DRAFT

SCOPING REPORT FOR THE PROPOSED DEVELOPMENT OF DNG ENERGY (PTY) LTD TLOU GAS-TO-POWER FACILITY AND ASSOCIATED INFRASTRUCTURE IN MALELANE WITHIN THE JURISDICTION OF NKOMAZI LOCAL MUNICIPALITY, MPUMALANGA PROVINCE

REF: F010- 20-B

OCTOBER 2020

NSOVO ENVIRONMENTAL CONSULTING

DRAFT SCOPING REPORT FOR THE PROPOSED DEVELOPMENT OF DNG ENERGY (PTY) LTD TLOU GAS-TO-POWER FACILITY AND ASSOCIATED INFRASTRUCTURE IN MALELANE WITHIN THE JURISDICTION OF NKOMAZI LOCAL MUNICIPALITY, MPUMALANGA PROVINCE

REF: F010- 20-B

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PROJECT TITLE:

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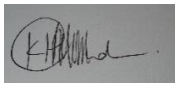
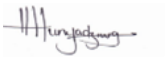
Draft Scoping Report	Khuliso Mudau  _____ Rejoice Aphane  _____	Masala Mugwagwa  _____ Munyadziwa Rikhotso  _____

EXECUTIVE SUMMARY

Nsovo Environmental Consulting (hereafter referred to as Nsovo) has been appointed by DNG Energy (Pty) Ltd. to undertake Environmental Impact Assessment (EIA) for the proposed Tlou gas-to-power facility and associated infrastructures in Malelane. The proposed project will be located inside an urban area, on Portions 1, 4, and 116 of Farm Malelane 389 FP, which is situated approximately 2 km away from the Kruger National Park and 18 km away from Matsulu Township.

DNG Energy (Pty) Ltd (DNG Energy) is proposing to develop a 620 MW power facility using Open Cycle Gas Turbine (OCGT) and/or reciprocating engine and associated infrastructure. The proposed Tlou gas-to-power facility will be developed in two phases. The first phase involves the development of the 620 MW OCGT power facility, aboveground gas pipeline from the existing ROMPCO gas pipeline to the power plant, and the above aboveground storage tanks with a capacity of 500m^3 and bulk storage facility. DNG Energy is also proposing the development of approximately 0.5km 275 kV overhead powerline from the proposed power plant to the existing Eskom Khanyazwe substation. The second phase of the project involves the expansion of the capacity of power to 1000 MW by using Combined-Cycle Gas Turbines (CCGT).

The proposed project will be in an urban area (Malelane town), within agricultural lands, on Portions 1, 4, and 116 of Farm Malelane 389 FP, situated approximately 2 km away from the Kruger National Park and within 1km of the Malelane Central Business District within the jurisdiction of the Nkomazi Local Municipality in the Mpumalanga Province of South Africa.

The South Africa Protected Areas Database (2019, Q4) and National Protected Areas Expansion Strategy (2009) database indicate that the Kruger National Park is situated ± 2 km north of the study area. NPAES (2009) additionally indicates the Informal Dumaneni Reserve (Conservation Area System) located approximately 2.3 km south east of the proposed gas pipeline. Further, there are no other protected areas are located within 10 km of the study area. However, according to the Mpumalanga Biodiversity Sector Plan (2014), the entire study area is situated within an Ecological Support Area (ESA) Protected Area Buffer, associated with the Kruger National Park. These are areas surrounding protected areas that moderate the impacts of undesirable land-uses that may affect the ecological functioning or tourism potential of Protected Areas. Buffer distance varies according to reserve status: National Parks - 10 km; Nature Reserves - 5 km buffer; and Protected Environments — 1 km buffer. The majority of the study area is classified as an area that is “Heavily Modified”. These are areas currently modified to such an extent that any valuable biodiversity and ecological functions have been lost. The remaining portions of the study area are classified as “Other Natural Areas”. These areas have not been identified as priority in the current systematic biodiversity plan but retain most of their natural character and perform a range of biodiversity and ecological infrastructural functions.

DNG Energy has appointed Nsovo Environmental Consulting, as independent environmental consultant, to undertake an Environmental Impact Assessment (EIA). The EIA process is being undertaken in accordance with the requirements of Appendix 2 of the NEMA EIA Regulations of 2014 as amended.

The objective of the Scoping process as indicated in the Regulations process is to, through a consultative process—

(a) identify the relevant policies and legislation relevant to the activity;
(b) motivate the need and desirability of the proposed activity, including the need and desirability of the activity in the context of the preferred location;
(c) identify and confirm the preferred activity and technology alternative through an identification of impacts and risks and ranking process of such impacts and risks;
(d) identify and confirm the preferred site, through a detailed site selection process, which includes an identification of impacts and risks inclusive of identification of cumulative impacts and a ranking process of all the identified alternatives focusing on the geographical, physical, biological, social, economic, and cultural aspects of the environment
(e) identify the key issues to be addressed in the assessment phase;
(f) agree on the level of assessment to be undertaken, including the methodology to be applied, the expertise required as well as the extent of further consultation to be undertaken to determine the impacts and risks the activity will impose on the preferred site through the life of the activity, including the nature, significance, consequence, extent, duration and probability of the impacts to inform the location of the development footprint within the preferred site; and
(g) Identify suitable measures to avoid, manage or mitigate identified impacts and to determine the extent of the residual risks that need to be managed and monitored.

The Scoping phase entailed a detailed description of the baseline environment, which would form the backdrop of the impact assessment phase. Further, it allowed for the identification of critical issues and concerns based on input from the relevant stakeholders, I&APs, and the EAP's professional judgment based on experience and expertise in the field.

In considering the alternatives, various aspects are considered, and this may include, the degree of sensitivity of the site, technical viability, and to a certain extent, the economic viability. The scoping assessment, including specialist input highlighted the following: The proposed development of Tlou gas-to-power facility will be undertaken as detailed in the DMRE IPPPP minimum requirements, and the locations deemed preferable and most feasible for projects of this nature.

The scoping phase assessed technical and structural alternatives of the Tlou gas-to-power facility, powerline and pipeline. These alternatives will be assessed further during the EIA phase. The preferred alternatives will be the alternative with the least environmental impacts as well as providing most benefits to the socio-economy.

