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

ENVIRONMENTAL MANAGEMENT PROGRAMME (EMPr): REVISION 1

DEA REF NO.: 14/12/16/3/3/2/867

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PROJECT DETAILS

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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
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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, or that is intended or required to be discarded or disposed of, by the holder of that 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.
(b) any other 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
OCGT	Open Cycle Gas Turbines
CO_2	Carbon dioxide
COGTA	Cooperative Governance and Traditional Affairs
DAFF	Department of Forestry and Fisheries
DEA	National Department of Environmental Affairs
EDTEA	Kwazulu-Natal Department of Economic Development, Tourism and Environmental Affairs
DMRE	Department of Minerals Resources and 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
RLPG	Regasified Liquefied Petroleum Gas
RLNG	Regasified Liquefied Natural Gas
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

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1. PROJECT DETAILS

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 (refer to **Figure 1.1**). The net output of the plant, at International Standards Organisation (ISO) Reference Conditions, is expected to be up to 400MW, to be developed and operated with LPG, LNG, RNLG (in various forms) or pipeline gas as the fuel source for the facility. It is anticipated that 400MW will be fuel generated energy utilising an Open Cycle Gas Turbine generation process (OCGT).

This project is to be developed in response to the Department of Mineral Resources and Energy's (DMRE) 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), as well as the Gas to Power Independent Power Producer Procurement Programme and the Risk Mitigation Power Procurement Programme of DMRE.

The main infrastructure associated with the facility includes the following:

- Up to six (6) Gas Turbines for Mid-merit/Peaking Plant.
- Multiple engine halls, each of ~70MW. Each engine hall will typically comprise two gas turbines. Stacks associated with engine halls will be up to 20m in height.
- Closed Fin-fan coolers.
- Water Injection.
- Access roads within project locality boundaries.
- Fuel storage tanks with a combined capacity of up to 10 000m^3 which will be used for fuel storage. Eight (8) 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.
- Control centre, guard house, admin building, workshops, and a warehouse.

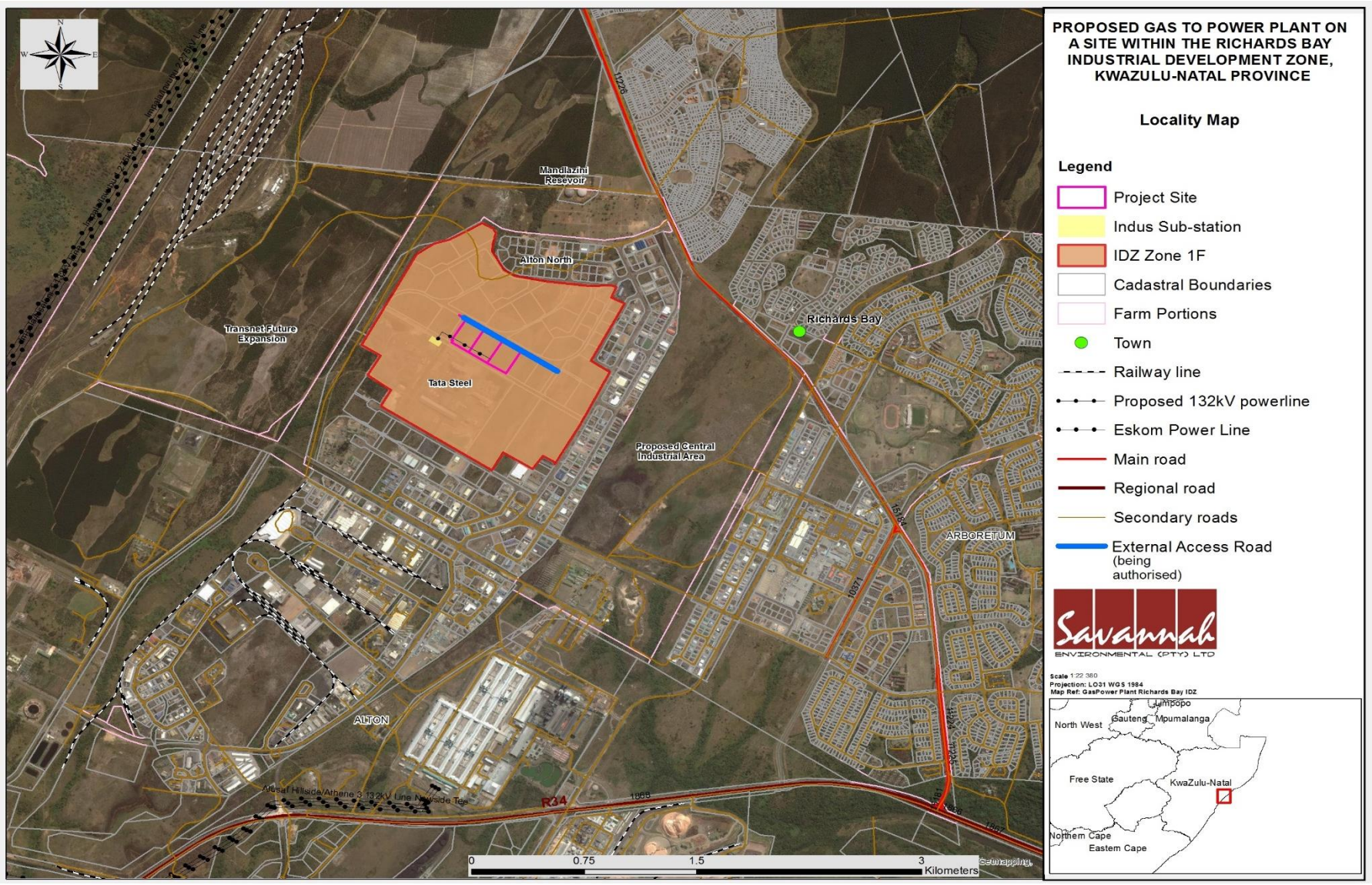

Figure 1.1: Locality Map (Refer to Appendix B for A3 Maps)

The Richards Bay Gas to Power Energy Facility will be operational for an estimated period of 20 years.

Water volumes of 3,400m^3 per day, or 1 – 1.2 million m^3 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. 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**).

1.1. Layout Update

In accordance with Condition 14 of the Environmental Authorisation (EA)[1], the Applicant, Richards Gas to Power 2 (Pty) Ltd, is undertaking an update to the layout of the Gas To Power facility, as well as an update to the EMPr in accordance with Condition 17 of the EA. The update of the layout follows a change in the technology and the infrastructure components required for the operations of the gas to power facility.

Table 1.1 below shows a comparison between the authorised infrastructure components and the proposed components as part of the layout and EMPr update.

Authorised Infrastructure Components for Richards Gas to Power Facility	Proposed Infrastructure Components for Richards Bay Gas to Power Facility
Up to six (6) Gas Turbines to run at either base-load or mid-merit.	Up to six (6) Gas Turbines for Mid-merit/Peaking Plant.
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.	Multiple engine halls, each of ~70MW. Each engine hall will typically comprise two gas turbines. Stacks associated with engine halls will be up to 20m in height.
1-2 steam turbines utilising the heat from all the engines for power production in a steam cycle.	Closed Fin-fan coolers and Water Injection.
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.	Fuel storage tanks with a combined capacity of up to 10 000m^3 which will be used for fuel storage. Eight (8) fuel unloading stations will be associated with these tanks

Figure 1.2 and 1.3 include environmental sensitivity and layout maps of the initial layout of the gas to power facility that was authorised as a result of the gas to power facility. **Figure 1.4** includes an environmental sensitivity and layout map of the updated layout of the gas to power facility.

