation.
Potential Impact	» Soil erosion can result in the loss of valuable topsoil and formation of erosion gullies. This can cause localized habitat loss or alteration due to increased sediment deposition or erosion of natural areas, affecting vegetation condition, ecological processes and diminishing habitat available for fauna/flora.
Activity/risk source	» Vegetation stripping/clearing will temporarily denude the vegetation on the site and expose the soils to erosive elements in the immediate to short-term.
Mitigation: Target/Objective	» Onsite measures to be provided that aim to minimise erosion of soils and resultant sedimentation risks.

Mitigation: Action/control	Responsibility	Timeframe
Vegetation clearing should ideally proceed mainly during the dry, winter months where possible in order to minimize the risk of soil erosion linked to high runoff rates.	Contractor	Construction
Vegetation/ soil clearing activities must only be undertaken during agreed working times and permitted weather conditions. If heavy rains are expected, clearing activities should be put on hold. In this regard, the contractor must be aware of weather forecasts.	Contractor	Duration of the construction period
Schedule vegetation clearing such that this is completed immediately before construction in an area, to avoid prolonged exposure of the soil to weather elements.	Contractor	Duration of the construction period
Any disturbed natural areas outside of the area to be developed must be re-vegetated as soon as practically possible to prevent erosion of bare/exposed soils, as per the relevant rehabilitation guidelines contained in Section 4.4.4 of the specialist terrestrial ecological report (refer to Appendix H of the EIA Report).	Contractor	Duration of the construction period

Performance Indicator	» Vegetation clearing is undertaken at suitable times to limit exposure of bare soils to heavy rainfall.

	» Vegetation clearing is scheduled and undertaken immediately prior to construction commencing in an area to limit exposure of bare soils. » Rehabilitation of any natural areas disturbed outside of the development footprint have been adequately rehabilitated as per the specialist rehabilitation guidelines.
Monitoring	» After every rainfall event, the contractor must check the site for erosion damage and rehabilitate this damage immediately. » Regular site visits and compliance audits to be undertaken by the ECO and EO. » An incident reporting system must be implemented by the EO with the support of the ECO to record any non-issues of non-compliance with the requirements of the EMPr and identify corrective actions to be actioned to address incidents and ensure compliance is achieved.

OBJECTIVE 6: Manage the risk of direct impacts to fauna during vegetation clearing and site preparation

Project component/s	» Vegetation clearing and land preparation.
Potential Impact	» Vegetation stripping and site clearing/preparation activities can result in mortalities or damage to local wildlife (fauna/animals) as a result of vehicles and machinery operating in the area.
Activity/risk source	» During initial vegetation clearing, local fauna and possibly species conservation importance such as Red Data and protected species may be killed, injured or damaged. » Human activities occurring within a close proximity to natural habitat can also lead to increased pressure on natural resources through illegal hunting/poaching/trapping of wildlife for various uses such as food/medicinal purposes.
Mitigation: Target/Objective	» Onsite control measures to be provided that aim to minimise the risk of incurring direct impacts to fauna.

Mitigation: Action/control	Responsibility	Timeframe
Manage the extent of disturbance by supervising clearing activities to ensure these are limited to the designated development zone only.	Contractor and EO	Duration of the construction period
Any fauna/animal found on the site during site clearing may not under any circumstance be hunted, snared, captured, injured, killed, and harmed in any way. Such animals must rather be moved to the closest point of natural or semi-natural vegetation outside the area to be stripped. This	Contractor and EO	Duration of the construction period

Mitigation: Action/control	Responsibility	Timeframe
includes animals perceived to be vermin (such as snakes, rats, mice, etc.). Workers are to be informed of this requirement.		
The handling and relocation of any animal (including those which are potentially dangerous/ venomous/ poisonous) must be undertaken by a suitably trained individual.	EO and specialist	Reactive: upon incident occurring
All vehicles accessing the site should adhere to a low speed limit (30km/h is recommended) to avoid collisions with susceptible species such as reptiles (snakes and lizards).	Contractor and EO	Duration of the construction period
No litter, food or other foreign material should be disposed of on the ground or left around the site or within adjacent natural areas and should be placed in demarcated and fenced rubbish and litter areas that are animal proof.	Contractor and EO	Duration of the construction period

Performance Indicator	» Records indicate that all staff have undergone environmental induction training. » A copy of the EMPr is located at the site at all times. » Site inspection reports indicate any situations of non-compliance and corrective actions have been implemented and if not, the reason why. » Fines have been issued for any major infringements to the conditions of the EMPr. » The extent of the area to be cleared of vegetation has been restricted to the development footprint. » No wildlife has been unnecessarily harmed during pre-construction vegetation clearing and site preparation activities.
Monitoring	» Regular site visits and compliance audits to be undertaken by the ECO and EO. » An incident reporting system must be implemented by the EO with the support of the ECO to record any non-issues of non-compliance with the requirements of the EMPr and identify corrective actions to be actioned to address incidents and ensure compliance is achieved. » Records of environmental inductions and staff attendance to be maintained by the EO.

OBJECTIVE 7: Manage the risk of direct impacts to fauna during construction

Project component/s	» Activities associated with construction of the power plant facility and associated infrastructure including earthworks, operation of machinery and presence of construction workers.
Potential Impact	» Construction activities can result in mortalities or damage to local wildlife (fauna/animals) as a result of vehicles and machinery operating in the area.
Activity/risk source	» During construction, local fauna and possibly species conservation importance such as Red Data and protected species may be killed, injured or damaged. » Human activities occurring within a close proximity to natural habitat can also lead to increased pressure on natural resources through illegal hunting/poaching/trapping of wildlife for various uses such as food/medicinal purposes.
Mitigation: Target/Objective	» Onsite control measures to be provided that aim to minimise the risk of incurring direct impacts to fauna.

Mitigation: Action/control	Responsibility	Timeframe
Manage the extent of disturbance by supervising construction to ensure these are limited to the designated construction zone only.	EO	Duration of the construction period
The handling and relocation of any animal perceived to be dangerous/venomous/poisonous must be undertaken by a suitably trained individual.	EO and specialist	Reactive: upon incident occurring
All construction and other vehicles accessing the site should adhere to a low speed limit (30km/h is recommended) to avoid collisions with susceptible species such as reptiles (snakes and lizards).	Contractor and EO	Duration of the construction period
No litter, food or other foreign material should be disposed of on the ground or left around the site or within adjacent natural areas and should be placed in demarcated and fenced rubbish and litter areas that are animal proof.	Site supervisor	Duration of the construction period

Performance Indicator	» Records indicate that all staff have undergone environmental induction training. » A copy of the EMPr is located at the site at all times. » Site inspection reports indicate any situations of non-compliance and corrective actions have been implemented and if not, the reason why. » Fines have been issued for any major infringements to the conditions of the EMPr.

	» The extent of the construction zone has been restricted to the development footprint. » No wildlife has been unnecessarily harmed by construction activities or construction workers.
Monitoring and Reporting	» Regular site visits and compliance audits to be undertaken by the ECO and EO. » An incident reporting system must be implemented by the EO with the support of the ECO to record any non-issues of non-compliance with the requirements of the EMPr and identify corrective actions to be actioned to address incidents and ensure compliance is achieved. » Records of environmental inductions and staff attendance to be maintained by the EO.

OBJECTIVE 8: Manage the disturbance caused by noise during construction activities

Project component/s	» Vegetation clearing and land preparation. » Construction activities » Vehicular movements
Potential Impact	» Vegetation stripping and initial site clearing/preparation activities can result in noise pollution that could disturb fauna in the area.
Activity/risk source	» During initial vegetation clearing, local fauna could be affected by increased noise levels due to humans and machinery operating at the development site. » Impacts are likely to be short-lived during the construction phase and affecting only a few areas of natural habitat where sensitive species may occur and will probably mainly affect local bird species that can quite easily migrate to other similar habitat in the area. Other locally common species already occurring in the surrounding area are likely to be less sensitive to noise disturbance (due to the proximity of existing human development) and can probably become habituated at the site.
Mitigation: Target/Objective	» Onsite control measures to be implemented where practically possible that aim to reduce noise disturbance.

Mitigation: Action/control	Responsibility	Timeframe
Manage the extent of disturbance by supervising clearing activities during construction to ensure these are limited to the designated development zone only.	Contractor and EO	Duration of the construction period
Ensure that workers accessing the site conduct themselves in an acceptable manner while on site.	Contractor and EO	Duration of the construction period
Temporary noise pollution should be minimized by ensuring the proper	Contractor and EO	Duration of the construction period

Mitigation: Action/control	Responsibility	Timeframe
maintenance of equipment and vehicles, and tuning of engines and mufflers as well as employing low noise equipment where possible.		
No activities should be permitted at the site after dark (between sunset and sunrise), except for security personnel guarding the development site.	Contractor and EO	Duration of the construction period

Performance Indicator	» Site inspection reports indicate any situations of non-compliance and corrective actions have been implemented and if not, the reason why. » Fines have been issued for any major infringements to the conditions of the EMPr. » The extent of the area to be cleared of vegetation has been restricted to the development footprint.
Monitoring	» Regular site visits and compliance audits to be undertaken by the ECO and EO. » An incident reporting system must be implemented by the EO with the support of the ECO to record any non-issues of non-compliance with the requirements of the EMPr and identify corrective actions to be actioned to address incidents and ensure compliance is achieved. » Records of environmental inductions and staff attendance to be maintained by the EO.

OBJECTIVE 9: Maximise local employment and skills opportunities associated with the construction phase

It is acknowledged that skilled personnel are required for the construction of the power plant and associated infrastructure. However, where semi-skilled and unskilled labour is required, opportunities for local employment should be maximised as far as possible. Employment of locals and the involvement of local Small, Micro and Medium Enterprises (SMMEs) would enhance the social benefits associated with the project, even if the opportunities are only temporary. The procurement of local goods could furthermore result in positive economic spin-offs.

Project component/s	» Construction of the power plant and associated infrastructure.
Potential Impact	» The opportunities and benefits associated with the creation of local employment and skills development to be maximised.
Activities/risk sources	» Construction procurement practice employed by the contractor » Proponent's investment plan
Enhancement:	» The proponent should aim to employ as many low-skilled and semi-

Target/Objective	skilled workers from the local area as possible. This should also be made a requirement for all contractors.

Mitigation: Action/control	Responsibility	Timeframe
If possible, employ local contractors that are compliant with Broad Based Black Economic Empowerment (BBBEE) criteria.	Proponent and Contractor	Pre-construction and construction phase
It is recommended that a local employment policy is adopted to maximise the opportunities made available to the local labour force (sourced from nearest towns/settlements).	Proponent and Contractor	Pre-construction and construction phase
The recruitment selection process should seek to promote gender equality and the employment of women wherever possible.	Contractor	Pre-construction and construction phase
Where feasible, training and skills development programmes are to be initiated prior to the commencement of the construction phase.	Proponent	Pre-construction and construction phase
A method of communication should be implemented whereby procedures to lodge complaints are set out in order for the local community to express any complaints or grievances with the construction process. The contractor should appoint a designated staff member to implement grievance procedures and address issues and complaints. A Public Complaints register must be maintained, by the Contractor to record all complaints and queries relating to the project and the action taken to resolve the issue.	Contractor	Pre-construction and construction phase

Performance Indicator	» Employment policy document that sets out local employment and targets completed before construction phase commences; » Employ as many local semi and unskilled labour as possible. » Training and skills development programme undertaken prior to the commencement of construction phase.
Monitoring and Reporting	» The proponent and contractor must keep a record of local recruitments and information on local labour to be shared with the ECO for reporting purposes.

OBJECTIVE 10: Maximise the local economic multiplier effect during construction phase

Project component/s	» Construction of the power plant and associated infrastructure.
Potential Impact	» Potential local economic benefits

Activity/risk source	» Proponent's procurement plan
Enhancement: Target/Objective	» Increase the procurement of goods and services especially within the local economy

Enhancement: Action/control	Responsibility	Timeframe
It is recommended that a local procurement policy is to be developed and adopted to maximise the benefits to the local economy	Proponent and Contractor	Pre-construction and construction phase
Where feasible, develop a database of local companies, specifically Historically Disadvantaged (HD) which qualify as potential service providers (e.g. construction companies, security companies, catering companies, waste collection companies, transportation companies etc.) prior to the tender process and invite them to bid for project-related work where applicable	Proponent and Contractor	Pre-construction and construction phase
Where feasible, source as much goods and services as possible from the local area. Engage with local authorities and business organisations to investigate the possibility of procurement of construction materials, goods and products from local suppliers	Proponent	Pre-construction and construction phase

Performance Indicator	» Local procurement policy is developed and adopted » Local goods and services are purchased from local suppliers where feasible
Monitoring	» The proponent must monitor indicators listed above to ensure that they have been met for the construction phase

OBJECTIVE 11: Reduce the pressure on economic and social infrastructure and social conflicts from an influx of jobseekers during the construction phase

Project component/s	» Construction of the power plant and associated infrastructure.
Potential Impact	» Decline on local economic and social infrastructure and services as well as a rise in social conflicts from an influx of jobseekers
Activity/risk source	» Influx of jobseekers
Mitigation: Target/Objective	» To avoid or minimise the potential impact on local infrastructure, services and communities and their livelihoods

Mitigation: Action/control	Responsibility	Timeframe
A 'locals first' policy should be advertised for construction employment opportunities, especially for	Proponent and Contractor	Pre-construction and construction

Mitigation: Action/control	Responsibility	Timeframe
semi and low-skilled job categories.		phase
Tender document should stipulate the use of local labour as far as possible	Contractor	Pre-construction and construction phase
Prior to construction commencing representatives from the local community (e.g. ward councillor, surrounding landowners) should be informed of details of the construction schedule and exact size of the workforce.	Proponent and Contractor	Pre-construction and construction phase
Recruitment of temporary workers at the gates of the proposed development should not be allowed. A recruitment office should be established by the contractor in a nearby town to deal with jobseekers.	Contractor	Pre-construction and construction phase
Clear rules and regulations for access to the proposed site must be implemented.	Contractor	Pre-construction and construction phase
Security company must be appointed and appropriate security procedures implemented	Proponent and Contractor	Pre-construction and construction phase
Establish procedures for the control and removal of loiterers at the construction site.	Contractor	Pre-construction and construction phase
A comprehensive employee induction programme should address issues such as HIV/ AIDS and sexually transmitted diseases. The induction should also address a code of conduct for employees that would align with community values.	Contractor	Pre-construction and construction phase

Performance Indicator	» Ensure 'locals first' policy is adopted/advertised » Ensure no recruitment takes place on site » Control/removal of loiters
Monitoring	» The proponent must keep a record of local recruitments and information on local labour to be shared with the EO and ECO for reporting purposes.

OBJECTIVE 12: To avoid traffic disruptions, traffic congestion and reduce the impact on movement patterns of local community during the construction phase

Project component/s	» Construction of the power plant and associated infrastructure.
Potential Impact	» Increase in traffic disruptions, congestion, safety hazards and impacts on movement patterns of local community

Activity/risk source	» Construction activities affecting daily living and movement patterns
Mitigation: Target/Objective	» To avoid or minimise the potential impact on local communities and their livelihoods

Mitigation: Action/control	Responsibility	Timeframe
Develop and implement a traffic management plan (Refer to **Appendix E**).	Contractor(s), (Transportation sub-contractor)	Duration of contract
All relevant permits for abnormal loads must be applied for from the relevant authority.	Contractor(s), (Transportation sub-contractor)	Duration of contract
Any traffic delays because of construction traffic must be co-ordinated with the appropriate authorities.	Contractor(s)	Duration of contract
Signage must be established at appropriate points warning of turning traffic and the construction site (all signage to be in accordance with prescribed standards). Signage must be maintained on an on-going basis.	Contractor(s)	Duration of contract
Signs must be placed along construction roads to identify speed limits, travel restrictions, and other standard traffic control information. Signs are to be appropriately placed and must be maintained throughout the construction phase.	Contractor(s)	Duration of contract
All vehicles travelling on public roads must adhere to the specified speed limits and all drivers must be in possession of an appropriate valid driver's license.	Contractor(s)	Duration of contract
The R34 (John Ross Pkwy) access route to the IDZ 1F area should be utilised as far as possible.	Contractor	Construction phase
All vehicles must be road worthy and be inspected regularly to ensure their road safety worthiness.	Contractor	Duration of contract
Implement penalties for reckless driving for the drivers of heavy vehicles as a way to enforce compliance to traffic rules.	Contractor	Construction phase
Appropriate road management strategies must be implemented on external and internal roads with all employees and contractors required to abide by standard road and safety procedures.	Contractor(s), (Transportation sub-contractor)	Duration of contract
The movement of all vehicles within the site must be on designated roadways.	Contractor(s)	Duration of contract
All hazardous substances must be transported in accordance with the relevant legislation and regulations.	Contractor(s)	Duration of contract
A method of communication should be implemented whereby procedures to lodge complaints are set out in order for the local community to express any complaints or grievances with the construction process. The EPC	Contractor	Pre-construction & construction phase

Mitigation: Action/control	Responsibility	Timeframe
contractor should appoint a designated staff member to implement grievance procedures and address issues and complaints. A Public Complaints register must be maintained, by the Contractor and monitored by the ECO, to record all complaints and queries relating to the project and the action taken to resolve the issue.		

Performance Indicator	» Vehicles are roadworthy, inspected regularly and speed limits are adhered to » Roads are maintained or improved upon if disturbed from project activities
Monitoring	» The proponent and contractor must monitor the indicators listed above to ensure that they have been met for the construction phase.

OBJECTIVE 13: To avoid or reduce the possibility of the increase in crime and safety and security issues during the construction phase due to workers in the area

Project component/s	» Construction of the power plant and associated infrastructure.
Potential Impact	» Increase in crime atributable to influx of non-local workforce and job seekers into the area
Activity/risk source	» Safety and security risks associated with construction activities
Mitigation: Target/Objective	» To avoid or minimise the potential impact on local communities and their livelihoods

Mitigation: Action/control	Responsibility	Timeframe
Working hours should be kept to daylight hours during the construction phase, and/or as any deviation that is approved by the surrounding landowners.	Contractor	Construction phase
The perimeter of the construction site should be appropriately secured to prevent any unauthorised access to the site; the fencing of the site should be maintained throughout the construction period.	Contractor	Pre-construction and construction phase
A security company must be appointed and appropriate security procedures implemented.	Contractor	Construction Phase
Access in and out of the site should be strictly controlled by a security company.	Contractor	Construction Phase
Provide workers with identity tags and prohibit the access of unauthorized people to the construction site.	Contractor	Construction Phase
Open fires on the site for heating, smoking or cooking must not be allowed, except in designated areas.	Contractor	Construction phase

Mitigation: Action/control	Responsibility	Timeframe
Provide adequate firefighting equipment on site and provide firefighting training to selected construction staff.	Contractor	Pre-construction and construction phase
A comprehensive employee induction programme must be developed and utilised to cover land access protocols, fire management and road safety	Contractor	Pre-construction and construction phase
Ensure roads utilised are either maintained in the present condition or restored if disturbed from project activities	Proponent and Contractor	Construction phase
Have a personal trained in first aid on site to deal with smaller incidents that require medical attention	Contractor	Pre-construction and construction phase
All vehicles must be road worthy and drivers must be qualified and made aware of the potential road safety issues and follow the speed limits.	Contractor	Pre-construction and construction phase
A method of communication should be implemented whereby procedures to lodge complaints are set out in order for the local community to express any complaints or grievances with the construction process. The EPC contractor should appoint a designated staff member to implement grievance procedures and address issues and complaints. A Public Complaints register must be maintained, by the Contractor and monitored by the ECO, to record all complaints and queries relating to the project and the action taken to resolve the issue.	Contractor	Pre-construction and construction phase

Performance Indicator	» Employee induction programme, covering land access protocols, fire management and road safety » The construction site is appropriately secured with a controlled access system » Ensure a security company is appointed and appropriate security procedures and measures are implemented
Monitoring	» The proponent and contractor must monitor the indicators listed above to ensure that they have been met for the construction phase.

OBJECTIVE 14: Ensure disciplined conduct of on-site contractors and workers

In order to minimise impacts on the surrounding environment, Contractors must be required to adopt a certain Code of Conduct and commit to restricting construction activities to areas within the development footprint. Contractors and their sub-contractors must be familiar with the conditions of the Environmental Authorisation, the EIA Report and this EMPr, as well as the requirements of all relevant environmental legislation.

Project component/s	» Gas turbines; » Steam turbines; » Engine halls and stacks; » HV-Yard and substation » 132kV powerline; » Internal access roads; » Fuel tanks and unloading stations; » Water storage facilities (demineralisation, raw and fire water and partially treated water tanks); » Guard house, admin building, workshops and a warehouse; and » Associated infrastructures.
Potential Impact	» Pollution/contamination of the environment; and » Disturbance to the environment and surrounding communities.
Activity/risk source	» Contractors are not aware of the requirements of the EMPr, leading to unnecessary impacts on the surrounding environment.
Mitigation: Target/Objective	» To ensure appropriate management of actions by on-site personnel in order to minimise impacts to the surrounding environment.

Mitigation: Action/control	Responsibility	Timeframe
Contractors must use chemical toilets/ablution facilities situated at designated areas of the site; no abluting must be permitted outside the designated area. These facilities must be regularly serviced by appropriate contractors.	Contractor(s) (and sub-contractor/s)	Duration of contract
Cooking must take place in the kitchen (and canteen). No firewood or kindling may be gathered from the site or surrounds.	Contractor(s) (and sub-contractor/s)	Duration of contract
All litter must be deposited in a clearly marked, closed, animal-proof disposal bin in the construction area; particular attention needs to be paid to food waste.	Contractor(s) (and sub-contractor/s)	Duration of contract
No one must disturb flora or fauna outside of the demarcated construction area/s.	Contractor(s) (and sub-contractor/s)	Duration of contract

Performance Indicator	» Compliance with specified conditions of Environmental Authorisation, EIA Report and EMPr; » No complaints regarding contractor behaviour or habits; and » Code of Conduct drafted before commencement of construction phase and briefing session with construction workers held at outset of construction phase.
Monitoring and Reporting	» Observation and supervision of Contractor practices throughout construction phase. » A complaints register must be maintained, in which any complaints from the community are to be logged. Complaints must be

	investigated and, if appropriate, acted upon as soon as possible. » An incident reporting system must be used to record non-conformances to the EMPr.

OBJECTIVE 15: Management of Noise

Project component/s	Construction of: » Gas turbines; » Steam turbines; » Engine halls and stacks; » HV-Yard and substation » 132Kv powerline; » Internal access roads; » Fuel tanks and unloading stations; » Water storage facilities (demineralisation, raw and fire water and partially treated water tanks); » Guard house, admin building, workshops and a warehouse; and » Associated infrastructures.
Potential Impact	» Heavy vehicles and construction activities can generate noise.
Activity/risk source	» Construction activities
Mitigation: Target/Objective	» To avoid and or minimise the potential noise impacts associated with construction activities. » The preferred method for controlling noise from stationary sources is to implement noise control measures at source.

Mitigation: Action/control	Responsibility	Timeframe
On-site construction activities should be limited to daylight hours as far as possible. No construction activities after 13:00 on Saturdays, Sundays and public holidays. Should construction activities need to be undertaken outside of these times, landowners need to be consulted. Where work takes place outside of normal working hours, the relevant legislation should be adhered to.	Contractor(s)	Construction
Construction staff working in areas where the 8-hour ambient noise levels exceed 75Dba must wear ear protection equipment.	Contractor(s)	Construction
Construction noise must be managed according to the Noise Control Regulations and SANS 10103	Contractor(s)	Construction
The construction crew must abide by the national standards and local by-laws, if any, regarding noise.	Contractor(s)	Construction
Select equipment with lower sound power levels.	Contractor(s)	Construction
Installing suitable mufflers on engine exhaust.	Contractor(s)	Construction
Establish a line of communication and notify all	Contractor(s)	All phases of

Mitigation: Action/control	Responsibility	Timeframe
stakeholders and sensitive receptors of the means of registering any issues, complaints or comments.		project.

Performance Indicator	» Grievance mechanism and communication channel procedures.
Monitoring	» Should a complaint about noise be reported, the Proponent and/or Contractor(s) is to look into the matter and determine steps to deal with the complaint. » An incident reporting system must be used to record non-conformances to the EMPr. » Public complaints register used to record complaints received.

OBJECTIVE 16: Management of dust and emissions

Project component/s	Construction of: » Gas turbines; » Steam turbines; » Engine halls and stacks; » HV-Yard and substation; » 132Kv powerline; » Internal access roads; » Fuel tanks and unloading stations; » Water storage facilities (demineralisation, raw and fire water and partially treated water tanks); » Guard house, admin building, workshops and a warehouse; and » Associated infrastructures.
Potential Impact	» Heavy vehicles can generate noise and dust impacts. Movement of heavy vehicles can also damage roads; » Dust and particulates from vehicle movement to and on-site, foundation excavation, road construction activities, road maintenance activities, temporary stockpiles, and vegetation clearing affecting the surrounding residents (dust nuisance) and visibility; and » Release of minor amounts of air pollutants (for example NO_2, CO and SO_2) from vehicles and construction equipment.
Activities/risk sources	» The movement of heavy vehicles and their activities on the site can result in noise and dust impacts and damage roads; » Clearing of vegetation and topsoil; » Excavation, grading and scraping; » Transport of materials, equipment and components on internal access roads; » Re-entrainment of deposited dust by vehicle movements; » Wind erosion from topsoil and spoil stockpiles and unsealed roads and surfaces; and » Fuel burning from construction vehicles with combustion engines.
Mitigation:	» To avoid and or minimise the potential noise and dust impacts

Target/Objective	associated with heavy vehicles, and also minimise damage to roads; and » To ensure emissions from all vehicles are minimised, where possible, for the duration of the construction phase; and » To minimise nuisance to the community and adjacent landowners from dust emissions and to comply with workplace health and safety requirements for the duration of the construction phase.

Mitigation: Action/control	Responsibility	Timeframe
Implement appropriate dust suppression measures on site such as wetting roads on a regular basis including during site clearing and periods of high winds (by using non-potable water as far as practically possible).	Contractor(s) and EO	Construction
Haul vehicles moving outside the construction site carrying material that can be wind-blown should be covered with tarpaulins.	Contractor(s)	Duration of contract
Ensure vehicles adhere to speed limits on public roads and speed limits set within the site.	Contractor(s) / transportation contractor and EO	Duration of contract
Disturbed areas must be re-vegetated as soon as practicable after construction is complete in an area.	Contractor(s)	At completion of the construction phase.
Vehicles and equipment must be maintained in a road-worthy condition at all times.	Contractor(s)	Prior to construction phase.
Ensure that damage to gravel public roads and access roads attributable to construction vehicles use for the construction of the Project is repaired before completion of construction phase.	Contractor(s) and EO	Before completion of construction phase.
Regular dust control of materials (sand, soil, concrete) must be used on site.	Contractor(s) and EO	Construction
Strictly control vibration pollution from compaction plant or excavation plant as far as practically possible.	Contractor(s) and EO	Construction
Disturbed areas must be re-vegetated as soon as practicable.	Contractor(s)	At completion of the construction phase.
If monitoring results or complaints indicate inadequate performance against the criteria indicated, then the source of the problem will be identified, and existing procedures or equipment modified to ensure the problem is rectified.	Contractor(s) and EO	Duration of contract

Performance Indicator	» Appropriate dust suppression measures implemented on site during the construction phase. » Drivers made aware of the potential safety issues and enforcement of

	strict speed limits when they are employed or before entering the site. » Road worthy certificates in place for all heavy vehicles at outset of construction phase and up-dated on a monthly basis.
Monitoring and Reporting	» The Proponent and appointed EO must monitor indicators listed above to ensure that they have been met for the construction phase. » Immediate reporting by personnel of any potential or actual issues with nuisance dust or emissions to the Site Manager. » An incident reporting system must be used to record non-conformances to the EMPr. » Public complaints register used to record complaints received.

OBJECTIVE 17: Protection of heritage resources

As noted in the EIA Report, surveys undertaken in the area adequately captured the heritage resources. The heritage resources identified have low local significance ratings. Almost all of the sites are archaeological and have previously been identified during heritage impact assessments conducted by Gavin Anderson. The only built environment heritage resource is 5.5km to the north of the proposed development area. The buildings at this site are associated with the railway infrastructure and are well away from the development. There are no known sites which require mitigation or management plans. No further heritage work is required for the proposed development. Should the contractor come across any items that may be of heritage significance, the relevant mitigation measures included in this EMPr must be implemented.

Project component/s	» Gas turbines; » Steam turbines; » Engine halls and stacks; » HV-Yard and substation » 132Kv powerline; » Internal access roads; » Fuel tanks and unloading stations; » Water storage facilities (demineralisation, raw and fire water and partially treated water tanks); » Guard house, admin building, workshops and a warehouse; and » Associated infrastructures.
Potential Impact	» Heritage objects or artefacts found on site are inappropriately managed or destroyed; and » Loss of fossil resources.
Activity/risk source	» Site preparation and earthworks; » Foundations or plant equipment installation; » Mobile construction equipment movement on site; and » Internal access road construction activities.
Mitigation: Target/Objective	» To ensure that any heritage objects found on site are treated appropriately and in accordance with the relevant legislation.

Mitigation: Action/control	Responsibility	Timeframe
The EO for the project should be alerted to the potential for, and scientific significance of, new fossil finds during the construction phase of the development. They should familiarise themselves with the sort of fossils concerned through museum displays and accessible, well-illustrated literature.	EO	Duration of contract
If a heritage object, fossil resource, archaeological or palaeontological material, or human remains are discovered during excavations, immediately stop excavation in the vicinity of the potential material. ECO to inform the developer and the developer must contact an appropriate specialist to assess the site, notify the administering authority (Amafa / Heritage KwaZulu Natali and/or the South African Heritage Resources Agency) of the item/site, so that a systematic and professional investigation can be undertaken. Sufficient time should be allowed to investigate and to remove/collect such material.	Proponent, contractor, EO and specialist	Duration of contract

Performance Indicator	» No disturbance outside of designated work areas » All heritage items located are dealt with as per the legislative guidelines
Monitoring and Reporting	» Observation of excavation activities by EO throughout construction phase. » Supervision of all clearing and earthworks. » An incident reporting system must be used to record non-conformances to the EMPr. » Public complaints register must be used to record complaints received.

OBJECTIVE 18: Management of Waste (general /domestic /liquid in nature)

Project component/s	Construction of: » Gas turbines; » Steam turbines; » Engine halls and stacks; » HV-Yard and substation » 132Kv powerline; » Internal access roads; » Fuel tanks and unloading stations; » Water storage facilities (demineralisation, raw and fire water and partially treated water tanks); » Guard house, admin building, workshops and a warehouse; and

	» Associated infrastructures.
Potential Impact	» Inefficient use of resources resulting in excessive waste generation. » Litter or contamination of the site or water through poor waste management practices.
Activities/risk sources	» All construction related activities. » Packaging and other construction wastes. » Spoil material from excavation, earthworks and site preparation
Mitigation: Target/Objective	» To ensure appropriate waste storage and disposal. » To ensure that the generation, storage and handling of waste does not cause pollution to the environment or harm to persons. » To comply with waste management legislation. » To minimise production of waste. » To avoid environmental harm from waste disposal.

Mitigation: Action/control	Responsibility	Timeframe
Hazardous and non-hazardous waste must be separated at source. Separate waste collection bins must be provided for this purpose. These bins must be clearly marked and appropriately covered.	Contractor and EO	Erection: during site establishment Maintenance: for duration of Contract within a particular area.
Bins and skips must be available on-site for collection, separation and storage of waste streams (such as wood, metals, general refuse etc.).	Contractor(s)	Duration of contract
No waste to be burnt or buried on-site or surrounding the site (i.e. in vacant land).	Contractor and EO	Duration of contract
Avoiding or minimizing the generation waste materials, as far as practicable.	Contractor and EO	Duration of contract
Where waste generation cannot be avoided but has been minimized, recovery and reuse is encouraged.	Contractor and EO	Duration of contract
Where waste cannot be recovered or reused; store and dispose of it in an environmentally sound manner. Disposal of waste must be in accordance with relevant legislative requirements, including the use of licensed contractors and licensed waste disposal sites. It is understood that refuse removal takes place weekly by the uMhlathuze Local Municipality.	Contractor and EO	Duration of contract
Specific areas must be designated on-site for the temporary management of various waste streams, i.e. general refuse, construction waste (wood and metal scrap) and contaminated waste. Location of such areas must seek to minimise the potential for impact on the surrounding environment, including prevention	Contractor and EO	Duration of contract

Mitigation: Action/control	Responsibility	Timeframe
of contaminated runoff, seepage and vermin control.		
Disposal of waste must be in accordance with relevant legislative requirements, including the use of licensed contractors and licensed waste disposal sites.	Contractor and EO	Duration of contract
An incident/complaints register must be established and maintained on-site.	Contractor and EO	Duration of contract
Upon the completion of construction, the area will be cleared of potentially polluting materials.	Contractor(s)	Completion of construction
Supply adequate weather and vermin proof waste collection bins and skips (covered at minimum with secured netting or shadecloth) at site where construction is being undertaken.	Contractor and EO	Site establishment, and duration of construction
Liquid waste: » No liquid waste, including grey water, may be discharged into any water body or drainage line. » All sewage disposal to take place at a registered and operational wastewater treatment works. » Slips of disposal to be retained as proof of responsible disposal. » The waste water will be contaminated with heavy metals and must be disposed of by a specialist contractor. » The waste water must be stored in a sump at each unit. » Oily water must be collected from drains and processes at the gas turbines. » The oily water must be sent to an oily water separator (one at each unit). » Oil that is separated from the water must be removed from the sump periodically by a specialist contractor. » The grey water from the separator must be discharged into the municipal's wastewater system which is a dedicated effluent discharge pipeline used by existing industrial users. It must however be noted that prior to any discharge of grey water, the developer must obtain an oil contamination requirement from the municipality to ensure that the oily water separator filter purchased is of the correct specifications. This will ensure that grey water discharged into the municipal system will not further contaminate the municipal wastewater system.	Contractor and EO	During and post construction.
Upon the completion of construction, the area must be cleared of potentially polluting materials. Spoil	Contractor and EO	Completion of construction

Mitigation: Action/control	Responsibility	Timeframe
stockpiles must also be removed and appropriately disposed of or the material re-used for an appropriate purpose.		