DNG Energy has considered various technology options which include the OCGT and Reciprocating Engine. Several aspects including technical, economic and environmental are considered in selecting the most suitable technology. However, of the many technologies available the project is considering either the OCGT or alternatively the reciprocating engine. These will be assessed further in the EIA Phase.

The alternatives identified, assessed and considered for this project include:

- **Power generation Technology:** DNG Energy has considered various technology options which include the OCGT and Reciprocating Engine. Several aspects including technical, economic and environmental are considered in selecting the most suitable technology. However, of the many technologies available the project is considering either the OCGT or alternatively the reciprocating engine. These will be assessed further in the EIA Phase.
- **Underground and above ground powerline:** Two technical alternatives have been identified for the proposed powerline - the overhead powerline and underground cabling. Technically, underground cables need to be insulated against the surrounding soil. On low voltage reticulation networks (11kV & 22kV), the heat generated by the cable is low enough for standard insulation to be used; however, on larger power lines (i.e., 132KV as proposed), the method of electrical and heat insulation becomes more burdensome. As such, the use of the underground cabling therefore will not be assessed further during the EIA phase. There are already overhead powerlines in the study area. The servitude could be used to tie in the proposed powerlines.
- **Structural alternatives**: Different types of structural alternatives for the pylons are feasible. These include the use of Cross-Rope suspension type; Self-supporting type; and Guyed V towers. None of the above options have been dismissed and remain alternatives depending on the terrain and topography. Taking into consideration aspects such as visual; the selection of the pylons to be used for the proposed powerline will take the potential impacts into consideration.

- **No go alternative:** Under GN R.982, consideration must be given to the option not to act, in which an alternative is usually considered when the proposed development is envisaged to have significant adverse environmental impacts that mitigation measures cannot ameliorate effectively. The no-go alternative would be the option of not undertaking the development of the proposed project. A further assessment of the no-go alternative will be undertaken in the EIA Phase.

In order to assess the potential impacts on the environment associated with the construction and operation of the proposed Tlou gas-to-power facility and associated infrastructure, detailed specialist studies to address the above issues must be undertaken during the EIA phase. The identification and assessment of impacts was based on input from specialist studies that provided baseline information and the necessary detail in preparation of the Report. The details of Specialist are included in the Table below and the Reports are attached as Appendix C:

Specialist Study	Company	Specialist
Biodiversity (flora and fauna);	Scientific Terrestrial Services CC	Nelanie Cloete
Heritage;	Mulaifa Development Consulting	Moses Mabuda

The Draft Scoping Report will be made available to the Interested and Affected Parties (I&APs) and the Organs of State for thirty (30) days to allow them to review and comment. All comments received will be included in the Comments and Response Report, which will form part of the final Scoping Report. The Plan of Study for the EIA is also incorporated in this report and it is submitted to the Competent Authority (CA) (the National Department of Environment, Forestry and Fisheries (DEFF)) in terms of section 24C of the National Environmental Management Act (NEMA). The Scoping Report has been prepared as dictated by the Regulations and thus achieved the primary objectives as detailed above.

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LIST OF ACRONYMS AND ABBREVATIONS

AEL	Atmospheric Emission License
CARA	Conservation of Agricultural Resources Act, 1983 (43 of 1983)
CBA	Critical Biodiversity Area
CBD	Central Business District
CCGT	Combined Cycle Gas Turbines
DBSA	Development Bank of Southern Africa
DEDEAT	Department of Economic Development, Environmental Affairs and Tourism
DEFF	Department of Environment, Forestry, and Fisheries
DHSWS	Department of Human Settlement, Water, and Sanitation
DMRE	Department of Mineral Resources and Energy
EA	Environmental Authorisation
EAP	Environmental Assessment Practitioner
EIA	Environmental Impact Assessment
EIR	Environmental Impact Report
EMPr	Environmental Management Programme
ERA	Electricity Regulation Act, 2006 (4 of 2006)
FSRU	Floating Storage Regasification Unit
GA	Gas Act, 2001 (48 of 2001)
GHG	Greenhouse Gas Emissions
GNR	Government Notice Regulations
GSA	Gas Supply Agreement
HSA	Hazardous Substances Act, 1973 (56 of 1973)
I&APs	Interested and Affected Parties
IDP	Integrated Development Plan
IDZ	Industrial Development Zone
IEA	International Energy Agency
IEP	Integrated Energy Plan

IPPPP	Independent Power Producers Procurement Programme
IRP	Integrated Resource Plan
LNG	Liquefied Natural Gas
MBSP	Mpumalanga Biodiversity Sector Plan
MPRDA	Minerals and Petroleum Resources Development Act, 2002 (Act No. 28 of 2002)
MDARDLA	Mpumalanga Department of Agriculture, Rural Development and Land Administration
MW	Megawatt
NCRECA	Noise Control Regulations under the Environmental Conservation Act, 1989 (73 of 1989)
NDP	National Development Plan
NEMA	National Environmental Management Act, 1998 (Act 107 of 1998)
NEMAQA	National Environmental Management: Air Quality Act, 2004 (No. 39 of 2004)
NEMBA	National Environmental Management: Biodiversity Act, 2004 (No. 10 of 2004)
NEMPA	National Environmental Management: Protected Areas Act, 2003 (57 of 2003)
NEMWA	National Environmental Management: Waste Act, 2008 (Act No. 59 of 2008)
NHRA	National Heritage Resources Act, 1999 (No. 25 of 1999)
NLM	Nkomazi Local Municipality
NO_2	Nitrogen dioxide
NPA	National Ports Act, 2005 (12 of 2005)
NPAES	National Protected Areas Expansion Strategy (2009)
NWA	National Water Act, 1998 (Act No. 36 of 1998)
OCGE	Open Cycle Gas Engine
OCGT	Open Cycle Gas-Turbine
OHSA	Occupational Health and Safety Act, 1993 (Act 85 of 1993)
PPP	Public Participation Process
RMIPPPP	Risk Mitigation Independent Power Producer Procurement Programme
SACAD	South Africa Conservation Areas Database (2019, Q4)
SAPAD4	
SAHRA	South African Heritage Resources Agency
SANBI	South African National Biodiversity Institute
SAPAD	South Africa Protected Areas Database) (2019, Q4)
ToR	Terms of Reference
WULA	Water Use Licence Application