[1] DEA Reference No:. 14/12/16/3/3/2/2/867

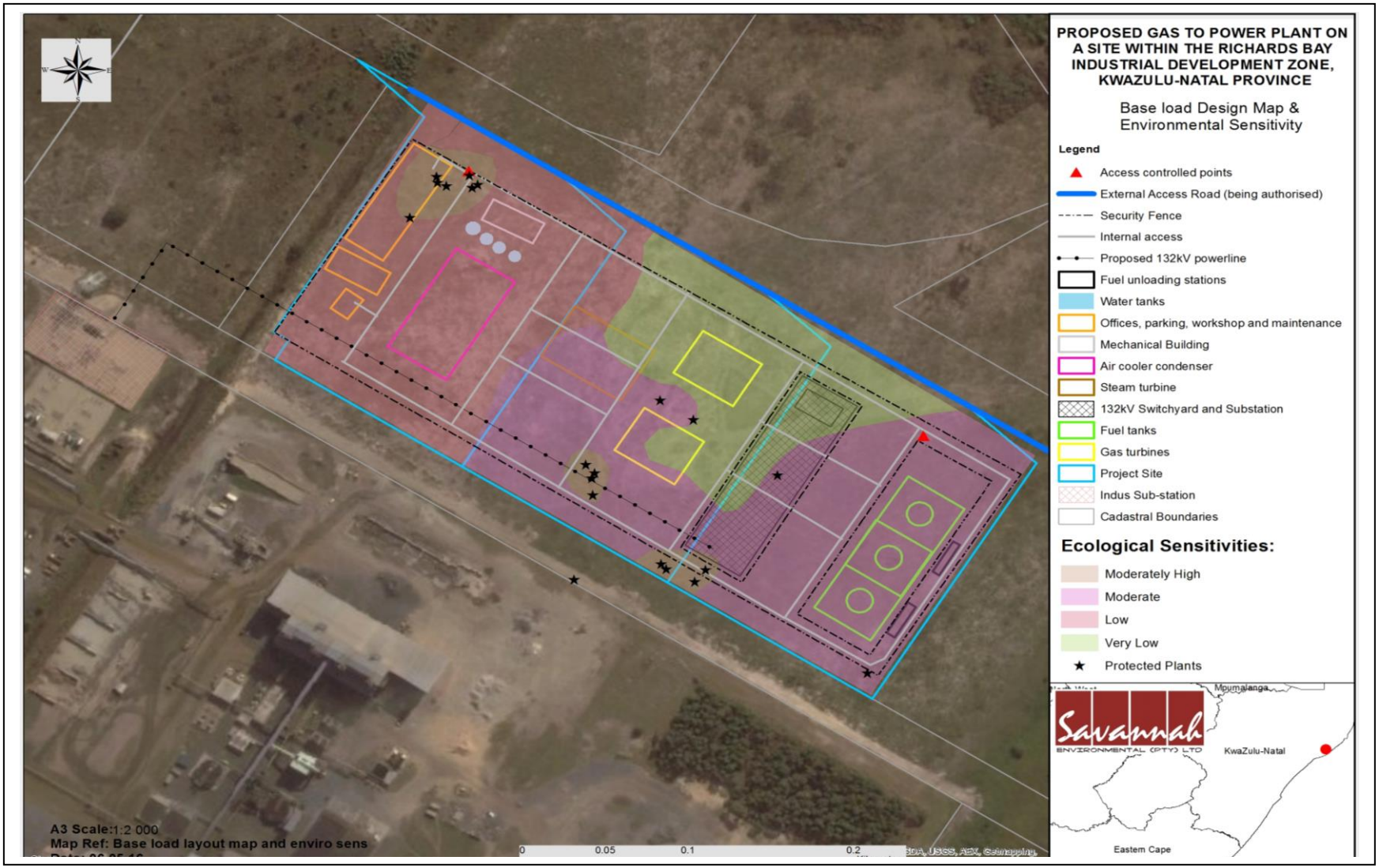

Figure 1.2: Environmental sensitivity map for the authorised layout illustrating the ecologically sensitive areas within the project site of the gas to power facility, as well as the protected plant species at base-load operational design.

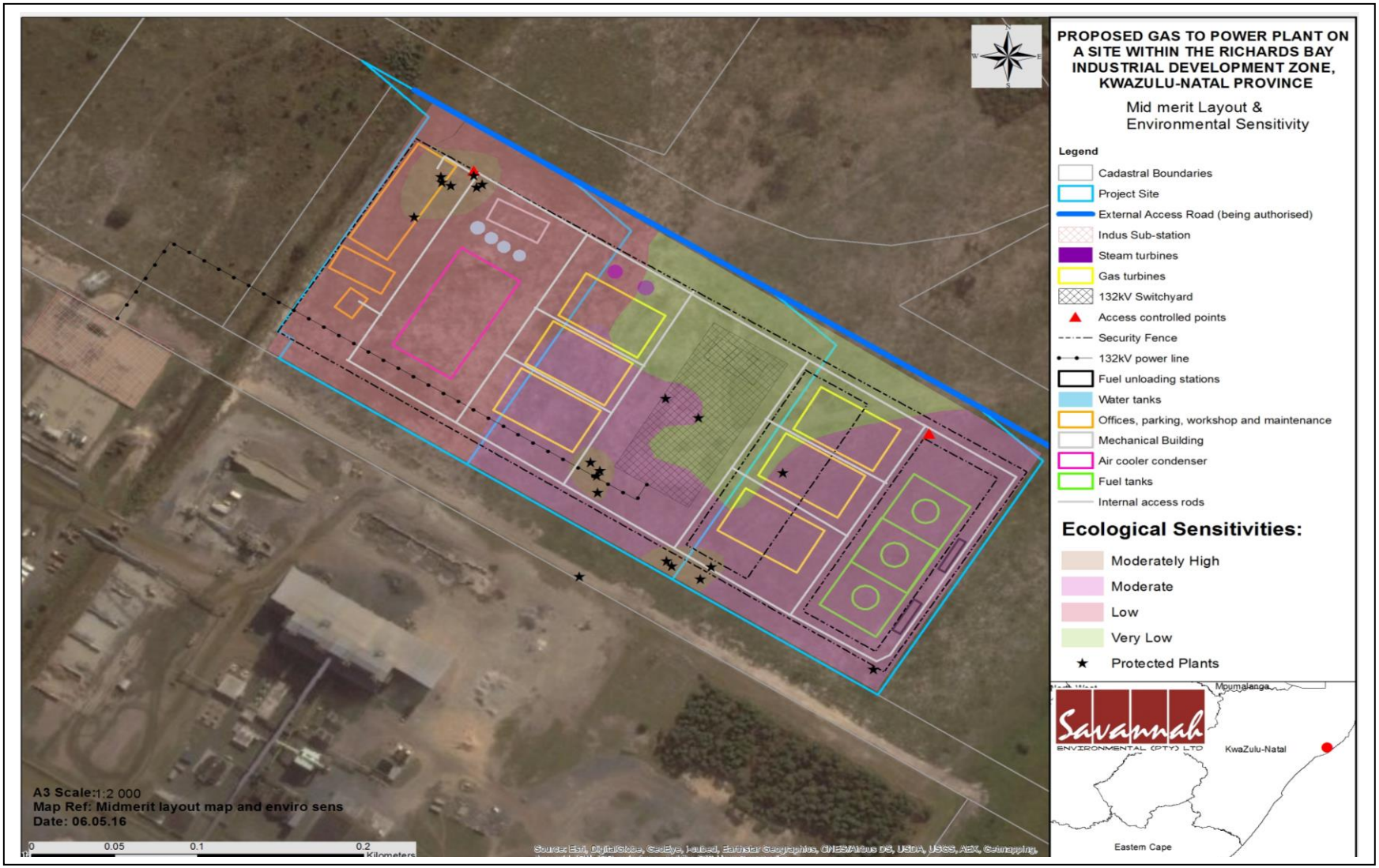

Figure 1.3: Environmental sensitivity map for the authorised layout illustrating the ecologically sensitive areas within the project site of the gas to power facility, as well as the protected plant species at mid-merit operational design.

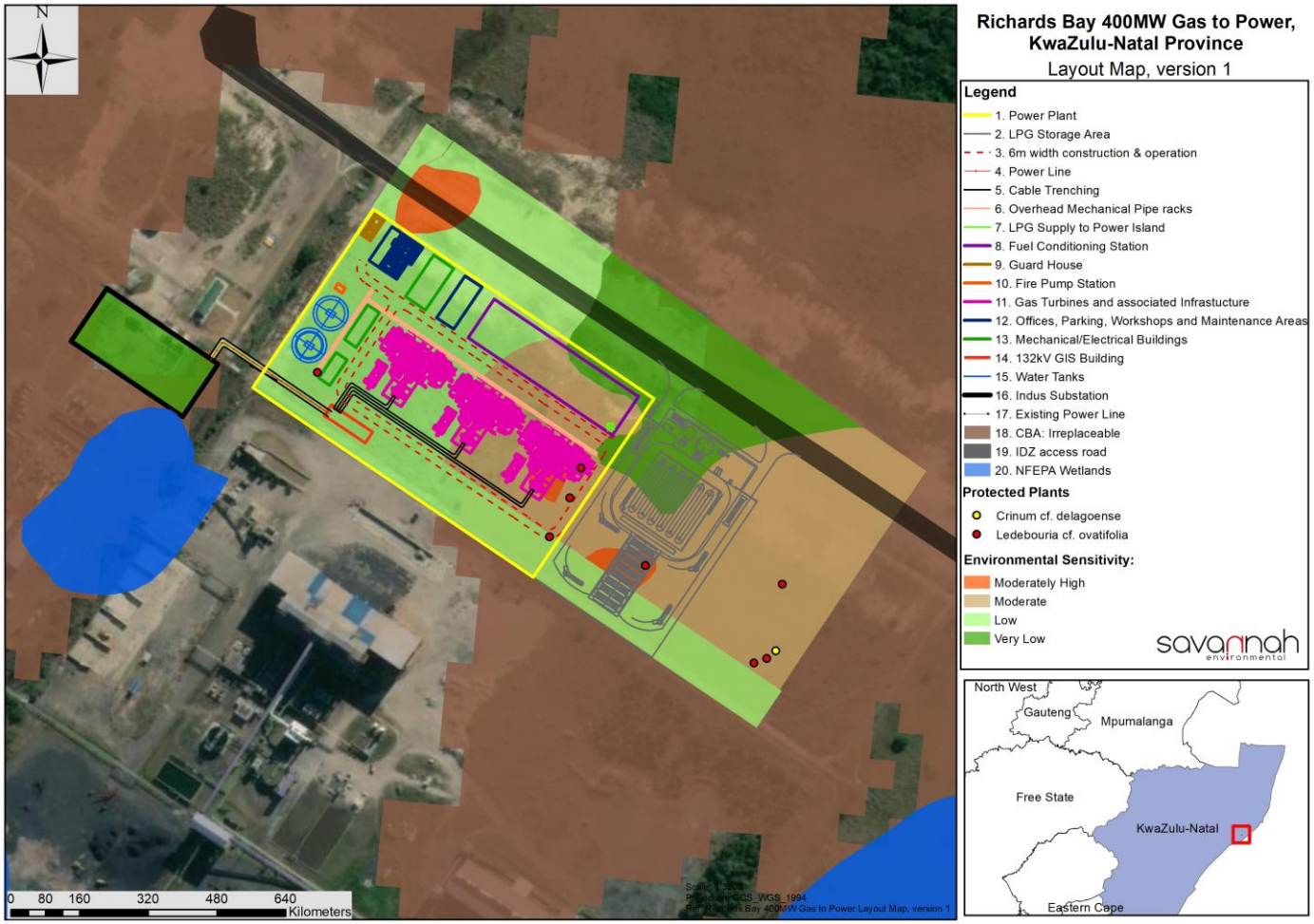

Figure 1.4: Updated Environmental Sensitivity and Layout Map for the project study area illustrating ecologically sensitive areas in relation to the gas to power plant as well as the location of protected plant species (Refer to **Appendix B** for A3 maps). The layout map has been updated in accordance with Condition 14 of the EA.