Performance Indicator	» No complaints received regarding waste on site or indiscriminate dumping; » Internal site audits ensuring that waste segregation, recycling and reuse is occurring appropriately; and » Provision of all appropriate waste manifests for all waste streams.
Monitoring and Reporting	» A complaints register must be maintained, in which any complaints from the community must be logged. Complaints must be investigated and, if appropriate, acted upon. » Observation and supervision of waste management practices throughout construction phase. » Waste collection to be monitored on a regular basis. » Waste documentation completed. » An incident reporting system must be used to record non-conformances to the EMPr. » Proponent and appointed ECO must monitor indicators listed above to ensure that they have been met for the construction phase.

OBJECTIVE 19: Appropriate handling, management and storage of chemicals, hazardous substances and hazardous waste

Project component/s	Construction of: » Gas turbines; » Steam turbines; » Engine halls and stacks; » HV-Yard and substation » 132Kv powerline; » Internal access roads; » Fuel tanks and unloading stations; » Water storage facilities (demineralisation, raw and fire water and partially treated water tanks); » Guard house, admin building, workshops and a warehouse; and » Associated infrastructures.
Potential Impact	» Release of contaminated water from contact with spilled chemicals; » Generation of contaminated wastes from used chemical containers;
Activity/risk source	» Vehicles associated with site preparation and earthworks; » Substation and power line construction activities; and » Hydrocarbon use and storage.
Mitigation: Target/Objective	» To ensure that the storage and handling of chemicals and hydrocarbons on-site does not cause pollution to the environment or harm to persons;

	» To ensure that the storage and maintenance of machinery on-site does not cause pollution of the environment or harm to persons; » To comply with hazardous waste management legislation; » To minimise production of hazardous waste; » To ensure appropriate hazardous waste storage and disposal; and » To avoid environmental harm from hazardous waste disposal.

Mitigation: Action/control	Responsibility	Timeframe
An effective monitoring system must be implemented during the construction phase to detect any leakage or spillage of hazardous substances during their transportation, handling, use and storage.	Contractor and EO	Duration of contract
The storage of flammable and combustible liquids such as oils must be in designated areas which are appropriately bunded, and stored in compliance with Material Safety Data Sheets (MSDS) files.	Contractor and EO	Duration of contract
Any spills must receive the necessary clean-up action. Bioremediation kits must be kept on-site and used to remediate any spills that may occur. Appropriate arrangements to be made for appropriate collection and disposal of all cleaning materials, absorbents and contaminated soils.	Contractor and EO	Duration of contract
Any storage and disposal permits/ approvals which may be required must be obtained, and the conditions attached to such permits and approvals will be complied with.	Contractor and EO	Duration of contract
Routine servicing and maintenance of vehicles is not to take place on-site (except for emergency situations or large cranes which cannot be moved off-site). If repairs of vehicles must take place on site, e.g. during emergencies, an appropriate drip tray must be used to contain any fuel or oils.	Contractor and EO	Duration of contract
Transport of all hazardous substances must be in accordance with the relevant legislation and regulations.	Contractor and EO	Duration of contract
Waste disposal records must be available for ECO review at all times.	Contractor and EO	Duration of contract
Specific areas must be designated on-site for the temporary management of contaminated waste. Location of such areas must seek to minimise the potential for impact on the surrounding environment, including prevention of contaminated runoff, seepage and vermin control.	Contractor and EO	Duration of contract
Disposal of hazardous waste must be in accordance with relevant legislative requirements, including the use of licensed contractors and licensed waste disposal	Contractor and EO	Duration of contract

Mitigation: Action/control	Responsibility	Timeframe
sites.		
Hydrocarbon waste must be contained and stored in sealed containers within an appropriately bunded area.	Contractor and EO	Duration of contract
Documentation (waste manifest) must be maintained detailing the quantity, nature and fate of any hazardous waste.	Contractor and EO	Duration of contract
An incident/complaints register must be established and maintained on-site.	Contractor and EO	Duration of contract
Hazardous and non-hazardous waste must be separated at source. Separate waste collection bins must be provided for this purpose. These bins must be clearly marked and appropriately covered.	Contractor and EO	Erection: during site establishment Maintenance: for duration of Contract within a particular area.
Construction equipment must be refuelled within designated refuelling locations, or where remote refuelling is required, appropriate drip trays must be utilised.	Contractor(s)	Duration of contract
All stored fuels to be maintained within a bund and on a sealed surface.	Contractor(s)	Duration of contract
Fuel storage areas must be inspected regularly to ensure bund stability, integrity and function.	Contractor and EO	Duration of contract
Construction machinery must be stored in an appropriately sealed area.	Contractor(s)	Duration of contract
Spilled cement/concrete must be cleaned up as soon as possible and disposed of at a suitably licensed waste disposal site.	Contractor(s)	Duration of contract
Corrective action must be undertaken immediately if a complaint is made, or potential/actual leak or spill of polluting substance identified. This includes stopping the contaminant from further escaping, cleaning up the affected environment as much as practically possible and implementing preventive measures.	Contractor and EO	Duration of contract
In the event of a major spill or leak of contaminants, the relevant administering authority must be immediately notified as per the notification of emergencies/incidents. Spill kits to be kept on-site.	Contractor and EO	Duration of contract
Any contaminated/polluted soil removed from the site must be disposed of at a licensed hazardous waste disposal facility.	Contractor and EO	Duration of contract
Ensure compliance with all national, regional and local legislation with regard to the storage, handling and	Contractor and EO	During and post

Mitigation: Action/control	Responsibility	Timeframe
disposal of hydrocarbons, chemicals, solvents and any other harmful and hazardous substances and materials. The onus is on the Contractor to identify and interpret the applicable legislation. Hazardous waste to be disposed of at a registered h:H or H:H landfill site. Depending on the classification of the waste, a registered service provider with the necessary permits is to collect, transport and dispose of hazardous waste. Proof of appropriate disposal to be provided to the ECO.		construction.
Keep a record of all hazardous substances stored on site for submission to the ECO. Clearly label all the containers storing hazardous waste.	Contractor and EO	Pre-Construction
An effective monitoring system must be put in place to detect any leakage or spillage of all hazardous substances during their transportation, handling, installation and storage.	Contractor and EO	Duration of contract
Precautions must be in place to limit the possibility of oil and other toxic liquids from entering the soil or clean stormwater system.	Contractor(s)	Duration of contract
Upon the completion of construction, the area must be cleared of potentially contaminating materials.	Contractor(s)	Completion of construction

Performance Indicator	» No chemical spills outside of designated storage areas; » No water or soil contamination by chemical spills; » Provision of all appropriate waste manifests for all waste streams. » Spills are sufficiently cleaned and dealt with.
Monitoring and Reporting	» Observation and supervision of chemical storage and handling practices and vehicle maintenance throughout construction phase. » A complaints register must be maintained, in which any complaints from the community must be logged. Complaints must be investigated and, if appropriate, acted upon. » Observation and supervision of hazardous waste management practices throughout construction phase. » Hazardous waste collection to be monitored on a regular basis. » Hazardous waste documentation completed. » An incident reporting system must be used to record non-conformances to the EMPr. » Proponent and appointed ECO must monitor indicators listed above to ensure that they have been met for the construction phase.

OBJECTIVE 20: Manage storm water and control soil erosion during construction to limit the risk of eroding top soils and causing sedimentation within adjacent natural areas

Project component/s	Construction of: » Gas turbines; » Steam turbines; » Engine halls and stacks; » HV-Yard and substation » 132Kv powerline; » Internal access roads; » Fuel tanks and unloading stations; » Water storage facilities (demineralisation, raw and fire water and partially treated water tanks); » Guard house, admin building, workshops and a warehouse; and » Associated infrastructures.
Potential Impact	» Erosion of soils and resultant sedimentation of adjacent habitats outside of the construction zone/development footprint due to poor storm water management, soil management and erosion control.
Activity/risk source	» Construction of power plant and associated infrastructure » Earthworks, trenching, stockpiling of soils, operation of heavy machinery and general disturbance of soil surfaces. » Uncontrolled/poorly managed storm water runoff from the construction and development site may result in the erosion of topsoil and sedimentation of adjacent habitats, affecting vegetation condition, ecological processes and diminishing habitat available for fauna/flora.
Mitigation: Target/Objective	» Onsite measures to be provided that aim to control storm water runoff from the site in order to minimise erosion of soils and resultant sedimentation risks.

Mitigation: Action/control	**Responsibility**	**Timeframe**
Schedule the construction phase such that this occurs as soon as initial vegetation clearing and site preparation has been completed to avoid prolonged exposure of the soil to weather elements	Proponent, Contractor(s)	Prior to construction activities commencing
Construction should ideally proceed mainly during the dry, winter months where possible in order to minimize the risk of soil erosion linked to high runoff rates.	Proponent, Contractor(s)	Construction
If heavy rains are expected, construction activities should be put on hold. In this regard, the contractor must be aware of weather forecasts.	Contractor(s)	Construction
Any disturbed surfaces outside of the construction zone and area to be developed must be re-vegetated as soon as practically possible to prevent erosion of bare/exposed soils, as per the relevant rehabilitation guidelines contained in Section 4.4.4 of the specialist terrestrial ecological report (Appendix H).	Contractor under the guidance of the EO and with the support specialist if required.	Construction

Mitigation: Action/control	Responsibility	Timeframe
Dewater any excavated trenches required for the development in a manner that does not cause erosion and does not result in silt-laden water flowing downslope. Water must be pumped out into a well-vegetated area to facilitate sediment trapping.	Contactor	Construction
Run-off generated from cleared and disturbed areas such as access roads must be controlled using suitable erosion control measures (e.g. sand bags, earthen berms, etc.). Sediment barriers (e.g. silt fences, sandbags, hay bales, earthen filter berms or retaining walls) must be established to counter erosion and sedimentation where necessary.	Contractor and EO	Construction
Sediment barriers should be regularly maintained and cleared so as to ensure effective drainage.	Contractor and EO	Construction
All temporary soil berms, sandbags and silt fences must only be removed once construction has been completed and vegetation cover has successfully re-colonised any disturbed areas outside of the construction zone.	Contractor and EO	Construction
Erosion/ sediment control measures such as silt fences, concrete blocks and/ or sand bags must also be placed around soil/ material stockpiles to limit sediment runoff from stockpiles. The slope and height of stockpiles must be limited to 2m to avoid collapse. If soil stockpiles are to be kept for more than 3 months they must be hydro-seeded.	Contractor(s)	Construction
Disturbed surfaces are to be paved or re-vegetated as soon as practically possible after construction has been completed to prevent erosion of bare/exposed soils. Rehabilitation and re-vegetation of areas disturbed outside of the development footprint is to be undertaken as soon as practically possible, as per the relevant rehabilitation guidelines contained in Section 4.4.4 of the specialist terrestrial ecological report.	Contractor under the guidance of the EO and with the support specialist if required.	Upon completion of construction or sooner.

Performance Indicator	» Storm water and erosion control measures are adequate to control soil erosion and sedimentation on the site and in surrounding areas. » Erosion control measures (berms, sandbags and/or silt fences) have been adequately maintained and repaired immediately when damaged. » All disturbed areas are rehabilitated upon completion of construction activities. » Site inspection reports indicate situations of non-compliance and corrective actions have been implemented and if not, the reason why. » Fines have been issued for any major infringements to the conditions

	of the EMPr. » Rehabilitation of any natural areas disturbed outside of the development footprint have been adequately rehabilitated as per the specialist rehabilitation guidelines contained in the terrestrial ecological report.
Monitoring and Reporting	» Storm water and erosion control measures (berms, sandbags and/or silt fences) are to be monitored to ensure these are operating effectively and have been maintained and/or repaired where necessary. » After every rainfall event, the contractor must check the site for erosion damage and rehabilitate this damage immediately. » Regular site visits and compliance audits to be undertaken by the ECO and EO. » An incident reporting system must be implemented by the EO with the support of the ECO to record any non-issues of non-compliance with the requirements of the EMPr and identify corrective actions to be actioned to address incidents and ensure compliance is achieved.

OBJECTIVE 21: Manage hazardous substances and potential waste streams during construction that could pollute or damage the natural environment and its components surrounding the construction site.

Project component/s	» Chemicals, fuels and other hazardous substances stored and used during the construction phase as well as any waste products generated during construction.
Potential Impact	» Pollution of soils, water, vegetation and habitat due to waste streams from spills or mismanagement of contaminating substances/materials as well as any waste products generated at the site.
Activity/risk source	» Storage and handling of any potentially hazardous/contaminating substances, materials, fuels, chemicals, etc. and any waste products handled and disposed of during site construction.
Mitigation: Target/Objective	» Reduce the risk of pollution/environmental contamination through appropriate storage, handling and disposal of chemicals, hazardous substances and waste at the site, employ appropriate measures to clean-up and rehabilitate any potential accidental chemical/fuel/waste spills.

Mitigation: Action/control	Responsibility	Timeframe
Ensure adequate fire-fighting equipment is available and train workers on how to use it	Contractor and EO	Duration of the construction period
The proper storage and handling of hazardous	Contractor and EO	Duration of the

Mitigation: Action/control	Responsibility	Timeframe
substances (e.g. fuel, oil, cement, bitumen, paint, etc.) needs to be administered.		construction period
Construction materials liable to spillage are to be stored in appropriate containment structures (e.g. drip-trays).	Contractor and EO	Duration of the construction period
No refuelling, servicing or chemical storage should occur outside the established construction camp. Hazardous storage and re-fuelling areas must be bunded prior to their use on site during the construction period. The bund wall should be high enough to contain at least 110% of any stored volume.	Contractor and EO	Duration of the construction period
Drip trays should be utilised at all fuel/chemical dispensing areas. Provide drip-trays beneath standing machinery/plant.	Contractor and EO	Duration of the construction period
Vehicle maintenance should not take place on site unless a specific lined and bunded area is constructed within the construction camp for such a purpose.	Contractor	Duration of the construction period
Mixing and/or decanting of all chemicals and hazardous substances must take place on a tray, shutter boards or on an impermeable surface and must be protected from the ingress and egress of stormwater.	Contractor	Duration of the construction period
An emergency spill response procedure must be formulated and staff is to be trained in spill response. All necessary equipment for dealing with spills of fuels/chemicals must be available at the site. Spillages of fuels, oils and other potentially harmful chemicals should be cleaned up immediately and contaminants properly drained and disposed of using proper solid/hazardous waste facilities (not to be disposed of within the natural environment). Any contaminated soil from the construction site must be removed and rehabilitated timeously and appropriately.	Contractor and EO	Duration of the construction period
Contaminated water containing fuel, oil or other hazardous substances must never be released into the environment. It must be disposed of at a registered hazardous landfill site.	Contractor and EO	Duration of the construction period
Sanitation – portable toilets (1 toilet per 15 users is the norm) to be provided where construction is occurring and away from watercourses such as rivers and wetlands. Workers need to be encouraged to use these	Contractor and EO	Duration of the construction period

Mitigation: Action/control	Responsibility	Timeframe
facilities and not the natural environment.		
Provide adequate rubbish bins and waste disposal facilities on-site and educate/encourage workers not to litter or dispose of solid waste in the natural environment but to use available facilities for waste disposal.	Contractor and EO	Duration of the construction period
Clear and completely remove from site all general waste, constructional plant, equipment, surplus rock and other foreign materials once construction has been completed.	Contractor and EO	Duration of the construction period
No litter, refuse, wastes, rubbish, rubble, debris and builders waste must be placed, dumped or deposited on adjacent/surrounding properties during or after the construction period.	Contractor and EO	Duration of the construction period
Recycling/re-use of waste is to be encouraged.	Contractor and EO	Duration of the construction period
Ensure that no refuse/waste is burnt or buried on the site or on surrounding premises	Contractor and EO	Duration of the construction period

Performance Indicator	» Records indicate that all construction staff have undergone environmental induction training, including training in environmental spill response, chemical/hazardous substances management, waste management and fire-fighting/emergency procedures and response. » A copy of the EMPr is located at the site at all times. » A fire management plan is in place and fire-fighting equipment is adequate and readily available and in good working order (e.g. fire extinguishers up to date in terms of servicing interval). » A spill management/response plan is in place with adequate equipment for dealing with spills to be readily available and maintained in good working order. » Record of spills indicates no spills or any spill incidents have been appropriately addressed through corrective actions. » Chemicals, hazardous substances and fuels are stored in adequately secured bunded areas with the capacity to contain any spillage. » Material Safety Data Sheets (MSDSs) are available for all stored chemicals/ fuels/ hazardous substances. » Potentially polluting activities are appropriately managed and confined to designated areas (e.g. vehicle maintenance, fuel decanting, cement/concrete mixing, etc.). » An adequate number of portable toilets has been provided for workers and thee are regularly maintained. » An adequate number of bins/skips for solid and hazardous waste has been provided and are regularly cleared and taken for disposal to

	landfill (chain of custody to be provided by the appointed waste management contractor). » Site inspection reports indicate situations of non-compliance and corrective actions have been implemented and if not, the reason why. » Fines have been issued for any major infringements to the conditions of the EMPr.
Monitoring and Reporting	» Regular site visits and compliance audits to be undertaken by the ECO and EO. » An incident reporting system must be implemented by the EO with the support of the ECO to record any non-issues of non-compliance with the requirements of the EMPr and identify corrective actions to be actioned to address incidents and ensure compliance is achieved. » Records of environmental inductions and staff attendance to be maintained by the EO.

5.4. Detailing Method Statement

OBJECTIVE 22: Ensure all construction activities are undertaken with the appropriate level of environmental awareness to minimise environmental risk

The environmental specifications are required to be underpinned by a series of Method Statements, within which the Contractors and Service Providers are required to outline how any identified environmental risks will be practically mitigated and managed for the duration of the contract, or for the time period in which that risk will exist and how specifications within this EMPr will be met. That is, the Contractor will be required to describe how specified requirements will be achieved through the submission of written Method Statements to the Site Manager.

A Method Statement is defined as "a written submission by the Contractor in response to the environmental specification or a request by the Site Manager and ECO, setting out the plant, materials, labour and method the Contractor(s) proposes using to conduct an activity, in such detail that the Site Manager and ECO is able to assess whether the Contractor(s)'s proposal is in accordance with the Specifications and/or will produce results in accordance with the Specifications". The Method Statement must cover applicable details with regard to:

» Details of the responsible person/s;
» Construction procedures;
» Materials and equipment to be used;
» Getting the equipment to and from site;
» How the equipment/material will be moved while on-site;
» How and where material will be stored;
» The containment (or action to be taken if containment is not possible) of leaks or spills of any liquid or material that may occur;
» Timing and location of activities;

» Compliance/non-compliance with the Specifications; and
» Any other information deemed necessary by the Site Manager and/or ECO.

Method Statements must be compiled for all activities which affect any aspect of the environment and should be applied consistently to all activities. Specific areas to be addressed in the method statement: pre, during and post construction includes, *inter alia*:

» Site establishment (which explains all activities from induction training to offloading, construction sequence for site establishment and the different amenities to be established etc. Including a site camp plan indicating all of these).
» Preparation of the site (i.e. clearing vegetation, compacting soils and removing existing infrastructure and waste).
» Soil management/stockpiling and erosion control.
» Excavations and backfilling procedure.
» Batching procedures
» Stipulate norms and standards for water supply and usage (i.e.: comply strictly to licence and legislation requirements and restrictions)
» Stipulate the storm water management procedures recommended in the storm water management method statement (in accordance with the Storm Water Management Plan – Attached as **Appendix F**).
» Ablution facilities (placement, maintenance, management and servicing)
» Solid Waste Management:
  * Description of the waste storage facilities (on site and accumulative).
  * Placement of waste stored (on site and accumulative).
  * Management and collection of waste process.
  * Recycle, re-use and removal process and procedure.
» Liquid waste management:
  * The design, establish, maintain and operate suitable pollution control facilities necessary to prevent discharge of water containing polluting matter or visible suspended materials into rivers, streams or existing drainage systems.
  * Should grey water (i.e. water from basins, showers, baths, kitchen sinks etc.) need to be disposed of, link into an existing facilities where possible. Where no facilities are available, grey water runoff must be controlled to ensure there is no seepage into natural watercourses.
» Dust and noise pollution
  * Describe necessary measures to ensure that noise from construction activities is maintained within lawfully acceptable levels.
  * Procedure to control dust at all times on the site, access roads, borrow pits and spoil sites (dust control shall be sufficient so as not to have significant impacts in terms of the biophysical and social environments). These impacts include visual pollution, decreased safety due to reduced visibility, negative effects on human health and the ecology due to dust particle accumulation.

- Hazardous substance storage (Ensure compliance with all national, regional and local legislation with regard to the storage of oils, fuels, lubricants, solvents, wood treatments, bitumen, concrete, pesticides and any other harmful and hazardous substances and materials. South African National Standards apply).
  - Lists of all potentially hazardous substances to be used.
  - Appropriate handling, storage and disposal procedures.
  - Prevention protocol of accidental contamination of soil at storage and handling areas.
  - All storage areas, (i.e.: for harmful substances appropriately bunded with a suitable collection point for accidental spills must be implemented and drip trays underneath dispensing mechanisms including leaking engines/machinery).
- Fire prevention and management measures on site.
- Fauna and flora protection process on and off site (i.e. removal to reintroduction or replanting, if necessary).
  - Rehabilitation and re-vegetation process.
- Incident and accident reporting protocol.
- General administration
- Designate access road and the protocol on while roads are in use.
- Requirements on gate control protocols.

The Contractor(s) may not commence the activity covered by the Method Statement until it has been provided to, reviewed and accepted by the Site Manager /Project Manager and/or ECO, except in the case of emergency activities and then only with the consent of the Site Manager. Review and accepted (or approval where required) of the Method Statement will not absolve the Contractor(s) from their obligations or responsibilities in terms of their contract. Failure to submit a method statement may result in suspension of the activity concerned until such time as a method statement has been submitted and accepted/approved.

The ECO and the EO must monitor the construction activities to ensure that these are undertaken in accordance with the approved Method Statement(s).

5.5 Awareness and Competence: Construction Phase of the Gas to Power Plant

OBJECTIVE 23: To ensure all construction personnel have the appropriate level of environmental awareness and competence to ensure continued environmental due diligence and on-going minimisation of environmental harm

To achieve effective environmental management, it is important that Contractors are aware of the responsibilities in terms of the relevant environmental legislation and the contents of this EMPr. The Contractor is responsible for informing employees and sub-contractors of their environmental obligations in terms of the environmental specifications, and for ensuring that employees are adequately experienced and properly

trained in order to execute the works in a manner that will minimise environmental impacts. The Contractors obligations in this regard include the following:

» All employees must have a basic understanding of the key environmental features of the construction site and the surrounding environment. This includes the discussion/explanation of site environmental matters during regular toolbox talks.
» The content and requirements of Method Statements are to be clearly explained to all plant operators and general workers. All staff acting in a supervisory capacity is to have copies of the relevant Method Statements and be aware of the content thereof.
» Ensuring that a copy of the EMPr is readily available on-site, and that all site staff are aware of the location and have access to the document.
» Senior site staff will be familiar with the requirements of the EMPr and the environmental specifications as they apply to the construction of the facility.
» Employees must undergo training for the operation and maintenance activities associated with a gas to power plant and have a basic knowledge of the potential environmental impacts that could occur and how they can be minimised and mitigated.
» Ensuring that, prior to commencing any site works, all employees and sub-contractors have attended an Environmental Awareness Training course which can be done by the contractors environmental representative or the ECO.
» The course should be sufficient to provide the site staff with an appreciation of the project's environmental requirements, and how they are to be implemented.
» Awareness of any other environmental matters, which are deemed to be necessary by the ECO.
» Ensuring that employee information posters, outlining the environmental "do's" and "don'ts" (as per the environmental awareness training course) are erected at prominent locations throughout the site.
» Ensure that construction workers have received basic training in environmental management, including the storage and handling of hazardous substances, minimisation of disturbance to sensitive areas, management of waste, and prevention of water pollution.
» Records must be kept of those that have completed the relevant training.
» Training should be done either in a written or verbal format but must be in an appropriate format for the receiving audience.
» Refresher sessions must be held to ensure the contractor staff are aware of their environmental obligations as practically possible.
» All sub-contractors must have a copy of the EMPr and sign a declaration/ acknowledgement that they are aware and familiar with the contents and requirements of the EMPr and that they will conduct work in such a manner as to ensure compliance with the requirements of the EMPr. All subcontractors performing the works should appoint a qualified Environmental Officer for the implementation of this EMPr and other project permits and authorisations.

» Contractors and main sub-contractors should have a basic training in the identification of archaeological sites/objects, and protected flora and fauna that may be encountered on the site.

Therefore, prior to the commencement of construction activities on site and before any person commences with work on site thereafter, adequate environmental awareness and responsibility are to be appropriately presented to all staff present onsite, clearly describing their obligations towards environmental controls and methodologies in terms of this EMPr.

5.5.1 Environmental Awareness Training

Environmental Awareness Training must take the form of an on-site talk and demonstration by the ECO before the commencement of site establishment and construction on site. The education/awareness programme should be aimed at all levels of management and construction workers within the contractor team. A record of attendance of this training must be maintained by the ECO on site.

5.5.2 Induction Training

Environmental induction training must be presented to all persons who are to work on the site – be it for short or long durations; Contractor's or Engineer's staff; administrative or site staff; sub-contractors or visitors to the site.

This induction training should include discussing the Proponent's environmental policy and values, the function of the EMPr and Contract Specifications and the importance and reasons for compliance to these. The induction training must highlight overall do's and don'ts on site and clarify the contractual and legal repercussions of non-compliance (penalty fees will be outlined in the service level agreement between the proponent and the contractor). The non-conformance reporting system must be explained during the induction as well. Opportunity for questions and clarifications must form part of this training. A record of attendance of this training must be maintained by the EO/ Environmental Representative on site.

5.5.3 Toolbox Talks

Toolbox talks should be held on a scheduled and regular basis (at least twice a month/ if necessary) where foremen, environmental and safety representatives of different components of the Works and sub-consultants hold talks relating to environmental practices and safety awareness on site. These talks should also include discussions on possible common incidents occurring on site and the prevention of reoccurrence thereof. Records of attendance and the awareness talk subject must be kept on file.

5.6. Monitoring Schedule: Construction Phase of the Gas to Power Plant

OBJECTIVE 24: To monitor the performance of the control strategies employed against environmental objectives and standards

An environmental monitoring schedule should be developed and implemented not only to ensure conformance with the condition of the EMPr, but also to monitor any environmental issues and impacts which have not been accounted for in the EMPr that are, or could result in significant environmental impacts for which corrective action is required. The independent ECO will be responsible for monitoring (on a monthly basis) for the most part on a monthly basis although will include others on a needs basis (also refer to section 5.6.1 below). The Site Manager and Proponent's Environmental Manager will ensure that the monitoring is conducted and reported.

The aim of the monitoring and auditing process would be to routinely monitor the implementation of the specified environmental specifications, in order to:

» Monitor and audit compliance with the prescriptive and procedural terms of the environmental specifications;
» Ensure adequate and appropriate interventions to address non-compliance;
» Ensure adequate and appropriate interventions to address environmental degradation;
» Provide a mechanism for the lodging and resolution of public complaints;
» Ensure appropriate and adequate record keeping related to environmental compliance;
» Determine the effectiveness of the environmental specifications and recommend the requisite changes and updates based on audit outcomes, in order to enhance the efficacy of environmental management on site; and
» Aid communication and feedback to authorities and stakeholders.

The EO for the Contractor/s performing different aspects of activities on site must be appointed prior to site mobilisation and will be responsible for the day to day implementation of the EMPr and other project permits and authorisations. The EO will be responsible for weekly and monthly reporting to the ECO and Site Manager.

The ECO will ensure compliance with the EMPr during construction, and will conduct monitoring activities on a regular basis. An independent ECO must be appointed, and have the appropriate experience and qualifications to undertake the necessary tasks. The ECO will report any non-compliance or where corrective action is necessary to the Site Manager, DEA and/or any other monitoring body stipulated by the regulating authorities.

5.6.1 Non-Conformance Reports

All supervisory staff including Foremen, Resident Engineers, and the ECO/ EO must be provided the means to be able to submit non-conformance reports to the Site Manager. Non-conformance reports will describe, in detail, the cause, nature and effects of any environmental non-conformance by the Contractor. Records of penalties imposed may be required by the relevant authority.

The non-conformance report will be updated on completion of the corrective measures indicated on the finding sheet. The report must indicate that the remediation measures have been implemented timeously and that the non-conformance can be closed-out to the satisfaction of the Site Manager and ECO.

5.6.2 Monitoring Reports

A monitoring report will be compiled by the ECO on a monthly basis and must be submitted to DEA for their records (Director: Compliance Monitoring). This report should include details of the activities undertaken in the reporting period, any non-conformances or incidents recorded, corrective action required, and details of those non-conformances or incidents which have been closed out. The ECO/EO will be responsible for the weekly and monthly reports which will be submitted internally which will aid the ECO in compiling the monitoring report. The monitoring report must be submitted to the DEA on the first week of the following month.

5.6.3 Audit Reports

The Proponent must ensure that project compliance with the conditions of the Environmental Authorisation (once issued) is audited, and that the audit reports re submitted to the Director: Compliance Monitoring at the DEA.

5.6.4 Final Audit Report

A final external audit should be conducted following the completion of rehabilitation after construction is completed. The audit report must be submitted to the DEA within 30 days of completion of the audit (i.e. within 30 days of site handover) and within 30 days of completion of rehabilitation activities.

The final environmental audit report must:

» Be compiled by an independent environmental auditor;
» Indicate the date of the audit, the name of the auditor and the outcome of the audit;

- Evaluate compliance with the requirements of the approved EMPr and the EA;
- Include measures to be implemented to attend to any non-compliances or degradation noted;
- Include copies of any approvals granted by other authorities relevant to the development for the reporting period;
- Highlight any outstanding environmental issues that must be addressed. Along with recommendations for ensuring these issues are appropriately addressed;
- Include a copy of the EA and the approved EMPr;
- Include all documentation such as waste disposal certificates, hazardous waste landfill site licenses etc. pertaining to the EA; and
- Include evidence of adherence to the conditions of this authorisation and the EMPr where relevant such as training records and attendance registers.

MANAGEMENT PROGRAMME FOR THE GAS TO POWER PLANT: OPERATION CHAPTER 6

6.1. Overall Goal for Operation

Overall Goal for Operation: To ensure that the operation of the gas to power plant does not have unforeseen impacts on the environment and to ensure that all potential impacts are monitored and the necessary corrective action taken in all cases. In order to address this goal, it is necessary to operate the gas to power plant in a way that:

» Ensures that operation activities are properly managed in respect of environmental aspects and impacts;
» Enables the gas to power plant operation activities to be undertaken without significant disruption to other land uses in the area, in particular with regard to ambient air quality impacts, traffic and road use, and effects on surrounding landowners; and
» Establishes an environmental baseline for gas to power plant sites in South Africa.

6.2. Roles and Responsibilities

Formal responsibilities are necessary to ensure that key procedures are executed. Specific responsibilities of the gas to power plant's Operations Manager, and Environmental Manager for the operation phase of this project are detailed below.

The **O&M Operator** must:
» Ensure that adequate resources (human, financial, technology) are made available and appropriately managed for the successful implementation of the operational EMPr.
» Conduct annual basis reviews of the EMPr to evaluate its effectiveness.
» Take appropriate action as a result of findings and recommendations in management reviews and audits.
» Provide forums to communicate matters regarding environmental management.

The **Environmental Manager** must:
» Develop and Implement an Environmental Management System (EMS) for the gas to power plant and associated infrastructure.
» Manage and report on the facility's environmental performance.
» Maintain a register of all known environmental impacts and manage the monitoring thereof.
» Conduct internal environmental audits and co-ordinate external environmental audits if and when required.

- » Liaise with statutory bodies such as the National and Provincial Department of Environmental Affairs (DEA) on environmental performance and other issues.
- » Conduct environmental training and awareness for the employees who operate and maintain the gas to power plant.
- » Compile environmental policies and procedures where required.
- » Liaise with interested and affected parties on environmental issues of common concern.
- » Track and control the lodging of any complaints regarding environmental matters.

6.3. Objectives for the Operation EMPr

In order to meet this goal, the following objectives have been identified, together with necessary actions and monitoring requirements.

OBJECTIVE 1 : Securing the site

Safety issues may arise with public access to the gas to power plant (e.g. unauthorised entry to the site). Prevention and control measures to manage public access are therefore important.

Project component/s	» Gas turbines; » Steam turbines; » Engine halls and stacks; » HV-Yard and substation » 132kV powerline; » Fuel tanks and unloading stations; » Water storage facilities (demineralisation, raw and fire water and partially treated water tanks); » Guard house, admin building, workshops and a warehouse; and » Associated infrastructures.
Potential Impact	» Safety concerns to landowners and public
Activities/risk sources	» Uncontrolled access to the gas to power plant and associated infrastructure.
Mitigation: Target/Objective	» To secure the site against unauthorised entry; and » To protect members of the public/landowners/residents.

Mitigation: Action/control	Responsibility	Timeframe
Where necessary to control access, fence and secure access to the site and entrances to the site.	Proponent / O&M Operator	Operation
Post information boards about public safety hazards and emergency contact information.	Proponent / O&M Operator	Operation

Performance Indicator	» Site is secure and there is no unauthorised entry; » No members of the public/ landowners injured; and » No complaints from landowners/ public.
Monitoring and Reporting	» Regular visual inspection of fence for signs of deterioration/forced access. » An incident reporting system must be used to record non-conformances to the EMPr. » Public complaints register must be developed and maintained on site. » Landowners should be consulted regularly.