1 INTRODUCTION AND BACKGROUND

According to the World Energy Outlook 2002, the International Energy Agency has projected that fossil fuels will remain the primary source of energy, meeting more than 90% of the increase in energy demand by the year 2030. However, the demand for natural gas will rise more strongly than for any other fossil fuel – again, this is in concert with the increasing part that natural gas will play in South Africa (Independent EP, 2003). Natural gas is expected to play a central role in supporting Africa's drive to achieve electricity connection for nearly 600 million people without access to the grid, to reduce widespread reliance on coal for power generation, and to fast-track the continent's slowed industrial expansion. In support of the vision for the South African Gas to Power Programme, the DMRE has developed a Liquid Natural Gas (LNG) to Power Independent Power Producer Procurement Programme (IPPPP), which will serve as an anchor for the gas infrastructure required for the establishment of a gas market in the country.

The Department of Mineral Resources and Energy (DMRE) has proposed a 20-year Integrated Resource Plan (IRP) outlining a new power generation program to 2030. The program will use various renewable energies and natural gas to produce electricity. With 91.2% or 46,776 MW of its generation coming from coal-fired thermal power stations, South Africa has included in the IRP gas technology to generate 6,000 MW from Closed-Cycle Gas Turbines (CCGT). The promulgation of the IRP 2019 and associated ministerial determinations guide the Independent Power Producers Procurement Programme (IPPPP). The IRP 2019 indicates a short-term electricity supply gap of approximately 2,000 MW between 2019 and 2022.

The Department launched a Risk Mitigation Independent Power Producer Procurement Programme (RMIPPPP) on the 23rd of August 2020. The objective of the RMIPPPP is to fill the current short-term supply gap, alleviate the existing electricity supply constraints, and reduce the extensive utilisation of diesel-based peaking electrical generators. The Determination for the RMIPPPP was gazetted on the 7th of July 2020.

Under the Ministerial Determination as gazetted, the Minister of Mineral Resources and Energy, in consultation with the National Energy Regulator of South Africa, has determined that the department is to procure 2,000 MW of new generation capacity from a range of energy source technologies based on the following criteria:

- It will be technology agnostic;
- Based on the plant-performance needs of the electricity system operator;
- It will procure dispatchable flexible generation that should be able to provide energy, capacity, and ancillary services;
- Should be able to operate between 5h00 to 21h30;
- It must have an Automatic Generation Control (AGC) load-following ability, flexible capacity factor and must be "scalable" with changing capacity requirements; and

- Must be able to connect power to the grid by June 2022.

The Department formally invited interested parties to register prospective bids under the Risk Mitigation IPP Procurement Programme on 22 August 2020. DNG Energy (Pty) Ltd. has thus responded to the Request for Proposal (RFP) issued by the DMRE and proposes the development of the Eagle gas-to-power facility and associated infrastructure in Mossel Bay, within the jurisdiction of the Mossel Bay Local Municipality in the Western Cape Province. The project will be undertaken in line with the requirements of the National Environmental Management Act, 1998 (Act 107 of 1998 and associated EIA Regulations of 2014 as amended.

The scope of the projects for the earmarked areas will include:

- LNG procurement and delivery;
- LNG storage and regasification facilities via a Floating Storage Regasification Unit (FSRU) (or equivalent LNG regasification and storage technology);
- Port infrastructure, including fixed maritime structures and modifications;
- Gas transmission pipelines to connect the FSRU (or equivalent LNG regasification and storage technology) with the new power generation facility;
- LNG and or gas distribution hub(s) for the third party off-take;
- Power plant, including the high voltage connection to the electrical grid; and
- Arrangements for independent delivery of LNG, and the sale of a modest percentage of gas and LNG to external users.

1.1 PROJECT OVERVIEW

DNG Energy is proposing to establish a 350 MW Open Cycle Gas Turbine (OCGT) and/ or Reciprocating Engine Power facility and associated infrastructure, situated approximately within 500m of Malelane town, which falls within the jurisdiction of Nkomazi Local Municipality in the Mpumalanga Province. The project shall be referred to as the Tlou gas-to-power station.

The proposed project will be developed in two phases. The first phase involves the development of 620 MW gas-to-power station and approximately 1km gas pipeline to connect to the power station and the above aboveground storage tanks with a capacity of 500m3 and bulk storage facility. DNG Energy is also proposing the construction of approximately 1km 275 kV overhead powerline from the proposed power plant to the existing Khanyazwe 275/132kV substation.

The second phase of the project involves the expansion of the capacity of power to 1000 MW by using Combined-Cycle Gas Turbines (CCGT).

DNG Energy proposes the following activities and infrastructure:

Phase 1

Phase 1 will entail the development of the following primary activities:

- Tlou 620 MW gas-to-power facility with OCGT and/ or Reciprocating Engine. The facility footprint is 60 m by 100 m with height of 25 m;
- Approximately 1km gas pipeline to connect from the existing ROMPCO gas pipeline to the proposed Tlou power station;
- Extension of a Busbar at the Eskom Khanyazwe substation;
- Approximately 500m 275 kV powerline to connect to the existing Eskom Khanyazwe substation; and
- Approximately 8m wide access road.

Phase 2

Phase 2 will entail the increase capacity to 1000MW by using CCGT.

The proposed development triggers listed activities and an Environmental Impact Assessment (EIA) process must be undertaken in accordance with the EIA Regulations, 2014 (promulgated in terms of the National Environmental Management Act, 1998 (Act No. 107 of 1998) (NEMA), as amended in April 2017. Further, a Water Use Licence Application (WULA) in terms of the National Water Act, 1998 (Act No. 36 of 1998) (NWA) will be obtained from the Department of Human Settlement, Water and Sanitation (DHSWS). Subsequently, Nsovo Environmental Consulting (Nsovo) is the independent consultant appointed by DNG Energy responsible for the necessary authorisation and licencing processes to comply with the requirement of the legislation. The project proponent is DNG Energy (Pty) Ltd., whereas the Competent Authority is the Department of Environment, Forestry, and Fisheries (DEFF).