1.2. Activities Associated with the Gas to Power Plant

Table 1.2: Activities anticipated Associated with Planning, Construction, Operation and Decommissioning of the Facility

Main Activity/Project Component	Components of Activity	Details
	Planning	
Conduct surveys	» Risk Assessment by an Approved Inspection Authority which is competent to express an opinion as to the risks associated with the gas to power plant and provide an appropriate emergency response plan. » 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.	» Once the project has been granted authorisation, the Developer must follow the procedures as per the Major Hazardous Installation (MHI) Regulations contained in the Occupational Health and Safety Act to undertake a Risk Assessment, prior to the commencement of construction. The Risk Assessment should be carried out once the final design and volumes of fuels are confirmed as the Risk Assessment has to be based on the quantities and types of substances as prescribed in the General Machinery Regulations (8) and its Schedule A on notifiable substances. » 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 constructed 12m wide road from the RBIDZ Zone IF entrance off the Alumina Allee Street. » 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.	» 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
	» Site establishment of offices/ admin/ workshops with ablution facilities, parking, area for placement of gas turbines, water, 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

Main Activity/Project Component	Components of Activity	Details
		* Step 3: Selection of best-suited conductor, towers, 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 applicant, the project will employ up to 40 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.

Main Activity/Project Component	Components of Activity	Details
		» Each gas turbine in the facility will be operational, except 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 44 fuel trucks will deliver fuel on a daily basis if the power plant is to run at mid-merit (as a worst-case scenario). » Water volumes of between 1-1.2 million m^3 per annum is 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.

1.3. 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.

1.3.1. Impacts on Ecology

The development of the project will require the clearance of the entire development footprint (i.e. an area of 7.3ha). 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 as a result of 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 are expected to range 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 to 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 plant 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 relatively 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. The contribution of the project itself to this impact is expected to be limited as a result of the limited footprint (i.e. 7.3ha).

From an ecological perspective, it is concluded that the project is acceptable and can be implemented provided that recommended mitigation measures are implemented.

1.3.2. Impacts on Air Quality

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 phases 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 99th 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, it has been concluded that 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.

From an air quality perspective, it is concluded that the project is supported, provided that mitigation measures are implemented and adhered to.

1.3.3. Impacts on the Social Environment

Positive and negative social impacts have been identified to be associated with the construction and operation of the project. 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. These impacts can be reduced to acceptable levels with the implementation of the mitigation measures proposed.
- Employment opportunities will be created in the construction and operation phases. The impact is rated as positive even if only a small number of individuals benefit in this regard as a result of high levels of unemployment in the region.
- 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.

From a social perspective it is concluded that the project is supported, but that mitigation measures should be implemented and adhered to.

1.3.4. Overall Conclusion (Impact Statement)

The Integrated Resource Plan (IRP) 2010-2030 developed by the then 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 2010 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 Independent Power Producers (IPP) Office was established by the Department of Energy (DoE), the National Treasury and the Development Bank of Southern Africa (DBSA) to facilitate the involvement of IPPs in the generation of electricity. The IPP Office has to date successfully procured 6327MW independently produced renewable energy under the Renewable Energy

IPP Procurement Programme (REIPPP). In April 2015, the Minister of Energy released a Media Statement for the "Expansion and Acceleration of the Independent Power Producer Procurement Programme". In this release, the Minister placed a Ministerial Determination that a further 3126MW of new generation capacity, from gas, which represents the capacity allocated to "Gas CCGT (natural gas)" and "OCGT (diesel)", under the heading "New build", for the years 2019 to 2025, in Table 3 of the Integrated Resource Plan for Electricity 2010-2030, is needed to contribute towards future energy security. The IPP Office, together with Transnet, is working together to help expedite the 3126MW for Gas IPPs.

For the Gas IPP Procurement Programme, the DoE through the IPP Office has, in collaboration with Transnet, developed a two-phased approach. The first phase is to introduce Floating Power Plants in three of South Africa's commercial ports – Saldanha Bay, Ngqura and Richards Bay. The second phase is to facilitate the import of Liquefied Natural Gas (LNG) in the same three ports, to allow for the development of medium- to long-term gas power plants outside of the port boundaries. Following the Environmental Review Committee (ERC) Meeting held for the EIA process, it was established that the Floating Power Plant project has been halted indefinitely, although no formal statement was released by the DoE. In addition, there has also been uncertainty raised by IAPs at the ERC meeting regarding the LNG Import facility at the Richards Bay harbour. However, there is a very clear and strong indication of the establishment of a downstream Gas Economy. In this regard, the following is to be noted:

- At the South Africa Gas Options Conference held in Cape Town in September 2015, Transnet presented its plans for gas infrastructure in South Africa. This included marine berthing, storage and regasification in ports as well as pipeline transmission to gas distribution hubs at the Port of Richards Bay. Transnet's plans for gas infrastructure is linked to Operation Phakisa (which was implemented by the Presidency): Phased Gas Pipeline Network concepts.
- In the "Natural Gas Infrastructure Planning" document also released by Transnet in 2015, provision is made for the development of Gas Infrastructure in KwaZulu-Natal (Port of Richards Bay). The following citation has been extracted from the document: *"KwaZulu-Natal has an existing gas supply via Transnet's Lilly pipeline. This pipeline transports methane-rich gas from Secunda in Mpumalanga via Richards Bay to Durban. An additional gas source is proposed via an LNG terminal in the Port of Richards Bay and this could also feed imported gas into the Lilly pipeline network. In addition, there could be a new gas network supplying alternative gas markets. Potential gas markets in KwaZulu-Natal include a proposed IPP CCGT power station, Avon OCGT power station (currently under construction), new customers in the Richards Bay IDZ and existing and new markets in KZN. Inland gas demand could potentially rise to the extent that the gas flow in the Lilly pipeline is reversed and gas is sent from the Richards Bay inland."*
- The State of the Province Address, delivered by the Honourable Premier of Kwazulu-Natal, in February 2016 notes that the RBIDZ is being used to pioneer an energy production hub and that currently 20 hectares of land has been allocated for gas-to-power operations in an effort to yield diversified energy generation capacity. This is reiterated in the Budget Policy Speech 2016/2017, delivered by the MEC of the Department of Economic Development, Tourism and Environmental Affairs.
- In May 2016, the DoE released an Expression of Interest (EOI) to determine the private sector's interest in seeking appointment as a Strategic Partner to one or more State-Owned Company/ies to implement projects for new generation capacity which is

needed to contribute towards energy security in the amount of 600MW and is to be generated from Gas (which includes Liquefied Natural Gas or natural Gas delivered by pipeline from a natural Gas field). In addition, the EOI noted that the Department is currently preparing procurement documentation for the LNG to Power IPP Procurement Programme in support of the Government's policies and plans to introduce gas and diversifying the country's energy mix. One of the key objectives of such programme is to stimulate the introduction of a portfolio of gas supply options in the short term, including from imported gas sources, so as to facilitate and enable the development of indigenous gas resources in the longer term.

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[2]. 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 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 cut 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

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

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[3].

In response to the initiatives detailed above by various Government Departments, Richards Bay Gas Power 2 (Pty) Ltd is proposing the construction of a gas to power plant.

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 proposed gas to power plant 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 specialist studies are proposed:

- Once the project has been granted authorisation, the Developer must follow the procedures as per the Major Hazardous Installation (MHI) Regulations (GN R692) contained in the Occupational Health and Safety Act (Act No. 85 of 1993) to undertake a Risk Assessment, prior to the commencement of construction, as there will be storage of diesel and LPG for Phase 1 of the development. The Risk Assessment should be carried out once the final design and volumes of fuels are confirmed as the Risk Assessment has to be based on the quantities and types of substances as prescribed in the General Machinery Regulations (8) and its Schedule A on notifiable substances. The Risk Assessment must be carried out in a manner where there is collecting, organising, analysing, interpreting, communicating and implementing of information in order to identify the probable frequency, magnitude and nature of any major incident which could occur at an MHI, and the measures required to remove, reduce or control the potential causes of such an incident. The Risk Assessment must be carried out by an Approved Inspection Authority which is competent to express an opinion as to the risks associated with the gas to power plant and provide an appropriate emergency response plan. The minimum information that must be included in the Risk Assessment is detailed in sub-regulation 5(b) of the MHI Regulations (GN R692). The Risk Assessment must be submitted to the Chief Inspector, relevant local government and provincial director.
- Following the finalisation of the design of the facility, which is dependent on the DoE IPP Programme requirements, as well as those of Eskom, a revised layout must be submitted to DEA for review and approval prior to commencing with construction.

[3] White Paper on Energy Policy, 1998

- An independent Environmental Control Officer (ECO) should be appointed to monitor compliance with the specifications of the EMPr for the duration of the construction period.
- All mitigation measures detailed within the EIA Report and the specialist reports contained within **Appendices F-H** of the EIA Report are to be implemented.
- This Environmental Management Programme (EMPr) should form part of the contract with the Contractors appointed to construct and maintain the proposed gas to power plant, and will 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 key in achieving the appropriate environmental management standards as detailed for this project.
- 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 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 C**).
- 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 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.

- 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.
- 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.
- Utilise the John Ross Pkway for transportation of diesel during Phase 1.
- 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.
- The Developer should consider NO_X mitigation strategies, as proposed in the Air Quality Assessment, at the proposed gas to power plant, as 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.
- The Developer should consider utilising diesel with decreased sulphur content as this will further reduce SO_2 emissions. 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, as provided in this EMPr, to reduce and avoid negative impacts.
- It is important that the mitigation measures relating to traffic impacts (daily living and movement patterns) as detailed within the SIA (refer to **Appendix F** of the EIA Report) are implemented to reduce the negative impacts.
- Obtain all other environmental permits for the project, as required.

1.4. Findings of the EA Amendment process (2020)

1.4.1. Impacts on air quality

The proposed facility amendments will influence operational atmospheric emissions through the: choice of fuel (LPG instead of diesel) and the quantity of fuel used to generate 400 MW via a simple cycle gas turbine; as well as, the storage of fuel (LPG pressure vessels compared with fixed-roof diesel tanks).