OBJECTIVE 2 : Manage Invasive Alien Plants on the development site and adjacent/surrounding areas to prevent colonisation of undesirable plant species within remaining untransformed grassland habitat

Project component/s	» Disturbed areas prone to colonisation by alien plants and weeds post-construction.
Potential Impact	» Although this impact is generally initiated during the construction phase, it is typically an operational issue as recovery of natural vegetation communities following disturbance can be a lengthy process. Invasive Alien Plants (IAPs) and other undesirable plants can have significant negative consequences for adjacent natural habitats in terms of replacing indigenous vegetation and interfering with ecological processes.
Activity/risk source	» IAPs and other undesirable plants introduced to the site during construction can persist in the environment for a long period of time if not adequately managed
Mitigation: Target/Objective	» Successfully implement a suitable alien plant management programme for the site to eradicate and/or control species of alien and other undesirable plant species within areas adjacent to the development site.

Mitigation: Action/control	Responsibility	Timeframe
Implement an Invasive Alien Plant (IAP) Control and Eradication Programme for the site, as per the Invasive Alien Plant Eradication and Control Programme contained in Section 4.4.3 of the specialist terrestrial ecological report (Appendix H of the EIA Report), for areas adjacent to or surrounding the development that may be disturbed during construction and where IAPs and other undesirable plant species (weeds for example) colonise these sites (refer to **Appendix I**).	Proponent and contractor	Duration of operation of the power plant facility until the site has been decommissioned and adequately rehabilitated

Performance Indicator	» All NEMBA-listed Category 1, 2 and 3 IAPs have been eradicated or controlled from the site and adjacent areas (as per NEMBA

	requirements). » The spread of all other alien plant species not listed in terms of NEMBA has been controlled at the site and within adjacent areas. » Adequate follow-up control/maintenance to control and suppress the re-growth of alien plant material.
Monitoring and Reporting	» Monitor IAP species and densities to ensure that adequate eradication/ control is being undertaken successfully according to the IAP Eradication and Control Programme and to identify where further actions are needed.

OBJECTIVE 3 : Manage storm water and control soil erosion during site operation to limit the risk of eroding soils and causing sedimentation within adjacent natural areas.

Project component/s	» Storm water runoff from hardened surfaces/ infrastructure during the operation of the power plant facility.
Potential Impact	» Erosion of soils and resultant sedimentation of adjacent habitats outside of the development footprint due to poor storm water management and erosion control.
Activity/risk source	» Uncontrolled/ poorly managed storm water runoff from the developed site may result in the erosion of soil and sedimentation within adjacent habitats, affecting vegetation condition, ecological processes and diminishing habitat available for fauna/flora.
Mitigation: Target/Objective	» Onsite operational storm water and erosion control measures implemented that aim to control storm water runoff from the site in order to minimise erosion of soils and resultant sedimentation risks.

Mitigation: Action/control	Responsibility	Timeframe
Implement storm water management plan that was compiled in the pre-construction phase, designed for the operational phase	O&M Operator	Duration of operation

Performance Indicator	» Storm water and erosion control measures are adequate to control soil erosion and sedimentation on the site and in surrounding areas. » Erosion control measures have been adequately maintained and repaired immediately when damaged. » All disturbed areas are rehabilitated timeously. Rehabilitation of any natural areas disturbed outside of the development footprint have been adequately rehabilitated as per the specialist rehabilitation guidelines contained in the terrestrial ecological report.
Monitoring and Reporting	» Storm water and erosion control measures are to be monitored to ensure these are operating effectively and have been maintained and/or repaired where necessary.

OBJECTIVE 4 : Manage the risk of direct impacts to fauna during operation.

Project component/s	» Presence of operational staff/ employees regularly accessing the site of the power plant.
Potential Impact	» Pressures from humans on wildlife during site operation, which is likely to be of low significance due to the existing close proximity of industrial activities and livestock grazing which has likely depleted the faunal communities occurring in the surrounding areas.
Activity/risk source	» Wherever there are human activities occurring within a close proximity to natural habitat, this can lead to increased pressure on natural resources through illegal hunting/ poaching/ trapping of wildlife by staff/ workers accessing the power plant facility.
Mitigation: Target/Objective	» Onsite control measures to be provided that aim to minimise the risk of incurring direct impacts to fauna.

Mitigation: Action/control	Responsibility	Timeframe
Regular education of staff/employees accessing and working on the property on not to harm wildlife unnecessarily.	Proponent and O&M Operator	Duration of the operation period
No wild animal may under any circumstance be hunted, snared, captured, injured, killed, harmed in any way or removed from the surrounding natural habitat. This includes animals perceived to be vermin (such as snakes, rats, mice, etc.). Any fauna/ animal found on the power plant site must rather be moved to the closest point of natural or semi-natural vegetation outside the facility. Employees/ workers are to be informed of this requirement.	Proponent and O&M Operator	Duration of the operation period
The handling and relocation of any animal perceived to be dangerous/ venomous/ poisonous must be undertaken by a suitably trained individual.	Proponent and O&M Operator	Duration of the operation period
Ensure that a suitable perimeter fence around the power plant facility is kept at all times to restrict access of wildlife onto the site and likewise to restrict/ control access of staff to adjacent natural areas.	Proponent and O&M Operator	Duration of the operation period
No open fires to be permitted on the site and in surrounding areas.	Proponent and O&M Operator	Duration of the operation period

Performance Indicator	» Records indicate that all staff have undergone environmental induction training. » A copy of the EMPr is located at the site at all times. » Fines have been issued for any major infringements to the conditions of the EMPr.

	» No wildlife has been unnecessarily harmed by construction activities or construction workers.
Monitoring and Reporting	» Records of environmental education and staff attendance to be maintained

OBJECTIVE 5 : Maximise local employment and skills opportunities associated with the operation phase

Project component/s	» Gas to power plant; and » Day to day operational activities associated with the power plant including maintenance etc.
Potential Impact	» Loss of opportunities to stimulate production and employment of the local economy.
Activity/risk source	» Labour practices employed during operations.
Mitigation: Target/Objective	» Maximise local community employment benefits in the local economy

Mitigation: Action/control	Responsibility	Timeframe
A skills development plan should be developed which should concentrate on the transfer of skills to employees to increase their capacity and to equip them with alternative skills should they wish to be employed elsewhere.	Proponent and O&M Operator	Operation phase
The skill requirements should be communicated to the local community leaders and community based organisations.	Proponent	Operation phase
It is recommended that local employment policy is adopted to maximise the opportunities made available to the local community.	Proponent and O&M Operator	Operation phase
An equitable process whereby minorities and previously disadvantaged individuals (including women) are taken into account should be implemented.	Proponent and O&M Operator	Operation phase
Establish vocational training programs for the local labour force to promote the proposed development of skills	Proponent	Operation phase

Performance Indicator	» Percentage of workers that were employed from local communities. » Number of people attending vocational training on an annual basis.
Monitoring and Reporting	» The proponent must keep a record of local recruitments and information on local labour to be shared with the ECO for reporting purposes

OBJECTIVE 6 : Maximise the local economic multiplier effect during operation phase

A limited number of permanent employment opportunities will be created during the operational phase of the project. The operational phase is expected to last for 20 - 25 years. Some local procurement of goods, materials and services could occur which would result in positive economic spin-offs. These opportunities for local service providers to render services to the proposed facility could include maintenance of the guardhouse, gardening at the guardhouse, cleaning services, security services and maintenance or replacement of general equipment.

Project component/s	» Gas to power plant; and » Day to day operational activities associated with the power plant including maintenance etc.
Potential Impact	» The opportunities and benefits associated with the creation of business should be maximised.
Activity/risk source	» Proponent's procurement plan. » Local businesses are not supported.
Mitigation: Target/Objective	» Increase the procurement of goods and services especially within the local economy.

Mitigation: Action/control	Responsibility	Timeframe
Ensure that a local procurement policy is adopted by the proponent to maximise the benefits to the local economy for the operation phase.	Proponent and O&M Operator	Pre-construction & construction phase
Where feasible, for the operation phase, develop a database of local companies, specifically Historically Disadvantaged (HD) which qualify as potential service providers (e.g. security companies, catering companies, waste collection companies, transportation companies etc.) prior to the tender process and invite them to bid for project-related work where applicable	Proponent and O&M Operator	Prior to the operation phase

Performance Indicator	» Local procurement policy is adopted » Local goods and services are purchased from local suppliers where feasible
Monitoring and Reporting	» The proponent must monitor indicators listed above to ensure that they have been met for the construction phase

OBJECTIVE 7 : To avoid traffic disruptions, traffic congestion and reduce the impact on movement patterns of local community during the operation phase

Project component/s	» Operation of the power plant and associated infrastructure.
Potential Impact	» Increase in traffic disruptions, congestion, safety hazards and impacts on movement patterns of local community
Activity/risk source	» Operation activities affecting daily living and movement patterns
Mitigation: Target/Objective	» To avoid or minimise the potential impact on local communities and their livelihoods

Mitigation: Action/control	Responsibility	Timeframe
Implement a traffic management plan (Refer to **Appendix E**).	O&M Operator (Transportation sub-contractor)	Duration of contract
All relevant permits for abnormal loads must be applied for from the relevant authority.	O&M Operator (Transportation sub-contractor)	Duration of contract
All relevant permits for transportation of fuel (diesel/ LNG) must be applied for from the relevant authority.	Contractor(s), (Transportation sub-contractor)	Operation
Any traffic delays because of operation traffic must be co-ordinated with the appropriate authorities.	Contractor(s)	Duration of contract
Ensure that signage placed during the pre-construction and construction phases are maintained on an on-going basis.	Contractor(s)	Duration of contract
Ensure that all vehicles travelling on public roads adhere to the specified speed limits and all drivers must be in possession of an appropriate valid driver's license.	Contractor(s)	Duration of contract
The R34 (John Ross Pkwy) access route to the IDZ 1F area should be utilised as much as possible.	Contractor	Duration of contract
Ensure that all vehicles are road worthy and be inspected regularly to ensure their road safety worthiness.	Contractor	Duration of contract
Continue with the implementation of penalties for reckless driving for the drivers of heavy vehicles as a way to enforce compliance to traffic rules.	Contractor	Duration of contract
Ensure that appropriate road management strategies proposed in the construction phase is implemented on external and internal roads with all employees and contractors required to abide by standard road and safety procedures during the operation phase as well.	Contractor(s), (Transportation sub-contractor)	Duration of contract
Ensure that the movement of all vehicles within the site	Contractor(s)	Duration of

Mitigation: Action/control	Responsibility	Timeframe
must be on designated roadways.		contract
All hazardous substances must be transported in accordance with the relevant legislation and regulations.	Contractor(s)	Duration of contract
Maintain the Grievance Mechanism for complaints during the operational phase. The contractor should appoint a designated staff member to implement grievance procedures and address issues and complaints. A Public Complaints register must be maintained, by the Contractor and monitored by the ECO, to record all complaints and queries relating to the project and the action taken to resolve the issue.	Contractor	Pre-construction & construction phase

Performance Indicator	» Vehicles are roadworthy, inspected regularly and speed limits are adhered to. » R34 road is utilised as much as possible for transportation of fuel.
Monitoring	» The proponent and contractor must monitor the indicators listed above to ensure that they have been met for the operation phase.

OBJECTIVE 8 : Water consumption and management

Project component/s	» Operation of the power plant and associated infrastructure.
Potential Impact	» Use of water for the operation of the gas power plant has the potential to compete with other water users in the RBIDZ or drinking water resources.
Activity/risk source	» Operation of the gas to power plant.
Mitigation: Target/Objective	» Conservation of water resources, particularly in areas with limited water resources. » Prevent or control impacts to water resources.

Mitigation: Action/control	Responsibility	Timeframe
Consider adoption of the most efficient technology as proposed in the planning and design phase (i.e. consider air cooler condensers) to reduce water requirements from the local municipality.	Proponent/ O&M Operator	Operation
Recycling of wastewater.	Proponent/ O&M Operator	Operation
Where practical and feasible, storm/ rainwater harvesting and use.	Proponent/ O&M Operator	Operation
Consider the use of treated waste water to be included in project design processes.	Proponent/ O&M Operator	Operation
Project design to have measures for adequate water	Proponent/	Operation

Mitigation: Action/control	Responsibility	Timeframe
collection, spill control and leakage control system.	O&M Operator	
Shut off water to unused areas.	Proponent/ O&M Operator	Operation
Water Monitoring and Management: » Identification, regular measurement, and recording of consumption used within the power plant; » Definition and regular review of performance targets, which are adjusted to account for changes in major factors affecting water use (e.g. industrial production rate); » Regular comparison of water consumption with performance targets to identify where action should be taken to reduce water use.	Proponent/ O&M Operator	Operation
Firewater from test releases should be contained and directed to the wastewater treatment pipeline, if contaminated with hydrocarbons. This will prevent further contamination of clean water systems which can be reused for the plant's operational activities.	Proponent/ O&M Operator	Operation

Performance Indicator	» Volume of water used during the operational phase. » Volume of wastewater and contaminated water discharged into the wasterwater treatment pipeline.
Monitoring	» The proponent and contractor must monitor the volumes of water used and wastewater produced.

OBJECTIVE 9 : Management of Wastewater, Stormwater, Effluents and Hazardous substances

Project component/s	» Operation of the power plant and associated infrastructure.
Potential Impact	» Contamination of municipal wastewater if discharged into the stormwater system. » Contamination of soils due to spills or leakages. » Contamination of water resources.
Activity/Risk Source	» Operation of the power plant and substation, maintenance of infrastructure. » Contamination arises from demineralizers, lubricating and auxiliary fuel oils and chlorine, biocides, and other chemicals used to manage the quality of water in cooling systems.
Mitigation: Target/Objective	» Prevent contamination of water resources, particularly in areas with limited water resources. » Prevent contamination of wastewater treatment and stormwater systems.

Mitigation: Action/control	Responsibility	Timeframe
The proper storage and handling of hazardous substances (e.g. fuel, oil, cement, bitumen, etc.) needs to be administered.	Proponent/ O&M Operator	Duration of the operation period
Construction materials liable to spillage are to be stored in appropriate containment structures (e.g. drip-trays).	Proponent/ O&M Operator	Duration of the operation period
No refuelling, servicing or chemical storage should occur outside the established construction camp. Hazardous storage and re-fuelling areas must be bunded prior to their use on site during the construction period. The bund wall should be high enough to contain at least 110% of any stored volume.	Proponent/ O&M Operator	Duration of the operation period
Drip trays should be utilised at all fuel/chemical dispensing areas. Provide drip-trays beneath standing machinery/plant.	Proponent/ O&M Operator	Duration of the operation period
Vehicle maintenance should not take place on site unless a specific lined and bunded area is constructed within the construction camp for such a purpose.	Proponent/ O&M Operator	Duration of the operation period
Mixing and/or decanting of all chemicals and hazardous substances must take place on a tray, shutter boards or on an impermeable surface and must be protected from the ingress and egress of stormwater.	Proponent/ O&M Operator	Duration of the operation period
Ensure strict implementation of the emergency preparedness and response plan (refer to **Appendix J**). All necessary equipment for dealing with spills of fuels/chemicals must be available at the site. Spillages of fuels, oils and other potentially harmful chemicals should be cleaned up immediately and contaminants properly drained and disposed of using proper solid/hazardous waste facilities (not to be disposed of within the natural environment). Any contaminated soil from the construction site must be removed and rehabilitated timeously and appropriately.	Proponent/ O&M Operator	Duration of the operation period
Contaminated water containing fuel, oil or other hazardous substances must never be released into the environment. It must be disposed of at a registered hazardous landfill site.	Proponent/ O&M Operator	Duration of the operation period
Sanitation – portable toilets (1 toilet per 15 users is the norm) to be provided where construction is occurring and away from watercourses such as rivers and wetlands. Workers need to be encouraged to use these facilities and not the natural environment.	Proponent/ O&M Operator	Duration of the operation period
Waste water must be stored in a sump at each unit.	Proponent/ O&M Operator	Duration of the operation period

Mitigation: Action/control	Responsibility	Timeframe
Waste water contaminated with heavy metals and must be disposed of by a specialist contractor.	Proponent/ O&M Operator	Duration of the operation period
Oily water must be collected from drains and processes at the gas turbines. The oily water must be sent to an oily water separator (one at each unit). Oil that is separated from the water must be removed from the sump periodically by a specialist contractor. The grey water from the separator must be discharged into the municipal's wastewater system which is a dedicated effluent discharge pipeline used by existing industrial users. It must however be noted that prior to any discharge of grey water, the developer must obtain an oil contamination requirement from the municipality to ensure that the oily water separator filter purchased is of the correct specifications. This will ensure that grey water discharged into the municipal system will not further contaminate the municipal wastewater system. .	Proponent/ O&M Operator	Duration of the operation period
If feasible, the proponent must investigate and should consider the treatment of acidic low-volume wastewater streams, such as those associated with the regeneration of makeup demineralizer, by chemical neutralization in-situ before discharge into the municipal's wastewater system.	Proponent/ O&M Operator	Prior to operation
Ensure strict implementation and enforcement of the operational storm water management plan designed during the pre-construction phase.	Proponent/ O&M Operator	Duration of the operation period
Surface runoff from process areas or potential sources of contamination should be prevented. Where this approach is not practical, runoff from process and storage areas should be segregated from potentially less contaminated runoff.	Proponent/ O&M Operator	Duration of the operation period
Where stormwater treatment is deemed necessary to protect the quality of receiving water bodies, priority should be given to managing and treating the first flush of stormwater runoff where the majority of potential contaminants tend to be present.	Proponent/ O&M Operator	Duration of the operation period
When water quality criteria allow, stormwater should be managed as a resource for meeting water needs at the facility.	Proponent/ O&M Operator	Duration of the operation period

Performance Indicator	» Volume of wastewater and contaminated water discharged into the wasterwater treatment pipeline. » Provision of all appropriate waste manifests. » No contamination of soil or water.

	» Monitoring parameters.
Monitoring	» A wastewater and water quality monitoring program with adequate resources and management oversight should be developed and implemented. » An incidents/complaints register must be maintained, in which any complaints from the community must be logged. » Complaints must be investigated and, if appropriate, acted upon. » Regular reports on exact quantities of all waste streams exiting the site must be compiled by the waste management contractor. » All appropriate waste disposal certificates with the monthly reports.

OBJECTIVE 10 : Minimisation of noise impacts from the operation of the gas and steam turbines, generators, auxiliaries, engines, compressors, etc.

Project component/s	» Gas and steam turbines, generators and auxiliaries, engines, fans and ductwork, pumps, compressors, condensers and cooling towers.
Potential Impact	» Increased noise levels at potentially sensitive receptors.
Activity/risk source	» Operation of the power plant.
Mitigation: Target/Objective	» Prevent the generation of disturbing noise from the gas turbines and associated infrastructure; and » Ensure acceptable noise levels at surrounding stakeholders and potentially sensitive receptors

Mitigation: Action/control	Responsibility	Timeframe
The facility is located more than 1000m from the closest potential noise-sensitive receptors and therefore the potential of a noise impact would be low. This is in line with point 5.4 (h) of SANS 10328:2003 that states that if industry is to be situated further than 1000m from noise-sensitive developments the activity is unlikely to have any acoustical implications. However, the health of employees need to be taken into consideration. In this regard, the proponent should consider: » Design of generators to meet applicable occupational noise levels; » Identifying and marking high noise areas and require that personal noise protecting gear is used all the time when working in such high noise areas (typically areas with noise levels >85 dBA).	Proponent/ O&M Operator	Duration of the operation period

Performance Indicator	» Ensure that the change in ambient sound levels (L_{Aeq}) as experienced by Potentially Sensitive Receptors is less than 7 dBA.
Monitoring and Reporting	» A complaints register must be maintained, in which any complaints from the community are to be logged. Complaints must be

	investigated and, if appropriate, acted upon.

OBJECTIVE 11 : Management of Waste (general /domestic /liquid in nature)

Project component/s	» Operation of power plant.
Potential Impact	» Inefficient use of resources resulting in excessive waste generation. » Litter or contamination of the site or water through poor waste management practices.
Activities/risk sources	» All operation related activities. » Packaging and other operation wastes.
Mitigation: Target/Objective	» To ensure appropriate waste storage and disposal. » To ensure that the generation, storage and handling of waste does not cause pollution to the environment or harm to persons. » To comply with waste management legislation. » To minimise production of waste. » To avoid environmental harm from waste disposal.

Mitigation: Action/control	Responsibility	Timeframe
Ensure waste management priorities established during the pre-construction and construction phases are implemented and enforced during the operation phase.	Contractor	Duration of operation
Ensure that waste prevention, reduction, reuse, recovery, recycling, removal and final disposal of wastes strategies are continuously from the construction phase and enforced during the operation phase. Disposal of waste must be in accordance with relevant legislative requirements, including the use of licensed contractors and licensed waste disposal sites. It is understood that refuse removal takes place weekly by the uMhlathuze Local Municipality.	Contractor	Prior to any construction activity occurring
Ensure separation of hazardous and non-hazardous waste at source with the provision of separate waste collection bins which are clearly marked and appropriately covered.	Proponent and Contractor(s)	Duration of operation
Ensure provision of weather and vermin proof waste bins and skips for on-site collection, separation and storage of waste streams (such as wood, metals, general refuse etc.).	Contractor	Duration of contract
No waste to be burnt or buried on-site or surrounding the site (i.e. in vacant land).	Proponent and O&M Operator	Duration of operation
Specific detailed waste management plans/ method statements to deal with all waste streams during the operation phase must be implemented and enforced.	Proponent and O&M Operator	Duration of operation

Mitigation: Action/control	Responsibility	Timeframe
Ensure that there are specific areas designated on-site for the temporary management of various waste streams, i.e. general refuse and contaminated waste. Location of such areas must seek to minimise the potential for impact on the surrounding environment, including prevention of contaminated runoff, seepage and vermin control.	Proponent and O&M Operator	Duration of operation
Ensure that the disposal of waste is in accordance with relevant legislative requirements, including the use of licensed contractors and licensed waste disposal sites.	Proponent and O&M Operator	Duration of operation
Maintain an incident/complaints register on-site for the operation phase.	Proponent and O&M Operator	Duration of operation
Upon the completion of all maintenance work, the area must be cleared of potentially polluting materials.	Proponent and O&M Operator	Duration of operation
Liquid waste: » No liquid waste, including grey water, may be discharged into any water body or drainage line. » All sewage disposal to take place at a registered and operational wastewater treatment works. » Slips of disposal to be retained as proof of responsible disposal. » The waste water will be contaminated with heavy metals and must be disposed of by a specialist contractor. » The waste water must be stored in a sump at each unit. » Oily water must be collected from drains and processes at the gas turbines. The oily water must be sent to an oily water separator (one at each unit). » Oil that is separated from the water must be removed from the sump periodically by a specialist contractor. The grey water from the separator must be discharged into the municipal's wastewater system which is a dedicated effluent discharge pipeline used by existing industrial users. It must however be noted that prior to any discharge of grey water, the developer must obtain an oil contamination requirement from the municipality to ensure that the oily water separator filter purchased is of the correct specifications. This will ensure that grey water discharged into the municipal system will not further contaminate the municipal wastewater	Proponent and O&M Operator	Duration of operation

Mitigation: Action/control	Responsibility	Timeframe
system.		

Performance Indicator	» No complaints received regarding waste on site or indiscriminate dumping; » Internal site audits ensuring that waste segregation, recycling and reuse is occurring appropriately; and » Provision of all appropriate waste manifests for all waste streams.
Monitoring and Reporting	» A complaints register must be maintained, in which any complaints from the community must be logged. Complaints must be investigated and, if appropriate, acted upon. » Observation and supervision of waste management practices throughout operation phase. » Waste collection to be monitored on a regular basis. » Waste documentation completed. » An incident reporting system must be used to record non-conformances to the EMPr. » Proponent and appointed ECO must monitor indicators listed above to ensure that they have been met for the construction phase.

OBJECTIVE 12 : Ensure the implementation of an appropriate fire management plan during the operation phase

Project Component/s	» Operation and maintenance of the power plant and associated infrastructure.
Potential Impact	» Fires can pose a personal safety risk to occupants within the RBIDZ and communities and their facilities. In addition, fire can pose a significant risk to the power plant.
Activities/Risk Sources	» Storage of fuels onsite; and » Activities of employees.
Mitigation: Target/Objective	» To avoid and or minimise the potential risk of fires on the RBIDZ, local communities and their livelihoods.

Mitigation: Action/Control	Responsibility	Timeframe
Provide adequate fire-fighting equipment on site and implement the Emergency Preparedness and Response Plan (**refer to Appendix J**).	Proponent / O&M Operator	Operation
Join local Fire Protection Association, should there be one in existence.	Proponent / O&M Operator	Operation
Provide fire-fighting training to selected operation and maintenance staff.	Proponent / O&M Operator	Prior to commencement of operation
Ensure that appropriate communication channels are established to be implemented in the event of a fire.	Proponent / O&M Operator	Operation

Mitigation: Action/Control	Responsibility	Timeframe
Fire breaks should be established where and when required in consultation with the landowner. Cognisance must be taken of the relevant legislation when planning and burning firebreaks (in terms of timing, etc.). Access roads may also act as fire breaks.	Proponent / O&M Operator	Operation
Ensure all staff are conversant of the Emergency Preparedness and Response Plan (refer to **Appendix J**). Staff must receive regular training on the plan (e.g. every six months to a year).	Proponent / O&M Operator	Operation
Contact details of emergency services should be prominently displayed on site.	Proponent / O&M Operator	Operation
Design considerations for electrical hazards: » Consider installation of hazard warning lights inside electrical equipment enclosures to warn of inadvertent energization which can lead to fires. » Deactivation and proper grounding of live power equipment and distribution lines according to applicable legislation and guidelines whenever possible before work is performed on or proximal to them. » Provision of specialized electrical safety training to those workers working with or around exposed components of electric circuits. This training should include, but not be limited to, training in basic electrical theory, proper safe work procedures, hazard awareness and identification, proper use of Personal Protective Equipment, proper lockout/tagout procedures, first aid including CPR, and proper rescue procedures. Provisions should be made for periodic retraining as necessary.	Proponent / Project Engineer/ O&M Operator	Planning and design, and operation
Consider the use of automated systems such as temperature gauges or carbon monoxide sensors to survey solid fuel storage area to detect fires caused by self-ignition and to identify risk points.	Proponent / Project Engineer/ O&M Operator	Planning and design, and operation
Equipping facilities with fire detectors, alarm systems, and fire-fighting equipment. The equipment should be maintained in good working order and be readily accessible. It should be adequate for the dimensions and use of the premises, equipment installed, physical and chemical properties of substances present, and the maximum number of people present.	Proponent / Project Engineer/ O&M Operator	Planning and design, and operation
Design considerations for fuel storage: » Store flammables away from ignition sources and oxidizing materials. Further, flammables storage area should be:	Proponent / Project Engineer/ O&M Operator	Planning and design, and operation

Mitigation: Action/Control	Responsibility	Timeframe
» Remote from entry and exit points into buildings » Away from facility ventilation intakes or vents » Have natural or passive floor and ceiling level ventilation and explosion venting » Use spark-proof fixtures » Be equipped with fire extinguishing devices and self-closing doors, and constructed of materials made to withstand flame impingement for a moderate period of time		
Defining and labelling fire hazards areas to warn of special rules (e.g. prohibition in use of smoking materials, cellular phones, or other potential spark generating equipment)	Proponent / O&M Operator	Operation
Providing specific worker training in handling of flammable materials, and in fire prevention or suppression	Proponent / O&M Operator	Planning and design, and operation

Performance Indicator	» Fire-fighting equipment and training provided before the operation phase commences. » Appropriate fire breaks in place. » Signage at all fire hazard areas (e.g. fuel tanks and offloading stations).
Monitoring and Reporting	» Proponent must monitor indicators listed above to ensure that they have been met.

OBJECTIVE 13 : Appropriate handling and management of hazardous substances and waste

Project component/s	» Operation of power plant.
Potential Impact	» Inefficient use of resources resulting in excessive waste generation; and » Litter or contamination of the site or water through poor waste management practices.
Activity/risk source	» Generators and gearbox, turbines; fuel and oil storage.
Mitigation: Target/Objective	» To comply with waste management legislation; » To minimise production of waste; » To ensure appropriate waste disposal; and » To avoid environmental harm from waste disposal.

Mitigation: Action/control	Responsibility	Timeframe
Ensure that hazardous substances are stored in	Proponent	Operation

Mitigation: Action/control	Responsibility	Timeframe
sealed containers within a clearly demarcated designated area.		
Storage areas for hazardous substances must be appropriately sealed and bunded.	Proponent / O&M Operator	Operation
All structures and/or components replaced during maintenance activities must be appropriately disposed of at an appropriately licensed waste disposal site or sold to a recycling merchant for recycling.	Proponent	Operation
Care must be taken to ensure that spillage of oils and other hazardous substances are limited during maintenance. Handling of these materials should take place within an appropriately sealed and bunded area. Should any accidental spillage take place, it must be cleaned up according to specified standards regarding bioremediation.	O&M Operator	Operation and maintenance
Waste handling, collection and disposal operations must be managed and controlled by a waste management contractor.	Proponent / O&M Operator / waste management contractor	Operation
Used oils and chemicals: » Where these cannot be recycled, appropriate disposal must be arranged with a licensed facility in consultation with the administering authority or a licensed contractor should be appointed to collect and dispose of used oil. » Waste must be stored and handled according to the relevant legislation and regulations.	Proponent / O&M Operator	Operation
Hazardous waste (including hydrocarbons) and general waste must be stored and disposed of separately.	Proponent / O&M Operator	Operation
Disposal of hazardous waste must be in accordance with relevant legislative requirements, including the use of licensed contractors.	O&M Operator/ waste management contractor	Operation
No waste may be burned or buried on site.	Proponent / O&M Operator	Operation

Performance Indicator	» No complaints received regarding waste on site or dumping; » Internal site audits identifying that waste segregation, recycling and reuse is occurring appropriately; » Provision of all appropriate waste manifests; and » No contamination of soil or water.
Monitoring and Reporting	» Waste collection must be monitored internally on a regular basis·. » Waste documentation must be completed and available for inspection

	on request; » An incidents/complaints register must be maintained, in which any complaints from the community must be logged. Complaints must be investigated and, if appropriate, acted upon; and » Regular reports on exact quantities of all waste streams exiting the site must be compiled by the waste management contractor and monitored by the environmental manager. All appropriate waste disposal certificates must accompany the monthly reports.

OBJECTIVE 14 : Management of emissions

SO_2, NO_2, PM_{10}, CO and benzene emissions are anticipated from the operation of the gas turbines.

Project component/s	» Operation of the power plant.
Potential Impact	» Release of minor amounts of air pollutants (SO_2, NO_2, PM_{10}, CO and benzene) from the proposed gas to power plant.
Activities/risk sources	» Emissions from proposed gas to power plant will increase the existing ambient concentrations of all pollutants in the immediate vicinity and the surrounding areas. Predicted ambient SO_2, NO_2, PM_{10}, CO and benzene concentrations are very low for all operational scenarios for the proposed gas to power plant.
Mitigation: Target/Objective	» To minimise the contribution to ambient concentrations beyond the immediate vicinity of the proposed gas to power plant.

Mitigation: Action/control	Responsibility	Timeframe
The developer must consider the use of the cleanest fuel economically available (natural gas is preferable to oil, which is preferable to coal). In this case, diesel and LNG would be preferred over LFO and HFO in Phase 1. The developer should switch over to LNG once available.	Proponent	Pre-construction (planning and design / final technology choice) and duration of operation
As stated in the IFC General Environmental, Health and Safety (EHS) Guidelines, emissions from a single project should not contribute more than 25% of the applicable ambient air quality standards to allow additional, future sustainable development in the same airshed.	Proponent, O&M Operator	Duration of operation
Fugitive Emissions (Volatile Organic Compounds (VOCs) and particulate matter (PM): » Open burning of solid wastes, whether hazardous or non-hazardous, is not considered good practice and must not take place, as the generation of polluting	Proponent, O&M Operator	Design and planning, and duration of operation

Mitigation: Action/control	Responsibility	Timeframe
emissions from this type of source cannot be controlled effectively. » Regularly monitor fugitive emissions from pipes, valves, seals, tanks, and other infrastructure components with vapour detection equipment, and maintenance or replacement of components as needed in a prioritized manner. » Maintain stable tank pressure and vapour space by: * Coordinating filling and withdrawal schedules, and implementing vapour balancing between tanks, (a process whereby vapour displaced during filling activities is transferred to the vapour space of the tank being emptied or to other containment in preparation for vapour recovery); * Use supply and return systems, vapour recovery hoses, and vapour-tight trucks / railcars / vessels during loading and unloading of transport vehicles; * Use bottom-loading truck / rail car filling systems; and * Where vapour emissions contribute or result in ambient air quality levels in excess of health based standards, install secondary emissions controls, such as vapour condensing and recovery units, catalytic oxidizers, vapour combustion units, or gas adsorption media.		
Venting and Flaring of LNG/ NG: Venting and flaring are an important operational and safety measure used in natural gas processing facilities to ensure gas is safely disposed of in the event of an emergency, power or equipment failure, or other plant upset conditions. » Optimize plant controls to increase the reaction conversion rates; » Recycle unreacted raw materials and by-product combustible gases in the process or utilize these gases for power generation or heat recovery, if possible; » Provide back-up systems to achieve as high a plant reliability as practical; and » Locate the flaring system at a safe distance from residential areas or other potential receptors, and maintain the system to achieve high efficiency.	Proponent, O&M Operator	Design and planning, and duration of operation
Annual Stack Emission Testing for SO_2, NO_X and PM: If Annual Stack Emission Testing results show	Proponent, O&M Operator	Duration of operation

Mitigation: Action/control	Responsibility	Timeframe
constantly (3 consecutive years) and significantly (e.g. less than 75%) better than the required levels, frequency of Annual Stack Emission Testing can be reduced from annual to every two or three years.		
Emission Monitoring: » NO_X - Continuous monitoring of either NO_X emissions or indicative NO_X emissions using combustion parameters if emissions are anticipated to be high. » SO_2 - Continuous monitoring if SO_2 control equipment is used and if emissions are anticipated to be high.	Proponent, O&M Operator	Duration of operation

Performance Indicator	» Results from emission testing of monitoring parameters.
Monitoring and Reporting	» Annual Stack Emission Testing for SO_2, NO_X and PM. » Emission monitoring for NO_X and SO_2.