2 DETAILS OF THE ENVIRONMENTAL ASSESSMENT PRACTITIONER

Nsovo has been appointed by DNG Energy (Pty) Ltd as the independent Environmental Assessment Practitioner (EAP) for the proposed project and meets the general requirements as stipulated in regulations 13(3) of the NEMA 2014 EIA Regulations as amended. Nsovo therefore:

- Is independent and objective;
- Has expertise in conducting EIAs;
- Takes into account all relevant factors relating to the application; and
- Provides full disclosure to the applicant and the relevant environmental authority.

Table 1 presents the details of the EAP involved, including relevant experience. A detailed Curriculum Vitae and Qualifications are attached as **Appendix E**.

Table 1: Details of the Environmental Assessment Practitioner (EAP)

Name of Company	Nsovo Environmental Consulting
Person Responsible	Khuliso Mudau
Professional Registration	South African Council for Natural Scientific Professions (SACNASP)
Postal Address	Private Bag x29 Postnet Suite 697 Gallo Manor 2052
Telephone Number	011 041 3689
Fax Number	086 602 8821
Email	khuliso@nsovo.co.za
Qualifications & Experience	B.Sc. Honours Environmental and Water Science **09 years of experience**
Project Related Expertise	In terms of project related expertise, the Environmental Assessment Practitioner has completed the following projects: • EIA for the proposed Maphutha-Witkop powerline in Limpopo Province. • EIA for the proposed Shongweni substation and Hector - Shongweni 400kV powerline in Kwazulu Natal Province. • EIA for the proposed Inyaninga substation and Inyaninga – Mbewu 400kV powerline in Kwazulu Natal Province. • EIA for the proposed Tubatse strengthening phase 1 – Senakangwedi B integration within the jurisdiction of Greater Tubatse Local Municipality in Limpopo Province. • EMPr, WULA and EA amendment for the proposed Juno Gromis 400kV power line

	• Basic Assessment for the proposed Decommissioning and Demolition of Verwoedberg Substation and 275kV power. • Basic Assessment for Bloemendal Substation and loop in and out lines.

2.1 DETAILS OF THE APPLICANT

DNG Energy (Pty) Ltd operates in the renewable energy industry, and has been operating since 2013. Table 2 presents details of the responsible persons at DNG Energy (Pty) Ltd.

Table 2: Details of the Applicant

Name of Company	DNG Energy (Pty)Ltd
Project	Tlou
Project Reference	D-1656
Physical Address	27 Fricker Rd Illovo 2196
Postal Address	P O Box 783451 Sandton 2146
Contact Person	Aldworth Mbalati
Email	aldworth@dng.energy
Project Manager	Elmar Keusgen
Email	elmar@dng.energy
Telephone Number	010 880 2935

3 DESCRIPTION OF LOCALITY AND THE PROPERTY ON WHICH THE ACTIVITY IS TO BE UNDERTAKEN AND LOCATION OF ACTIVITY ON THE PROPERTY

This section provides detailed information on the location of the proposed project. The main aim is to provide the environmental aspects found within the area of the proposed development and to provide the baseline description of the surroundings.

3.1 LOCALITY OF THE PROPOSED PROJECT

The proposed project will be situated inside an urban area, on portion 1, 4, and 116 of Malelane 389 FP Farm which is approximately 2 km from the Kruger National Park and 18 km from the Matsulu Township. The proposed site is under the administration of Nkomazi Local Municipality, Ehlanzeni District Municipality, in Mpumalanga province. Figure 1 shows the locality map that depicts the proposed Tlou gas-to-power facility. Refer to Appendix A for the A3 locality and sensitivity maps.