For comparative purposes, atmospheric emissions from the various plant options considered were provided by the turbine manufacturer's (PWPS) assuming the selected turbines ran on liquid fuel (diesel), LPG or natural gas. The emission rates for the of criteria atmospheric pollutants from the amended plant are likely to be lower for SO_2, NO_X, PM and VOCs than the original plant design even though the fuelled generative capacity will be higher than the originally authorised capacity. The impact of the amended plant on ambient air quality is therefore likely to be similar to or lower than originally assessed by uMoya-NILU. Please note this also applies to cumulative impacts assessed in the EIA.

On-site storage of LPG will be bullet-style pressure vessels that will be mounded in sand bed foundations. The pressure vessels are required to keep the LPG in a liquified state. If properly maintained, fugitive losses from the LPG loading and storage are only likely to take place during unloading events from the transport tankers, where losses are expected to be negligible if adequately controlled. Fugitive losses from diesel tanks include working loses (loading / unloading) as well as breathing losses from safety release vents. Although, the on-site storage capacity be the similar (6 000 m³ diesel vs 6 000 m³ LPG), the conditions of storage will result in emission rates that will be similar to or lower than the original plant design assessed.

The results of the air quality study indicate that the proposed changes are likely to have a zero or negligible effect on the significance of impacts identified in the EIA report. Therefore, impact ratings as identified within the EIA apply to the proposed amendment scenario.

It is concluded that the amended fuel source of the plant will present lower annual emissions of atmospheric pollutants such as SO_2, NO_X, PM and VOCs although there will be an increase in the generation capacity of the plant compared to the originally assessed layout. As a result, air quality impacts of the facility due to the change in the fuel source (diesel) are likely to be marginally lower than previously assessed in the uMoya-NILU specialist study, and this project is therefore supported from an air quality perspective, provided the recommended mitigation measures are implemented and adhered to.

While no increase in the significance rating or nature of air quality impacts are due to the proposed amendments, additional mitigation measures have been requested by the specialist to ensure ongoing best practice. These are detailed in Section 6.3 of this EMPr.

1.4.2. Impacts on ecology

The findings of the Ecology Specialist Letter indicates that although there will be a slight change to the operational process and/or design of the Richards Bay Gas to Power Energy Plant, this change will not have an effect on the significance or nature of the impacts assessed during the EIA process, primarily due to the following:

- The principle amendment involves the correct specification of fuel sources, fuel storage at the site and the configuration of the power station (combined cycle to simple cycle process) and this has no measurable influence on the development footprint originally assessed in 2016, with no deviations from the development property boundary initially assessed.
- Since the development footprint will remain unchanged, direct and indirect construction impacts described in terms of: loss of indigenous vegetation, habitat fragmentation, soil erosion/sedimentation, pollution of soils/habitat, faunal impacts, and noise/light disturbance impacts will not change as the impact assessment conservatively considered the 'worst-case' possible scenario – being that the entire property will be transformed in some way, shape or form.
- Given that the baseline and impact assessment chapters of the ecological report will remain unchanged, impact mitigation and management recommendations (and inputs into the EMPr from an ecological perspective) still apply and remain unchanged under the amended process design scenario, as the recommendations address mainly the mitigation of impacts to flora and fauna associated with the physical footprint of the development and site transformation/disturbance.
- With construction, operational and decommissioning impacts remaining unchanged under the amended design scenario, cumulative impacts will also remain unchanged as these are mainly associated with the direct loss of vegetation and habitat and the impact on conservation targets, ecosystem services and species of conservation importance, all which can be attributed to the physical footprint of the development.

Due to the footprint of the plant remaining the same, the impacts anticipated for the project from an ecological perspective will remain unchanged and ecology-related mitigation measures included in the EMPr remain enforceable for the project phases. As a result, the specialist concluded that the proposed amendments of the Richards Bay Gas to Power Energy Plant will not alter the findings of the Terrestrial Ecological Impact Assessment undertaken by Eco-Pulse in 2016. No additional mitigation measures were provided for in the ecological impact statement considering no change to the nature or significance found for any of the ecological impacts associated with the development.

1.4.3. Social impacts

Following a careful assessment of the impact of the proposed changes to the project infrastructure and scope, it can be concluded that no changes to the significance ratings of socio-economic impacts are expected during construction and operation phases. The same applies to the cumulative impacts predicted and assessed originally in the study of May 2016.

The impacts associated with the baseload option and impact on employment during the decommissioning phase, assessed in the original study, will no longer be applicable.

Enhancement measures proposed in the original study for similar impacts during the construction phase will also be applicable to the same impacts during decommissioning.

Overall, considering the current knowledge, it can be reasonably concluded that from the socio-economic perspective the project in its revised scope should be approved for the development. No mitigation measures in addition to those proposed in the original study are recommended. The mitigation measures to enhance positive impacts and to mitigate negative effects that have been proposed in the study of May 2016 will remain applicable to the project.

1.5. Findings of the Atmospheric Emissions Licence process (2020)

1.5.1. Impacts on air quality

Airshed Planning Professionals (Pty) Ltd (Airshed) was appointed by Savannah Environmental (Pty) Ltd (Savannah) to an Atmospheric Impact Report (AIR) for a 400 MW gas-to-power plant near Richards Bay, KwaZulu-Natal. The AIR will be used in support of the application for an Atmospheric Emissions License (AEL) and includes a Climate Change Impact study. The plant will use imported liquified petroleum gas (LPG) delivered to site by tanker truck for power generation. The LPG will be stored in on-site pressure vessels. The plant will include gas turbines, exhaust stacks, water demineralisation plant, LPG storage, ancillary infrastructure including a stand-by diesel generator to enable black start-ups, offices and other buildings. The plant design will allow for a change of fuel from LPG to LNG when a supply via pipeline is available in Richards Bay with a possibility of similar or lower combustion emissions and air quality impact.

Baseline air quality in Richards Bay, for the period 2016 to 2019, was assessed for thoracic particulates (with a diameter less than 10 µm), sulfur dioxide (SO_2) and nitrogen dioxide (NO_2) at the monitoring stations managed by the City of uMhlathuze and the Richards Bay Clean Air Association (RBCAA). Non-compliance with daily SO_2 NAAQS was noted at Harbour West in 2018. Daily PM_{10} was non-compliant with the applicable NAAQS the RBCAA Brackenham station in 2018 while daily PM_{10} and $PM_{2.5}$ were non-compliant at the City of uMhlathuze eSikhaleni station in 2019. Hourly and annual compliance with NAAQS is noted at all stations for all pollutants assessed across the period assessed.

The impact of the project on ambient air quality was simulated using the United States Environmental Protection Agency (US EPA) CALPUFF modelling suite. Simulated meteorological data for the Richards Bay area was acquired for the period 2017 to 2019. The wind field showed generally north to north-easterly co-dominance with south and south-westerly component. The assessment of the impact of the project assumed that emissions from the power station would primarily be vented to the atmosphere via the exhaust stacks where the emissions would meet the minimum emission standards (MES) for Subcategory 1.4 – Gas Combustion facilities. Simulated pollutant concentrations were compared against the NAAQS, international human health-effect screening levels and various environmental screening levels for ecosystem impacts. Simulated nuisance dust-fall rates were compared against the National Dust Control Regulations (NDCR) for non-residential and residential areas.

The main findings of the simulated incremental assessment were:

1. Compliance with hourly, daily and annual NAAQS under normal operations for hourly, daily and annual average pollutant concentrations as applicable to SO_2, NO_2, particulate matter, (PM_{10} and $PM_{2.5}$), and carbon monoxide (CO).
2. It is unlikely that gas combustion will result in SO_2 emissions at the emission standard and therefore the facilities impact on SO_2 was also assessed using mass balance calculations for LPG boilers using actual sulfur content of the fuel (0.014%)
    a. Compliance the NAAQS was simulated for hourly, daily and annual average SO_2.
3. The impact of the facility was simulated to be below the NDCR and VOC health-effect screening levels.
4. Annual SO_2 concentrations may impact cyanobacterial lichen via various measures of productivity and reproductive success up to 500 m from site (using the United Nations Economic Commission for Europe (UNECE) Convention on Long Range Trans-boundary Air Pollution Limits). Annual NO_2 concentrations could affect all vegetation via various measures of productivity and reproductive success up to 100 m from the site boundary.
5. Annual greenhouse gas (GHG) emissions for the operational phases of the plant were estimated to represent 0.36% of the published South African National 2015 GHG Inventory, contributing to the Energy sector. A "medium" rating was determined for the GHG emissions associated with the project.

The main findings of the cumulative assessment were:
1. Cumulative annual SO_2 and NO_2 concentrations are likely to be compliant with the applicable NAAQS across the domain.
2. Cumulative PM_{10} concentrations may have result in exceedances at Harbour West and Scorpio due to the elevated simulated baseline for that area. However, the contribution from the power plant is minimal and acceptable.

Mitigation measures related to air quality and climate change were provided for inclusion into the EMPr – refer Section 4.2, objective 4 and Section 6, objective 14.

1.6. Applicable Legislation and Guidelines

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

2. PURPOSE & OBJECTIVES OF THE EMPR

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"[4]. 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.
- 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.

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

- 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, 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 (June 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).