MANAGEMENT PLAN FOR THE GAS TO POWER PLANT: DECOMMISSIONING CHAPTER 7

The lifespan of the proposed power station is more than 20 years. Equipment associated with this facility would only be decommissioned once it has reached the end of its economic life or if it is no longer required. It is most likely that decommissioning activities of the infrastructure of the facility discussed in this EIA process would comprise the disassembly and disposal of the infrastructure. This would include the disassembly of the production units and ancillary infrastructure, demolishing of buildings, removal of waste from the site and rehabilitation to the desired end-use.

The relevant mitigation measures contained under the construction section should be applied during decommissioning and therefore is not repeated in this section.

7.1. Site Preparation

Site preparation activities will include confirming the integrity of the access to the site to accommodate required equipment, preparation of the site (e.g. lay down areas, construction platform) and the mobilisation of construction equipment.

7.2. Disassemble and Remove Infrastructure

Disassembled components will be reused, recycled, or disposed of in accordance with regulatory requirements.

7.3 Rehabilitation of the Site

In order to minimise the extent of rehabilitation activities required during the decommissioning phase, the project Proponent must ensure that constant effort is applied to rehabilitation activities throughout the construction, operation and maintenance phases of the project.

In decommissioning of the facility the Proponent must ensure that:

» All sites not already vegetated are vegetated as soon as possible after operation ceases with species appropriate to the area.
» Any fauna encountered during decommission should be removed to safety by a suitably qualified person.
» All structures, foundations (to at least 750mm below ground level) and sealed areas are demolished, removed and waste material disposed of at an appropriately licensed waste disposal site.

- All access/service roads not required to be retained by landowners are closed and fully rehabilitated.
- All vehicles to adhere to low speed limits (40km/h max) on the site, to reduce risk of faunal collisions as well as reduce dust.
- All disturbed areas are compacted, sloped and contoured to ensure drainage and runoff and to minimise the risk of erosion.
- All rehabilitated areas are monitored for erosion.
- Components of the facility are removed from the site and disposed of appropriately.
- Retrenchments should comply with South African Labour legislation of the day.

OBJECTIVE 1 : To avoid and or minimise the potential environmental and social impacts associated with the decommissioning phase

Project component/s	» Gas turbines; » Steam turbines; » Engine halls and stacks; » HV-Yard and substation » 132kV powerline; » Internal access roads; » Fuel tanks and unloading stations; » Water storage facilities (demineralisation, raw and fire water and partially treated water tanks); » Guard house, admin building, workshops and a warehouse; and » Associated infrastructures.
Potential Impact	» Impacts on people, flora, fauna, soils etc.
Activity/risk source	» Decommissioning of the gas power plant.
Mitigation: Target/Objective	» To avoid and or minimise the potential impacts associated with decommissioning phase of the gas power plant.

Mitigation: Action/control	Responsibility	Timeframe
Retrenchments should comply with South African Labour legislation of the day.	O&M Operator	Decommissioning.
Proponent must ensure that all relevant regulations, national and local legislation are adhered to and that the relevant authorities are informed and involved in the process as much as possible.	Proponent	Decommissioning
Rehabilitation should start immediately after decommissioning is completed.	Proponent / O&M Operator / Contractor	Decommissioning
Re-vegetation specifications to be developed.	Proponent / O&M Operator / contractor	Decommissioning
All excavations must be rehabilitated with soil and	O&M Operator /	Decommissioning

Mitigation: Action/control	Responsibility	Timeframe
topsoil, which should not contain invasive plant species (in compliance with the CARA, as amended), to the satisfaction of the ECO.	Contractor	
All building materials must be removed from the site. All compacted surfaces must be ripped and re-vegetated as per the re-vegetation specifications.	O&M Operator / Contractor	Decommissioning
The most suitable seed mix for disturbed areas to be used in rehabilitation would include indigenous species.	O&M Operator / Contractor	Decommissioning
Rehabilitation to be conducted in a progressive manner (i.e. once decommissioning in an area has been completed the area will be rehabilitated). The rehabilitation of the area with indigenous vegetation must coincide with the rainfall events and all alien invasive vegetation shall be removed (**Appendix I**).	O&M Operator / Contractor	Decommissioning
Rehabilitation measures for the site are to include the following: » Re-contouring Subsoil stockpiles should be used to re-contour construction affected areas. The Contractor shall restore the profile, soil condition and landform to as close as possible state to the pre-construction state. » Scarification and ripping All areas where rehabilitation interventions are required shall be cross-ripped before topsoil placement. Topsoil and fertile soil shall be uniformly scarified to allow for vegetation growth » Fertilising The Contractor shall be required to perform soil analysis tests on the top 75mm of prepared surface prior to re-vegetation/seeding to determine the required fertiliser levels for permanent cover. » Seed acquisition The Contractor shall purchase seed from a South African National Seed Organisation (SANSOR) accredited dealer. Seed used for rehabilitation shall not be older than one season. Purchased seed must be of the correct species and of known origin, dried and packed, conforming to all legal requirements for seed. Proof of compliance must be provided to Proponent prior decommissioning of works.	Proponent and O&M Operator / Contractor	Decommissioning
The Contractor shall schedule works for placing of topsoil once all infrastructure has been successfully decommissioned. Seeding can then take place after the first rains of the season and should be concluded by one month before the end of the growing season.	O&M Operator / Contractor	Decommissioning

Mitigation: Action/control	Responsibility	Timeframe
The seed mix for use in rehabilitation must be an approved mix of indigenous grass species common to the area.	O&M Operator / Contractor	Decommissioning
The Contractor shall maintain rehabilitated areas free of weeds and invader plants until the end of the Defects Notification Period applicable to rehabilitation. Control of weeds and invader plants must be done in accordance with the specifications stipulated in the CARA.	O&M Operator / Contractor	Decommissioning
The Contractor shall be responsible for the prevention of erosion in areas impacted upon by their activities. All erosion repairs must be implemented at the first signs thereof and no erosion shall be allowed to develop on a large scale.	O&M Operator / Contractor	Decommissioning
All recyclable rubble and solid waste (e.g. scrap metal, cables, bottles, cans, and plastic residues) shall be collected and disposed of through a registered recycling company. Waste manifests will be kept by the Contractor and shown to the ECO on request. All non-recyclable rubble and solid waste shall be collected and disposed of at an approved waste disposal site. Waste manifests will be shown to the ECO on request.	O&M Operator / Contractor	Decommissioning

Performance Indicator	» South African Labour legislation at the relevant time; and » Successful re-vegetation and rehabilitation of the site
Monitoring	Monitoring of Rehabilitation by Project Proponent & Rehabilitation Close-Out Report.

FINALISATION OF THE ENVIRONMENTAL MANAGEMENT PROGRAMME CHAPTER 8

The EMPr is a dynamic document, which must be updated when required. It is considered critical that this draft EMPr be updated to include site-specific information and specifications following the final walk-through surveys (flora and fauna) and site development footprint, including the access roads and power line routes. This will ensure that the construction and operation activities are planned and implemented taking sensitive environmental features into account.

APPENDIX A:
LETTER OF CONFIRMATION FOR THE PROVISION OF WATER FROM THE RBIDZ

RICHARDS BAY
INDUSTRIAL DEVELOPMENT ZONE

21 January 2016

Byromate Proprietary Limited
P.O Box 66
Botrivier
7185

For Attention: Mr. Dion Wilmans

Dear Sir

RBIDZ PHASE 1F: CONFIRMATION OF RAW WATER DEMAND

This serves to confirm that the water network in RBIDZ Phase 1F has sufficient capacity to accommodate the raw water demand requirement for Byromate Proprietary Limited of 1150m³ per day.

The availability of raw water will however be subject to the availability of water from the source considering the current water shortages in the Richards Bay area due to the extreme drought.

Yours faithfully

JOE MULLER
EXECUTIVE MANAGER: ZONE DEVELOPMENT AND OPERATIONS

Captains Walk Building, Tuzi Gazi Waterfront, Pioneer Road, Richards Bay, Private Bag X1005, Richards Bay, 3900
Tel: +27 35 788 0571, **Fax:** +27 35 788 0578, **email:** info@rbidz.co.za, **website:** www.rbidz.co.za

APPENDIX B:
A3 LOCALITY & SENSITIVITY MAPS

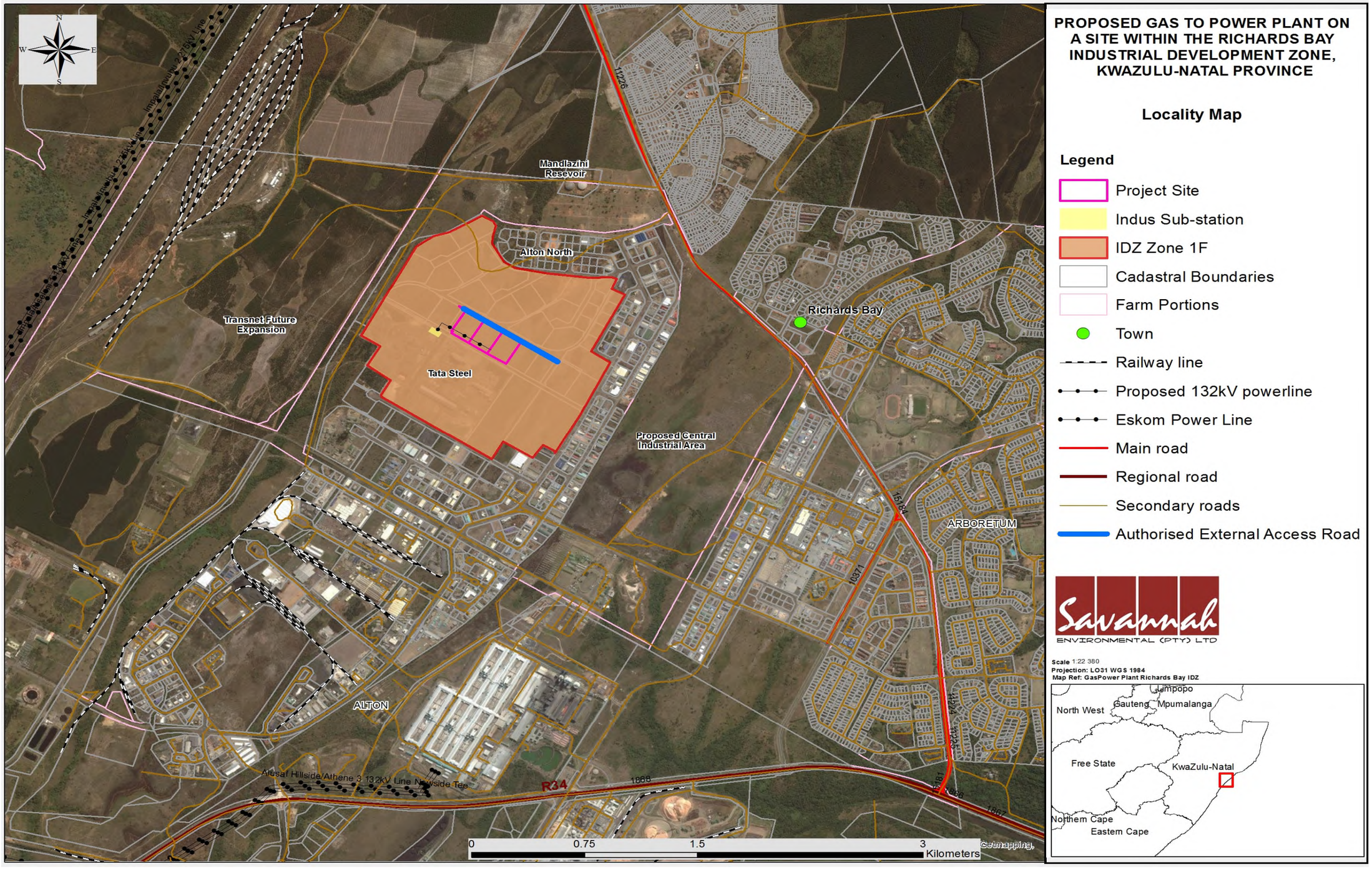


Figure 2.1: Locality Map

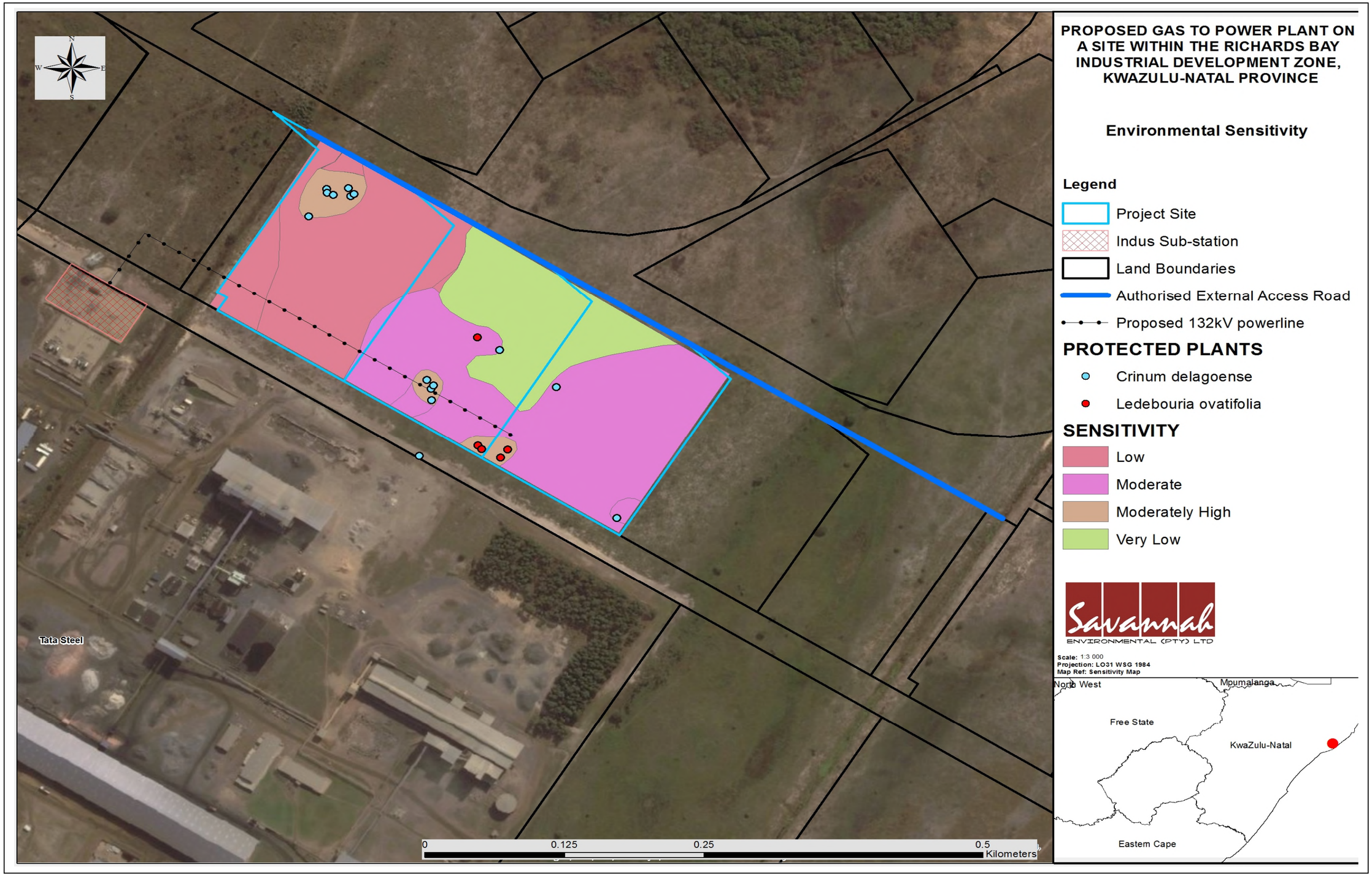


Figure 2.2: Environmental sensitivity map for the project study area illustrating ecologically sensitive areas in relation to the gas to power plant as well as protected plant species

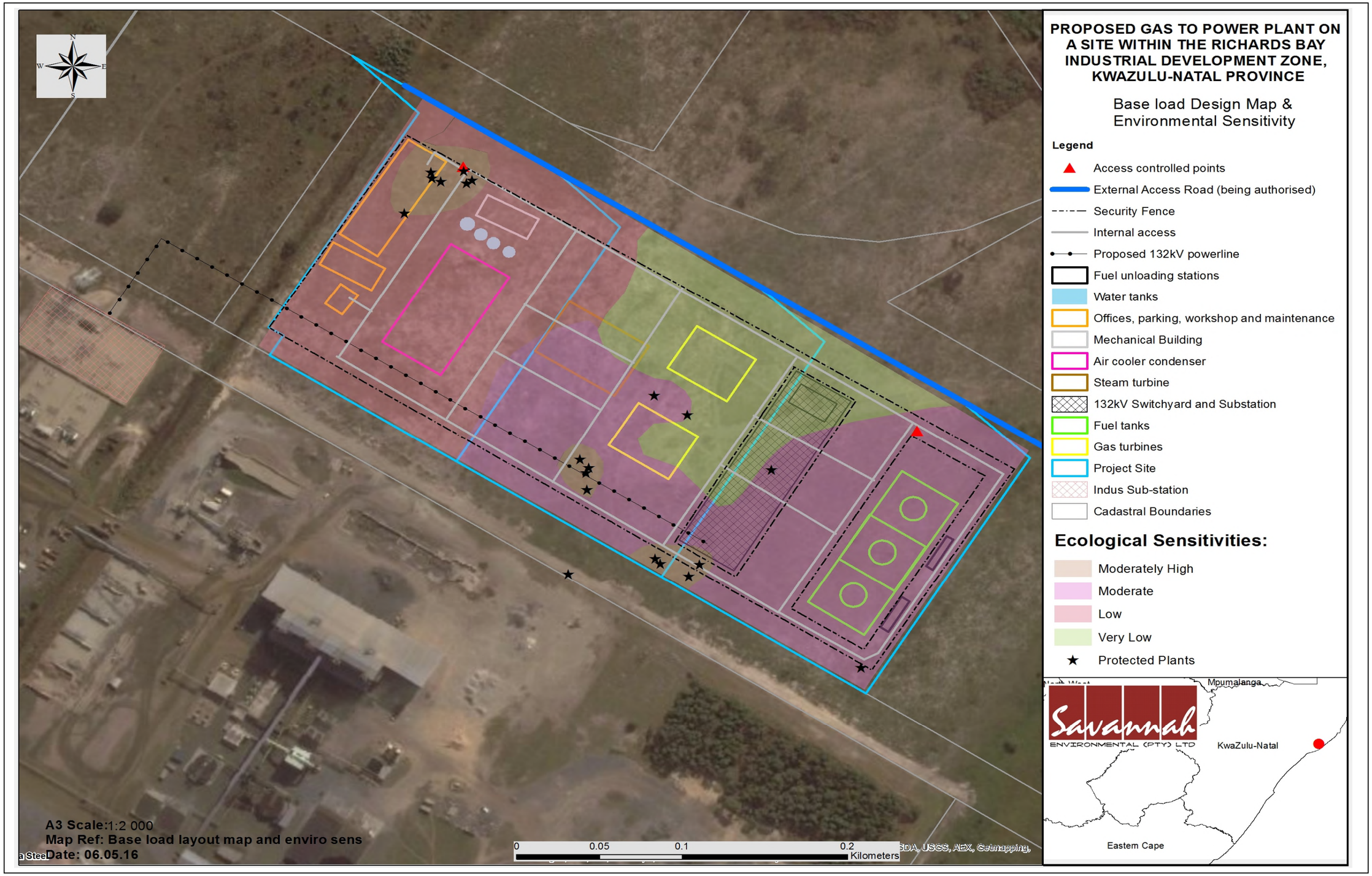


Figure 2.3: Environmental sensitivity map for the project study area illustrating ecologically sensitive areas in relation to the gas to power plant as well as protected plant species at Base load operational design

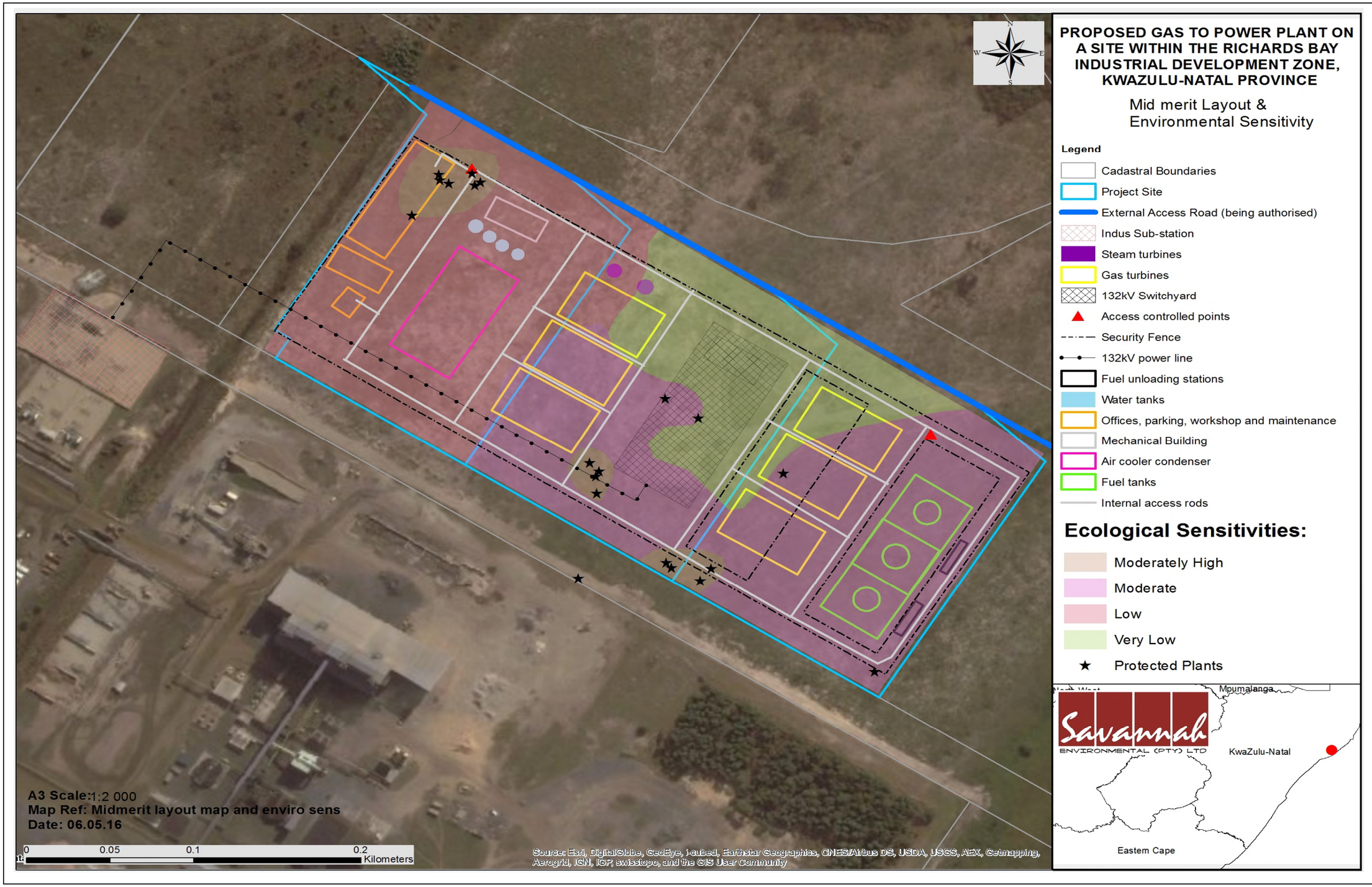
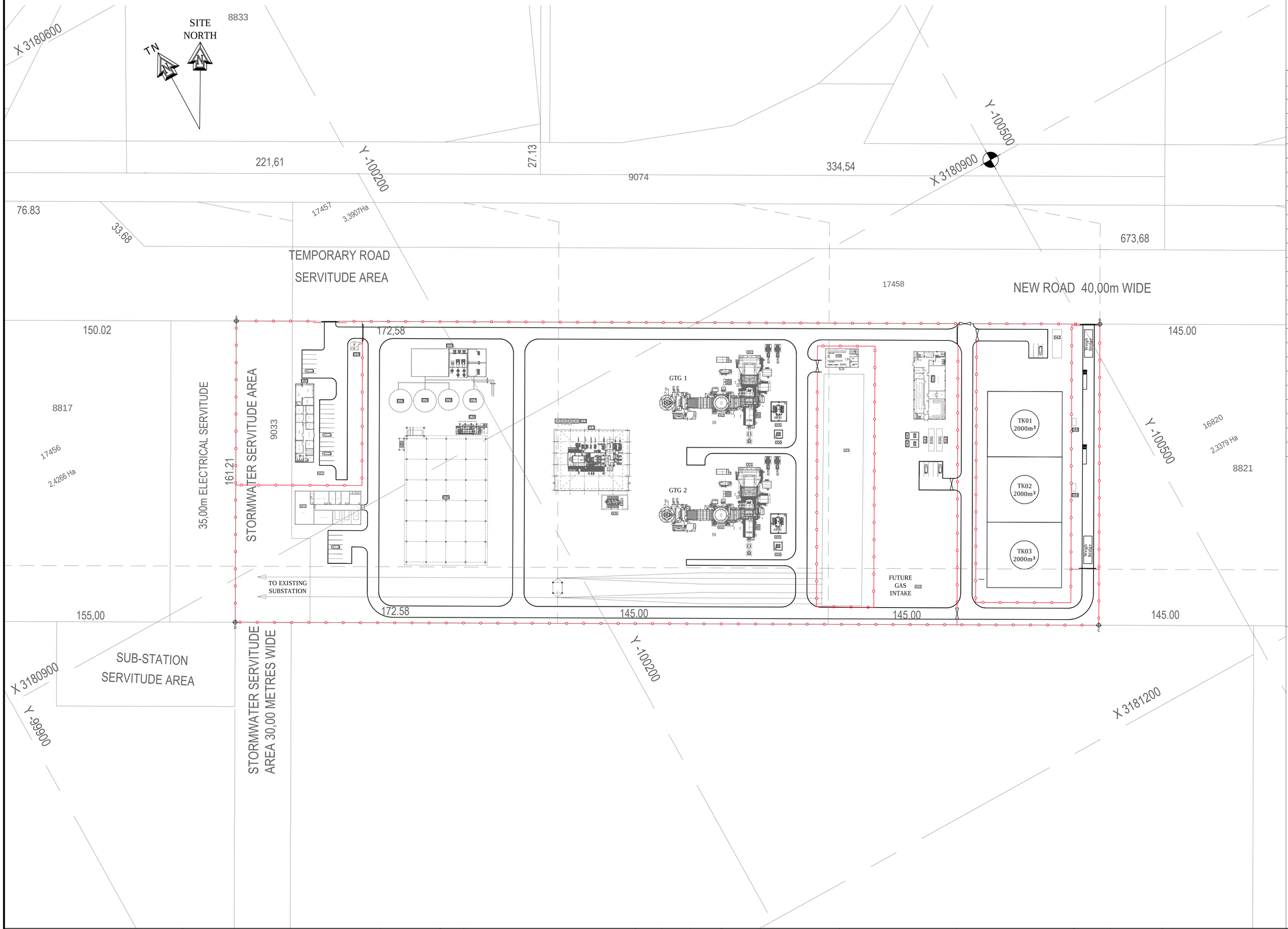


Figure 2.3: Environmental sensitivity map for the project study area illustrating ecologically sensitive areas in relation to the gas to power plant as well as protected plant species at mid-merit operational design



GENERAL NOTES:
All levels, heights and dimensions to be verified on site where applicable and to be checked against drawings.
Any errors, discrepancies, queries or omissions to be brought to the attention of SDE immediately prior to the commencement of any work.
All work to be carried out in strict accordance with local authority requirements, National Building Regulations and relevant standards.
Where applicable, contractors to locate and identify existing services on site and protect these from damage throughout the duration of the works.
This drawing must not to be scaled. Only figured dimensions shall be followed.
Only drawings referenced as "For Construction" shall be used for construction purposes.

SCHEDULE

ITEM	DESCRIPTION
001	GAS TURBINE
002	STACK
003	HEAT RECOVERY STEAM GENERATOR
005	GENERATOR STEP UP TRANSFORMER (GSU TX)
006	UNIT TRANSFORMER
010	GAS LET-DOWN AND METERING (FUTURE)
011	STEAM TURBINE GENERATOR
012	STEAM TURBINE FIN FAN COOLERS
021	132kV SWITCHYARD
022	ADMIN BUILDING
023	WORKSHOP AND MAINTENANCE BUILDING
024	SECURITY OFFICE
026	POWER PLANT CONTROL BUILDING
027	RAW AND FIRE WATER TANK (2000m³)
028	DEMIN WATER TANK (2 x 1000m³)
029	PARTIALLY TREATED WATER TANK
033	MECHANICAL BUILDING
034	FEED WATER PUMPS
035	AIR COOLER CONDENSERS
039	SWITCHYARD ELECTRICAL AND CONTROL ROOM
040	GATEHOUSE (IN 022)
041	EMERGENCY DIESEL GENERATOR
042	AUXILIARY TRANSFORMER
043	FUEL OFFICE AND LAB
044	OFFLOADING STATION

ISSUED FOR INFORMATION

0 10 20 40 60 80 100Metres

Reference Drawings	Drawing No.

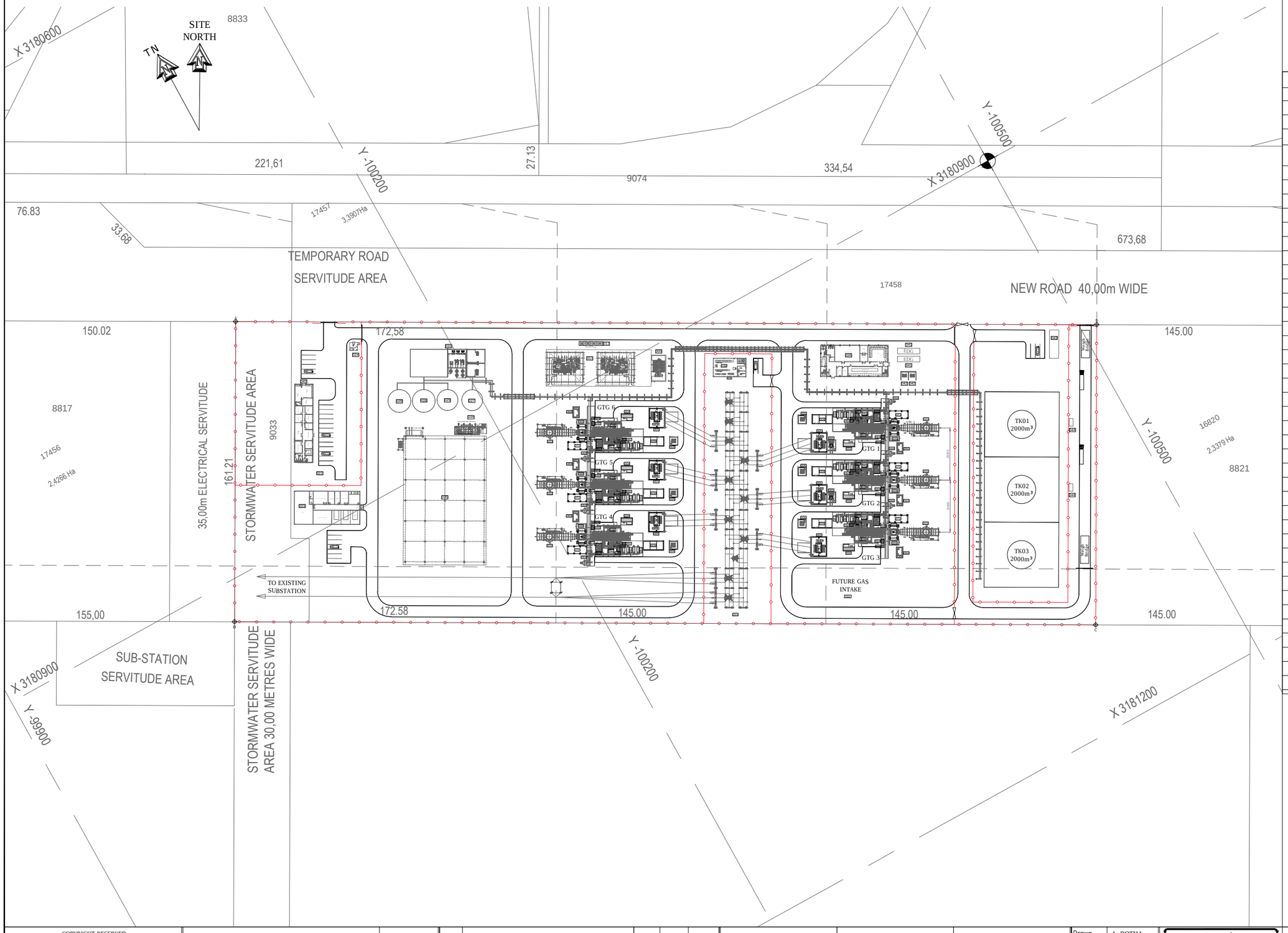
Rev.	Revision	Name	Date	Approved
A	ISSUED FOR INFORMATION	A.B.	12.04.16	A.S.