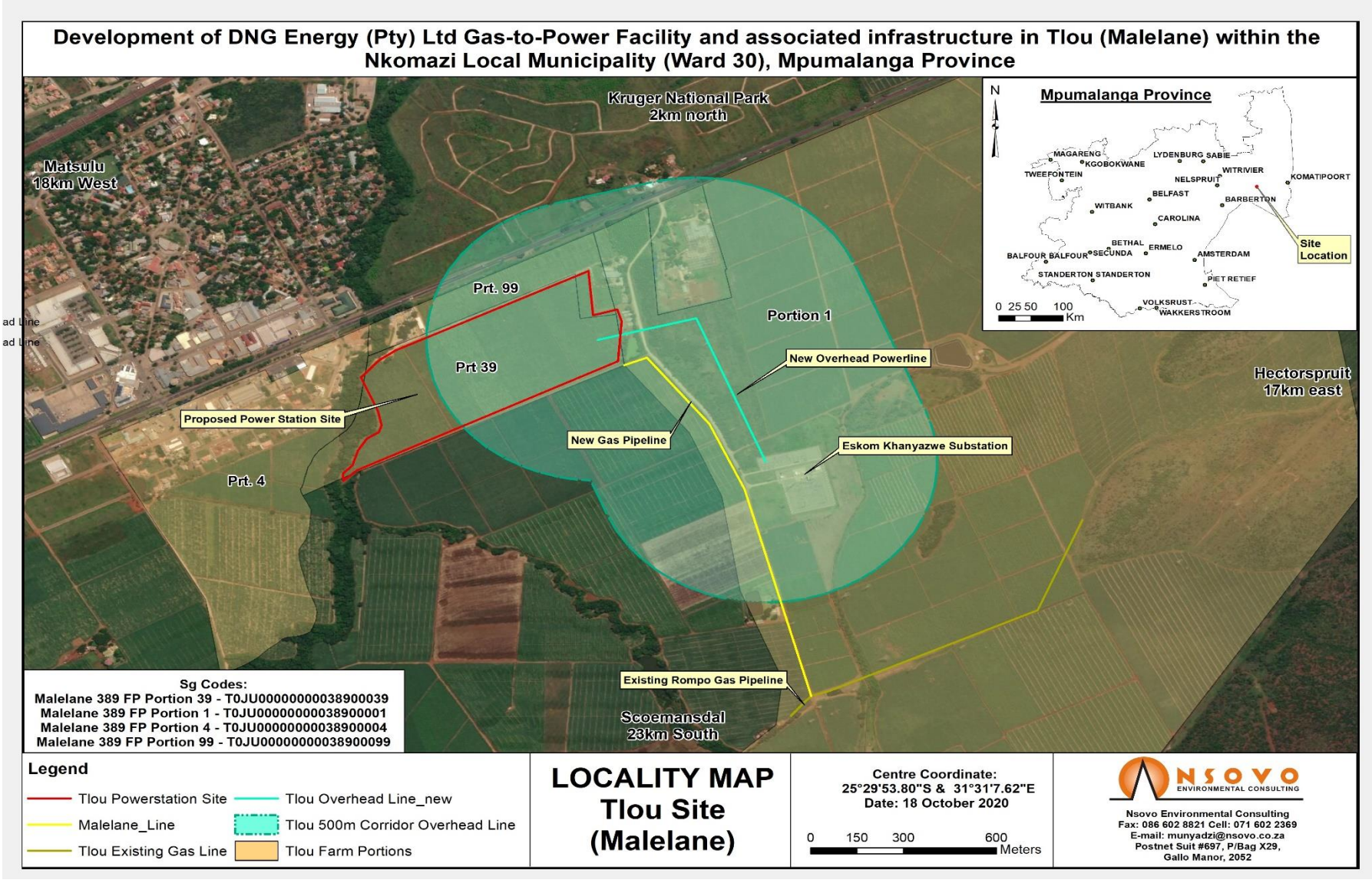


Figure 1: Locality map showing the proposed site for the Tlou gas-power-facility in Malelane.

3.1.1 PROVINCE AND PPROVINCIAL BOUNDARIES

The proposed development will be undertaken within the Mpumalanga Province which is bordered by Swaziland (North of Swaziland) and Mozambique (east of Mozambique).

3.1.2 MUNICIPALITY AND WARDS

The proposed development site is located within Ward Number 30 of Nkomazi Local Municipality within the jurisdiction of the Ehlanzeni District Municipality in the Mpumalanga Province.

3.2 DESCRIPTION OF THE AFFECTED PROPERTIES

The proposed development of the Tlou gas-to-power facility and associated structures will be located on the Farms listed in Table 3.

Table 3: Details of the proposed site property

Farm Name	Portion Number	Surveyor General 21 Digit Code
Malelane 389 FP	1	T0JU00000000038900001
Malelane 389 FP	4	T0JU00000000038900004
Malelane 389 FP	99	T0JU00000000038900099
Malelane 389 FP	116	T0JU00000000038900116

3.3 SURROUNDING LAND USES

This section provides the description of the land uses within and around the proposed study area, which includes farming, residential areas, and a retail centre are discussed as follows:

3.3.1 RESIDENTIAL

The immediate surroundings to the proposed development site comprises mainly of agricultural lands. The residential communities located adjacent to the proposed development site include informal, semi-suburban (township) as well as suburban households. Table 4 provides names and the descriptions of communities that may be affected by the proposed development.

Table 4: Names and the descriptions of communities that may be affected by the proposed project

COMMUNITY	DESCRIPTION
Matsulu	• A low-medium income residential household located adjacent to the site. • The town situated at the confluence of the Crocodile and Komati Rivers in the Mpumalanga Province, South Africa. • The town is 8 km from the Crocodile Bridge Gate into the Kruger Park, and 5 km from the Mozambique border and 65 km from the Eswatini border.
Malelane town	It is the closest town to the site located within 500m of the proposed site. Primarily medium-income residential households characterize the town.
Farms	There is sugar came farming within the proposed site

3.3.2 COMMERCIAL AND INDUSTRIAL

The main economic activities and source of employment within the Nkomazi Local Municipality is farming, manufacturing and tourism. According to the Development Bank of Southern Africa (DBSA, 2000) the GDP of Ehlanzeni District Municipality (which includes Nkomazi) is valued at R11.2 billion comprising about 18 % of Mpumalanga Province Gross Domestic Product (DBSA, 2000). The manufacturing sector contributes about 27%, trade 17% and agriculture 14% to the economic activity. A major challenge to growing the economy is lack of skills within the district. The following areas have been identified to become the regional drivers for economic growth and job creation: agriculture, mining, retailing, tourism, manufacturing and business opportunities that might exist due to the development of the N4 Maputo Corridor which is also the Mpumalanga provincial Flagship Project.

3.3.3 AGRICULTURE AND FARMING

The town is located on the N4 Corridor of South Africa. The town's economy relies on farming and numerous guest houses and guest farms in the area.

3.3.4 SURFACE INFRASTRUCTURE

This section provides the description of the surface infrastructures within the study area, which include the description of road network, existing substations and powerlines.

3.3.5 ROAD NETWORK

The site is located along the N4 which is a national route from South Africa to Mozambique. The proposed development site is located on Portions 1, 4, 99, and 116 of Farm Malelane 389 FB, and is accessed through a gravel road that connects the farm from N4.

3.3.6 EXISTING POWERLINES AND ASSOCIATED INFRASTRUCTURE

There is an existing Eskom Khanyazwe substation and a Retail centre alongside the proposed development site. Other infrastructure include transmission and distribution power lines within the proposed study area. The proposed site is within 500m of the Malelane Central Business District (CBD), which is the main economic hub of the Nkomazi Local Municipality. The CBD is noted to host activities and infrastructure suitable for daily economic activities and infrastructure such as shopping centre, police station, schools, post office, etc. In addition, a residential area exists within 500m north of the proposed side.

Figure 2 shows photographs of the site infrastructure and is described as follows:

- Figure 2A - depicts an existing Rompco gas pipeline in which the proposed will connect from.
- Figure 2B - the proposed gas pipeline will run parallel to this road from an existing line.
- Figure 2C - depicts existing infrastructure traversing the area earmarked for natural gas plant.
- Figure 2D - depicts an area earmarked for the establishment of Natural gas plant.

Figure 2: Photographs showing the site infrastructure

4 DESCRIPTION OF THE PROPOSED ACTIVITIES

This section provides the description of the proposed activities which include the scope of the proposed project mainly focusing on the listed activities which triggers the EIA process.