2.1. EMPr Update

This EMPr update is being undertaken in accordance with the requirements of Condition 16 and 17 of the EA dated, 4 October 2016. The EMPr Plans (**Appendix C – L**) included in the EMPr should be adhered to as they form part of this EMPr. **Table 2.1** below indicates how the conditions of the EA have been addressed in this EMPr update:

Table 2.1: EA Conditions which required the EMPr amendment

EA Condition Reference	Section of EMPr where Condition has been addressed
The EMPR amendment must include the following:	
17.1. The requirements and conditions of this authorisation.	Section 4.2 and Objective 1: *To ensure that the design of the power plant responds to identified environmental constraints*
17.2 All recommendations and mitigation measures recorded in the EIAr.	All recommendations and mitigation measures of the EIAr and the specialist reports have been included in Chapters 4, 5 and 6 of the EMPr. Where amendments and/or additions have been made, these have been underlined for an ease of reference.
17.3 All mitigation measures as listed in the specialist reports must be included in the EMPr and implemented.	All mitigation measures listed in the specialist reports have been included in Chapters 4, 5 and 6 of the EMPr. Where amendments and/or additions have been made, these have been underlined for an ease of reference.
17.4 An indication of the expected operational period for the approved Phase 1 Mid-merit/peaking plant.	Chapter 1 of the EMPr includes a project description of the Richards Bay Gas to Power Energy Facility, which also states that the facility will be operational for a period of up to 20 years.
17.5. A decommissioning plan and schedule for the Phase 1 Mid-merit/peaking plant.	A Decommissioning Plan and Schedule for the Phase 1 Mid-merit/peaking plant is included as **Appendix K** of the EMPr.
17.6. The final site layout map	The updated and final site layout map for the facility is included in **Appendix B** of the EMPr and included as **Figure 1.3**.
17.7. A risk management plan based on a risk assessment, specifically for the Phase 1 Mid-merit/peaking plant	The Risk Management Plan based on a risk assessment, specifically for the Phase 1 Mid-merit/peaking plant is included as **Appendix L** of the EMPr.
17.8. An alien invasive management plan to be implemented during the construction and operation of the facility. The plan must include mitigation measures to reduce the invasion of alien species and ensure that the continuous monitoring and removal of alien species is undertaken.	An Alien Invasive (inclusive of an Open Space Management Plan) has been included as **Appendix I** of the EMPr. The plan includes mitigation measures to be implemented to reduce the invasion of alien plant species within the project footprint and the surrounding area.
17.9. A plant rescue and protection which allows for the maximum transplant of conservation	The project has not reached the construction phase as yet, however a walk-through survey of

EA Condition Reference	**Section of EMPr where Condition has been addressed**
important species from areas to be transformed. This plan must be compiled by a vegetation specialist familiar with the site in consultation with the ECO and be implemented prior to the commencement of the construction phase.	the proposed development footprint of the facility has been undertaken by Ecological Specialist, C.I. Cook (*Pr.Sc.Nat*. 400084/08) on 24 June 2020. The Plant and Rescue Protection Plan has been appended to the EMPr as **Appendix C** of the EMPr.
17.10. A re-vegetation and habitat rehabilitation plan to be implemented during the construction and operation of the facility. Restoration must be undertaken as soon as possible after completion of construction activities to reduce the amount of habitat converted at any one time and to speed up the recovery to natural habitats.	A Re-Vegetation and Rehabilitation Plan has been included in the EMPr as **Appendix D**.
17.11. A traffic management plan for the site access roads to ensure that no hazards would result from the increase truck traffic flow would not be adversely impacted. This plan must include measures to minimize impacts on local commuters, e.g. limiting construction vehicles travelling on public roadways during the morning and late afternoon commute time and avoid using roads through densely populated built-up areas as not to disturb existing retail and commercial operations.	A Traffic Management Plan for the Richards Bay Gas Power Energy Facility has been included in the EMPr as **Appendix E.**
17.12. A stormwater management plan to be implemented during the construction and operation of the facility. The plan must ensure compliance with applicable regulations and prevent off-site migration of contaminated stormwater or increased soil erosion. The plan must include the construction of appropriate design measures that allow surface and subsurface movement of water along drainage lines so as not to impede natural surface and subsurface flows. Drainage measures must promote the dissipation of stormwater run-off.	A Stormwater Management Plan and the Richards Bay Industrial Development Preliminary Design Report have been developed for the facility and have been included in the EMPr as **Appendix F1 – F3**. A more detailed Stormwater Management Plan will be developed when the final civil design drawings for the proposed facility are finalized and prior to the commencement of the construction phase.
17.13. An erosion management plan for monitoring and rehabilitation erosion events associated with the facility. Appropriate erosion mitigation must form part of this plan to prevent and reduce the risk of any potential erosion.	An Erosion Management Plan has been included as **Appendix G** of the EMPr.
17.14. An effective monitoring system to detect any leakage or spillage of all hazardous substances during their transportation, handling, use and storage. This must include precautionary measures to limit to the possibility of oil and other toxic liquids from entering the soil or storm water systems.	An Emergency Preparedness and Responses Plan has been included in the EMPr as **Appendix J.**

EA Condition Reference	**Section of EMPr where Condition has been addressed**
17.15. A fire management plan to be implemented during the construction and operational phase.	An Emergency Preparedness and Responses Plan has been included in the EMPr as **Appendix J.** The Plan includes mitigation measures to mitigate against possible fires during the construction and operation phases of the facility.
17.16. Measures to protect hydrological features such as streams, rivers, pans, wetlands, dams and their catchments, and other environmental sensitive areas from construction impacts including the direct or indirect spillage of pollutants.	The Stormwater Management Plan (**Appendix F1**), the Stormwater Disposal Plan (**Appendix F2**), and the Richards Bay Industrial Development Zone Preliminary Design Report (**Appendix F3**) include measures that protect hydrological features within the development area of the facility and the surrounding area.
7.17. An environmental sensitivity map indicating environmental sensitive areas and features identified during the EIA process.	Environmental sensitivity maps of the gas to power facility have been included as **Figures 1.2, 1.3** and **1.4** and as **Appendix B**.
7.18. A map combining the final layout map superimposed (overlain) on the environmental sensitivity map. This map must reflect the proposed location of the facility as stated in the EIAr and this authorisation.	A map combining the final layout of the gas to power facility and superimposing the environmental sensitivities within the project site, as well as reflecting the proposed location of the gas to power facility has been included in the EMPr as **Figure 1.4** and in **Appendix B**.

Furthermore, this EMPr forms part of an EA amendment application (Part II) for the project and includes additional mitigation measures as required by the specialist team identified specifically for the amendment (2020). The amendments being applied for are indicated below:

1. A validity extension of the EA by five (5) years.
2. An update to the capacity and configuration of the power plant in the EA project description from: '300MW (fuelled) and 100MW (steam) in a combined cycle' to: 'a 400MW (fuelled) simple cycle process'.
3. The removal of various infrastructure which would become redundant with the use of a simple cycle process mentioned in the project description of the EA, which relate to a combine cycle (no longer applicable if amendment 2 is approved).
4. To include in the project description of the EA the use of Liquified Natural Gas (LNG), Liquified Petroleum Gas (LPG), Regasified Liquefied Natural Gas (RLNG) or pipeline gas as the fuel source (as assessed for the approved EA) for the project in addition to the specification of LNG (in various forms) in future (also as approved in the EA).
5. The removal of diesel as a fuel source from the project description of the EA.
6. Update of the fuel storage capacity.
7. A replacement of all references to the wording, 'mid-merit' in the EA to correctly reflect 'Mid-Merit/Peaking, to ensure that both peaking and mid-merit options/scenarios have been considered for the development.
8. A correction on the EA to specify Activity 2 of Listing Notice 2 in the EA.
9. Amendment to conditions 14,15,16 and 17 of the approved EA to specify that the layout submitted and EMPr submitted have been approved.

As required in terms of Regulation 32(1)(a)(iii) of the EIA Regulations, 2014 (as amended), consideration was given to the requirement for additional measures to ensure avoidance, management and mitigation of impacts associated with the proposed change in the project details. From the specialist inputs provided into the amendment motivation, additional mitigation measures have been recommended. These additional mitigation measures have been shown in underlined text in this EMPr, to illustrate which measures are novel inclusions and relate to the 2020 amendment.

The EMPr is a dynamic document, which must be updated when required in line with the relevant legislation at the time. 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.

3. STRUCTURE OF THIS EMPR

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; » Closed Fin-fan coolers. » Water Injection. » 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); » Control centre, 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 EMPr
Plant Rescue and Protection Plan	Appendix C
Revegetation and Rehabilitation Plan	Appendix D
Traffic Management Plan	Appendix E
Storm Water Management Plan (including Stormwater Disposal Plan and RBDIZ Preliminary Design Report)	Appendix F1 – F3
Erosion Management Plan	Appendix G
Grievance Mechanism for Public Complaints	Appendix H
Alien Invasive and Open Space Management Plan	Appendix I
Emergency Preparedness and Response Plan	Appendix J
Decommissioning Plan & Schedule	Appendix K
Risk Management Plan	Appendix L
Chance Find Procedure	Appendix M

3.1 Project Team

This EMPr was compiled by:

EMPr Compilers	
Dilona Somai (2016)	Savannah Environmental
Jo-Anne Thomas (2016 & 2020)	Savannah Environmental
Gideon Raath (2020)	Savannah Environmental
Reuben Maroga (2020)	Savannah Environmental
Input from Specialists	
Ecology	Adam Teixeira-Leite of Eco-Pulse (2016) Clayton Cook (2020)
Air Quality	Mark Zunckel and Atham Raghunandan of uMoya-Nilu (2016) Terri Bird of Airshed (2020)
Social	Candice Hunter of Savannah Environmental (with external review by Neville Bews) (2016)

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.