Name		Name		Name	
Designation		Designation		Designation	
Date		Date		Date	

Drawn	A. BOTHA
Design	A. STEAD
Checked	K. GAFNER
Approved	K. GAFNER
Date	08.04.2016
Scale	1:1000
Original	A1

single destination engineering
Power and Process Engineering
Balblair
Kildrummy Office Park
Cnr Witkoppen Road and Umhlanga Avenue
Paulshof, Sandton
Email : contactsde@sde.co.za
Website : www.sde.co.za
Tel: +2711 997 2340 Fax: +2711 997 2360

Project	Richards Bay PP RGBP-2
	OVERALL POWER PLANT CONCEPTUAL (FRAME 9e)
Drawing Number	7381 - CPT - SI - 03
Rev.	A



GENERAL NOTES:
All levels, heights and dimensions to be verified on site where applicable and to be checked against drawings.
Any errors, discrepancies, queries or omissions to be brought to the attention of SDE immediately prior to the commencement of any work.
All work to be carried out in strict accordance with local authority requirements, National Building Regulations and relevant standards.
Where applicable, contractors to locate and identify existing services on site and protect these from damage throughout the duration of the works.
This drawing must not to be scaled. Only figured dimensions shall be followed.
Only drawings referenced as "For Construction" shall be used for construction purposes.

SCHEDULE

ITEM	DESCRIPTION
001	GAS TURBINE
002	STACK
003	HEAT RECOVERY STEAM GENERATOR
004	GENERATOR CIRCUIT BREAKER (GCB) & ISOLATOR PHASE BUSBAR
005	GENERATOR STEP UP TRANSFORMER (GSU TX)
006	UNIT TRANSFORMER
008	POWER CONTROL MODULE (PCM)
009	CEMS
010	GAS LET-DOWN AND METERING (FUTURE)
011	STEAM TURBINE GENERATOR
012	STEAM TURBINE FIN FAN COOLERS
021	132kV SWITCHYARD
022	ADMIN BUILDING
023	WORKSHOP AND MAINTENANCE BUILDING
024	SECURITY OFFICE
026	POWER PLANT CONTROL BUILDING
027	RAW AND FIRE WATER TANK (2000m³)
028	DEMIN WATER TANK (2 x 1000m³)
029	PARTIALLY TREATED WATER TANK
033	MECHANICAL BUILDING
034	FEED WATER PUMPS
035	AIR COOLER CONDENSERS
039	SWITCHYARD ELECTRICAL AND CONTROL ROOM
040	GATEHOUSE (IN 022)
041	EMERGENCY DIESEL GENERATOR
042	AUXILIARY TRANSFORMER
043	FUEL OFFICE AND LAB
044	OFFLOADING STATION
060	SPRINT SKID
061	WATER INJECTION SKID
062	AUXILIARY SKID
063	LUBE OIL SKID
064	FIRE PROTECTION SKID
065	STATION TRANSFORMER (GTG1 & GTG2 ONLY)
066	LINE SIDE CUBICLE
068	DEMIN WATER BUFFER TANK
069	GAS DUPLEX FILTER (FUTURE)
070	LIQUID FUEL PUMP SKID
071	LIQUID FUEL OIL FILTER SKID
072	FIN FAN COOLER
080	OILY & USED WASH WATER SUMP

ISSUED FOR INFORMATION

0 10 20 40 60 80 100Metres

Reference Drawings	Drawing No.

Rev.	Revision	Name	Date	Approved
A	ISSUED FOR INFORMATION	H.B	11.04.16	A.S.

Name		Name		Name	
Designation		Designation		Designation	
Date		Date		Date	

Drawn	A. BOTHA
Design	A. STEAD
Checked	K. GAFNER
Approved	K. GAFNER
Date	27.11.2015
Scale	1:1000
Original	A1

single destination engineering
Power and Process Engineering
Balblair
Kildrummy Office Park
Cnr Witkoppen Road and Umhlanga Avenue
Paulshof, Sandton
Email : contactsde@sde.co.za
Website : www.sde.co.za
Tel: +2711 997 2340 Fax: +2711 997 2360

Project	Richards Bay PP RGBP-2
	OVERALL POWER PLANT CONCEPTUAL
Drawing Number	7381 - CPT - SI - 01
Rev.	A

APPENDIX C:
PLANT RESCUE AND PROTECTION PLAN

PLANT RESCUE AND PROTECTION PLAN

1. PURPOSE

The purpose of the plant rescue, translocation and protection plan is to provide guidelines for the implementation of plant rescue, translocation and protection as a means of mitigating development impacts of the proposed power plant development on protected plants of conservation importance occurring on the site.

2. RELEVANT ASPECTS OF THE SITE

Schedule 12 of the (KZN) Nature Conservation Ordinance (No. 15 of 1974) lists Specially Protected Plants that are regulated in terms of activities that can take place with respect to harvesting, selling, importing, trading and handling of these plant species. On application by a landowner wishing to develop his land in such a manner that such development may cause damage or destruction to specially protected indigenous plants, a permit for the relocation of such plants may be granted.

The following species found to occur on the site have been identified as being Specially Protected Plants which will require a permit for removal/relocation should their disturbance be unavoidable:

Crinum delagoense

Ledebouria ovatifolia

3. GUIDELINES FOR SEARCH AND RESCUE

A plant rescue and translocation operation for these protected plants will need to be undertaken prior to site clearing/construction taking place, according to the following guidelines:

» A suitably qualified botanist or other specialist with extensive experience in terrestrial plant rescue and translocation within the Zululand coastal zone must be appointed prior to any construction/land clearing activities taking place, to undertake plant rescue and relocation for the protected plants listed for the site.
» Prior to plant translocation, a suitable patch of similar natural sandy terrestrial coastal grassland (preferably 1ha or larger) will need to be identified outside of the construction/developed footprint (also bearing in mind future development within the RBIDZ Phase 1F area – these areas are to be excluded from potential relocation sites). Intact habitat is a prerequisite, with limited ecological disruptions to prevent further disturbance of translocated plant populations. In situ conservation is preferable to ex situ conservation. Removing a population from its natural habitat and placing it under artificial conditions results in the erosion of the inherent genetic diversity and characteristics of that species. Sites nearest to the donor grassland site (i.e. the development site) are ideal, as too great a distance could impair genetic variation and potential exchange. Suitable habitat should meet the candidate species' total biotic and abiotic needs through space and time and for all life stages (IUCN, 2012).
» A list of protected plants together with their coordinates is included below (Table 1) for use in relocating individual plants in the field. Refer also to the map showing the location of protected plants in Figure 1.
» A plant permit must be obtained from the relevant environmental/conservation authority prior to plant rescue and translocation. In the case of Specially Protected Plants (Schedule 12 of the Natal Conservation Ordinance), the permits office at Ezemvelo KZN Wildlife (EKZNW, formerly the Natal Parks Board) will need to be approached in this regard.
» The appointed specialist must identify, demarcate and translocate protected plants. Each individual plant rescued must be photographed prior to removal, tagged with a unique number of code and the geographical coordinates (latitude/ longitude) recorded using a hand-held GPS device.
» The specialist and team appointed to carry out plant rescue and relocation must carefully remove each plant from the loose sandy substrate, including its underground storage organ (bulb/ corn) and/or rooting structure (root ball) by hand or using a small shovel/ trowel) and carefully transport plants without causing unnecessary damage/ trauma to the rescued plants.

- Rescued plants are likely to be sensitive to removal and transplanting and are therefore to be handled with care and not to be stored outside of their soil/ habitat for more than a few hours (remove and transplant plants on the same day). Alternatively, plants can be planted into suitable containers and housed within a temporary nursery.
- Plants removed are to be stored safely and treated according to their specific requirements (to be advised by the botanist/plant translocation specialist appointed to undertake rescue and relocation of plants).
- Relocate/ transplant the rescued plants at the target grassland area identified.
- The timing of plant rescue operations and transplanting will be essential and should be planned for the onset of the growing season. The optimal timeframe for removal and replanting is to perform the search, rescue and relocation in spring or early summer (September to November), once the spring rains have fallen, in order to facilitate plant establishment.
- The plants should be planted in patches within the grassland (similar to how they occur spatially/naturally at the site).
- Transplants should be placed within a small hole (large enough to contain the bulb/route structure), with soil to be placed and gently compacted around the base of the plant (gently firm down the soil, compaction not to be too great).
- Re-planting into the wild must occur sensitively, causing as little damage/disturbance to natural vegetation as possible.
- Immediately after being transplanted, species should be adequately watered.
- Plant mortality can be high when individuals are relocated to a new environment and it is therefore recommended that relocated plants be monitored for a period of at least a month post-translocation to identify any additional plant requirements.
- Step are to be taken to protect rescued and translocated plants from further disturbance in order to aid/facilitate their re-establishment at the new site (may require fencing off, signage, monitoring, etc.). The position (coordinates) of rescued plants that have been re-planted should be recorded using a GPS device to inform future monitoring of the success of the plant rescue, translocation and protection efforts undertaken. Success entails not only survival of the translocated individuals but also establishment of a self-sustaining, viable population able to reproduce and adapt to changing environmental conditions.
- Any deviations from the plan that may be required should first be checked by the ECO and the appointed botanist/specialist responsible for plant rescue and translocation.

Other species that should be relocated from the development site should include the following Endemic species:

Hyphaene coriacea (Lala palm) – 1 plant observed along the eastern boundary of the development site

Table 1. Coordinates of protected plant species for rescue and relocation.

SPECIES NAME	LATITUDE (S)	LONGITUDE (E)
Crinum delagoense Number of plants observed: ~15-20	-28.74049868450	32.02706985460
	-28.74080255870	32.02760902580
	-28.74195530290	32.02824085870
	-28.74098102040	32.02648415000
	-28.74088023210	32.02647111530
	-28.74084823810	32.02648887670
	-28.74080091030	32.02642816700
	-28.74149136930	32.02640479250
	-28.73938148700	32.02525153960
	-28.73912809220	32.02539781970
	-28.73916201100	32.02540612800
	-28.73917916290	32.02546213520
	-28.73918146780	32.02562169990
	-28.73916130690	32.02565341140
	-28.73911016570	32.02559840170
Ledebouria ovatifolia Number of plants observed: ~5-8	-28.74039231160	32.02686107380
	-28.74136947300	32.02693225920
	-28.74139884280	32.02696616260
	-28.74146660610	32.02714611170
	-28.74139207500	32.02720701230

Figure 1: Map showing the location of protected plant species occurring at the development site.

APPENDIX D:
REVEGETATION &REHABILITION PLAN

REVEGETATION AND REHABILITATION PLAN

1. PURPOSE

During construction there is bound to be disturbance of terrestrial vegetation outside the actual development footprint (for access by vehicles/workers, site camps, storage of equipment/material, etc.). Such disturbance is likely to be inevitable and will likely require rehabilitation post-construction where the vegetation and/or soil surface has been damaged or disturbed. The purpose of the rehabilitation plan for the site can be summarised as follows:

» Achieve long-term stabilisation of all disturbed areas to minimise erosion potential.
» Re-vegetate all disturbed areas with suitable local plant species.
» Minimise visual impact of disturbed areas.
» Ensure that disturbed areas are safe for future uses.

This Revegetation and Rehabilitation Plan should be closely aligned with other site-specific plans, including the Erosion Management Plan, Alien Invasive and Open Space Management Plan, and Plant Rescue and Protection Plan.

2. REHABILITATION GUIDELINES

The following guidelines provide a clear and practical means of implementing such rehabilitation once construction activities have ceased.

2.1. Land/soil preparation measures

The following are general land preparation requirements for all terrestrial areas potentially requiring rehabilitation:

» All rubble, litter, foreign materials and waste products needs to be removed from the construction area and disposed of at proper local waste disposal/landfill facilities. Minimise additional disturbance by limiting the use of heavy vehicles and personnel during clean-up operations
» Any topsoil stockpiles/material must be spread evenly on the ground to match the natural slope of the grassland. The final prepared surface shall not be smooth but furrowed to follow the natural contours of the land pre-disturbance.
» All Invasive Alien Plants (IAPs) and weeds must be removed from target sites, preferably by uprooting (refer to the detail contained in **Appendix J***).*
» Any erosion features within the construction site must be stabilised. Compacted soil infill, rock plugs, gabions, excavation and reshaping or any other suitable measures can be used for this purpose.

» Where significant soil compaction has occurred, the soil may need to be ripped or scarified with a mechanical ripper or by hand to a depth >25cm, in order to reduce its bulk density thus improving the chances of such that vegetation can become established at the site. Rip and / or scarify all disturbed and compacted areas outside of the development footprint. The ECO with the assistance of the engineer/contractor will specify whether ripping and / or scarifying is necessary, based on the site conditions.
» Immediately after ripping and scarifying disturbed areas, about 300mm of topsoil must be applied on top. The thickness of the topsoil maybe reduced at the instruction of the engineer only if the recommended 300mm of topsoil compromises the integrity of the works.
» Topsoil must be placed in the same area from where it was originally 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. Where topsoil is lost during construction as a result of erosion, topsoil will need to be imported to the site and re-established. Such topsoil must be sourced commercially and legally.
» The topsoil must be compacted to similar compaction levels as natural soils in the area. The engineer will provide detailed advice on this.
» For seeding, the soil needs to be prepared to optimise germination. This is typically undertaken by hand hoeing to loosen the soil in the seedbed but should be firm enough to facilitate good contact between the seeds and the soil.
» Other relevant land preparation methods are illustrated in Figure 1 below.

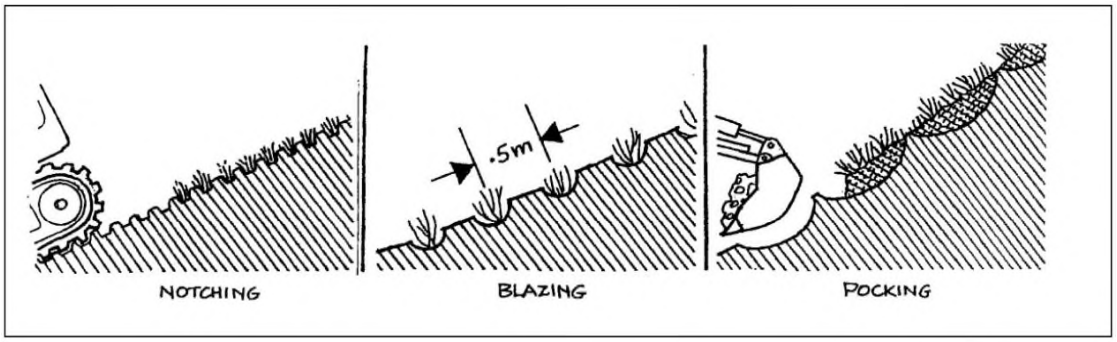


Figure 1: Methods of preparing the land for planting (Source: EThekwini Municipality, 2002).

2.2. Re-vegetation of disturbed terrestrial areas

For disturbed terrestrial sites outside of the development footprint where rehabilitation and re-vegetation will be necessary, the end state of the vegetation should be decided upon (should be similar to that which occurred at the site pre-disturbance associated with the development) and a list of species to be established for each specific site must be generated. Immediately after preparing the soil at a

site to be rehabilitated, re-vegetation must commence in order to help bind the soil and prevent soil erosion and to inhibit IAP/weed establishment which will compete with the natural vegetation for space, light, nutrients and water. In this regard, the following mitigation measures must be implemented for disturbed terrestrial habitats/vegetation:

» **Method 1: Sodding/transplanting**

* Transplants of grasses, herbs and woody shrubs/small trees removed during vegetation clearing at the site can and should be used to revegetate within disturbed areas where possible.
* A temporary on-site plant nursery will need to be established for the holding of rescued plant material and the propagation of appropriate species for re-vegetation.
* Stored plants will need to be kept moist and weed free and shall be protected from vermin, pests, pathogens, excessive sun and wind.
* Runner grass sods composed of indigenous species found naturally at the site must be laid out on all road batters and secured in place using wooded pegs. Use of grass sods is the most preferred revegetation method because it offers instant protection of vulnerable areas. It is best to install the sod as soon as it is delivered.
* Prior to installing sods, rake or harrow to achieve a smooth, final grade.
* Lay the grass sods then peg each on to the ground using wooden pegs/stakes.
* When sodding is carried out in alternating strips, or other patterns the areas between the sods should be seeded immediately after the sodding.
* Immediately after revegetation, the grass sods must be watered thoroughly. Watering must be undertaken on a daily basis until such time as the sod becomes well rooted within the soil. Thereafter, less frequent watering should be sufficient until such time as the vegetation is established to the satisfaction of the rehabilitation implementer and ECO/resident engineer.
* **No exotic/alien plants are to be used in sodding.**
* Soil or other propagation media, where used, shall be weed- and pathogen free.

» **Method 2: Hydroseeding**

* Hydroseeding is the second preferred option to re-vegetating slopes. The advantages of hydroseeding include faster germination, increased plant survival, and the ability to cover large, often inaccessible areas rapidly.

- The slurry (basic materials) for hydroseeding must consist of water, seed, fertiliser, anti-erosion compounds (soil binders) and organic supplements to enhance grass growth.
- Prior to hydroseeding water must be sprayed over target area to provide added moisture.
- The target groundcover of re-vegetated areas shall be no less than 80% of specified vegetation and there must be no bare patches of more than 500 x 500mm in maximum dimension.
- Ideal species for hydroseeding include runner and short tufted species, such as *Cynodon dactylon* or suitable alternative indigenous grasses species adapted to the local environmental conditions (preferably grasses endemic to the region).
- A stabilising grass *mix should be selected* that should consist of a mix of quick covering grasses (pioneer species) and mat-forming grasses (e.g. *Digitaria eriantha, Cynodon dactylon, Chloris gayana*) to ensure prompt and adequate coverage of the exposed soil while ensuring that long-term stability of the grass sward is also achieved. The seed mix should consist of pioneer grass species of the area, which will also depend on what species are commercially available during the season required. Tufted grasses (e.g. *Eragrostis curvula, Themeda triandra*) are recommended.
- The natural seed bank in the topsoil will supplement the seed mix applied.
- **No exotic/alien plants are to be used in hydroseeding** (e.g. Kikuyu grass, *Pennisetum clandestinem,* is not recommended).
- Sowing rates for seeds should be obtained from the relevant supplier and in accordance with the existing environment. The quantity of seed used will depend on the slope, with a steeper slope generally requiring a heavier application of seed. For slopes<15º: 15-25 kg/ha.
- The areas which have been seeded must be regularly watered directly after seeding until the grass cover becomes established. Watering is to be done in a manner that ensures that no erosion of the topsoil and seed mix takes place.
- In the absence of sufficient follow-up rains after seeds start germinating, watering of the new vegetation cover will become necessary until it is established in order to avoid loss of this vegetative cover and the associated seedbank.
- From sites that will be cleared, 100% of all seeds from indigenous grasses/shrubs/trees available may be collected and broadcast across disturbed areas requiring re-vegetation (note that seed harvested may not contain materials of any alien invasive species). Where nursery facilities onsite can only cater for rescued plants, a suitable local nursery nearby should be identified that will be willing to receive seeds collected and propagate the necessary species for later revegetation.

2.3. Monitoring of re-vegetated areas

» Re-vegetated areas should be monitored on a monthly basis by the ECO during construction, and then every 2-3 months for the first 12 months post-construction or until such time as 80% of the desired plant species cover has been achieved, with annual inspections thereafter until the rehabilitation/re-vegetation of the plant community has been deemed successful and self-sustaining.

» Re-vegetated areas showing inadequate surface coverage (less than 30% within 9 months after re-vegetation) should be prepared and re-vegetated/reseeded from scratch. Where necessary, another dressing of topsoil may need to be applied prior to re-seeding the area.

» Damage/disturbance to any re-vegetated areas should be repaired.

» Exotic weeds and invaders that establish on re-vegetated areas should be controlled to allow the native species to properly establish (refer to the detail contained in **Appendix J**).

APPENDIX E:
TRAFFIC MANAGEMENT PLAN

PRINCIPLES FOR TRAFFIC MANAGEMENT

1. PURPOSE

The purpose of this Traffic Management Plan (TMP) is to address regulatory compliance, traffic management practices, and protection measures to help reduce impacts related to transportation during the construction and operation phase of the power plant site. The objectives of this plan include the following:

» To ensure compliance with all legislation regulating traffic and transportation within South Africa (National, Provincial, Local & associated guidelines).
» To avoid incidents and accidents while vehicles are being driven and while transporting personnel, materials, and equipment to and from the project site.
» To raise greater safety awareness in each driver and to ensure the compliance of all safe driving provisions for all the vehicles.
» To raise awareness to ensure drivers respect and follow traffic regulations.
» To avoid the deterioration of access roads and the pollution that can be created due to noise and emissions produced by equipment, machinery, and vehicles.

2. RELEVANT ASPECTS OF THE PROJECT

2.1. Construction Phase

An increase in traffic due to construction vehicles and heavy vehicles could create short-term disruptions and safety hazards for current road users. Transportation of project components and equipment to the proposed site will be transported using vehicular / trucking transport. The developer has indicated that the number of heavy vehicle trips per day would be in the region of ~30-50 trips in the beginning phase and thereafter approximately only ~15-20 trips. Access to the proposed development site will be via existing roads within the IDZ Phase 1F (already approved through an EIA undertaken for the Phase 1F infrastructure).

The IDZ Phase 1F can be accessed via:

» The N2 via the R619 (located north of the IDZ 1F) onto Heliumhoogte Road and then onto Alumina Alley Road; or
» The IDZ 1F can be accessed via the N2 on the R34 (also known as John Ross PKWY) and then onto Alumina Alley road.

Increased traffic due to construction vehicles and heavy vehicles could cause disruptions to road users and increase safety hazards. The use of local roads and

transport systems may cause road deterioration and congestion. During the stakeholder consultations that took place it was noted that the R619 route is currently a congested route with high volumes of vehicles and trucks passing through each day. Increased vehicular movement during the construction phase may influence daily living and movement patterns of community members in the surrounding communities. Mitigation measures are aimed at optimising vehicular movement during the construction phase to minimize traffic congestion problems in the area, which in turn influences daily living and movement patterns of community members in the surrounding communities who make use of these roads. It is suggested that construction vehicles and trucks utilise the R34 route to access the IDZ phase 1F area, to prevent further congestion on the R619 route.

2.2. Operations Phase

During phase 1 of the power plant, fuels will need to be transported to site each day, including diesel and Liquified Petrolium Gas (LPG) (phase 1 of the proposed development). The project involves the construction of a gas-fired power station which will provide either baseload[1] or mid-merit[2] power supply to the electricity grid. Tankers will be delivering fuel per day during phase 1 of the operation phase. Each tanker delivering fuel to site will bring 40-44 m^3 of diesel or LPG. Depending on the technology design required the number of tankers delivering fuel per day will be as follows:

- For baseload operation – 52 tankers a day
- For mid-merit operation – 18 tankers a day

Access to the proposed development site will be via existing roads within the RBIDZ Phase 1F (already approved through an EIA undertaken for the Phase 1F infrastructure).

The RBIDZ Phase 1F can be accessed via:

- The N2 via the R619 (located north of the IDZ 1F) onto Heliumhoogte Road and then onto Alumina Alley Road; or
- The IDZ 1F can be accessed via the N2 on the R34 (also known as John Ross PKWY) and then onto Alumina Alley road.

Increased traffic due to heavy vehicles (tankers) could cause disruptions to road users and increase safety hazards. The use of local roads and transport systems may cause road deterioration and increase congestion. During the stakeholder

[1] "Baseload electricity generating capacity" refers to power station technology designed specifically to generate electricity continuously for all hours of the day and night.
[2] "Mid-Merit electricity generating capacity" refers to power station technology designed specifically to generate electricity during peak demand hours.

consultations that took place it was noted that the R619 route is currently a congested road with high volumes of vehicles and trucks passing through each day. Increased vehicular movement during the operation phase may influence daily living and movement patterns of community members in the surrounding communities through increased congestion. Mitigation measures are aimed at optimising vehicular movement during the operation phase to minimize traffic congestion problems in the area, which in turn influences daily living and movement patterns of community members in the surrounding communities who make use of these roads. It is suggested that construction vehicles and trucks utilise the R34 route to prevent further congestion along the R619 route.

3. TRAFFIC AND TRANSPORTATION MANAGEMENT PRINCIPLES

» Prior to the commencement of construction and thereafter during operation, the contractors must develop their own detailed Transport Management Plan (TMP) based on traffic volumes and road carrying capacity.
» The transport contractor must ensure that all required permits for the transportation of abnormal loads are in place prior to the transportation of equipment and project components to the site. Specific abnormal load routes must be developed with environmental factors taken into consideration.
» Before construction commences, authorised access routes must be clearly marked in the field with signs or flagging. The Construction Contractor must review the location of designated access and will be responsible for ensuring construction travel is limited to designated routes. The entrance off the main access road must not be constructed before a blind rise or on a bend of the public road.
» All employees must attend an environmental training program (e.g. toolbox talks) by the Environmental Officer (EO). Through this program, employees will be instructed to use only approved access roads, drive within the delineated road limits, and obey jurisdictional and posted speed limits to minimise potential impacts to the environment and other road users.
» The contractor will be responsible for making sure that their suppliers, vendors, and subcontractors strictly comply with the principles of this TMP and the contractor's TMP.
» Adjacent landowners must be notified of the construction and operation schedule.
» Access roads and entrances to the site should be carefully planned to limit any intrusion on the neighbouring property owners and road users.
» Signs must be posted in the project area to notify landowners and others of the construction activity.
» Flagging must be provided at access points to the site and must be maintained until construction is completed on the site.

- Speed limits must be established prior to commencement of construction and enforced over all construction traffic.
- Speed controls and implementation of appropriate dust suppression measures must be enforced to minimise dust pollution.
- Throughout construction the contractor will be responsible for monitoring the condition of roads used by project traffic and for ensuring that roads are maintained in a condition that is comparable to the condition they were in before the construction began.
- Drivers must have an appropriate valid driver's license and other operational licences required by applicable legislation.
- All vehicles must be maintained in good mechanical, electrical, and electronic condition, including but not limited to the brake systems, steering, tires, windshield wipers, side mirrors and rear view mirror, safety belts, signal indicators, and lenses.
- Any traffic delays attributable to construction traffic must be co-ordinated with the appropriate authorities.
- No deviation from approved transportation routes must be allowed, unless roads are closed for reasons outside the control of the contractor.
- Impacts on local communities must be minimised. Consideration should be given to limiting construction vehicles travelling on public roadways during the morning and late afternoon commute time.

4. MONITORING

- The principal contractor must ensure that all vehicles adhere to the speed limits.
- A speeding register must be kept with details of the offending driver.
- Repeat offenders must be penalised.
- Where traffic signs are not being adhered to, engineering structures must be used to ensure speeds are reduced.

APPENDIX F:
STORM WATER MANAGEMENT PLAN

STORMWATER MANAGEMENT PLAN

1. PURPOSE

It is understood that activities associated with developments can impact negatively on drainage systems. By taking greater cognisance of natural hydrological patterns and processes it is possible to develop stormwater management systems in a manner that reduces these potentially negative impacts and mimic nature. The main risks associated with inappropriate stormwater management are increased erosion risk and risks associated with flooding. Therefore, this Stormwater Management Plan and the Erosion Management Plan are closely linked to one another and should be managed together.

This Stormwater Management Plan addresses the management of stormwater runoff from the development site and significant impacts relating to resultant impacts such as soil erosion and downstream sedimentation. The main factors influencing the planning of storm water management measures and infrastructure are:

» Topography and slope gradients;
» Placing of infrastructure and infrastructure design;
» Annual average rainfall;and
» Rainfall intensities;

The objective of the plan is therefore to provide measures to address runoff from disturbed portions of the site, such that they:

» do not result in concentrated flows into natural watercourses i.e. provision should be made for temporary or permanent measures that allow for attenuation, control of velocities and capturing of sediment upstream of natural watercourses.
» do not result in any necessity for concrete or other lining of natural watercourses to protect them from concentrated flows off the development if not necessary.
» do not divert flows out of their natural flow pathways, thus depriving downstream watercourses of water.

This Stormwater Management Plan must be updated and refined once the construction/ civil engineering plans have been finalised following detailed design.

2. STORMWATER MANAGEMENT PRINCIPLES

In the design phase, various stormwater management principles should be considered including:

» Prevent concentration of stormwater flow at any point where the ground is susceptible to erosion.

- Reduce stormwater flows as far as possible by the effective use of attenuating devices (such as swales, berms, silt fences). As construction progresses, the stormwater control measures are to be monitored and adjusted to ensure complete erosion and pollution control at all times.
- Minimse the area of exposure of bare soils to minimse the erosive forces of wind, water and all forms of traffic.
- Ensure that development does not increase the rate of stormwater flow above that which the natural ground can safely accommodate at any point in the sub-catchments.
- Ensure that all stormwater control works are constructed in a safe and aesthetic manner in keeping with the overall development.
- Plan and construct stormwater management systems to remove contaminants before they pollute surface waters or groundwater resources. Implement the principle of separating clean and dirty run-off streams (typically from bunded areas or those areas associated with hydrocarbon storage or the facility substation).
- Contain soil erosion, whether induced by wind or water forces, by constructing protective works to trap sediment at appropriate locations. This applies particularly during construction.
- Avoid situations where natural or artificial slopes may become saturated and unstable, both during and after the construction process.
- Design and construct roads to avoid concentration of flow along and off the road. Where flow concentration is unavoidable, measures to incorporate the road into the pre-development stormwater flow should not exceed the capacity of the culvert. To assist with the stormwater run-off, gravel roads should typically be graded and shaped with a 2-3% crossfall back into the slope, allowing stormwater to be channelled in a controlled manor towards the natural drainage lines and to assist with any sheet flow on the site.
- Design culvert inlet structures to ensure that the capacity of the culvert does not exceed the pre-development stormwater flow at that point. Provide detention storage on the road and/or upstream of the stormwater culvert.
- Design outlet culvert structures to dissipate flow energy. Any unlined downstream channel must be adequately protected against soil erosion.
- Where the construction of a building causes a change in the vegetative cover of the site that might result in soil erosion, the risk of soil erosion by stormwater must be minimised by the provision of appropriate artificial soil stabilisation mechanisms or revegetation of the area. Any inlet to a piped system should be fitted with a screen, or grating to prevent debris and refuse from entering the stormwater system.
- Preferably all drainage channels on site and contained within the larger area of the property (i.e. including buffer zone) should remain in the natural state so that the existing hydrology is not disturbed.

3.1. Engineering Specifications

A detailed Stormwater Management Plan with engineering specifications describing and illustrating the proposed stormwater control measures must be prepared by the Civil Engineers during the detailed design phase and should be based on the underlying principles of this Stormwater Management Plan. This should include erosion control measures. Requirements for project design include:

» Erosion control measures to be implemented before and during the construction period, including the final stormwater control measures (post construction).
» All temporary and permanent water management structures or stabilisation methods must be indicated within the detailed comprehensive Stormwater Management Plan.
» The drainage system for the site should be designed to specifications that can adequately deal with a 1:50 year intensity rainfall event or more to ensure sufficient capacity for carrying storm waters around and away from infrastructure.
» Procedures for stormwater flow through a project site need to take into consideration both normal operating practice and special circumstances. Special circumstances in this case typically include severe rainfall events.
» An on-site Engineer or Environmental Officer must be responsible for ensuring implementation of the erosion control measures on site during the construction period.
» The EPC Contractor holds ultimate responsibility for remedial action in the event that the approved stormwater plan is not correctly or appropriately implemented and damage to the environment is caused.

During the construction phase, the contractor must prepare a Stormwater Control Method Statement to ensure that all construction methods adopted on site do not cause, or precipitate soil erosion and shall take adequate steps to ensure that the requirements of the Stormwater Management Plan are met before, during and after construction. The designated responsible person on site, must be indicated in the Stormwater Control Method Statement and shall ensure that no construction work takes place before the relevant stormwater control measures are in place.

An operation phase Stormwater Management Plan should be designed and implemented if not already addressed by the mitigations implemented as part of construction, with a view to preventing the passage of concentrated flows off hardened surfaces and onto natural areas.

APPENDIX G:
EROSION MAMAGEMENT PLAN

PRINCIPLES FOR EROSION MANAGEMENT

1. PURPOSE

Exposed and unprotected soils are the main cause of erosion in most situations. Therefore, this erosion management plan and the revegetation and rehabilitation plan are closely linked to one another and should not operate independently, but should rather be seen as complementary activities within the broader environmental management of the site and should therefore be managed together.

This Erosion Management Plan addresses the management and mitigation of potential impacts relating to soil erosion. The objective of the plan is to provide:

- A general framework for soil erosion and sediment control, which enables the contractor to identify areas where erosion can occur and is likely to be accelerated by construction related activities.
- An outline of general methods to monitor, manage and rehabilitate erosion prone areas, ensuring that all erosion resulting from all phases of the development is addressed.

2. RELEVANT ASPECTS OF THE SITE

The study area is located on the Maputaland Coastal Plain, characterised by relatively flat to slightly undulating paeleodune fields comprised of recent (Quaternary Age) sedimentary deposits of Aeolian/marine origin (~18 000 years old) and comprising mainly yellowish and argillaceous redistributed sands (Berea and Muzi Formations of the Maputaland Group, respectively). Soils generally comprise very loose, grey-brown sand.