4.1 BACKGROUND AND THE PROPOSED SCOPE OF WORK

This section describes the proposed activities, which include the scope of the proposed project, mainly focusing on the listed activities which trigger the EIA process. DNG Energy proposes to undertake the following activities that will be undertaken in two phases:

- **Phase 1** will entail the development of the following primary activities:
    - Tlou 620 MW gas-to-power facility with OCGT and/ or Reciprocating Engine. The facility footprint is 60 m by 100 m with height of 25 m;
    - Approximately 1km gas pipeline to connect from the existing ROMPCO gas pipeline to the proposed Tlou power station;
    - Extension of a Busbar at the Eskom Khanyazwe substation;
    - Approximately 500m 275 kV powerline to connect to the existing Eskom Khanyazwe substation; and
    - Approximately 8m wide access road.
- **Phase 2** will entail the increase capacity to 1000MW by using CCGT.

The proposed development triggers listed activities and an Environmental Impact Assessment (EIA) process must be undertaken in accordance with the EIA Regulations, 2014 (promulgated in terms of the National Environmental Management Act, 1998 (Act No. 107 of 1998) (NEMA), as amended in April 2017. Further, a Water Use Licence Application (WULA) in terms of the National Water Act, 1998 (Act No. 36 of 1998) (NWA) will be obtained from the Department of Human Settlement, Water, and Sanitation (DHSWS). Further, the proposed project will trigger Listed Activities in terms of section 21 of the National Environmental Management: Air Quality Act, 2004 (Act 39 of 2004) (NEM:AQA), as such, an Atmospheric Emissions Licence (AEL) will be required and obtained from the relevant Municipality.

4.1.1 ACTIVITIES ASSOCIATED WITH THE PROJECT

The construction phase of the proposed project would take approximately 18 months, and the activities to be undertaken are indicated on the map below and discussed hereunder.

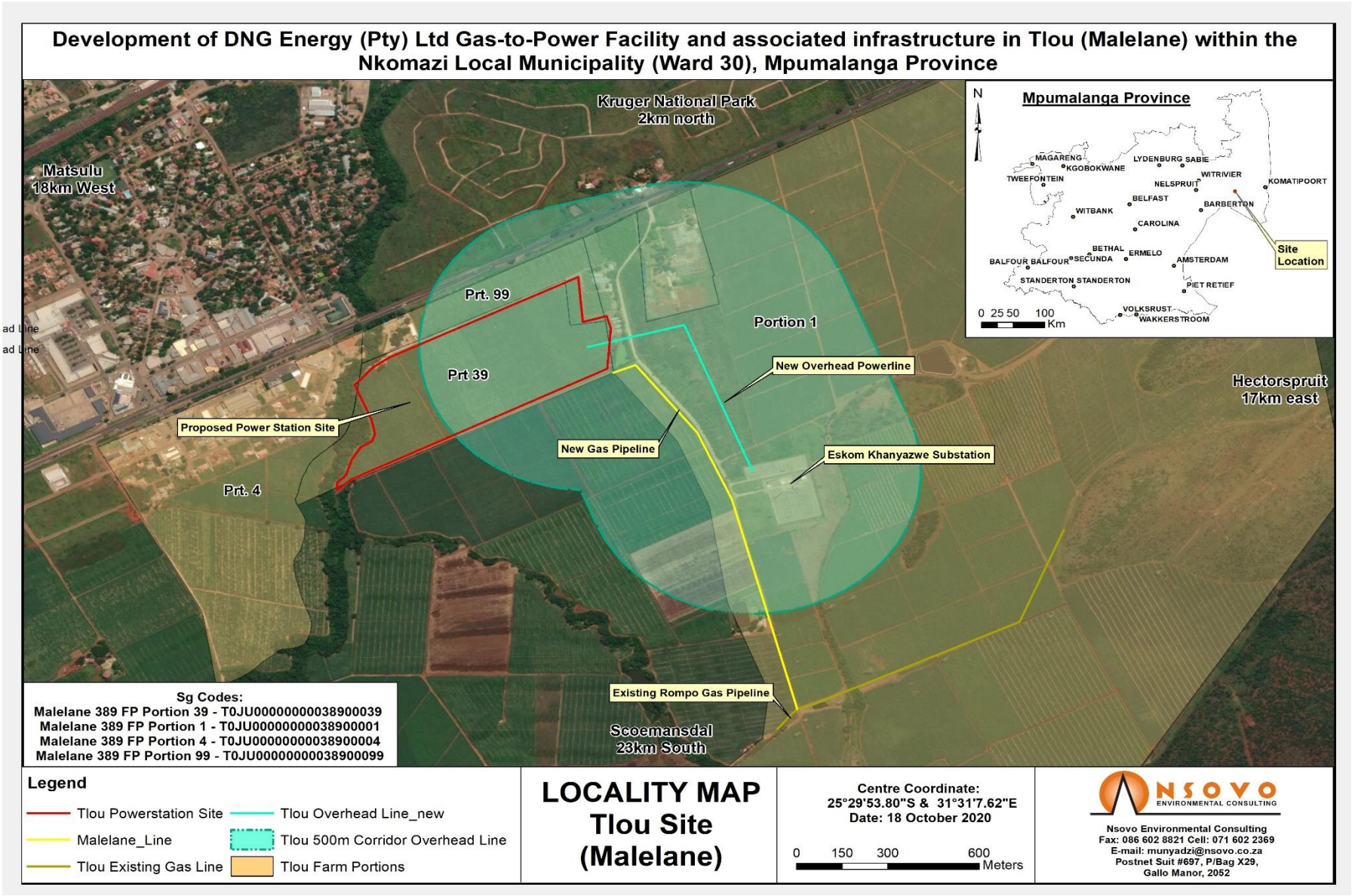


Figure 3: Map showing the proposed activities

4.1.1.1 Site walk-down

A site walk-down will be undertaken along the gas pipeline and powerline to determine the less sensitive areas. The main aim of the walk-down survey is to ensure that the identified sensitive areas are avoided and to create buffer zones for conservation purposes.

4.1.1.2 Access roads

The primary road to the proposed development site is a gravel road that connects to the N4.

4.1.1.3 Vegetation clearance

The Tlou gas-to-power facility will require approximately 0.6 hectares whereas 1km gas pipeline will require clearance of 36m servitude along the pipeline route. Only the immediate footprint within the study area will be cleared for construction. Further, clearance will be undertaken in accordance with the approved Environmental Management Programme (EMPr), permits, licences, Municipal by-laws as well as DNG Energy's policies and guidelines.