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

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; » Closed Fin-fan coolers. » Water Injection. » 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.	Developer	Prior to construction
A Stormwater Control Method Statement and design approved by the IDZ or municipality (as appropriate) must be developed prior to commencing with construction and must supplement the Stormwater Management Plan attached to this EMPr (refer **Appendix F1-3**). This method statement and plan must ensure compliance with applicable regulations and prevent off-site migration of contaminated storm water or increased soil erosion, and illustrate the proposed stormwater control measures as prepared by the Civil Engineers and should be based on the underlying principles of the Stormwater Management Plan as well as any surface water flow modelling studies or geotechnical studies conducted. The plan should address both construction and operational phase activities.	Proponent and contractors	Prior to construction
The conditions of the Environmental Authorisation (EA) and any amendments thereto are legally binding.	Proponent	Duration of project
The EMPr Plans (**Appendix C – L**) included in the EMPr form part of the EMPr and are legally binding.	Proponent	Duration of project
Permits are required to possess, transport, or propagate plant species listed as protected under National or Provincial legislation. The permit for removal of Threatened or Protected Species (TOPS) as defined in the NEM:BA (Act No. 10 of 2004) must be obtained from the permit office of Ezemvelo KZN Wildlife (KZN).	Proponent	Planning and Design
No permit is required from the Department of Environment, Forestry and Fisheries (DEFF) for the removal of tree species listed under the National Forest Act (Act No. 84 of 1998) as no nationally	Proponent	Planning and Design

Mitigation: Action/control	Responsibility	Timeframe
protected tree species occur within the project site of the gas to power facility.		
All Threatened or Protected Species (TOPS) that are located within the footprint of the gas to power facility, as identified by an Ecologist/Botanist must be rescued.	Proponent Ecologist/Botanist	Planning and Design
The plant rescue operation must be undertaken by an Ecologist/Botanist to remove plant species prior to the clearance of vegetation on site. Translocation of the plants must ideally occur during one of the cooler months in order to promote survival, with the optimal period at the site likely be late August to early September (after the first spring rains). This will give the translocated plants sufficient time to establish and recover before the hot summer season (November – March). If the plants are removed during the wet summer months (October – March), it is important that they are watered on a weekly basis to avoid desiccation.	Proponent Ecologist/Botanist	Design and Planning
No translocation to adjacent natural areas must take place. The removed plants must be translocated within the lower lying seasonally inundated seepage wetland's buffer zone or alternatively, along the outer edges of the artificial stormwater trench on the north-western boundary.	Ecologist/Botanist	Design and Planning
Appoint an experienced ecologist or botanist to undertake the rescue operation, manage the rescued plant material (*Ledebouria cf. ovatifolia* and *Crinum cf delagoense*) and relocate in suitable habitat adjacent to the conserved seasonal seepage wetland and grassland buffer zone. For all plants that are rescued, relevant information must be collected, as is determined by the ecologist as being adequate for reporting and monitoring. This information could include the number of individuals/clumps and date collected; photographs of plants removed as well as the GPS locality of the relocated plants.	Proponent Ecologist/Botanist	Prior to construction
Translocation of plant species must occur during one of the cooler months in order to promote survival, with the optimal record period at the site likely to be late August to early September (after the first spring rains). This will give the translocated plants sufficient time to establish and recover before the hot summer season (November – March).	Proponent Ecologist/Botanist	Prior to construction
No translocation to adjacent natural areas must take place. The removed plants should be translocated within the lower-lying seasonally inundated seepage wetland's grassland buffer	Proponent Ecologist/Botanist	Prior to construction

Mitigation: Action/control	Responsibility	Timeframe
zone or alternatively along the outer edges of the artificial stormwater trench on the north-western boundary.		
All Threatened or Protected Species (TOPS) that can be located within the footprint of the development zone, as identified by an ecologist/botanist must be rescued. This includes the single *Crinum cf. delagoense* and *Ledebouria cf. ovatifolia.*	Ecologist/Botanist	Prior to construction
The collection of plants by unauthorised persons should be prevented.	EO	Duration of contract
The EO or suitably authorised representative should monitor that vegetation clearing only happens once the search and rescue operation has been completed.	EO Suitably authorised representative	Duration of construction
The EO or suitably authorised representative should monitor construction activities in sensitive habitats (wetlands and buffer zones) to ensure that impacts within these areas are kept to a minimum.	EO Suitably authorised representative	Duration of construction
Plan and conduct pre-construction activities (all surveys) in an environmentally acceptable manner.	Proponent and specialists	Prior to construction
Demarcate areas identified as harbouring protected plants using suitable measures (such as fencing these areas or using perimeter stakes with high visibility/barrier tape for example).	Proponent	Prior to construction
Accessing the site during site initial planning/surveys walk-throughs by foot only (limiting vehicle access to the southern fence line and firebreak associated with the adjacent Tata steel factory) and being careful not to disturb/damage protected plants by avoiding areas with high densities of protected plants.	Proponent	Prior to construction
The Project Proponent must appoint an Approved Inspection Authority, who is competent to express an opinion as to the risks associated with the gas to power plan, to undertake a Risk Assessment prior to commencement of construction, as there will be storage of LPG, LNG and RLNG for the development. The Risk Assessment should be carried out once the final design and volumes of fuels are confirmed as the Risk Assessment has to be based on the quantities and types of substances as prescribed in the General Machinery Regulations (8) and its Schedule A on notifiable substances. The minimum information that must be included in the Risk Assessment is detailed in sub-regulation 5(b) of the MHI Regulations (GN R692), and includes: » A general process description of the MHI;	Proponent and Approved Inspection Authority	Prior to construction

Mitigation: Action/control	Responsibility	Timeframe
» A description of the major incidents associated with that type of installation and the consequences of such incidents, which shall include potential incidents; » An estimation of the probability of a major incident; » A copy of the site emergency plan; » An estimation of the total result in the case of an explosion or fire; » In the case of toxic release, an estimation of concentration effects of such release; » The potential effect of an incident on an MHI or part thereof on an adjacent MHI or part thereof; » The potential effect of a major incident on any other installation, member of the public and residential areas; » Meteorological tendencies; » The suitability of existing emergency procedures for the risks identified; » Any requirements laid down in terms of the Environmental Conservation Act, 1989; and » Any organisational measures that may be required. The Risk Assessment must be submitted to the Chief Inspector, relevant local government, and provincial director.		
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 / EPC Contractor(s)	Tender Design and Design Review Stage
Obtain abnormal load permits for transportation of project components to site (if required).	EPC Contractor(s)/ Transport Contractor	Prior to construction
Plan the facility to be equipped with fire detectors, alarm systems, and fire-fighting equipment. These 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	Design and planning.
The Proponent should consider closed circuit dry cooling systems (e.g. air-cooled condensers) to	Proponent and Design Engineer	Design and planning

Mitigation: Action/control	Responsibility	Timeframe
capture condensation and reuse this water in the operational processes of the gas to power plant.		
Project design to include measures for adequate water collection, spill control and leakage control system.	Proponent and Design Engineer	Design and planning
The Proponent should consider the use of treated wastewater within the power generation process to be included in project design processes.	Proponent and Design Engineer	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) as water-saving strategies.	Proponent and Design Engineer	Design and planning
Design considerations for electrical hazards: » Consider installation of hazard warning lights inside electrical equipment enclosures to warn of inadvertent energisation 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 (e.g. every 6 months or annually).	Proponent and Design Engineer	Design and planning, duration of contract
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/Design Engineer O&M Operator	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 and Design Engineer	Design and planning
Design considerations for fuel storage:	Proponent and Design Engineer	Design and planning

Mitigation: Action/control	Responsibility	Timeframe
» 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 of generators to adhere to applicable noise occupational levels.	Proponent Design Engineer	Design and planning

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. » All species of conservation concern identified or removed prior to vegetation clearance.
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 Proponent, Project Manager, ECO, EPC Contractor, and the Environmental Officer (EO) prior to the commencement of construction. » Written and photographic records from all search and rescue operations. » Survival rate of translocated plants. » Post relocation monitoring of plants relocated during the search and rescue to evaluated whether the intervention was successful or not. This must be undertaken on a three-monthly basis over a period of one year from the date of transplanting in order to evaluate the success thereof. » Provision of a detailed record, including photographs, that indicates the success of the plant rescue operation.

OBJECTIVE 2: To ensure effective communication mechanisms

On-going communication with the landowner (Richards Bay Industrial Development Zone) and affected / surrounding industries 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; » Closed Fin-fan coolers. » Water Injection. » 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 the landowner (Richards Bay Industrial Development Zone) and affected / surrounding industries 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 the landowner (Richards Bay Industrial Development Zone) and affected / surrounding industries » 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 EPC 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 EPC 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 EPC Contractor(s)	Pre-construction
An incident reporting system must be developed and used to record non-conformances to the EMPr.	EPC 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 design and 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 for inputs prior to the commencement of construction. This Method Statement must be approved by the Site Manager/ Site Engineer prior to implementation.	Proponent/ EPC Contractor	Pre-construction
Reduce the potential increase in surface flow velocities and the resultant impact on the localised drainage system through increased sedimentation.	Design engineer and 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	Design engineer and Proponent	Planning and design

Mitigation: Action/control	Responsibility	Timeframe
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 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.	Design 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.	Design 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.	Design 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. simple 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
Obtain an Air Emissions License (AEL) prior to construction of the facility. The conditions of the AEL and any updates thereto are legally binding and must be complied with. All specific made by the Air Emissions License (AEL) authority must be included into the EMPr.	Proponent	Planning and Design
A Leak Detection and Repair (LDAR) Programme for fuel storage must be developed and implemented prior to and during the construction phase and be implemented during both the construction and operation phase of the facility.	Proponent	Planning and Design
Reduce fuel usage in delivery vehicles through the use of a pipeline for LPG (or NG) delivery to site, where feasible.	Proponent	Planning and Design
Local sources of LPG or NG would reduce the Scope 3 emissions especially if delivered to site by pipeline.	Proponent	Planning and Design
Investigation of offset projects in the local community must be undertaken.	Proponent	Planning and Design
Ensure air emissions comply with minimum emissions standards as applicable at the time of construction and throughout operation	Proponent	Entire project life cycle
The proponent must select the best power generation technology to balance the environmental and economic benefits. Some examples include the use of higher energy-efficient systems such as simple cycle gas turbine system for LNG and NG. Please note,	Proponent	Pre-construction (planning and design / final technology choice)

Mitigation: Action/control	Responsibility	Timeframe
this action has already been completed by selection of technology.		
The developer must consider the use of the cleanest gas/fuel economically available (natural gas is preferable to oil, which is preferable to coal). In this case, LPG and LNG/NG would be preferred over LFO and HFO in Phase 1. The developer should switch over to LNG/NG as soon as possible once this fuel is available. Please note, this action has already been completed by selection of fuel.	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 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.	Proponent and Design Engineer	Pre-construction (planning and design)
Sulphur Dioxide: » Consider the use of fuels with a lower content of sulphur where economically feasible. Please note, this action has already been completed by selection of fuel.	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.	Proponent	Planning and design

Mitigation: Action/control	Responsibility	Timeframe
» 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 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

5. MANAGEMENT PROGRAMME FOR THE GAS TO POWER PLANT: CONSTRUCTION

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, the Risk Assessment, 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 EPC Contractor(s) 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 EPC 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 the MHI Risk Assessment.
- 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 EPC Contractor(s) site staff and that the Site Manager and EPC 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 and 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 be employed before construction commences and remain employed until all rehabilitation measures, as required for implementation due to construction damage, are completed and the site handed over for operation.