The geology and the hydrological regime of the area have given rise to geotechnical conditions that represent constraints to development. An Engineering Geology Study, undertaken by Golder in 2005, broadly classified areas for the purpose of identifying constraints to development as well as difficult founding conditions, or other geotechnical factors affecting urban development (refer to Figure 1). The zonal prefix (A-D) is based on the severity of the geotechnical or development constraints, or a combination of both, for a specific unit. They serve as an early warning for engineers and developers. The geotechnical and development constraint categories of the environmental sensitive zones are:

» **A** have no restrictions on development.
» **B** are developable, but with minor geotechnical and/or development constraints
» **C** is developable but with more costly geotechnical and/or development constraints. More detailed geotechnical investigations may be required.
» **D** recommends no development, or more detailed geotechnical investigations required.

In this regard, the proposed Project site falls within conditions classified as **A** and/or **B**.

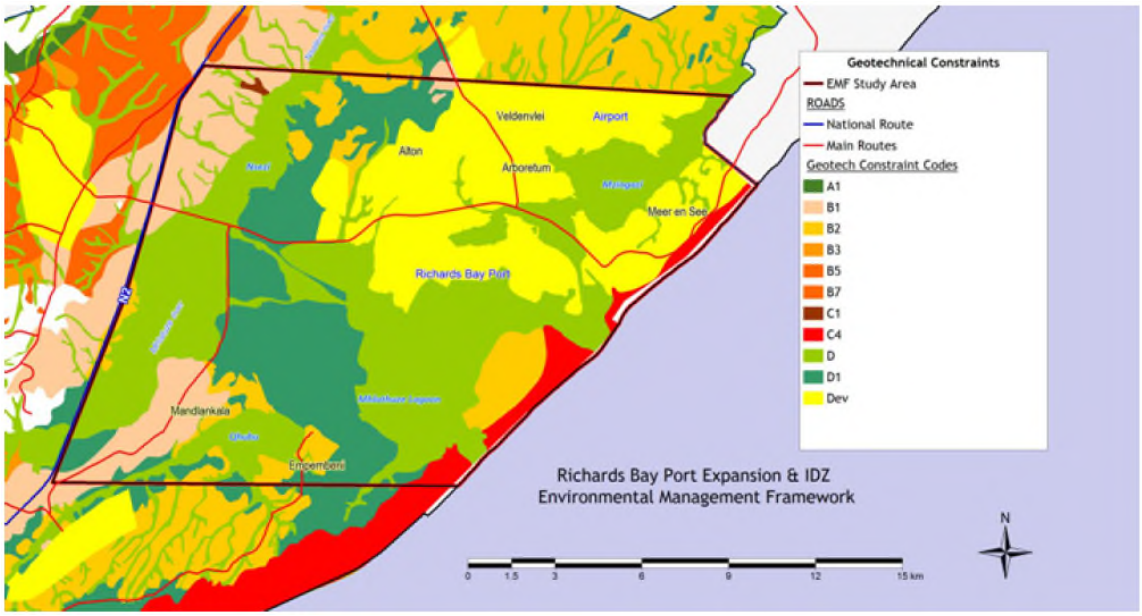


Figure 5.7: Geotechnical Conditions

3. EROSION AND SEDIMENT CONTROL PRINCIPLES

The goals of erosion control during and after construction at the site should be to:

» Protect the land surface from erosion;
» Intercept and safely direct run-off water from undisturbed upslope areas through the site without allowing it to cause erosion within the site or become contaminated with sediment; and
» Progressively revegetate or stabilise disturbed areas.

These goals can be achieved by applying the management practices outlined in the following sections.

3.1. On-Site Erosion Management

General factors to consider regarding erosion risk at the site includes the following:

» Soil loss will be greater during wet periods than dry periods. Intense rainfall events outside of the wet season, such as occasional summer thunder storms can also cause significant soil loss. Therefore precautions to prevent erosion should be present throughout the year.
» Soils loss will be greater along the access road that traverses land type Db6. Therefore precautions to prevent erosion should be present throughout the construction phase.
• Soils loss will be greater on steeper slopes. Ensure that steep slopes are not de-vegetated unnecessarily and subsequently become hydrophobic (i.e. have increased runoff and a decreased infiltration rate) increasing the erosion potential.
» Soil loss is related to the length of time that soils are exposed prior to rehabilitation or stabilisation. Therefore the gap between construction activities and rehabilitation should be minimised. Phased construction and progressive rehabilitation, where practically possible, are therefore important elements of the erosion control strategy.
» The extent of disturbance will influence the risk and consequences of erosion. Therefore site clearing should be restricted to areas required for construction purposes only. As far as possible, large areas should not be cleared all at once, especially in areas where the risk of erosion is higher.
» Roads should be planned and constructed in a manner which minimises their erosion potential. Roads should therefore follow the natural contour as far as possible. Roads parallel to the slope direction should be avoided as far as possible.
» Where necessary, new roads constructed should include water diversion structures present with energy dissipation features present to slow and disperse the water into the receiving area.
» Roads and other disturbed areas should be regularly monitored for erosion. Any erosion problems recorded should be rectified as soon as possible and monitored thereafter to ensure that they do not re-occur.
» Compacted areas should have adequate drainage systems to avoid pooling and surface flow. Heavy machinery should not compact those areas which are not intended to be compacted as this will result in compacted hydrophobic, water repellent soils which increase the erosion potential of the area. Where compaction does occur, the areas should be ripped.
» All bare areas should be revegetated with appropriate locally occurring species, to bind the soil and limit erosion potential.

» Silt fences should be used where there is a danger of topsoil or material stockpiles eroding and entering streams and other sensitive areas.
» Gabions and other stabilisation features should be used on steep slopes and other areas vulnerable to erosion to minimise erosion risk as far as possible.
» Activity at the site after large rainfall events when the soils are wet and erosion risk is increased should be reduced.
» Topsoil should be removed and stored separately during construction activities (as per the recommendations in the EMPr), and should be reapplied where appropriate as soon as possible in order to encourage and facilitate rapid regeneration of the natural vegetation on cleared areas.
» Regular monitoring of the site for erosion problems during construction (on-going) and operation (at least twice annually) is recommended, particularly after large summer thunderstorms have been experienced. The ECO will determine the frequency of monitoring based on the severity of the impacts in the erosion prone areas.

3.1.1. Erosion control mechanisms

The contractor may use the following mechanisms (whichever proves more appropriate/ effective) to combat erosion when necessary:

» Reno mattresses;
» Slope attenuation;
» Hessian material;
» Shade catch nets;
» Gabion baskets;
» Silt fences;
» Storm water channels and catch pits;
» Soil bindings;
» Geofabrics;
» Hydro-seeding and/or re-vegetating;
» Mulching over cleared areas;
» Boulders and size varied rocks; and
» Tilling.

3.2. Engineering Specifications

A detailed engineering Storm-water Management Plan describing and illustrating the proposed stormwater control measures must be prepared by the Civil Engineers during the detailed design phase and should be based on the underlying principles of the Stormwater Management Plan (Appendix F of the EMPr) and this should include erosion control measures. Requirements for project design include:

» Erosion control measures to be implemented before and during the construction period, including the final stormwater control measures (post construction).
» All temporary and permanent water management structures or stabilisation methods must be indicated within the Stormwater Management Plan.
» An onsite Engineer or Environmental Officer (EO) to be responsible for ensuring implementation of the erosion control measures on site during the construction period. The ECO to monitor the effectiveness of these measures on the interval agreed upon with the Site Manager and EO.
» The Contractor holds ultimate responsibility for remedial action in the event that the approved Stormwater Management Plan is not correctly or appropriately implemented and damage to the environment is caused.

3.3. Monitoring

The site must be monitored continuously during construction and operation in order to determine any indications of erosion. If any erosion features are recorded as a result of the activities on site the Environmental Officer (during construction) or Environmental Manager (during operation) must:

» Assess the significance of the situation.
» Take photographs of the soil degradation.
» Determine the cause of the soil erosion.
» Inform the contractor/operator that rehabilitation must take place and that the contractor/operator is to implement a rehabilitation method statement and management plan to be approved by the Site/Environmental Manager in conjunction with the ECO.
» Monitor that the contractor/operator is taking action to stop the erosion and assist them where needed.
» Report and monitor the progress of the rehabilitation weekly and record all the findings in a site register (during construction).
» All actions with regards to the incidents must be reported on a monthly compliance report which should be kept on file for if/when the Competent Authority requests to see it (during construction) and kept on file for consideration during the annual audits (during construction and operation).

The Contractor (in consultation with an appropriate specialist, e.g. an engineer) must:

» Select a system/mechanism to treat the erosion.
» Design and implement the appropriate system/mechanism

» Monitor the area to ensure that the system functions like it should. If the system fails, the method must be adapted or adjusted to ensure the accelerated erosion is controlled.
» Continue monitoring until the area has been stabilised.

4. CONCLUSION

The Erosion Management Plan is a document to assist the Proponent/ Contractor with guidelines on how to manage erosion during all phases of the project. The implementation of management measures is not only good practice to ensure minimisation of degradation, but also necessary to ensure compliance with legislative requirements. This document forms part of the EMPr, and is required to be considered and adhered to during the design, construction, operation and decommissioning phases of the project (if and where applicable).

APPENDIX H:
GRIEVANCE MECHANISM

GRIEVANCE MECHANISM / PROCESS

PURPOSE

This Grievance Mechanism has been developed to receive and facilitate resolution of concerns and grievances about the Project's environmental and social performance. The aim of the grievance mechanism is to ensure that grievances or concerns raised by local landowners and or communities are addressed in a manner that:

» Provides a predictable, transparent, and credible process to all parties, resulting in outcomes that are seen as fair, effective, and lasting.
» Builds trust as an integral component of broader community relations activities.
» Enables more systematic identification of emerging issues and trends, facilitating corrective action and pre-emptive engagement.

The aim of this Grievance Mechanism is to address grievances in a manner that does not require a potentially costly and time consuming legal process.

PROCEDURE FOR RECEIVING AND RESOLVING GRIEVANCES

» Local landowners, communities and authorities must be informed in writing by the Proponent of the grievance mechanism and the process by which grievances can be brought to the attention of the Proponent through its designated representative.
» A company representative must be appointed as the contact person for grievances to be addressed to. The name and contact details of the contact person must be provided to local landowners, communities and authorities.
» Project related grievances relating to the construction, operational and or decommissioning phase must be addressed in writing to the contact person. The contact person should assist local landowners and or communities who may lack resources to submit/prepare written grievances.
» The grievance must be registered with the contact person who, within 5 working days of receipt of the grievance, must contact the Complainant to discuss the grievance and agree on suitable date and venue for a meeting in order to discuss the grievances raised. Unless otherwise agreed, the meeting should be held within 3 weeks of receipt of the grievance.
» The contact person must draft a letter to be sent to the Complainant acknowledging receipt of the grievance, the name and contact details of Complainant, the nature of the grievance, the date that the grievance was raised, and the date and venue for the meeting (once agreed).

» Prior to the meeting being held the contact person must contact the Complainant to discuss and agree on the parties who should attend the meeting. The people who will be required to attend the meeting will depend on the nature of the grievance. While the Complainant and or proponent are entitled to invite their legal representatives to attend the meeting/s, it should be made clear that to all the parties involved in the process that the grievance mechanism process is not a legal process. It is therefore recommended that the involvement of legal representatives be limited.
» The meeting should be chaired by the Proponent's representative appointed to address grievances. The Proponent must provide a person to take minutes of and record the meeting/s. Any costs associated with hiring venues must be covered by the Proponent.
» Draft copies of the minutes must be made available to the Complainant and the Proponent within 4 working days of the meeting being held. Unless otherwise agreed, comments on the Draft Minutes must be forwarded to the company representative appointed to manage the grievance mechanism within 4 working days of receipt of the draft minutes.
» In the event of the grievance being resolved to the satisfaction of all the parties concerned, the outcome must recorded and signed off by the relevant parties. The record should provide details of the date of the meeting/s, the names of the people that attended the meeting/s, the outcome of the meeting/s, and where relevant, the measures identified to address the grievance, the party responsible for implementing the required measures, and the agreed upon timeframes for the measures to be implemented.
» In the event of a dispute between the Complainant and the Proponent regarding the grievance, the option of appointing an independent mediator to assist with resolving the issue should be discussed. The record of the meeting/s must note that a dispute has arisen and that the grievance has not been resolved to the satisfaction of all the parties concerned.
» In the event that the parties agree to appoint a mediator, the Proponent will be required to identify three (3) mediators and forward the names and CVs to the Complainant within 2 weeks of such agreement being reached. The Complainant, in consultation with the Proponent, must identify the preferred mediator and agree on a date for the next meeting. The cost of the mediator must be borne by the Proponent however the mediator may rule that the Complainant must re-imburse the Proponent a proportion of these costs. The Proponent must provide a person to take minutes of and record the meeting/s.
» In the event of the grievance, with the assistance of the mediator, being resolved to the satisfaction of all the parties concerned, the outcome must be recorded and signed off by the relevant parties, including the mediator. The record should provide details on the date of the meeting/s, the names of the people that attended the meeting/s, the outcome of the meeting/s, and where

relevant, the measures identified to address the grievance, the party responsible for implementing the required measures, and the agreed upon timeframes for the measures to be implemented.

» In the event of the dispute not being resolved, the mediator must prepare a draft report that summaries the nature of the grievance and the dispute. The report should include a recommendation by the mediator on the proposed way forward with regard to the addressing the grievance.

» The draft report must be made available to the Complainant and the Proponent for comment before being finalised and signed by all parties. Unless otherwise agreed, comments on the draft report must be forwarded to the company representative appointed to manage the grievance mechanism within 4 working days. The way forward will be informed by the recommendations of the mediator and the nature of the grievance.

A Complaint is closed out when no further action can be or needs to be taken. Closure status will be classified in the Complaints Register as follows:

» Resolved. Complaints where a resolution has been agreed and implemented and the Complainant has signed the Confirmation Form.

» Unresolved. Complaints where it has not been possible to reach an agreed resolution and the case has been authorised for close out by the Appeals Committee.

» Abandoned. Complaints where the Complainant is not contactable after one month following receipt of a Complaint and efforts to trace his or her whereabouts have been unsuccessful.

The grievance mechanism does not replace the right of an individual, community, group or organization to take legal action should they so wish. In the event of the grievance not being resolved to the satisfaction of Complainant and or the Proponent, either party may be of the opinion that legal action may be the most appropriate option.

APPENDIX I:
ALIEN INVASIVE & OPEN SPACE MANAGEMENT PLAN

ALIEN INVASIVE AND OPEN SPACE MANAGEMENT PLAN

1. PURPOSE

It is the responsibility of the developer/ applicant/ land owner to eradicate and control categorised Invasive Alien Plants (IAPs) and any other undesirable species (such as weeds) that invade any areas on the property and surrounds as a result of any disturbance caused during the construction and operation phases of the project. As such the ecologists from Eco-Pulse Consulting recommend the implementation of a bi-annual IAP monitoring and clearing exercise for the first year post-rehabilitation. Thereafter, IAPs clearing can be undertaken annually. In terms of Section 75 of NEMBA, the following applies to the control and eradication of IAPs:

» The control and eradication of a listed invasive species must be carried out by means of methods that are appropriate for the species concerned and the environment in which it occurs;
» Any action taken to control and eradicate a listed invasive species must be executed with caution and in a manner that may cause the least possible harm to biodiversity and damage to the environment; and
» The methods employed to control and eradicate a listed invasive species must also be directed at the new growth, propagating material and re-growth of such invasive species in order to prevent such species from producing offspring, forming seed, regenerating or re-establishing itself in any manner.

There are various means of controlling invasive alien plants in South Africa including chemical, biological, mechanical and integrated control methods. The suitability of control methods depends on a number of factors, including practical constraints, economic constraints and applicability of methods for particular species of alien plants. It is generally advised that a form of integrated control be implemented, based on a combination of two or more of the control measures outlined below (depending of course on the species present at the site). Selection of the appropriate methods of control should be based on the following criteria:

» **Species to be controlled:** Herbicides are registered for specific species. Selection should be based on "*A Guide to the use of Herbicides*" issued by the Directorate: Agricultural Production Inputs and labels and information brochures provides by herbicide suppliers.
» **Size/age of target plants:**
  * For **seedlings:** Hand-pulling or hoeing and foliar applications of herbicides for dense stands.
  * For **saplings:** Hand-pulling or hoeing, foliar applications of herbicides for dense stands, basal stem treatments and cut stump treatments recommended.
  * For **mature trees**: Ring barking, frilling, basal stem treatments and cut stump treatments recommended.

- **Density of stands:** Overall applications of herbicide can be made to dense stands of seedlings or saplings. Where dense stands of large trees are present, treatment of standing trees may be appropriate to obviate the problem of disposing felled trees.
- **Accessibility of terrain:** In inaccessible areas, methods that rely on the minimum amount of transportation of equipment and chemicals should be given preference.
- **Environmental considerations:** Riparian/ wetland areas require a careful approach to treatment/control. Only herbicides approved for use in wetland/riparian areas are to be considered because washed-away herbicides often end up in aquatic systems.
- **Desirable vegetation:** Control methods that will cause the least damage to desirable vegetation must be considered. Selective herbicides or mixes that will not damage other desirable vegetation should be applied where relevant.
- **Disposal of dead vegetation:** Where possible, utilizable wood should be removed after tree felling. This is also the case for trees that could cause the blockage of water courses. Brushwood should be spread rather than stacked to limit soil damage in instances where burning is planned.
- **Cost of application:** The cost of application and re-treatment should be taken into consideration when selecting methods/herbicides, etc.

A **Method Statement for IAP clearing and control** has been compiled and details the requirements and strategy for IAP control and eradication within disturbed terrestrial areas of the site. The method statement is presented below.

2. METHOD STATEMENTS

2.1. Method Statement 1. IAP Control and Eradication for terrestrial areas

Planning for IAP Control:

Proper planning and preparations are fundamental to achieving cost-effective and successful IAP control. The following steps must be followed during planning:

i. The contractor must visit the site and assess the extent of IAP infestation and topographic challenges they will have work in.
ii. Identify and gather field equipment and personal protective equipment (PPE) required.
iii. Gather all chemicals required to control IAPs. Only herbicides registered for use on the target species may be used (*note that the application of herbicides on different types of alien invasive plant species is limited in South Africa. It is therefore necessary to assess the herbicide's activity such as its residual effect in the soil; it ability to work under wet conditions etc.).*
iv. Train project workers and supervisors on target IAPs and identified clearing methods. This may include: environmental protection with emphasis on aquatic resources, IAP identification; safety training for use of specialised equipment such as chainsaws; specialised training for working in difficult or sensitive terrain and under difficult climatic conditions.

Strategy for IAP eradication/control:

The strategy for the removal of IAPs and weeds on the site shall be in accordance with the following practice measures and guidelines for control/eradication of IAPs:

i. Identify, locate and demarcate protected indigenous plants that should be conserved within areas to be cleared.
ii. Keep the team working in a line, with the daily tasks pegged out where possible.
iii. Target dense infestations of woody and herbaceous alien plants, focusing on the removal of IAPs.
iv. Recommended methods of IAP control and their application are summarised in Box 2. For the IAPs identified at the site (mainly *Psidium gaujava, Eucalyptus spp. and Sesbania bisponosa)* a form of integrated control is recommended with mechanical removal (hand-pulling and uprooting) of smaller plants and cut-stump treatment for larger woody plants that will be difficult to remove manually). There is a possibility that other IAP species may colonise the site in the future and the most relevant method of control will need to be selected as these plants appear at the site during the operational phase.
v. For large specimens that cannot be easily removed entirely, cut plants as low to ground as possible and apply herbicide to all cut surfaces and exposed roots. The "cut-stump" application method is the safest method of applying herbicides.
vi. All IAPs must be removed carefully and exposed soil should be covered with cut vegetation or leaf litter that is free of weed seeds to ensure that re-growth of alien flora will not occur.
vii. Press any loosened soil down carefully but firmly and mulch with plant material where possible.
viii. All alien seeds, fruit bulbs, tubers and stems must be stacked and burnt onsite or removed for disposal at a registered land fill for example.
ix. Stack/move the slashed brush off the stumps to aid herbicide application and re-establishment of indigenous plant species.
x. Stack the brush into hips for collection and disposal at a landfill site.

Follow-up control:

Follow-up inspections are necessary to ensure the success of the control phase. It is preferable to follow up on an area and remove all seedlings or treat re-sprouting plants, rather than treat a new area. Follow-up operations must be carried out if inspections establish that initial removal efforts have failed or have had a limited impact.

Maintenance:

Maintenance control entails conducting regular control of invasive alien plants. This helps to sustain low alien plant numbers and keep the alien plants in check. Inspections of the site must be carried out every six (6) months.

Monitoring requirements:

The site should be monitored through visual inspections at regular intervals to determine whether IAP control has been successful and if further follow-up treatment is required.

Notes on the use of herbicides in IAP control:

Note that herbicide application will need to be carried out strictly in accordance with the manufacturer's specifications and according to current legislation. The following pollution and safety measures must be also adhered to regarding the handling, use and storage of herbicides:

i. All herbicides, concentrated and diluted, must be stored in a secure and covered area, or off-site under lock and key.
ii. All containers into which the herbicide or mixers are decanted must be clearly marked and a copy of the original label secured to the container.
iii. Herbicides must at all times be applied according to the recommendations on the labels.
iv. All MSDS sheets are to be made available on site along with a fully kitted Medical Aid Kit.
v. Herbicide equipment must under no circumstances be washed in a local stream, river or wetland.
vi. Suitable protective clothing like gloves, aprons, overalls and eye protection must be worn by herbicide applicators at all times.
vii. The correct protective clothing is to be used in line with manufacturer's instructions and/or the Occupational Health & Safety Act, Act 85 of 1993 (and amendments).
viii. Avoid contact of herbicide with skin and eyes.
ix. After contact, all applicators must wash their hands with soap and water or as recommended on the herbicide label.

Box 2. Alien Plant Control Methods

The control methods detailed below have been adapted from the ARC-PPRI (Agricultural Research Commission: Plant Protection Research Institute) Weed Research Programme (online at www.arc.agric.za/arc-ppri/), the DWA Working for Water Programme ((http://www.dwaf.gov.za/wfw/Control/) and eThekwini Municipality's *Practical tips on the management and eradication of invasive alien plants* (EcoFiles Sheet 4. Local Action for Biodiversity).

1 Mechanical control

Mechanical control entails physically damaging or removing the target alien plant. Mechanical control is generally labour intensive and therefore expensive, and can also result in severe soil disturbance and erosion. Different techniques can be applied and include uprooting/hand-pulling, felling, slashing, mowing, ring-barking or bark stripping. This control option is only really feasible in sparse infestations or on a small scale, and for controlling species that do not coppice after cutting. Species that tend to coppice (e.g. *Eucalyptus spp., Melia azedarach)* need to have the cut stumps or coppice growth treated with herbicides following mechanical treatment.

- **Hand pulling/uprooting:** The hand-pulling should be reserved for small plants and shrubs with shallow root systems (not recommended for trees with a stem diameter of more than 10cm). Grip the young plant low down and pull out by hand (using gloves). Uprooting is similar but is undertaken on slightly older individuals with the major drawback being that a relatively large area can be disturbed with the soils being altered and opening the area up to re-infestation.
- **Chopping/ cutting/ slashing:** This method is most effective for plants in the immature stage, or for plants that have relatively woody stems/trunks. An effective method for non re-sprouters or in the case of re-sprouts (coppicing), it must be done in conjunction with chemical treatment of the cut stumps. Cut/slash the stem of the plant as near as possible to ground level. Paint re-sprouting plants with an appropriate herbicide immediately after they have been cut.
- **Strip bark:** Using a bush knife, strip bark away from tree from waist height down to soil. Cambium is stripped with the bark. No herbicide used.

- **Felling:** Large trees can be cut-down in their entirety, however, this is often not recommended unless absolutely necessary as large trees can play a pivot role in soil protection and biodiversity maintenance.
- **Girdling:** Girdling involves cutting a groove or notch into the trunk of a tree to interrupt the flow of sap between the roots and crown of the tree. The groove must completely encircle the trunk and should penetrate into the wood to a depth of at least 1.5 centimetres on small trees, and 2.5 to 4 centimetres on larger trees. The effectiveness of girdling can be increased by using herbicides.

2 Chemical control

Chemical control involves the use of registered herbicides to kill the target weed. The use of herbicide is often essential to the success of an eradication/ control programme as it greatly reduces the re-growth potential of alien plants. Unfortunately, if the wrong herbicide is chosen, one can potentially cause more harm than good to the environment. When choosing the most appropriate herbicide, one needs to consider the following:

- **Relative toxicity to humans/animals**
- **Selective vs non-selective herbicides**: There are advantages and disadvantages to using each type. When dealing with light to moderate infestations in grass-dominated veld types, a broad-leaf selective herbicide is recommended so as to reduce the danger that spray drift could kill natural grass. In areas of heavy infestation, a non-selective herbicide is recommended.
- **Residual effect**: Some active ingredients in herbicides will remain in the environment for months, even years, before denaturing. Others start to denature as soon as they enter the soil. If a persistent herbicide is used, ensure that it is not used near any watercourse or area with a high water table (such as wetlands and riparian areas).
- **Is the herbicide registered for the target species:** A list of registered herbicides can be obtained from the Department of Water Affairs: Working for Water Programme – Policy on the Use of Herbicides for the Control of Alien Vegetation (January 2002). Also see http://www.arc.agric.za/arc-ppri/Pages/Weeds%20Research/Specific-IAP-Species-and-their-control-according-to-botanical-names.aspx

Some additional recommendations regarding herbicide use include:

- Herbicides should be applied during the active growing season.
- Always observe all safety precautions printed on the labels and manufacturer's instructions when mixing and applying herbicide.
- Herbicides can be applied in various ways. They can be sprayed onto dense infestations or painted onto the main stem of the plant or cut stump.
- Spraying herbicide on small infestations is not recommended, rather cut and apply herbicide to the stumps either with a brush.
- Spraying should be restricted to windless days when there is less risk of droplets drifting onto non-target species.
- Pressure or flow regulators should be fitted to sprayers for overall application. Spraying should be restricted to plants waist height or lower, but also ensuring there is sufficient foliage to carry the applied herbicide to the root system of the target plant.
- For water-based applications, Actipron Super Wetter should be added where recommended on the herbicide label, at a rate of 1.75/ha for dense-closed stands of alien vegetation.
- For all water-based treatments, a suitable brightly coloured dye should be added to the mix to ensure that all target plants are treated. For diesel-based applications, Sudan Red Dye should be added.

- Chemical control of IAPs is not recommended in aquatic systems due to the risk of water pollution, but may be used in conjunction with cutting or slashing of plants.
- Chemicals should only be applied by qualified personnel.
- Only herbicide registered for use on target species may be used.
- Follow the manufacturer's instructions carefully.
- Appropriate protective clothing must be worn.
- Only designated spray bottles to be used for applying chemicals.
- The number of herbicides for safe use under wet conditions is very limited.

3 Biological control

Biological weed control involves the releasing of natural biological enemies to reduce the vigour or reproductive potential of an invasive alien plant. Research into the biological control of invasive alien plants is the main activity of the Weeds Research Programme of ARC-PPRI and a list of biocontrol agents released against invasive alien plants in South Africa can be downloaded from their website. To obtain biocontrol agents, provincial representatives of the Working for Water Programme or the Directorate: Land Use and Soil Management (LUSM), Department of Agriculture, Forestry and Fisheries (DAFF).

4 Mycoherbicides

A mycoherbicide is a formulation of fungal spores in a carrier, which can be applied to weeds in a similar way as a conventional chemical herbicide (using herbicide application equipment). The spores germinate on the plant, penetrating plant tissues and causing a disease which can eventually kill the plant. Mycoherbicides are indigenous to the country of use and therefore are already naturally present in the environment and do not pose a risk to non-target plants. Under natural conditions they do not cause enough damage to the weed to have a damaging impact and are therefore mass produced and applied in an inundative inoculation, which leads to an epidemic of the disease knocking the weed population down. Mycoherbicides need to be re-applied at regular intervals.

5 Integrated control

It is frequently advisable to use a combination of two or more of the control method mentioned above, which is referred to as *integrated control*. Killing plants without cutting down causes the least disturbance to the soil and is the ideal.

The following integrated control options are available:

- **Basal bark and stem application**: Apply recommended herbicide mixed in diesel carrier to the base of the stem of trees (<25cm stem height) and saplings. This method is appropriate for plants with thin bark or stems up to 25cm in diameter. Do not cut the bark. Apply herbicide mix with paintbrushes or using a coarse droplet spray from a narrow angle solid cone nozzle at low pressure. For multi-stemmed plants, each stem must be treated separately.
- **Ring barking**: Invasive trees growing away from any structures or roads can be ring-barked, poisoned and left standing rather than felled. They will slowly collapse over time and can establish habitat for birds, etc. Strip all bark and cambium from a height of 75cm to 100cm down to just below soil level. Cut a ring at the top and pull strips. All bark must be removed to below ground level for good results. Where clean de-barking is not possible due to crevices in the stem or where exposed roots are present, a combination of bark removal and basal stem treatments should be carried out. Bush knives or hatchets should be used for debarking.

- **Frilling:** Using an axe or bush knife, make angled cuts downward into the cambium layer through the bark in a ring. Ensure to effect the cuts around the entire stem and apply herbicide into the cuts.
- **Cut stump treatment**: This is a highly effective and appropriate control method for larger woody vegetation that has already been cut off close to the ground. The appropriate herbicide should be applied to the stump using a paintbrush within 30 min of being cut. Apply recommended herbicide mixture to the cut surface with hand sprayers, a paintbrush or knapsack sprayer at low pressure. Apply only to the cambium or outer layer of large stumps and the entire cut surface of small stumps. Ensure the stumps are cut as low to the ground as practically possible (about 10 – 15 cm or as stipulated on specific herbicide label). Herbicides are applied in diesel or water as recommended for the herbicide. Applications in diesel should be to the whole stump and exposed roots and in water to the cut area as recommended on the label.
- **Scrape and paint**: This method is suitable for large vines and scrambling plants i.e. creepers. Starting from the base of the stem, scrape 20-100cm of the stem to expose the sapwood just below the bark. Within 20 seconds apply the herbicide to the scraped section. Do not scrape around the stem. Stems over 1cm in diameter can be scraped in 2 sides. Leave the vines to die in place to prevent damaging any indigenous plants they may be growing over.
- **Foliar spray:** *This is not an advocated method of application by unqualified applicators due to the danger of spraying indigenous species.* Should be restricted to droplet application made directly on the leaves on plants that are no higher than knee height. Use a solid cone nozzle that ensures an even coverage on all leaves and stems to the point of runoff. Do not spray just before rain (a rainfall-free period of 6 hours is recommended) or before dew falls. Avoid spraying in windy weather as the spray may come into contact with non-target plants. Spraying dormant or drought stressed plants is not effective as they do not absorb enough of the herbicide.

6 Disposal of alien plant material

Treated/removed alien plant material will need to be removed from the site and disposed of at a proper/registered receiving area such as a local registered land fill site.

3. LEGISLATIVE CONTEXT

Conservation of Agricultural Resources Act (Act No. 43 of 1983)

In terms of the amendments to the regulations under the Conservation of Agricultural Resources Act (Act No. 43 of 1983), all declared aliens must be effectively controlled. Landowners are legally responsible for the control of invasive alien plants on their properties. In terms of this Act, 198 alien species were listed as declared weeds and invaders and ascribed to one of the following categories:

» Category 1: Prohibited and must be controlled.
» Category 2 (commercially used plants): May be grown in demarcated areas provided that there is a permit and that steps are taken to prevent their spread.
» Category 3 (ornamentally used plants): May no longer be planted. Existing plants may be retained as long as all reasonable steps are taken to prevent the spreading thereof, except within the flood line of watercourses and wetlands.

National Environmental Management: Biodiversity Act, 2004 (Act No.10 of 2004)

The National Environmental Management: Biodiversity Act (NEM:BA) regulates all invasive organisms in South Africa, including a wide range of fauna and flora. Regulations have been published in Government Notices R.506, R.507, R.508 and R.509 of 2013 under NEMBA. According to this Act and the regulations, any species designated under Section 70 cannot be propagated, grown, bought or sold without a permit. Below is an explanation of the three categories:

» Category 1a: Invasive species requiring compulsory control. Any specimens of Category 1a listed species need, by law, to be eradicated from the environment. No permits will be issued.
» Category 1b: Invasive species requiring compulsory control as part of an invasive species control programme. Remove and destroy. These plants are deemed to have such a high invasive potential that infestations can qualify to be placed under a government sponsored invasive species management programme. No permits will be issued.
» Category 2: Invasive species regulated by area. A demarcation permit is required to import, possess, grow, breed, move, sell, buy or accept as a gift any plants listed as Category 2 plants. No permits will be issued for Cat 2 plants to exist in riparian zones.
» Category 3: Invasive species regulated by activity. An individual plant permit is required to undertake any of the following restricted activities (import, possess, grow, breed, move, sell, buy or accept as a gift) involving a Category 3 species. No permits will be issued for Cat 3 plants to exist in riparian zones.

Plants listed under the categories above are detailed within Notice 1 of the Alien and Invasive Species published in GNR599 of 01 August 2014. The following guide is a useful starting point for the identification of alien species: Bromilow, C. 2010. Problem Plants and Alien Weeds of South Africa. Briza, Pretoria.

It is important to note that alien species that are regulated in terms of the Conservation of Agricultural Resources Act (Act 43 of 1983) (CARA) as weeds and invader plants are exempted from NEM:BA. This implies that the provisions of the CARA in respect of listed weed and invader plants supersede those of NEM:BA.

4. OPEN SPACE MANAGEMENT PRINCIPLES

The following elements are considered part of the Open Space Management Plan. The principles contained within the Alien Invasive Management Plan should also be considered to form part of the Open Space Management Plan.

Access Control:

» Access to the facility should be strictly controlled.
» All visitors and contractors should be required to sign-in.
» Signage at the entrance should indicate that disturbance to fauna and flora is strictly prohibited.