4.1.2 CONSTRUCTION OF THE TLOU GAS-TO-POWER FACILITY AND ASSOCIATED INFRASTRUCTURE

The exact specifications of the proposed Tlou gas-to-power facility will be clearly explained during the engineering phase of the development. However, the development is set to cover approximately one hectare. Based on the engineering scope, the technology options for phases 1 and 2 of the proposed development entail the use of a gas turbine. The client proposes to commence with a facility with a maximum of 620 MW using an Open Cycle Gas Turbine (OCGT) in phase 1, and later increase to a possible maximum capacity of 1000 MW using a Combined Cycle Gas Turbine in phase 2. The difference between OCGT and CCGT is that the latter uses a cycle configuration of combustion turbines, heat recovery steam generators, and steam turbines, to produce electricity.

The proposed development will ultimately include the construction of the following associated infrastructure:

- A gas pipe to connect to the proposed Tlou power station (approximately 1km);
- Development of an access road, which will be between 6-13 m wide;
- Building infrastructure which will include, but not limited to plant operational and maintenance building, ablution facilities, and offices;
- Transmission pipeline from the power plant to Eskom Khanyazwe substation, and
- Fencing to maximize security of the plant;

The construction phase of the proposed project will take approximately 18 months, and the activities to be undertaken are indicated on the map below and discussed hereunder. The general surface areas for the project components listed in Table 6 and presented in the map below. In order to meet the urgent additional generation capacity required in terms of the Risk Mitigation Independent Power Producer Procurement Programme (RMIPPPP) timeframe which is to connect power to the Eskom grid by June 2022, DNG Energy would aim to fast tract the construction timeframe as far as possible.

Table 5: Primary infrastructure

Project component	Area/length/Size	Servitude	Purpose
Power Plant	1 hectare	n/a	Generation of electricity using either the Open Cycle Gas turbine or Reciprocating Engines
Above ground gas pipeline	1km	36m	Transportation of gas from ROMPCO pipeline to the to the power plant
275kV Overhead transmission line	500m	55m	Transmission of electricity to the existing Eskom Khanyazwe substation.
Access/Service road	1km	8m	Access to the site for construction and service roads during the operational phase.
Above ground Storage tanks	500m^3	n/a	Will be used for gas storage on site.

4.1.3 REHABILITATION

On completion of construction work, the site will be rehabilitated as per the specifications of the EMPr, approved Method Statements and will meet the requirements of the Rehabilitation Plan. The rehabilitation activities will include:

- Removal of excess building material and waste;
- Repairing any damage caused by construction activities;
- Rehabilitating the area affected by temporary access roads;
- Reinstating existing roads; and
- Replacing topsoil and planting indigenous vegetation where necessary.

4.2 LISTED ACTIVITIES APPLICABLE TO THE PROJECT

The proposed development triggers listed activities in terms of 2014 EIA Regulations as amended, the National Water Act, 1998 (Act 36 of 1998) as well as the National Environmental Management: 1998 (Act 39 of 1998). The listed activities applicable are listed and briefly described in the Table 6 below:

Table 6: Listed activities applicable to the project

Listed Activity		Describe the portion of the proposed project to which the applicable listed activity relates
Applicable activities listed under the EIA Regulations of 2014 as amended – Listing Notice 1		
GNR 983 Activity 12	*"The development of—* *(i) infrastructure or structures with a physical footprint of 100 square metres or more* *(c) if no development setback exists, within 32 metres of a watercourse, measured from the edge of a watercourse."*	There is a watercourse less than 32m from the proposed project.
Activity 24	*"The development of a road:* *(ii) A road with a reserve wider than 13,5 meters, or where no reserve exists where the road is wider than 8 metres."*	The proposed project will require the development of an access road to the development site.
GNR 983 Activity 27	*The clearance of an area of 1 hectares or more, but less than 20 hectares of indigenous vegetation, except where such clearance of indigenous vegetation is required for—* *(i) the undertaking of a linear activity; or* *(ii) maintenance purposes undertaken in accordance with a maintenance management plan.*	The proposed power station will require a footprint clearance of more than 1ha but less than 20ha.
GNR 983 Activity 28	Residential, mixed, retail, commercial, industrial or institutional developments where such land was used for agriculture, game farming, equestrian purposes or afforestation on or after 01 April 1998 and where such development:	The proposed facility will be developed in an area that is currently used for agriculture, in an urban area. The footprint of the development will be bigger than 5 hectares.

Listed Activity		Describe the portion of the proposed project to which the applicable listed activity relates
	(i) will occur inside an urban area, where the total land to be developed is bigger than 5 hectares; or excluding where such land has already been developed for residential, mixed, retail, commercial, industrial or institutional purposes.	
Applicable activities listed under the EIA Regulations of 2014 as amended – Listing Notice 2		
GNR 984, Activity 2	*"The development and related operation of facilities or infrastructure for the generation of electricity from a non-renewable resource where the electricity output is 20 megawatts or more".*	The proposed project entails the development of a gas-to-power facility with a 620MW with output.
GNR 984, Activity 4	*"The development of facilities or infrastructure, for the storage, or storage and handling of a dangerous good, where such storage occurs in containers with a combined capacity of more than 500 cubic metres".*	The proposed project entails the development of above ground gas storage tanks with a capacity of more than 500 cubic metres.
GNR 984, Activity 6	*"The development of facilities or infrastructure for any process or activity which requires a permit or licence or an amended permit or licence in terms of national or provincial legislation governing the generation or release of emissions, pollution or effluent".*	The proposed development of the gas-to- power plant will require an Atmospheric Emission License (AEL) in terms of as National Environmental Management: National Environmental Air Quality Act, (Act 39 of 2004) (NEMAQA) for the burning of natural gas.
GNR 984, Activity 7	*"The development and related operation of facilities or infrastructure for the bulk transportation of dangerous goods-*	The proposed project entails the development of a gas pipeline from the existing ROPCOM gas pipeline to the gas-to- power facility.