EPC Contractor(s) and their Service Providers/ Sub-Contractors: The EPC 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 EPC Contractor(s) is fully aware of the responsibilities in terms of the relevant environmental legislation and the contents of this EMPr. The EPC 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 EPC 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 EPC 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).

EPC Contractor's EO and Environmental Representative[5]: The EO will be responsible for implementation of this EMPr and should be appointed prior to any commencement of the activities.

The EPC 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.

[5] 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.

- 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.
- Be fully knowledgeable with the contents of the MHI Risk Assessment.
- 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.
- 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 EPC 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 EPC 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; » Closed Fin-fan coolers. » Water Injection. » 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: Target/Objective	» To secure the site against unauthorised entry » 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.	EPC Contractor(s)	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.	EPC Contractor(s)	During site establishment Maintenance: for duration of Contract.
Fence and secure the site and the Contractor's equipment camp.	EPC 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.	EPC Contractor(s)	During site establishment Implement for duration of contract
All unattended open excavations must be adequately demarcated and/or appropriately fenced.	EPC 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.	EPC 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.	EPC Contractor(s)	During site establishment and during construction

Mitigation: Action/control	Responsibility	Timeframe
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.	EPC 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 waste for recycling.	EPC Contractor (s)	Site establishment, and duration of construction

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:	Proponent, EPC Contractor, EO and Specialist	Prior to any vegetation clearing activities occurring, once permits have been obtained for removing plants

Mitigation: Action/control	Responsibility	Timeframe
» 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. » 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.).	EPC 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.	EPC 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.	EPC 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 root systems intact to ensure rapid re-colonization in areas that are not to be permanently hardened.	EPC Contractor with the assistance of the EO	Duration of the construction period
No harvesting of plants for firewood, medical purposes or other uses is to be permitted.	EPC Contractor and EO	Duration of the construction period

Mitigation: Action/control	Responsibility	Timeframe
No open fires to be permitted on the site and in surrounding areas.	EPC Contractor and EO	Duration of the construction period
An appropriate fining system should be developed and implemented for any infringements to the EMPr.	EPC 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).	EPC 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 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.	EPC 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 EPC contractor must be aware of weather forecasts.	EPC 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.	EPC 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).	EPC Contractor	Duration of the construction period
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.	EPC Contractor	Duration of the construction period
Run-off generated from cleared and disturbed areas such as access roads must be controlled using suitable erosion control measures (e.g. sandbags, 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.	EPC Contractor	Duration of the construction period
Erosion/sediment control measures such as silt fences, concrete blocks and/or sandbags 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 hydroseeded.	EPC Contractor	Duration of the construction period

Mitigation: Action/control	Responsibility	Timeframe
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.	EPC 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.	EPC 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	EPC Contractor and EO	Duration of the construction period

Mitigation: Action/control	Responsibility	Timeframe
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 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).	EPC 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.	EPC 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.	EPC Contractor and 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).	EPC 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.	EPC 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 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.	EPC Contractor and EO	Duration of the construction period
Ensure that workers accessing the site conduct themselves in an acceptable manner while on site.	EPC Contractor and EO	Duration of the construction period
Temporary noise pollution should be minimized by ensuring the proper maintenance of equipment and vehicles and tuning of engines and mufflers as well as employing low noise equipment where possible.	EPC Contractor and EO	Duration of the construction period
No activities should be permitted at the site after dark (between sunset and sunrise), except for security personnel guarding the development site.	EPC 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: Target/Objective	» The proponent should aim to employ as many low-skilled and semi-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 EPC 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 EPC Contractor	Pre-construction and construction phase
The recruitment selection process should seek to promote gender equality and the employment of women wherever possible.	EPC 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	EPC Contractor	Pre-construction and construction phase

Mitigation: Action/control	Responsibility	Timeframe
and queries relating to the project and the action taken to resolve the issue.		

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 EPC 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 EPC 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 semi and low-skilled job categories.	Proponent and EPC Contractor	Pre-construction and construction phase
Tender document should stipulate the use of local labour as far as possible	EPC 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 EPC 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.	EPC Contractor	Pre-construction and construction phase
Clear rules and regulations for access to the proposed site must be implemented.	EPC Contractor	Pre-construction and construction phase
Security company must be appointed and appropriate security procedures implemented	Proponent and EPC Contractor	Pre-construction and construction phase
Establish procedures for the control and removal of loiterers at the construction site.	EPC 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.	EPC 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
The Traffic Management Plan (**Appendix E**) must be implemented.	EPC Contractor(s), (Transportation sub-contractor)	Duration of contract
All relevant permits for abnormal loads must be applied for from the relevant authority.	EPC Contractor(s), (Transportation sub-contractor)	Duration of contract
Any traffic delays because of construction traffic must be co-ordinated with the appropriate authorities.	EPC 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.	EPC 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.	EPC 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.	EPC Contractor(s)	Duration of contract
All vehicles must be road worthy and be inspected regularly to ensure their road safety worthiness.	EPC Contractor	Duration of contract
Implement penalties for reckless driving for the drivers of heavy vehicles as a way to enforce compliance to traffic rules.	EPC 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.	EPC Contractor(s), (Transportation sub-contractor)	Duration of contract
The movement of all vehicles within the site must be on designated roadways.	EPC Contractor(s)	Duration of contract
All hazardous substances must be transported in accordance with the relevant legislation and regulations.	EPC 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	EPC Contractor	Pre-construction & construction phase

Mitigation: Action/control	Responsibility	Timeframe
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 EPC 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 attributable 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.	EPC 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.	EPC Contractor	Pre-construction and construction phase
A security company must be appointed, and appropriate security procedures implemented.	EPC Contractor	Construction Phase
Access in and out of the site should be strictly controlled by a security company.	EPC Contractor	Construction Phase
Provide workers with identity tags and prohibit the access of unauthorized people to the construction site.	EPC Contractor	Construction Phase
Open fires on the site for heating, smoking or cooking must not be allowed, except in designated areas.	EPC Contractor	Construction phase
Provide adequate firefighting equipment on site and provide firefighting training to selected construction staff.	EPC 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	EPC Contractor	Pre-construction and construction phase

Mitigation: Action/control	Responsibility	Timeframe
Ensure roads utilised are either maintained in the present condition or restored if disturbed from project activities	Proponent and EPC Contractor	Construction phase
Have a personal trained in first aid on site to deal with smaller incidents that require medical attention	EPC 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.	EPC 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.	EPC 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 EPC 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, EPC Contractors must be required to adopt a certain Code of Conduct and commit to restricting construction activities to areas within the development footprint. EPC 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; » Closed Fin-fan coolers. » Water Injection. » 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	» 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.	EPC 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.	EPC 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.	EPC Contractor(s) (and sub-contractor/s)	Duration of contract
No one must disturb flora or fauna outside of the demarcated construction area/s.	EPC 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 EPC 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 dust and emissions

Project component/s	Construction of: » Gas turbines; » Closed Fin-fan coolers. » Water Injection. » 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	» 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: Target/Objective	» To avoid and or minimise the potential noise and dust impacts 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).	EPC Contractor(s) and EO	Construction
Haul vehicles moving outside the construction site carrying material that can be wind-blown should be covered with tarpaulins.	EPC Contractor(s)	Duration of contract
Ensure vehicles adhere to speed limits on public roads and speed limits set within the site.	EPC 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.	EPC Contractor(s)	At completion of the construction phase.
Vehicles and equipment must be maintained in a road-worthy condition at all times.	EPC Contractor(s)	Prior to construction phase.
Ensure that damage to gravel public roads and access roads attributable to construction vehicles use for the	EPC Contractor(s) and EO	Before completion of

Mitigation: Action/control	Responsibility	Timeframe
construction of the Project is repaired before completion of construction phase.		construction phase.
Regular dust control of materials (sand, soil, concrete) must be used on site.	EPC Contractor(s) and EO	Construction
Strictly control vibration pollution from compaction plant or excavation plant as far as practically possible.	EPC Contractor(s) and EO	Construction
Disturbed areas must be re-vegetated as soon as practicable.	EPC 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.	EPC 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 16: 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 and the Chance Find Procedure/Protocol (**Appendix XX**) must be implemented.

Project component/s	» Gas turbines; » Closed Fin-fan coolers. » Water Injection. » 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	» 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.	EPC contractor, 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.	EPC 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 17: Management of Waste (general /domestic /liquid in nature)

Project component/s	Construction of: » Gas turbines; » Closed Fin-fan coolers. » Water Injection. » 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	» 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.	EPC 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.).	EPC Contractor(s)	Duration of contract
No waste to be burnt or buried on-site or surrounding the site (i.e. in vacant land).	EPC Contractor and EO	Duration of contract
Avoiding or minimizing the generation waste materials, as far as practicable.	EPC Contractor and EO	Duration of contract
Where waste generation cannot be avoided but has been minimized, recovery and reuse is encouraged.	EPC 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	EPC Contractor and EO	Duration of contract

Mitigation: Action/control	Responsibility	Timeframe
contractors and licensed waste disposal sites. It is understood that refuse removal takes place weekly by the uMhlathuze Local Municipality.		
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 of contaminated runoff, seepage and vermin control.	EPC Contractor and EO	Duration of contract
Disposal of waste must be in accordance with relevant legislative requirements, including the use of licensed contractors and licensed waste disposal sites.	EPC Contractor and EO	Duration of contract
An incident/complaints register must be established and maintained on-site.	EPC Contractor and EO	Duration of contract
Upon the completion of construction, the area will be cleared of potentially polluting materials.	EPC 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.	EPC 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.	EPC Contractor and EO	During and post construction.