Prohibited Activities:

The following activities should not be permitted by anyone except the landowner or his representatives:

» No fires within the site.
» No hunting, collecting or disturbance of fauna and flora, except where required for the safe operation of the facility and only by the Environmental Officer on duty and with the appropriate permits and landowner permission.
» No driving off of demarcated roads.
» No interfering with livestock.

Fire Risk Management:

Although fires are not a regular occurrence at the site, fires may occasionally occur under the right circumstances. Ignition risk sources in the area include the following:

» Lightning strikes
» Personnel within the facility
» Infrastructure such as transmission lines

The National Veld and Forest Fires Act places responsibility on the landowner to ensure that the appropriate equipment as well as trained personnel are available to combat fires. Therefore, the management of the facility should ensure that they have suitable equipment as well as trained personnel available to assist in the event of fire.

Firebreaks

Targeted risk management should be implemented around vulnerable or sensitive elements of the facility such as substations or other high-risk components. Within such areas, the extent over which management action needs to be applied is relatively limited and it is recommended that firebreaks are created by mowing and that burning to create firebreaks is not used as this in itself poses a risk of runaway fires. Where such firebreaks need to be built such as around substation, a strip of vegetation 5-10 m wide can be cleared manually and maintained relatively free of vegetation through manual clearing on an annual basis. However if alien species colonise these areas, more regular clearing should be implemented.

APPENDIX J:
EMERGENCY PREPAREDNESS & RESPONSE PLAN

EMERGENCY PREPAREDNESS AND RESPONSE PLAN

1. PURPOSE

The purpose of the Emergency Preparedness and Response Plan is:

- To assist contractor personnel to prepare for and respond quickly and safely to emergency incidents, and to establish a state of readiness which will enable prompt and effective response to possible events.
- To control or limit any effect that an emergency or potential emergency may have on site or on neighbouring areas;
- To facilitate emergency response and to provide such assistance on the site as is appropriate to the occasion;
- To ensure communication of all vital information as soon as possible;
- To facilitate the reorganisation and reconstruction activities so that normal operations can be resumed;
- To provide for training so that a high level of preparedness can be continually maintained.

This plan outlines response actions for potential incidents of any size. It details response procedures that will minimise potential health and safety hazards, environmental damage, and clean-up efforts. The plan has been prepared to ensure quick access to all the information required in responding to an emergency event. The plan will enable an effective, comprehensive response to prevent injury or damage to the construction personnel, public, and environment during the project. Contractors are expected to comply with all procedures described in this document. A Method Statement should be prepared at the commencement of construction detailing how this plan is to be implemented as well as details of relevant responsible parties for the implementation. The method statement must also reflect conditions of the IFC Performance Standard 1 and include the following:

- » Identification of areas where accidents and emergency situations may occur;
- » Communities and individuals that may be impacted;
- » Response procedure;
- » Provisions of equipment and resources;
- » Designation of responsibilities;
- » Communication; and
- » Periodic training to ensure effective response to potentially affected communities.

2. PROJECT-SPECIFIC DETAILS

Due to the scale and nature of this development, it is anticipated that the following risks could potentially arises during the construction and operation phases:

- Fires;
- Leakage of hazardous substances;
- Storage of flammable materials and substances;
- Accidents; and
- Natural disasters.

3. EMERGENCY RESPONSE PLAN

There are three levels of emergency as follows:

- Local Emergency: An alert confined to a specific locality.
- Site Emergency: An alert that cannot be localised and which presents danger to other areas within the site boundary or outside the site boundary.
- Evacuation: An alert when all personnel are required to leave the affected area and assemble in a safe location.

If there is any doubt as to whether any hazardous situation constitutes an emergency, then it must be treated as an Evacuation.

Every effort must be made to control, reduce or stop the cause of any emergency provided it is safe to do so. For example, in the event of a fire, isolate the fuel supply and limit the propagation of the fire by wetting the adjacent areas. Then confine and extinguish the fire (where appropriate) making sure that re-ignition cannot occur; for a gas fire it is usually appropriate to isolate the fuel and let it burn itself out but keep everything around the fire cold.

3.1. Emergency Scenario Contingency Planning

3.1.1. Scenario: Spill which would result in the contamination of land, surface or groundwater

i. Spill Prevention Measures

Preventing spills must be the top priority at all operations which have the potential of endangering the environment. The responsibility to effectively prevent and mitigate any scenario lies with the Contractor and the ECO. In order to reduce the risk of spills and associated contamination, the following principles should be considered during construction and operation activities:

» All equipment refuelling, servicing and maintenance activities should only be undertaken within appropriately sealed designated areas.
» All maintenance materials, oils, grease, lubricants, etc. should be stored in a designated area in an appropriate storage container.
» No refuelling, storage, servicing, or maintenance of equipment should take place within 50m of drainage lines or sensitive environmental resources in order to reduce the risk of contamination by spills.
» No refuelling or servicing should be undertaken without absorbent material or drip pans properly placed to contain spilled fuel.
» Any fluids drained from the machinery during servicing should be collected in leak-proof containers and taken to an appropriate disposal or recycling facility.
» If these activities result in damage or accumulation of product on the soil, the contaminated soil must be disposed of as hazardous waste. Under no circumstances shall contaminated soil be added to a spoils pile and transported to a regular disposal site.
» Chemical toilets used during construction must be regularly cleaned. Chemicals used in toilets are also hazardous to the environment and must be controlled. Portable chemical toilets could overflow if not pumped regularly or they could spill if dropped or overturned during moving. Care and due diligence should be taken at all times.
» Contact details of emergency services and HazMat Response Contractors are to be clearly displayed on the site. All staff are to be made aware of these details and must be familiar with the procedures for notification in the event of an emergency (as well as the possible time delay in emergency services arriving due to the remote location of the site).

ii. Procedures

The following action plan is proposed in the event of a spill:

1. Spill or release identified.
2. Assess person safety, safety of others and environment.
3. Stop the spill if safely possible.
4. Contain spill to limit entering water bodies and surrounding areas.
5. Identify substance spilled.
6. Quantify spill (under or over guideline/threshold levels).
7. Notify Site Manager and emergency response crew and authorities (in event of major spill).
8. Inform users (and downstream users) of potential risk.
9. Clean up of spill using on-site spill kit or by HazMat team (if required).
10. Record of spill incident on company database.

a) Procedures for containing and controlling the spill (i.e. on land or in water)

Measures can be taken to prepare for quick and effective containment of any potential spills. Each contractor must keep sufficient supplies of spill containment equipment at the construction sites, at all times during and after the construction phase. These should include specialised spill kits or spill containment equipment. Other spill containment measures include using drip pans underneath vehicles and equipment every time refuelling, servicing, or maintenance activities are undertaken.

Specific spill containment methods for land and water contamination are outlined below.

Containment of Spills on Land

Spills on land include spills on rock, gravel, soil and/or vegetation. It is important to note that soil is a natural sorbent, and therefore spills on soil are generally less serious than spills on water as contaminated soil can be more easily recovered. It is important that all measures be undertaken to avoid spills reaching open water bodies. The following methods could be used:

» *Dykes*
Dykes can be created using soil surrounding a spill on land. These dykes are constructed around the perimeter or down slope of the spilled substance. A dyke needs to be built up to a size that will ensure containment of the maximum quantity of contaminant that may reach it. A plastic tarp can be placed on and at the base of the dyke such that the contaminant can pool up and subsequently be removed with sorbent materials or by pump into barrels or bags. If the spill is migrating very slowly, a dyke may not be necessary and sorbents can be used to soak up contaminants before they migrate away from the source of the spill.

» *Trenches*
Trenches can be dug out to contain spills. Spades, pick axes or a front-end loader can be used depending on the size of trench required. Spilled substances can then be recovered using a pump or sorbent materials.

Containment of Spills on or in Water (including water resource features)

Spills in water can negatively impact water quality and aquatic life. All measures need to be undertaken to contain spills to drainage lines or open water. The following methods could be used:

» *Temporary weirs*
Temporary weir structures can be used to contain spills in streams and to prevent further migration downstream. Plywood or other materials found on site can be placed into and across the width of the stream, such that water can still flow under the weir. Weirs are however only effective for spilled substances which float on the water surface, and also only for a limited time period.

» *Barriers*
In some situations barriers made of netting or fence material can be installed across a stream, and sorbent materials placed at the base to absorb spilled substance. Sorbents will need to be replaced as soon as they are saturated. Water will be allowed to flow through.

b) Procedures for transferring, storing, and managing spill related wastes

Used sorbent materials are to be placed in plastic bags for future disposal. All materials mentioned in this section are to be available in the spill kits. Following clean up, any tools or equipment used must be properly washed and decontaminated, or replaced if this is not possible.

Spilled substances and materials used for containment must be placed into empty waste oil containers and sealed for proper disposal at an approved disposal facility.

c) Procedures for restoring affected areas

Criteria that may be considered include natural biodegradation of oil, replacement of soil and revegetation. Once a spill of reportable size has been contained, the ECO and the relevant Authority must be consulted to confirm that the appropriate clean up levels are met.

3.1.2. Scenario: Fire (and fire water handling)

i. Action Plan

The following action plan is proposed in the event of a fire:

1. Quantify risk
2. Assess person safety, safety of others and environment
3. If safe – attempt to extinguish fire using appropriate equipment
4. If not safe to extinguish, contain fire
5. Notify Site Manager and emergency response crew and authorities
6. Inform users (and downstream users) of potential risk of fire
7. Record of incident on company database

ii. Procedures

Because large scale fires may spread very quickly in the environment it is most advisable that the employee/ contractor not put his/ her life in danger in the case of an uncontrolled fire.

Portable firefighting equipment must be provided in line with the Building Code of South Africa and the relevant provincial building code. All emergency equipment including portable fire extinguisher, hose reels, hydrants must be maintained and inspected by a qualified contractor in accordance with the relevant legislation and National standards.

Current evacuation signs and diagrams for the building or site that are compliant to relevant state legislation must be provided in a conspicuous position, on each evacuation route. Contact details for the relevant emergency services should be clearly displayed on site and all employees should be aware of procedures to follow in the case of an emergency.

a) Procedures for initial actions

Persons should not fight the fire if any of the following conditions exist:

» They have not been trained or instructed in use of a fire extinguisher.
» They do not know what is burning.
» The fire is spreading rapidly.
» They do not have the proper equipment.
» They cannot do so without a means of escape.
» They may inhale toxic smoke.

b) Reporting procedures

» Report fire immediately to the site manager, who will determine if it is to be reported to the relevant emergency services and authorities.
» The site manager must have copies of the Report form to be completed.

SUMMARY: RESPONSE PROCEDURE

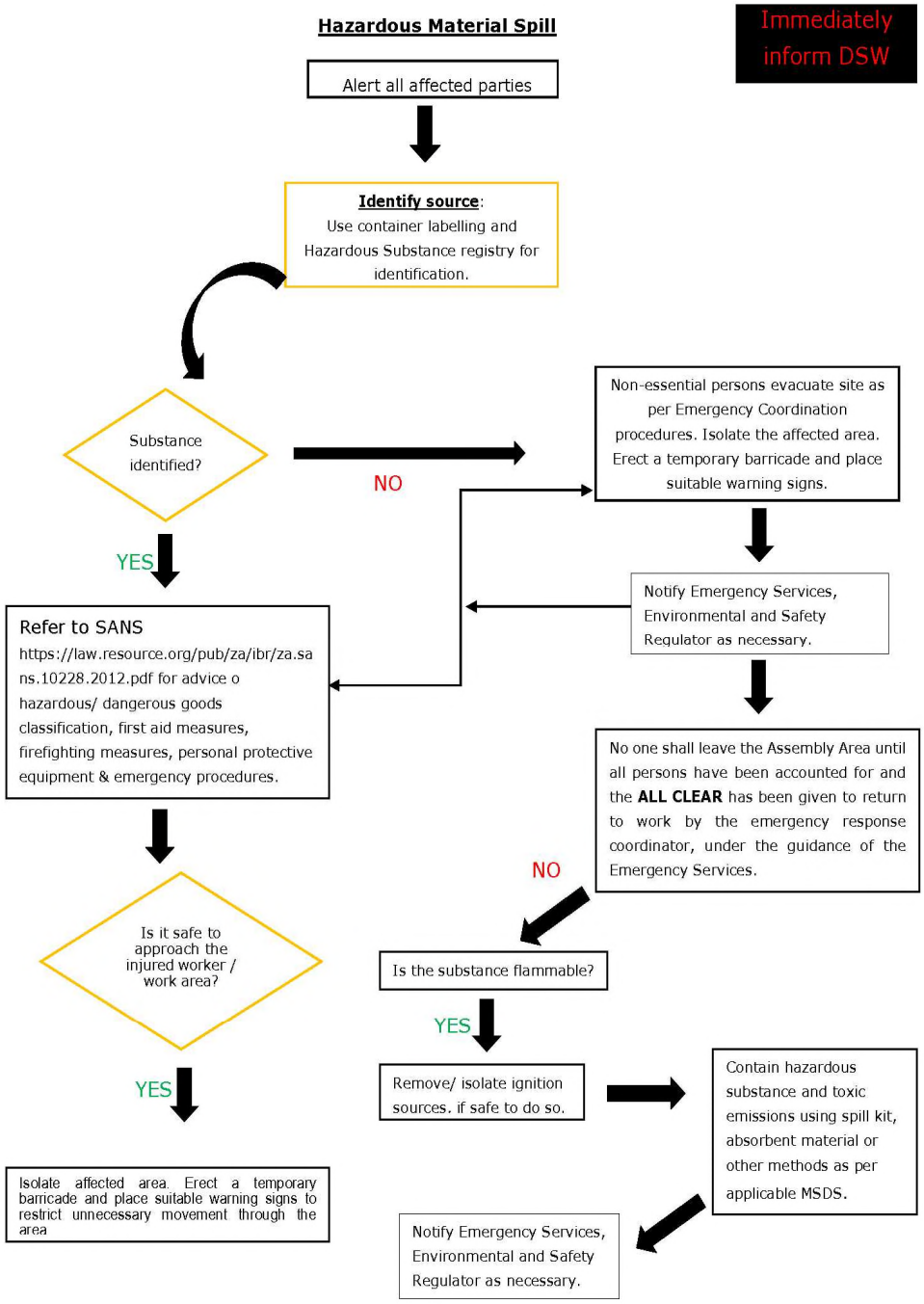


Figure 1: Hazardous Material Spill

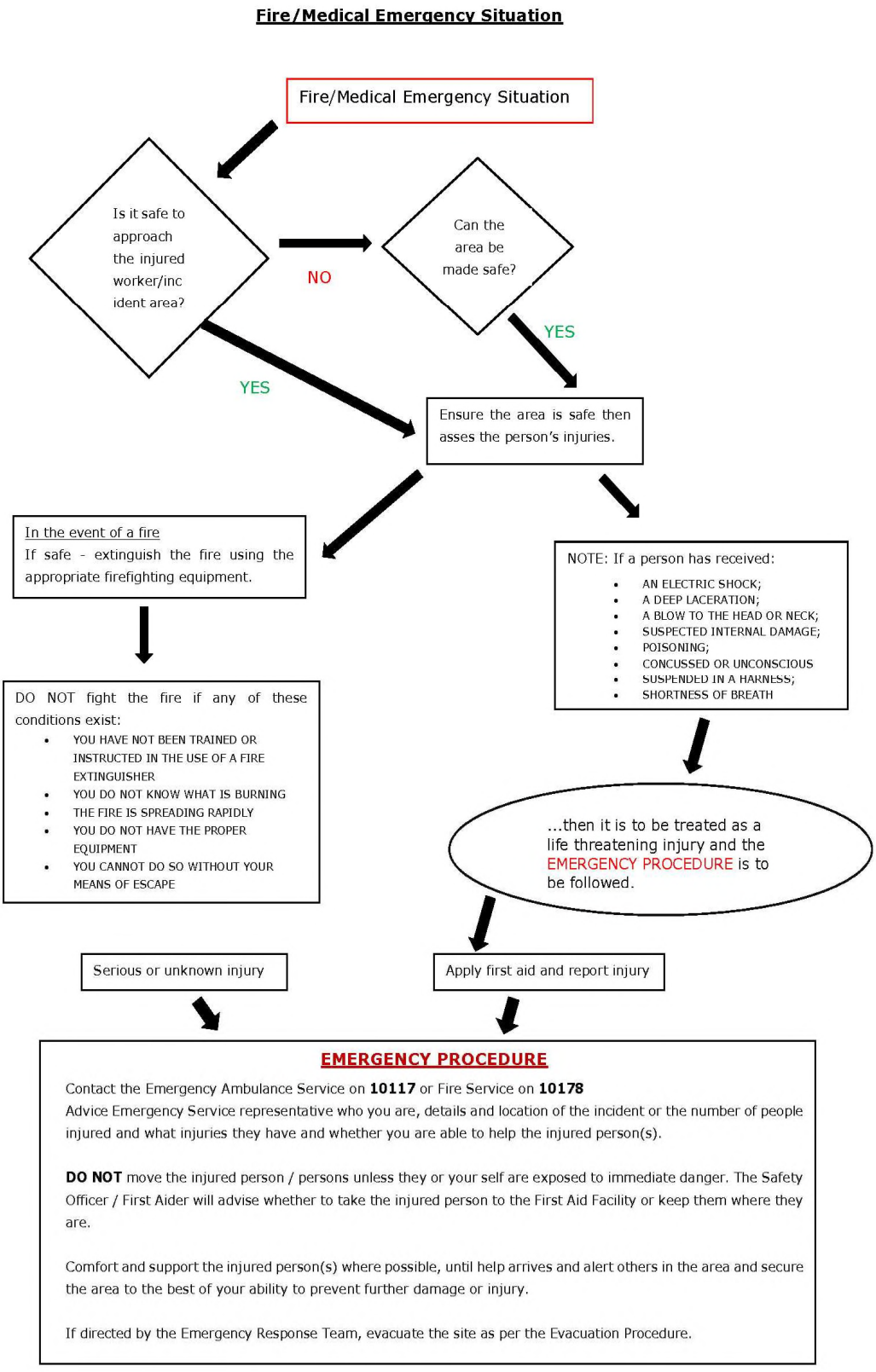


Figure 2: Emergency Fire/Medical

APPENDIX K:
APPLICABLE LEGISLATION

APPLICABLE LEGISLATION

The following legislation and guidelines have informed the scope and content of the EMPr:

- National Environmental Management Act (Act No 107 of 1998);
- EIA Regulations, published under Chapter 5 of the NEMA (GN 982, GNR 983, GNR 984 and GNR 985 in Government Gazette 38282 of 4 December 2014).
- Guidelines published in terms of the NEMA EIA Regulations, in particular:
  - Companion to the National Environmental Management Act (NEMA) Environmental Impact Assessment (EIA) Regulations of 2010 (Draft Guideline; DEA, 2010).
  - Public Participation in the EIA Process (DEA, 2010).
  - Integrated Environmental Management Information Series (published by DEA).
- International guidelines – the Equator Principles and the International Finance Corporation and World Bank Environmental, Health, and Safety Guidelines for Thermal Power, LNG and NG Processing Facilities (2007).

Several other Acts, standards, or guidelines have also informed the project process and the scope of issues addressed and assessed for the project. A review of legislative requirements applicable to the proposed project is provided in **Table 1**.

Table 1: Relevant legislative permitting requirements applicable to the gas to power plant EIA

Legislation / Policy / Guideline	Applicable Requirements	Relevant Authority	Compliance requirements
National Legislation			
National Environmental Management Act (Act No 107 of 1998)	EIA Regulations have been promulgated in terms of Chapter 5. Activities which may not commence without an environmental authorisation are identified within these Regulations. In terms of Section 24(1) of NEMA, the potential impact on the environment associated with these listed activities must be considered, investigated, assessed and reported on to the competent authority (the decision-maker) charged by NEMA with granting of the relevant environmental authorisation.	National Department of Environmental Affairs (DEA) KwaZulu-Natal Department of Economic Development, Tourism and Environmental Affairs (KZN DEDTEA)	In terms of the EIA Regulations, 2014 of GN R983, GN R984 and GN R985 a scoping and EIA process is required to be undertaken for the proposed project. This EIA Report will be submitted to the competent and commenting authority in support of the application for authorisation.
National Environmental Management Act (Act No 107 of 1998)	In terms of the Duty of Care provision in S28(1) the project proponent must ensure that reasonable measures are taken throughout the life cycle of this project to ensure that any pollution or degradation of the environment associated with this project is avoided, stopped or minimised. In terms of NEMA, it has become the legal duty of a project proponent to consider a project holistically, and to consider the cumulative effect of a variety of impacts.	National DEA (as regulator of NEMA).	While no permitting or licensing requirements arise directly by virtue of the proposed project, this section will find application during the EIA phase and will continue to apply throughout the life cycle of the project.

Legislation / Policy / Guideline	Applicable Requirements	Relevant Authority	Compliance requirements
National Environmental Management: Waste Act (Act No 59 of 2008)	The National Environmental Management Waste Act (No 56 of 2008) regulates waste management in order to protect the health and environment of South African citizens. This is achieved through pollution prevention, institutional arrangements and planning matters, national norms and standards and the licensing and control of waste management activities. Regulation 921 Act contains activities listed in Categories A and B that would require licensing from the provincial or national authorities. In order to obtain licences for these application a Basic Assessment or EIA process, respectively, should be followed according to the requirements stated in NEMA. Category C includes activities which require that the relevant norms and standards be applied. This includes the storage of waste.	National DEA (hazardous waste) KZN DEDTEA (general waste)	The proposed development does not include activities that require a Waste Management Licence. However, the measures recommended for the management of waste within this EMPr will be applicable throughout the life of the facility.
National Water Act (Act No 36 of 1998)	The National Water Act (Act No 36 of 1998) regulates the surface and subsurface water of South Africa. Water is considered a scarce commodity and should therefore be adequately protected. Amongst other, the act deals with the protection of water sources, water uses, water management strategies and catchment management, dam	Department of Water and Sanitation (DWS)	The proposed development does not include activities that require a Water Use Licence. However, measures for the management of water recommended within this EMPr will be applicable throughout the life of the facility.

Legislation / Policy / Guideline	Applicable Requirements	Relevant Authority	Compliance requirements
	safety and general powers and functions. The purpose of the act is to ensure that South Africa's water resources are protected, used, developed, conserved, managed and controlled. Water uses under S21 of the Act must be licensed unless such water use falls into one of the categories listed in S22 of the Act or falls under general authorisation in terms of S39 and GN 1191 of GG 20526 October 1999. In terms of Section 19, the project proponent must ensure that reasonable measures are taken throughout the life cycle of this project to prevent and remedy the effects of pollution to water resources from occurring, continuing or recurring.		
National Environmental Management: Biodiversity Act (Act No 10 of 2004)	The National Environmental Management: Biodiversity Act, 2004 (Act No. 10 of 2004 - NEMBA) was promulgated for the management and conservation of South Africa's biodiversity through the protection of species and ecosystems and the sustainable use of indigenous biological resources. In terms of section 52(1) (a), of the NEMBA, a national list of ecosystems that are threatened and in need of protection was gazetted on 9 December 2011 (Government	National DEA KZN DEDTEA	The study area falls within both the Savanna Biome (one of the four main biomes in KwaZulu-Natal as described by Mucina and Rutherford, 2006)) and regionally within the Sub-Escarpment Savanna Bioregion (Mucina & Rutherford, 2006). At a local scale, the study area falls within the Maputaland Wooded Grassland type according to the KZN Vegetation Map (EKZNW, 2012),which is

Legislation / Policy / Guideline	Applicable Requirements	Relevant Authority	Compliance requirements
	Notice 1002 (Driver et. al, 2004). The list classified all threatened or protected ecosystems in South Africa in terms of four categories; Critically Endangered (CR), Endangered (EN), Vulnerable (VU), or Protected.		regarded as Endangered (EN) in terms of its threat status with a moderate degree of protection, following the revision of the KZN vegetation map. An Ecological Assessment has been undertaken and is included in Appendix H of the EIA Report.
National Environmental Management: Biodiversity (Act No 10 of 2004)	GNR 598: The Alien and Invasive Species (AIS) Regulations provides for the declaration of weeds and invader plants.	Department of Agriculture, Forestry and Fisheries (DAFF)	This Act will find application throughout the life cycle of the project. In this regard, soil erosion prevention and soil conservation strategies are included in this EMPr. In addition, measures for weed control and management have also been included in this EMPr.
Conservation of Agricultural Resources Act (Act No 43 of 1983)	The Conservation of Agricultural Resources Act (Act No 43 of 1983) requires the maintenance of riparian vegetation and provides a list of invasive alien vegetation that must be controlled or eradicated.	DAFF	An Ecological Assessment has been undertaken and is included in Appendix H of the EIA Report. Measures for the control of invasive vegetation has been discussed in this EMPr.
National Heritage Resources Act (Act No 25 of 1999)	The National Heritage Resources Act (Act No 25 of 1999) was promulgated for the protection of National Heritage Resources and the empowerment of civil society to conserve their heritage resources. In terms of Section 38 of this act, certain listed	South African Heritage Resources Agency (SAHRA) Amafa / Heritage KwaZulu Natali	The surveys undertaken in the area adequately captured the heritage resources. The heritage resources identified have low local significance ratings. Almost all of the sites are archaeological and have previously

Legislation / Policy / Guideline	Applicable Requirements	Relevant Authority	Compliance requirements
	activities require authorisation from provincial agencies: » the construction of a road, wall, powerline, pipeline, canal or other similar form of linear development or barrier exceeding 300m in length; » the construction of a bridge or similar structure exceeding 50m in length; » any development or other activity which will change the character of a site * exceeding 5 000m^2 in extent;or * involving three or more existing erven or subdivisions thereof; » the re-zoning of a site exceeding 10 000m^2 in extent.		been identified during heritage impact assessments conducted by Gavin Anderson. The only built environment heritage resource is 5.5km to the north of the proposed development area. The buildings at this site are associated with the railway infrastructure and are well away from the development. There are no known sites which require mitigation or management plans. No further heritage work is required for the proposed development. Should the contractor come across any items that may be of heritage significance, the relevant mitigation measures included in this EMPr must be implemented.
Mineral and Petroleum Resources Development Act (Act No. 28 of 2002)	The Mineral and Petroleum Resources Development Act (MPRDA) (Act No. 28 of 2002) sets out the requirements with which applicants for prospecting rights, mining rights and mining permits must comply in Sections 16, 22 and 27 of the MPRDA. A mining permit or mining right may be required where a mineral in question is to be	Department of Mineral Resources (DMR) DEA	Should material not be sourced commercially and a borrow pit(s) is considered necessary, the Contractor shall source and apply for the relevant permit from the DEA.

Legislation / Policy / Guideline	Applicable Requirements	Relevant Authority	Compliance requirements
	mined (e.g. materials from a borrow pit) in accordance with the provisions of the Act.		
National Environmental Management: Air Quality Act (Act No 39 of 2004)	The National Environmental Management: Air Quality Act (Act No 39 of 2004 - NEMAQA) provides for the setting of national norms and standards for regulating air quality monitoring, management and control and describes specific air quality measures so as to protect the environment and human health or well-being by: » preventing pollution and ecological degradation; and » promoting sustainable development through reasonable resource use. S18, S19 and S20 of the Act allow certain areas to be declared and managed as "priority areas". Declaration of controlled emitters (Part 3 of Act) and controlled fuels (Part 4 of Act) with relevant emission standards. The Act provides that an air quality officer may require any person to submit an atmospheric impact report if there is reasonable suspicion that the person has failed to comply with the Act.	National DEA uThungulu District Municipality uMhlathuze Local Municipality	An Air Emissions License is required to be obtained for the project in terms of the NEM: Air Quality Act. Combustion installations used primarily for steam raising or electricity generation are Listed Activities (Category 1) in term of Section 21 of the NEM: AQA. Facilities with a design capacity equal to or greater than 50 MW and using liquid fuels are Sub-category 1.2 Listed Activities, while those using gaseous fuels are Sub-category 1.4 Listed Activities. The storage and handling of petroleum products at facilities with a combined storage capacity of 1 000 m3 is a Listed Activity (Category 2, sub-category 2.4) (Government Notice 893, Government Gazette 37054 of 22 November 2016). Special arrangements apply for Sub-category 2.4 Listed Activities depending on the vapour pressure of products being stored. Richards Bay Gas Power 2 propose to store more than 1 000m^3 of diesel. Special conditions for Sub-

Legislation / Policy / Guideline	Applicable Requirements	Relevant Authority	Compliance requirements
	Dust control regulations promulgated in November 2013 may require the implementation of a dust management plan. GNR831 of 01 November 2013 establishes emission standards and reporting requirements for small boilers (i.e. boilers with a capacity between 10MW and 50MW).		category refer to the design of the storage tank, Leak Detection and Repair and vapour recovery for road and rail offloading facilities. The consequence of listing an activity is described in Section 22 of the NEM: AQA, i.e. that no person may conduct a Listed Activity without a provisional Atmospheric Emission License or an Atmospheric Emission License (AEL).
National Forests Act (Act No 84 of 1998)	The purpose of this act is to amongst others, promote the sustainable management and development of forests for the benefit of all. The act defines the following: "*Forest*" includes- (a) a natural forest, a woodland and a plantation; (b) the forest produce in it; and "*Natural forest*" means a group of indigenous trees- (a) whose crowns are largely contiguous; or (b) which have been declared by the Minister to be a natural forest under section 7(2); (c) the ecosystems which it makes up A license is required to cut, disturb, damage or destroy any indigenous tree in a natural forest; or possess, collect, remove,	DAFF KZN DEDTEA	A permit or license is required for the destruction of protected tree species and/or indigenous tree species within a natural forest. Whilst the proposed site does not fall within a "natural forest", the following tree species were identified on site according to the Ecological Impact Assessment:

Legislation / Policy / Guideline	Applicable Requirements	Relevant Authority	Compliance requirements
	transport, export, purchase, sell, donate or in any other manner acquire or dispose of any tree, or any forest product derived from an indigenous tree in a natural forest. Further, the minister may publish a list of protected trees. No person may- (a) cut, disturb, damage or destroy any protected tree; or (b) possess, collect, remove, transport, export, purchase, sell, donate or in any other manner acquire or dispose of any protected tree, or any forest product derived for a protected tree, except- if they have a license to do.		
National Veld and Forest Fire Act (Act No 101 of 1998)	In terms of S13 the landowner would be required to burn firebreaks to ensure that should a veldfire occur on the property, that it does not spread to adjoining land. In terms of S13 the landowner must ensure that the firebreak is wide and long enough to have a reasonable chance of preventing the fire from spreading, not causing erosion, and is reasonably free of inflammable material. In terms of S17, the applicant must have such equipment, protective clothing, and trained personnel for extinguishing fires.	DAFF	While no permitting or licensing requirements arise from this legislation, this Act will find application during the construction and operational phase of the project The relevant management and mitigation measures have been included in this EMPr.
Environment Conservation Act (Act No 73 of 1989)	In terms of Section 25 of the ECA, the national noise-control regulations (GN R154 in Government Gazette No. 13717 dated 10	DEA KZN DEDTEA	The facility is located more than 1000m from the closest potential noise-sensitive receptors and

Legislation / Policy / Guideline	Applicable Requirements	Relevant Authority	Compliance requirements
	January 1992) were promulgated. The NCRs were revised under Government Notice Number R. 55 of 14 January 1994 to make it obligatory for all authorities to apply the regulations. Subsequently, in terms of Schedule 5 of the Constitution of South Africa of 1996, legislative responsibility for administering the noise control regulations was devolved to provincial and local authorities.	uMhlathuze Local Municipality	therefore the potential of a noise impact would be low. This is in line with point 5.4 (h) of SANS 10328:2003, that states that if industry is to be situated further than 1000m from noise-sensitive developments the activity is unlikely to have any acoustical implications. No further studies in this regard are therefore required and no permits are required.
Hazardous Substances Act (Act No 15 of 1973)	This Act regulates the control of substances that may cause injury, or ill health, or death by reason of their toxic, corrosive, irritant, strongly sensitising or inflammable nature or the generation of pressure thereby in certain instances and for the control of certain electronic products. To provide for the rating of such substances or products in relation to the degree of danger; to provide for the prohibition and control of the importation, manufacture, sale, use, operation, modification, disposal or dumping of such substances and products. » Group I and II: Any substance or mixture of a substance that might by reason of its toxic, corrosive etc., nature or because it generates pressure through	Department of Health uMhlathuze Local Municipality	It is necessary to identify and list all the Group I, II, III and IV hazardous substances that may be on the site and in what operational context they are used, stored or handled. If applicable, a license is required to be obtained from the Department of Health.

Legislation / Policy / Guideline	Applicable Requirements	Relevant Authority	Compliance requirements
	decomposition, heat or other means, cause extreme risk of injury etc., can be declared to be Group I or Group II hazardous substance; » Group IV: any electronic product; » Group V: any radioactive material. The use, conveyance or storage of any hazardous substance (such as distillate fuel) is prohibited without an appropriate license being in force.		
National Road Traffic Act (Act No 93 of 1996)	The Technical Recommendations for Highways (TRH 11): "Draft Guidelines for Granting of Exemption Permits for the Conveyance of Abnormal Loads and for other Events on Public Roads" outline the rules and conditions which apply to the transport of abnormal loads and vehicles on public roads and the detailed procedures to be followed in applying for exemption permits are described and discussed. Legal axle load limits and the restrictions imposed on abnormally heavy loads are discussed in relation to the damaging effect on road pavements, bridges and culverts. The general conditions, limitations and escort requirements for abnormally dimensioned	Provincial Department of Transport (provincial roads) South African National Roads Agency Limited (national roads)	An abnormal load/vehicle permit may be required to transport the various components to site for construction. These include: » Route clearances and permits will be required for vehicles carrying abnormally heavy or abnormally dimensioned loads. » Transport vehicles exceeding the dimensional limitations (length) of 22m. » Depending on the trailer configuration and height when loaded, some of the power station components may not meet specified dimensional limitations (height and width).

Legislation / Policy / Guideline	Applicable Requirements	Relevant Authority	Compliance requirements
	loads and vehicles are also discussed and reference is made to speed restrictions, power/mass ratio, mass distribution and general operating conditions for abnormal loads and vehicles. Provision is also made for the granting of permits for all other exemptions from the requirements of the National Road Traffic Act and the relevant Regulations.		
Provincial Legislation/ Policies / Plans			
KZN Conservation Management Act, 1997	The KZN Conservation Management Act, 1997 (No 9 of 1997) provides for the establishment of the KZN Conservation and prescribes its powers, duties and functions which include: » Direct Nature conservation management; and » Direct Protected areas management. This is currently carried out by Ezemvelo KZN Wildlife (EKZNW).	DEDTEA Ezemvelo KZN Wildlife (EKZNW)	Whilst most plant species identified at the site were species of 'Least Concern', there were two (2) species of plant identified which are 'specially protected plant species' in terms of the Natal Conservation Ordinance. These are *Crinum delagoense* (Candy striped Crinum, 'Declining' threat status) and the SA Endemic *Ledebouria ovatifolia* (identification of this species was made difficult as it was not flowering at the time of the survey). Both species were observed occurring in patches amongst other grasses/herbs in the grassland community. These are protected under Schedule 12 (Specially Protected Indigenous Plants) of the KZN Conservation Ordinance No. 15

Legislation / Policy / Guideline	Applicable Requirements	Relevant Authority	Compliance requirements
			of 1974. *A permit needs to be applied for with regards to relocating any of these species.*
EKWNW Norms and Standards on Biodiversity Offset for KwaZulu-Natal	The Provincial Norms and Standards on Biodiversity Offset for KwaZulu-Natal have been developed by Ezemvelo KZN Wildlife (Ezemvelo) (2009, 2013). The document provides details on how Ezemvelo, as the provincial biodiversity authority, requires offsets to be investigated and what information must be provided in an Offset Report.	Ezemvelo KZN Wildlife (Ezemvelo)	An offset has already been agreed to under the EIA carried out for the RBIDZ.
Local Legislation / Policies / Plans			
uThungulu District Municipality (UDM) Integrated Development Plan (IDP) (2012/2013-2014/2015)	The district with the support of its social partners like Cooperative Governance and Traditional Affairs (COGTA) is currently implementing innovative renewable and clean energy projects. The most notable projects in UDM are the Biogas and Wonderpot projects. Local economic development opportunities that will promote job creation are one of the key strategic objectives of the district municipality.	uThungulu District Municipality	New developments in the UDM to be in line with the IDP.
uThungulu District Municipality (UDM) Spatial Development Framework (SDF) (2012)	Richards Bay, Msunduzi, Newcastle and Port Shepstone has been identified as provincial Secondary Nodes and thus urban centres with good existing economic development	uThungulu District Municipality	New developments in the UDM to be in line with the SDF.

Legislation / Policy / Guideline	Applicable Requirements	Relevant Authority	Compliance requirements
	and the potential for growth and services to the regional economy. The SDF states that a major economic sector is manufacturing which is located in Richards Bay. It is important to continue enforcing investor confidence through the provision of infrastructure. It also notes the need to encourage alternative energy use in future developments given constraints in the electrification industry is critical.		
uMhlathuze Local Municipality (ULM) Integrated Development Plan (IDP) (2012-2017)	Key issues of the ULM include climate change, low levels of skills development and literacy, high rates if unemployment, low economic growth and high levels of poverty.	uMhlathuze Local Municipality	New developments in the ULM to be in line with the IDP.
uMhlathuze Spatial Development Framework (2007)	As part of the SDF, four (4) spatial development goals were identified. These include: (i) Promote Sustainable urban Development, (ii) Environmental management and Conservation, (iii) Promote Economic Development (Permitting and encouraging diverse land uses at appropriate locations to develop the economy. Boosting those economic sectors/activities that have the potential to grow and create employment and income.), and (iv) Provision of a minimum Level of Service (LOS) to all (New developments should, as far as possible, be serviced by existing infrastructure networks.	uMhlathuze Local Municipality	New developments in the ULM to be in line with the SDF.

Legislation / Policy / Guideline	Applicable Requirements	Relevant Authority	Compliance requirements
	Indicate where infrastructure investment is needed to provide minimum LOS).		
Richards Bay Environmental Management Framework	An Environmental Management Framework (EMF) was developed for an area of approximately 25 000 hectares within the uMhlathuze Municipality. This area is of strategic importance to the country because it contains the Port of Richards Bay and the nationally designated IDZ and the purpose of an EMF was to secure environmental protection and promote sustainability and cooperative environmental governance. The overall aim of the EMF is to guide decision-making in the area. The EMF notes that Phase 1 F falls within the Coastal Plain Commercial-Industrial Zone (Zone 7 of the EMF). It is located in the Alton North Area, a few kilometres to the north of the other IDZ sites. The Nsezi Rail Yard lies immediately to the west of this phase. The Richards Bay Cemetery lies to the north-east. The area to the south-east of the site is used for light industrial development. The EMF Zone 7 objective is 'To promote sustainable commercial and industrial development that is able to secure ecosystem productivity over the long-term.' There is still space to advance industrial development	Richards Bay IDZ	New developments are to be in line with the Richards Bay Environmental Management Framework.

Legislation / Policy / Guideline	Applicable Requirements	Relevant Authority	Compliance requirements
	but the prevailing environmental constraints on these sites may limit the extent to which this potential could be realised. The IDZ objectives must be promoted in this phase but this must take cognisance of the environmental constraints.		
	Standards		
Noise Standards	Four South African Bureau of Standards (SABS) scientific standards are considered relevant to noise. They are: » SANS 10103:2008. 'The measurement and rating of environmental noise with respect to annoyance and to speech communication'. » SANS 10210:2004. 'Calculating and predicting road traffic noise'. » SANS 10328:2008. 'Methods for environmental noise impact assessments'. » SANS 10357:2004. 'The calculation of sound propagation by the Concave method'. The relevant standards use the equivalent continuous rating level as a basis for determining what is acceptable. The levels may take single event noise into account, but single event noise by itself does not	Local Municipality	The recommendations that the standards make are likely to inform decisions by authorities, but non-compliance with the standards will not necessarily render an activity unlawful per se.

Legislation / Policy / Guideline	Applicable Requirements	Relevant Authority	Compliance requirements
	determine whether noise levels are acceptable for land use purposes.		
Air Standards SANS 69 - South African National Standard - Framework for setting & implementing national ambient air quality standards, SANS 1929 - South African National Standard - Ambient Air Quality - Limits for common pollutants.	The South African Bureau of Standards (SABS), through a technical committee, developed ambient air quality limits, based on international best practice for particulate matter less than 10 µm in aerodynamic diameter (PM10), dust fallout, sulphur dioxide, nitrogen dioxide, ozone, carbon monoxide, lead and benzene. These ambient limits were derived from international best practice and what was regarded to be achievable in the South African context, taking both the natural environment and socio-economic status into account. The SANS limits informed the newly promulgated SA Standards	Local Municipality	The recommendations that the standards make are likely to inform decisions by authorities, but non-compliance with the standards will not necessarily render an activity unlawful per se.
Air Quality IFC Air Emissions and Ambient Air Quality. Environmental, Health and Safety Guidelines. Washington DC, International Finance Corporation	The World Bank group through the IFC has emission guidelines for power plants. These guidelines are applicable to new facilities. Please note that the emission values are normalised to 6% excess oxygen, while the South African standards are normalised to 10% excess oxygen.	Local Municipality	The recommendations that the standards make are likely to inform decisions by authorities, but non-compliance with the standards will not necessarily render an activity unlawful per se.
Waste Management	Waste management should be addressed through a Waste management system that	Local Municipality	The recommendations that the IFC make are likely to inform decisions by

Legislation / Policy / Guideline	Applicable Requirements	Relevant Authority	Compliance requirements
IFC Environmental, Health, and Safety (EHS) Guidelines: General EHS Guidelines: Environmental Waste Management	addresses issues linked to waste minimization, generation, transport, disposal, and monitoring. Facilities that generate waste should characterize their waste according to composition, source, types of wastes produced, generation rates, or according to local regulatory requirements. Small Quantities of Hazardous Waste: Hazardous waste materials are frequently generated in small quantities by many projects through a variety of activities such as equipment and building maintenance activities. Examples of these types of wastes include: spent solvents and oily rags, empty paint cans, chemical containers; used lubricating oil; used batteries (such as nickel-cadmium or lead acid); and lighting equipment, such as lamps or lamp ballasts. IFC EHS Waste Guidelines should be adhered to where practical.		authorities, but non-compliance with the standards will not necessarily render an activity unlawful per se.
The Equator Principles (June 2003)	» The Equator Principles (EPs) are a voluntary set of standards for determining, assessing and managing social and environmental risk in project financing. Equator Principles Financial Institutions (EPFIs) commit to not	Local Municipality	The recommendations that the standards make are likely to inform decisions by authorities, but non-compliance with the standards will not necessarily render an activity unlawful per se.

Legislation / Policy / Guideline	Applicable Requirements	Relevant Authority	Compliance requirements
	providing loans to projects where the borrower will not or is unable to comply with their respective social and environmental policies and procedures that implement the EPs. » The Equator Principles were developed by private sector banks. The banks chose to model the Equator Principles on the environmental standards of the World Bank and the social policies of the International Finance Corporation (IFC).		

APPENDIX L:
CURRICULUM VITAE OF THE PROJECT TEAM

CURRICULUM VITAE
JO-ANNE THOMAS

Profession	:	Environmental Consultant
Specialisation	:	Environmental Management; Strategic environmental advice; Environmental compliance advice & monitoring; Environmental Impact Assessments; Policy, strategy & guideline formulation; Project Management; General Ecology
Years experience	:	Seventeen (17) years in the environmental field

KEY RESPONSIBILITIES

Provide technical input for projects in the environmental management field, specialising in Strategic Environmental Advice, Environmental Impact Assessment studies, environmental permitting, public participation, Environmental Management Plans and Programmes, environmental policy, strategy and guideline formulation, and integrated environmental management. Key focus on integration of the specialist environmental studies and findings into larger engineering-based projects, strategic assessment, and providing practical and achievable environmental management solutions and mitigation measures. Responsibilities for environmental studies include project management; review and manipulation of data; identification and assessment of potential negative environmental impacts and benefits; review of specialist studies; and the identification of mitigation measures. Compilation of the reports for environmental studies is in accordance with all relevant environmental legislation.

Undertaking of numerous environmental management studies has resulted in a good working knowledge of environmental legislation and policy requirements. Recent projects have been undertaken for both the public- and private-sector, including compliance advice and monitoring, electricity generation and transmission projects, various types of linear developments (such as National Road, local roads and power lines), waste management projects (landfills), mining rights and permits, policy, strategy and guideline development, as well as general environmental planning, development and management.

SKILLS BASE AND CORE COMPETENCIES

- Project management for a range of projects
- Identification and assessment of potential negative environmental impacts and benefits through the review and manipulation of data and specialist studies
- Identification of practical and achievable mitigation and management measures and the development of appropriate management plans
- Compilation of environmental reports in accordance with relevant environmental legislative requirements
- External and peer review of environmental reports & compliance advice and monitoring
- Formulation of environmental policies, strategies and guidelines
- Strategic and regional assessments; pre-feasibility & site selection
- Public participation processes for a variety of projects
- Strategic environmental advice to a wide variety of clients both in the public and private sectors
- Working knowledge of environmental planning processes, policies, regulatory frameworks and

legislation

EDUCATION AND PROFESSIONAL STATUS

Degrees:

B.Sc Earth Sciences, *University of the Witwatersrand, Johannesburg,* 1993
B.Sc Honours in Botany, *University of the Witwatersrand, Johannesburg,* 1994
M.Sc in Botany, *University of the Witwatersrand, Johannesburg,* 1996

Courses:

Environmental Impact Assessment, *Potchefstroom University,* 1998
Environmental Law, *Morgan University*, 2001

Professional Society Affiliations:

Professional Natural Scientist (Registration No 400024/00).

EMPLOYMENT

Current: Director of Savannah Environmental (Pty) Ltd. Independent specialist environmental consultant

October 1997-November 2005: Bohlweki Environmental (Pty) Ltd: Senior Environmental Scientist; Environmental Management and Project Management

January to July 1997: Junior Science Teacher, Sutherland High School, Pretoria

PROJECT EXPERIENCE

Compliance Advice and Due Diligence

- First annual Environmental and Social Monitoring Report for the Upington Airport 10MW PV Plant, Northern Cape Province
- Compliance advice for Financial Close of the Ilanga CSP Facility, Northern Cape Province
- Compliance advice for Financial Close of West Coast One Wind Energy Facility, Western Cape Province
- Compliance advice for Financial Close of Tsitsikamma Wind Energy Facility, Eastern Cape Province
- Compliance advice for Financial Close of Upington Solar Facility, Northern Cape Province
- Environmental Due Diligence of a wind energy facility in the Western Cape on behalf of EDPR Renewables
- Environmental Due Diligence of a wind energy facility on the West Coast of the Western Cape on behalf of ILF&S

Compliance Monitoring

- Project manager and auditor - ECO compliance monitoring for the construction of the De Hoop Dam and the deviation of the R555, Limpopo Province
- Project manager – ECO compliance at Kathu Solar Energy Facility, Northern Cape Province
- Project manager – ECO compliance at West Coast One Wind Energy Facility, Western Cape Province

- Project manager – ECO compliance at Sishen Solar Energy Facility, Northern Cape Province

- Project manager – ECO compliance monitoring for the expansion of Waterval WCW, Gauteng Province
- Project manager - ECO compliance monitoring for the Mine Water Recovery Project at Duvha Power Station, Mpumalanga Province
- Project manager – ECO compliance at Dorper Wind Energy Facility, Eastern Cape Province
- Project manager – ECO compliance monitoring for the !Khi CSP Facility near Upington, Northern Cape
- Project manager – ECO compliance at Gouda Energy Facility, West Coast Province
- Project manager – ECO compliance monitoring for the KaXu! CSP facility near Pofadder, Northern Cape
- Project manager – ECO compliance monitoring for the Upington Airport PV facility at Upington, Northern Cape Province
- Project manager – ECO compliance at RustMo1 Solar Energy Facility, North West Province
- Project manager – Environmental Officers for Gamma-Kappa 765kV power line between Laingsburg and Beaufort West, Western Cape
- Project manager – ECO compliance monitoring for the rehabilitation of Blaauwpan Dam, Gauteng Province

Electricity Sector Projects: Coal-fired Power Stations

- Project manager for the EIA undertaken in support of a NEMA authorisation and waste management license for the proposed Independent power Producer (IPP) Coal-fired Power Station and associated infrastructure near Lephalale within the Waterberg District Municipality of the Limpopo Province
- Project manager for the EIA undertaken in support of a NEMA authorisation and waste management license for the proposed Umbani Coal-fired Power Station and associated infrastructure near Kriel, Mpumalanga Province
- Project manager for the EIA undertaken in support of a NEMA authorisation and waste management license for the proposed Transalloys Coal-fired Power Station and associated infrastructure, Mpumalanga Province

Electricity Sector Projects: Wind Energy

- Project manager for the EIA undertaken for the proposed EXXARO West Coast wind energy facility and associated infrastructure at a site within the Western Cape (for EXXARO Resources)
- Project manager for the EIA undertaken for the proposed Oyster Bay wind energy facility, Eastern Cape Province (for Renewable Energy Resources Southern Africa)
- Project manager for the EIA undertaken for the proposed Spitskop Bay wind energy facility, Eastern Cape Province (for Renewable Energy Resources Southern Africa)
- EIA and EMP for the proposed wind energy facility and associated infrastructure at a site within the Western Cape (for Eskom Generation)
- EIA and EMP for the proposed wind energy facility and associated infrastructure at a site near Hopefield, Western Cape Province (for Umoya Energy)
- Project manager for the proposed Klipheuwel/Dassiesfontein wind energy facility and associated infrastructure at a site within the Overberg area of the Western Cape (for BioTherm Energy)
- Project manager for the proposed Suurplaat wind energy facility and associated infrastructure at a site within the Western Cape (for Moyeng Energy)

- Project manager for the proposed West Coast One wind energy facility and associated infrastructure at a site within the Western Cape (for Moyeng Energy)
- Project manager for the proposed Rheboksfontein wind energy facility and associated infrastructure at a site within the Western Cape (for Moyeng Energy)

- Basic Assessment for proposed wind monitoring masts on a site north of Koekenaap, Western Cape Province (for EXXARO Resources)
- Basic Assessment for proposed wind monitoring masts on a site in the Overberg area, Western Cape Province (for BioTherm Energy)
- Basic Assessment for proposed wind monitoring masts on a site near Beaufort West, Western Cape Province (for Umoya Energy)
- Basic Assessment for proposed wind monitoring masts on a site near Laingsburg, Western Cape Province (for Umoya Energy)

Electricity Sector Projects: Solar Energy

- Project manager for the EIA and EMP for two PV sites within the Western and Northern Cape Provinces (for INCA Energy)
- Project manager for the Basic Assessment and EMP for PV site within the Northern Cape Province (for INCA Energy)
- Project manager for the Basic Assessment and EMP for a PV site near Rustenburg, North-West Province (for Momentous Energy)Project manager for the EIA and EMP for the proposed Project Ilanga (125MW CSP facility) near Upington, Northern Cape Province (for Ilangethu Energy)
- Project manager for the EIA and EMP for two PV sites within the Northern Cape Province (for MedEnergy Global)
- Project manager for the Basic Assessment and EMP for PV sites within 4 ACSA airports within South Africa (for ACSA PV)
- Project manager for the EIA and EMP for the proposed Waterberg PV plant, Limpopo Province (for Thupela Energy)

Electricity Sector Projects: Eskom

- Project manager for the EIA and EMP for the proposed Mokopane Integration Project, Limpopo Province (for Eskom Transmission)
- Project manager for the proposed transmission lines from the Koeberg-2 Nuclear Power Station site, Western Cape Province (for Eskom Transmission)
- Project manager for the proposed Tshwane strengthening project, Phase 1, Gauteng Province (for Eskom Transmission)
- Project manager for the EIA and EMP for the proposed Kyalami Strengthening Project, Gauteng Province (for Eskom Transmission)
- Project manager for the EIA and EMP for the proposed Steelpoort Integration Project, Limpopo Province (for Eskom Transmission)
- Project manager for the EIA and EMP for the proposed conversion of the existing Open Cycle Gas Turbine (OCGT) Ankerlig Power Station (located in Atlantis Industria) to a Combined Cycle Gas Turbine (CCGT) power station, and the associated 400 kV transmission power line between Ankerlig Power Station and the Omega Substation (for Eskom Generation)
- Project manager for the EIA and EMP for the proposed conversion of the existing Open Cycle Gas Turbine (OCGT) Gourikwa Power Station (located near Mossel Bay) to a Combined Cycle Gas Turbine (CCGT) power station, and the associated 400 kV transmission power line between Gourikwa Power Station and the Proteus Substation (for Eskom Generation)

Infrastructure Projects

- Project manager for the EIA and EMP for the proposed bridge across the Ngotwane River located on the border of South Africa and Botswana

Strategic and Regional Assessments

- Strategic Assessment for the location of wind energy facilities within the Western Cape Province (for Western Cape Department of Environmental Affairs and Development Planning)
- Regional Assessment for wind energy developments within an identified area on the West Coast of the Western Cape Province (for Investec Bank Limited)
- Regional Assessment for wind energy developments within an identified area on the West Coast of the Western Cape Province (for Eskom Holdings Limited)
- Regional Assessments for wind energy developments within identified areas in the Overberg Area of the Western Cape Province (for BioTherm Energy)
- Regional Assessment for wind energy developments within an identified area in the Sutherland Area of the Northern and Western Cape Province (for Investec Bank Limited)

Environmental Management Tools

- Review the effectiveness and efficiency of the environmental impact management (EIA) system in South Africa on behalf of the Department of Environmental Affairs and Tourism
- Development of a comprehensive site-specific EMP for the construction and operation of the Eskom Braamhoek Integration Project, Free State and KwaZulu-Natal Provinces
- Compilation of Provincial Guidelines for off-road routes within the Western Cape Province
- Environmental Risk Analysis for Salbro Property Holdings, Gauteng Province
- Water use permit applications for water use at Tiffindell Ski Resort, Eastern Cape Province
- Water use permit applications for various properties within the Olifants West Game Reserve, Limpopo Province
- Project integration and compilation of a Strategy for Sustainable Development for Gauteng Province
- Advice regarding environmental compliance of existing and future development at Tiffindell Ski, Eastern Cape Province
- Advice regarding environmental compliance at Salberg factory, Gauteng Province

Peer Review

- Review of EIAs submitted in terms of the ECA for the Northern Cape Department of Tourism, Environment and Conservation, including:
  - EIA for a new wastewater treatment works in Warrenton
  - EIA for chicken layer houses in Kimberley
  - EIAs for the upgrading of petrol stations in Kimberley
  - EIA for a new up-market residential development in Kathu
  - EIA for residential development in Kimberley
- Review of EIA and EMP for the proposed Waterfall Wedge development, Gauteng Province

Mining Sector Projects

- Amendment of Environmental Management Programme for the Waterberg Colliery near Lephalale, Limpopo Province

- Amendment of EMPR for Grootegeluk Coal Mine near Lephalale, Limpopo Province, to include coal transportation infrastructure between the mine and Medupi Power Station
- Environmental Impact Assessment and Environmental Management Programme in terms of the MPRDA for the proposed Elitheni Coal Mine near Indwe, Eastern Cape Province
- Environmental Management Programmes for three borrow pits associated with the proposed Groot Letaba River Development Project, Limpopo Province

Water resources projects

- Project manager for the EIA and EMP for the proposed modification of the existing Hartebeestfontein Water Care Works, Gauteng Province (for ERWAT)
- Project manager for the EIA and EMP for the proposed expansion of the existing Welgedacht Water Care Works, Gauteng Province (for ERWAT)

Projects undertaken on behalf of Bohlweki Environmental include:

Specialist projects

- Development of an Environmental Policy for the Ekurhuleni Metropolitan Municipality
- Development of an Integrated Environmental Policy for the City of Tshwane Metropolitan Municipality Environmental Opportunities and Constraints Assessment for the Wonderboom Airport
- Review of the State of the Environment Report for the North West Province

Transport sector projects

- Environmental Impact Assessment for the proposed Platinum Highway from Warmbaths via Pretoria to Skilpadhek (on the South Africa-Botswana border), including obtaining all environmental permits required.
- Environmental input to the Ekurhuleni transportation corridors study
- Environmental input to the Denneboom Local Integrated Transport Plan
- Environmental Impact Assessment and Environmental Management Plan for the proposed N2 Wild Coast Toll Road between East London (Eastern Cape) and Durban (KwaZulu-Natal)
- Environmental Scoping Study and public participation process for the upgrading of Provincial Main Road 100 between the intersection with Main Road 521 and Ndwedwe
- Environmental Management Plan for repairs of portions of the N3 and N1, Gauteng
- Environmental Scoping Study and public participation process for the Kingsway Relief Road in Maseru, Lesotho

Electricity Sector projects

- Project manager for the undertaking of an EIA and compilation of an EMP for the proposed Open Cycle Gas Turbine (OCGT) Power Station and associated 400 kV Transmission lines and substation at Atlantis, Western Cape Province
- Environmental Scoping Study for a new coal-fired power station in the Lephalale area, Limpopo Province
- Project manager for the undertaking of Environmental Scoping Study and compilation of an Environmental Management Plan for various 132 kV Sub-Transmission lines and substations within the Mpumalanga Province
- Detailed Environmental Scoping Study and public participation for the proposed Capacity Increase Project at Arnot Power Station, Mpumalanga Province
- Project manager for the undertaking of an Environmental Scoping Study and EMP for the

proposed 132 kV sub-Transmission line between the GaRankuwa and Dinaledi substations, North West Province

- Project manager for the undertaking of an EIA for the proposed 765 kV Transmission line between the existing Hydra Substation (near De Aar) and the proposed Gamma Substation (near Victoria West), Northern Cape Province
- EIA & public participation for the proposed 3rd 400 kV Transmission line between the Poseidon and Grassridge Substations in the Eastern Cape Province
- EIA & public participation for the proposed new 400 kV Transmission line between Matimba Substation (near Lephalale) and Witkop Substation (near Polokwane), Limpopo Province
- EIA & public participation for the proposed new Ikaros Substation and associated 400 kV Transmission line infrastructure, North West Province
- Environmental Scoping Study public participation for the Establishment of Eskom Infrastructure for Power Supply to the C-Cut Development at Premier Mine, Cullinan, Gauteng Province
- Environmental Impact Study and public participation for the proposed 2nd 400 kV Transmission line between the Grassridge Substation and the Poseidon Substation in the Eastern Cape.
- Public Participation Process for the proposed Return-to-Service of the Camden Power Station, Mpumalanga Province
- Detailed Environmental Scoping Study and public participation for the Breyten Strengthening Project: proposed new Breyten Substation and associated 88 kV Distribution line, Mpumalanga Province
- Environmental Pre-Scoping Study for the proposed Concentrating Solar Plant, in the Northern Cape Province
- Environmental Impact Assessment public participation for the proposed new nine 132 kV power lines between the Grassridge Substation and the Coega Industrial Development Zone, Eastern Cape Province

Pipelines

- Environmental Impact Assessment for the proposed Petronet New Multi-Products Pipeline (NMPP) between Durban and Gauteng Province
- Exemption application for the construction of a gas pipeline between Majuba Mine and Majuba Power Station, Mpumalanga Province.
- Exemption application for the construction of an emergency water supply pipeline from Mamelodi to Ekandustria via Cullinan, Gauteng Province.
- Environmental Scoping Study for the installation of a new water supply pipeline from Centurion to Diepsloot, Gauteng Province.

EIAs for Technology projects

- Environmental Impact Assessment for the proposed Alternative Fuels and Resources Project at Alpha's ULCO Plant near Kimberley in the Northern Cape Province
- Environmental Impact Assessment for the proposed Alternative Fuels and Resources Project at Dudfield Plant, North West Province
- Environmental Impact Assessment for the proposed Blending Platform to be established within the Gauteng Province
- Investigation of possible alternative Scrap tyre collection and disposal strategies in Gauteng, South Africa

Mining sector projects

- Environmental Management Programme Report (EMPR) for the proposed small-scale kaolin clay mine near Ndwedwe, KwaZulu-Natal Province
- Environmental Management Programme Report (EMPR) for prospecting activities within the Premier Mine Game Farm, Cullinan for De Beers Consolidated Mines Limited
- Environmental Management Plan for the Proposed C-Cut Development at Premier Mine, Cullinan
- Environmental Management Programme Report for the Proposed C-Cut Development at Premier Mine, Cullinan
- Environmental Impact Assessment and public participation process for the Proposed C-Cut Development at Premier Mine, Cullinan

Development projects

- A detailed Environmental Scoping Study and public participation process for the Thaba ya Batswana Development on portions of the Farm Rietvlei 101 IR, Gauteng
- Environmental Scoping Report and public participation process for the development of a Community Safety Centre in Khutsong-South, Carletonville

Water resources projects

- A detailed Environmental Impact Assessment of new regional water care infrastructure in the DD5A sub-drainage district in Eastern Gauteng (adjacent to the Blesbokspruit Ramsar Site) for the East Rand Water Care Company (ERWAT)

CURRICULUM VITAE
DILONA SOMAI

Profession	:	Environmental Consultant for Savannah Environmental (Pty) Ltd
Specialisation	:	Environmental Consulting
Years experience	:	5 years

KEY RESPONSIBILITIES

- Report writing and review;
- Public participation / stakeholder engagement;
- Project Administration; and
- Development of Proposals.

SKILLS BASE AND CORE COMPETENCIES

- Environmental Impact Assessments
- Water Use License Applications
- Public participation process
- Environmental and Social Risk Assessments
- Social and Environmental Due Diligence (SEDD)
- Compiling of Environmental Management Plans (EMPs)

EDUCATION AND PROFESSIONAL STATUS

Degrees:

- BSc. Hons. Environmental Management: University of South Africa (2013)
- BSc Geography: University of KZN (2010)

Professional Memberships:

- South African Council for Natural Scientific Professions (SACNASP) – Candidate Natural Scientist for Environmental Science (2015/2016) (Registration number: 100235/14)
- Golden Key International Honour Society (2009)

Courses:

- SAVCA Master Class (Calculating Non-financial ROE) (August, 2014)
- Climate Change and Carbon Management Course (October, 2014)

EMPLOYMENT

- *February 2015 – Current:* Savannah Environmental (Pty) Ltd: Environmental Consultant
- *June 2015 – January 2016:* DMT Kai Batla (Pty) Ltd: Environmental Consultant and Team Leader
- *October 2014 – May 2015:* EBS Advisory (Pty) Ltd: ESG Risk Consultant
- *January 2013 – September 2014:* Fourth Element Consulting (Pty) Ltd: Environmental Consultant
- *March 2012 – December 2012:* NMA Effective Social Strategists (Pty) Ltd: Project Coordinator
- *February 2011 – February 2012:* The KZN ScienCentre: National Youth Services Education Officer

PROJECT EXPERIENCE

Previous projects include:

- Environmental Assessment Practitioner for the OBP SOC Limited Basic Assessment and Water Use License Application, Gauteng: South Africa for the expansion of an animal vaccination facility.
- Environmental Assessment Practitioner for the Umgeni Water Basic Assessment and Water Use License Application, KwaZulu-Natal: South Africa for the proposed installation of a hydropower unit and associated infrastructure on the Mooi-Mgeni Transfer Scheme (MMTS).
- Project Management Officer for the Department of Water and Sanitation & CSIR Validation and Verification Project, KwaZulu-Natal: South Africa.
- Project Manager for the compilation / development of the Free State Hazardous Waste Management Inventory, Free State: South Africa.
- Project Manager for the compilation / development of the City of Johannesburg Alien and Invasive Control Plan, Gauteng: South Africa.
- Project Manager for the compilation / development of the City of Johannesburg River Rehabilitation and Management Plan, Gauteng: South Africa.
- Environmental Assessment Practitioner for the proposed West Rand Logistics Hub (Environmental and Social Desktop Study), Gauteng: South Africa.
- Environmental Assessment Practitioner for the IRL (Pty) Ltd Prospecting Right Applications, North West: South Africa. Compilation of the Environmental Management Plans for prospecting of Phosphate ore, Iron Ore, Titanium and Magnetite. Undertook the public participation process for EMP.
- Environmental Assessment Practitioner for the Barleda cc Prospecting Right Applications, North West: South Africa. Compilation of the Environmental Management Plan for prospecting of Copper, Rare Earths and Uranium. Undertook the public participation process for EMP.
- Environmental Assessment Practitioner for Auditing (Internal compliance auditing of a Hazardous Waste Treatment facility - compliance against the waste management license environmental management plan and environmental authorisation) Gauteng: South Africa.
- Environmental Assessment Practitioner for the Platinum Waste Resources (Pty) Ltd Klinkerstene Water Use License Application, Mpumalanga: South Africa.
- Environmental Assessment Practitioner for the PFG Water Use License Application, Gauteng: South Africa.
- Assistant Environmental Assessment Practitioner for the Platinum Waste Resources (Pty) Ltd Klinkerstene Environmental Impact Assessment (EIA), Mpumalanga: South Africa.
- Assistant Environmental Assessment Practitioner for the Tlou Energy Resources Coal Bed Methane Exploration, Botswana.
- Assistant Environmental Assessment Practitioner for the Magnum Gas and Power Coal Bed Methane Exploration, Botswana.
- Assistant Environmental Assessment Practitioner for the Eskom Basic Assessment for the Roodepoort Transmission Project, Gauteng: South Africa.
- Assistant Environmental Assessment Practitioner for the Baseline Risk Assessments for the following sites: Nojoli and Gibson Bay Wind Farms in the Eastern Cape, Tom Burke PV plant in Limpopo, Adams PV plant in the Northern Cape, Pulida PV plant in the Free State and the Paleisheuwel PV Plant in the Western Cape.
- Assistant Environmental Assessment Practitioner for the Preliminary Risk Appraisal for the Provision of a hybrid power supply solution for the Geita Mine, Tanzania.
- Project Coordinator for the Public Participation Process (PPP) for the Environmental Impact

Assessment for the Mooi-Mgeni Transfer System – Phase 2, Kwa-Zulu Natal: South Africa.
- Project Coordinator for the Public Participation Process (PPP) for the Heritage Impact Assessment for the Solomon Mahlangu Freedom Square Upgrade Project, Gauteng: South Africa.
- Project Coordinator for the Public Participation Process (PPP) for the Kliptown Public Environmental Upgrade, Gauteng: South Africa.
- Project Coordinator for the Public Participation Process (PPP) for the Westgate Public Environmental Upgrade, Gauteng: South Africa.

SOCIAL AND ENVIRONMENTAL DUE DILIGENCE (SEDDs) / OTHER

- ESG Risk Consultant for the SEDD for a pool chemicals and equipment company, Gauteng: South Africa.
- ESG Risk Consultant for the SEDD for food outlets / franchises, Nigeria.
- ESG Risk Consultant for the SEDD for a Livestock production and husbandry company, Western Cape: South Africa.
- ESG Risk Consultant for the SEDD for a Material Recovery Facility, Gauteng: South Africa.
- ESG Risk Consultant for the SEDD for a Paint Manufacturing Facility, Ghana.
- ESG Risk Consultant for nine companies (including agriculture – processing and packaging, distribution and warehousing, pharmaceuticals, water purification and bottling), Botswana.
- ESG Risk Consultant for Social and Environmental Management System for seven companies (including manufacturing and services companies) throughout South Africa.
- Consultant for grant fund applications from the Jobs Fund for the agricultural sector (Livestock, Raisin and Peach).
- Consultant for the African perceptions of Chinese National Image Survey. Development of questionnaire.