Mitigation: Action/control	Responsibility	Timeframe
Upon the completion of construction, the area must be cleared of potentially polluting materials. Spoil stockpiles must also be removed and appropriately disposed of or the material re-used for an appropriate purpose.	EPC Contractor and EO	Completion of construction

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

Project component/s	Construction of: » Gas turbines; » Engine halls and stacks; » Closed Fin-fan coolers. » Water Injection. » 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	» 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.	EPC Contractor and EO	Duration of contract
Adoption of the emergency response plan compiled through the Risk Assessment for the facility.	EPC Contractor and EO	Duration of contract
All employees handling fuels and other hazardous materials are to be properly trained in their safe use, environmental restrictions and methods for proper disposal. Ensure that all employees are conversant with the on-site Emergency Plan that will be compiled as part of the Risk Assessment. The Proponent/ O&M Operator must test the on-site Emergency Plan in practice at least once a year and keep a record of such test.	EPC Contractor and EO	Prior to construction 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**). Ensure that all employees are conversant with the on-site Emergency Plan that will be compiled as part of the Risk Assessment. Test the on-site Emergency Plan in practice at least once a year and keep a record of such test.	EPC Contractor and EO	Prior to construction occurring and during 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.	EPC Contractor and EO	Duration of contract
Fire detectors, alarm systems, and fire-fighting equipment should be maintained in good working order and be readily accessible.	Proponent O&M Operator (during operation)	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.	EPC 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.	EPC 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.	EPC Contractor and EO	Duration of contract
Transport of all hazardous substances must be in accordance with the relevant legislation and regulations.	EPC Contractor and EO	Duration of contract

Mitigation: Action/control	Responsibility	Timeframe
Waste disposal records must be available for ECO review at all times.	EPC 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.	EPC 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 sites.	EPC Contractor and EO	Duration of contract
Hydrocarbon waste must be contained and stored in sealed containers within an appropriately bunded area.	EPC Contractor and EO	Duration of contract
Documentation (waste manifest) must be maintained detailing the quantity, nature and fate of any hazardous waste.	EPC Contractor and EO	Duration of contract
An incident/complaints register must be established and maintained on-site.	EPC 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.	EPC 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.	EPC Contractor(s)	Duration of contract
All stored fuels to be maintained within a bund and on a sealed surface.	EPC Contractor(s)	Duration of contract
Fuel storage areas must be inspected regularly to ensure bund stability, integrity and function.	EPC Contractor and EO	Duration of contract
Construction machinery must be stored in an appropriately sealed area.	EPC Contractor(s)	Duration of contract
An emergency spill response procedure must be formulated, and staff 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.	EPC 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.	EPC Contractor(s)	Duration of contract

Mitigation: Action/control	Responsibility	Timeframe
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.	EPC 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.	EPC 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.	EPC Contractor and EO	Duration of contract
Ensure compliance with all national, regional and local legislation with regard to the storage, handling and disposal of hydrocarbons, chemicals, solvents and any other harmful and hazardous substances and materials. The onus is on the EPC 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.	EPC Contractor and EO	During and post construction.
Keep a record of all hazardous substances stored on site for submission to the ECO. Clearly label all the containers storing hazardous waste.	EPC 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.	EPC 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.	EPC Contractor(s)	Duration of contract
Upon the completion of construction, the area must be cleared of potentially contaminating materials.	EPC Contractor(s)	Completion of construction
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.	EPC Contractor(s)	Duration of contract
Drip trays should be utilised at all fuel/chemical dispensing areas. Provide drip-trays beneath standing machinery/plant.	EPC Contractor(s)	Duration of contract
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.	EPC Contractor(s)	Duration of contract

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 19: 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; » Closed Fin-fan coolers. » Water Injection. » 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	» 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, EPC 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, EPC 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.	EPC 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).	EPC Contractor under the guidance of the EO and with the support specialist if required.	Construction
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.	EPC 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.	EPC Contractor and EO	Construction
Sediment barriers should be regularly maintained and cleared so as to ensure effective drainage.	EPC 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.	EPC 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.	EPC 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.	EPC 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.

5.4. Detailing Method Statement

OBJECTIVE 20: 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 facility 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 21: 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 contractor's environmental representative.
- 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 22: 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, 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 EO must 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 must 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

An environmental internal audit must be conducted every 3 months and an external audit must be conducted once a year. An annual audit report must be compiled and submitted to DEA until the completion of the construction and rehabilitation. This report must indicate the date of the audit, the name of the auditor and the outcome of each audit in terms of compliance with the environmental authorisation conditions and the requirements of the EMPr.

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.

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

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; » Closed Fin-fan coolers. » Water Injection. » Engine halls and stacks; » HV-Yard and substation » 132kV power line; » 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 the storm water management plan that was compiled in the pre-construction phase, designed for the operational phase (refer to **Appendix F**).	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

Mitigation: Action/control	Responsibility	Timeframe
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	Proponent and O&M Operator	Operation phase

Mitigation: Action/control	Responsibility	Timeframe
alternative skills should they wish to be employed elsewhere.		
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.

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	Proponent and O&M Operator	Prior to the operation phase

Mitigation: Action/control	Responsibility	Timeframe
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		

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 (including LNG, NG and RLNG) 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
Use the John Ross Pkwy for the delivery of fuel during Phase 1.	Proponent	Duration of contract
Ensure that all vehicles are road worthy and be inspected regularly to ensure their road safety worthiness.	Contractor	Duration of contract

Mitigation: Action/control	Responsibility	Timeframe
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 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
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, to record all complaints and queries relating to the project and the action taken to resolve the issue.	Contractor	Operation.

Performance Indicator	» Vehicles are roadworthy, inspected regularly and speed limits are adhered to. » R34 road is utilised as far 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
Recycling of wastewater should be undertaken as far as possible.	Proponent/ O&M Operator	Operation
Where practical and feasible, storm/ rainwater harvesting and use.	Proponent/ O&M Operator	Operation
Consider the use of treated wastewater to be included in project design processes.	Proponent/ O&M Operator	Operation
Project design to have measures for adequate water collection, spill control and leakage control system.	Proponent/ O&M Operator	Operation
Shut off water to unused areas.	Proponent/	Operation

Mitigation: Action/control	Responsibility	Timeframe
	O&M Operator	
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 wastewater 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
Adoption of emergency response plan compiled through the Risk Assessment for the facility.	Proponent/ O&M Operator	Duration of the operation period

Mitigation: Action/control	Responsibility	Timeframe
Ensure that all employees are conversant with the on-site Emergency Plan that will be compiled as part of the Risk Assessment. Test the on-site Emergency Plan in practice at least once a year and keep a record of such test.	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
Wastewater must be stored in a sump at each unit.	Proponent/ O&M Operator	Duration of the operation period
Wastewater 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	Proponent/ O&M Operator	Duration of the operation period

Mitigation: Action/control	Responsibility	Timeframe
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.		
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 wastewater 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 turbines, generators, auxiliaries, engines, compressors, etc.

Project component/s	» Gas 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: » 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
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.	Proponent and O&M Operator	Duration of operation

Mitigation: Action/control	Responsibility	Timeframe
» 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.		

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. » 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 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
Adoption of emergency response plan compiled through the Risk Assessment for the facility.	Proponent / O&M Operator	Prior to commencement of operation
Ensure that all employees are conversant with the on-site Emergency Plan that will be compiled as part of the Risk Assessment. Proponent and O&M Operator to test the on-site Emergency Plan in practice at least once a year and keep a record of such test.	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
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	Proponent / Project Engineer/ O&M Operator	Planning and design, and operation

Mitigation: Action/Control	Responsibility	Timeframe
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.	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: » 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	Proponent / Project Engineer/ O&M Operator	Planning and design, and operation
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 sealed containers within a clearly demarcated designated area.	Proponent	Operation
Storage areas for hazardous substances must be appropriately sealed and bunded.	Proponent / O&M Operator	Operation
Adoption of emergency response plan compiled through the Risk Assessment for the facility.	Proponent / O&M Operator	Prior to commencement of operation
Ensure that all employees are conversant with the on-site Emergency Plan that will be compiled as part of the Risk Assessment. Proponent and O&M Operation to test the on-site Emergency Plan in practice at least once a year and keep a record of such test.	Proponent / O&M Operator	Prior to commencement of operation
Fire detectors, alarm systems, and fire-fighting equipment should be maintained in good working order and be readily accessible.	Proponent O&M Operator	Duration of contract
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

Mitigation: Action/control	Responsibility	Timeframe
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

Mitigation: Action/control	Responsibility	Timeframe
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 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.	Proponent, O&M Operator	Design and planning, and duration of operation
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	Proponent, O&M Operator	Design and planning, and duration of operation

Mitigation: Action/control	Responsibility	Timeframe
» Locate the flaring system at a safe distance from residential areas or other potential receptors, and maintain the system to achieve high efficiency.		
Annual Stack Emission Testing for SO_2, NO_X and PM: If Annual Stack Emission Testing results show 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.	Proponent, O&M Operator	Duration of operation
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
Reduce fuel usage through minimal idle time of stationary LPG delivery and fuel-efficient vehicles.	Proponent	Duration of operation
Ensure air emissions comply with minimum emissions standards as applicable at the time of construction and throughout operation	Proponent	Entire project life cycle
Monitor emissions from the gas engines (turbines) as mandated by the conditions of the AEL.	Proponent, O&M Operator	Duration of operation
A minimum of one annual measurement campaign will be required where the measurement will also be stipulated within the AEL.	Proponent, O&M Operator	Duration of operation
In order to minimise losses from the LPG loading and storage facility during loading and via leaks, regular monitoring and maintenance of all LPG loading and storage equipment should be undertaken.	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. » Emission monitoring of the gas engines (turbines) in accordance with the conditions/requirements of the AEL. » Implementation of the Leak Detection and Repair (LDAR) Programme for the duration of the operation phase of the facility.

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

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; » Closed Fin-fan coolers. » Water Injection. » 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 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
An decommissioning plan must be developed and implemented for the decommissioning phase (refer **Appendix K – decommissioning plan and schedule**)	Proponent / O&M Operator / contractor	Decommissioning
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

Mitigation: Action/control	Responsibility	Timeframe
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

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 and Rehabilitation Close-Out Report.