Listed Activity		Describe the portion of the proposed project to which the applicable listed activity relates
	(i) *in gas form, outside an industrial complex, using pipelines, exceeding 1 000 metres in length, with a throughput capacity of more than 700 tons per day".*	
GNR 984, Activity 9	*"The development of facilities or infrastructure for the transmission and distribution of electricity with a capacity of 275 kilovolts or more, outside an urban area or industrial complex."*	The project involves the transmission powerline with a capacity of 275kV outside an industrial complex.
Applicable activities listed under the EIA Regulations of 2014 as amended – Listing Notice 3		

5 APPLICABLE LEGISLATION AND GUIDELINES

The EIA Regulations of 2014 as amended, under Appendix 2 Section 1(e) requires a description of applicable legislations in the Scoping Report. This section lists and describes the acts and legislations applicable to the proposed development and associated infrastructure. A list of the current South African environmental legislation, which is considered to be pertinent to the proposed development is described in Table 7 below.

Municipal policies, plans, and by-laws, as well as DNG Energy policies and world best practices, were considered during the undertaking of the EIA process. Table 7 below provides a description of legislations that apply to the project, it is not an exhaustive analysis; however, it provides a guideline to the relevant aspects of each legislation.

Table 7: Legislation pertaining to the proposed project

Aspect	Relevant Legislation	Brief Description
Environment	• National Environmental Management: Act 1998, (Act No. 107 of 1998) as amended. • Environmental Impact Assessment Regulations, December 2014 as amended	The overarching principles of sound environmental responsibility as reflected in the National Environmental Management Act, 1998 (Act No. 107 of 1998) apply to all listed projects. Construction and operation of activities must be conducted in line with the generally accepted principles of sustainable development, integrating social, economic and environmental factors. The EIA process followed is in compliance with the NEMA and the EIA Regulations of December 2014 as amended. The proposed development involves "listed activities", as defined by NEMA. Listed activities are an activity which may potentially have detrimental impacts on the environment and therefore require an EA from the relevant Competent Authority, in this case DEFF.
Biodiversity	National Environmental Management: Biodiversity Act, 2004 (Act No. 10 of 2004)	The purpose of the National Environmental Management Biodiversity Act, 2004 (Act No. 10 of 2004) (NEMBA) is to provide for the management and conservation of South Africa's biodiversity within the framework of the NEMA and the protection of species and ecosystems that warrant national protection. As part of its implementation strategy, the National Spatial Biodiversity Assessment was developed.
Protected Areas	National Environmental Management: Protected Areas Act, 2003 (Act No. 57 of 2003)	The purpose of this Act is to provide for the protection, conservation and management of ecologically viable areas representative of South Africa's biological diversity and its natural landscapes.
Heritage Resources	National Heritage Resources Act, 1999 (Act No. 25 of 1999)	The National Heritage Resources Act, 1999 (Act No. 25 of 1999) legislates the necessity for cultural and heritage impact assessment in areas earmarked for development, which

Aspect	Relevant Legislation	Brief Description
		exceed 0.5 ha. The Act makes provision for the potential destruction to existing sites, pending the archaeologist's recommendations through permitting procedures. Permits for this specific project would be administered by the Mpumalanga Heritage Agency or South African Heritage Resources Agency (SAHRA).
Air quality management and control	National Environmental Management: Air Quality Act, 2004 (Act 39 of 2004)	The objective of the Act is to protect the environment by providing reasonable measures for the protection and enhancement of air quality and to prevent air pollution. The Act makes provision for measures to control dust, noise and offensive odours. Section 32 of The National Environmental Management: Air Quality Act, 2004 (Act 39 of 2004) deals with dust control measures in respect of dust control. The National Dust Control Regulations (2013) provides for the management and monitoring of dust. Chapter 5 of NEMAQA deals with the control and management of emissions relates to the listing of activities that are sources of emissions and the issuing of emission licences in respect of these activities. These activities are listed in terms of GN 893 of 22 November 2013 and are broken up into 10 categories and associated sub-categories, including 'Liquid Fuel Combustion Installations' (Subcategory 1.2), 'Gas Combustion Installations' (Subcategory 1.4), 'Reciprocating Engines' (Subcategory 1.5) as well as the storage and handling of petroleum products (Subcategory 2.4).
Noise Management and Control	Noise Control Regulations in terms of the Environmental Conservation, 1989 (Act 73 of 1989)	The assessment of impacts relating to noise pollution management and control, where appropriate, must form part of the EMPr. Applicable laws regarding noise management and control refer to the National Noise Control Regulations issued in terms of the Environment Conservation, 1989 (Act 73 of 1989).

Aspect	Relevant Legislation	Brief Description
Water Resources Management	National Water Act, 1998 (Act 36 of 1998)	This Act provides for fundamental reform of law relating to water resources and use. The preamble to the Act recognises that the ultimate aim of water resource management is to achieve sustainable use of water for the benefit of all users and that the protection of the quality of water resources is necessary to ensure sustainability of the nation's water resources in the interests of all water users. The proposed activities will encroach on watercourses such as the wetlands located within and nearby the study area, therefore, the necessary licence will be obtained in due course.
Agricultural Resources	Conservation of Agricultural Resources Act, 1983 (Act No. 43 of 1983)	The Act aims to provide for control over the utilization of natural agricultural resources in order to promote the conservation of the soil, water resources and vegetation and to combat weeds and invader plants. Section 6 of the Act makes provision for control measures to be applied in order to achieve the objectives of the Act.
Human	The Constitution of South Africa, 1996 (Act No. 108 of 1996	The Constitution provides for an environmental right (section 24). The State is obliged "to respect, protect, promote and fulfil the social, economic and environmental rights of everyone…" The environmental right states that: "Everyone has the right -

Aspect	Relevant Legislation	Brief Description
		a) To an environment that is not harmful to their health or well-being; and b) To have the environment protected, for the benefit of present and future generations, through reasonable legislative and other measures that - • Prevent pollution and ecological degradation; • Promote conservation; and • Secure ecologically sustainable development and use of natural resources while promoting justifiable economic and social development."
Waste	National Environmental Management: Waste Act, 2008 (Act 59 of 2008)	This Act provides fundamental reform of the law regulating waste management in order to protect health and the environment by providing reasonable measures for the prevention of pollution and ecological degradation and for securing ecologically sustainable development. This Act also ensures the provision of national norms and standards for regulating the management of waste by all spheres of government. Further, it provides for specific waste management measures; licensing and control of waste management activities; remediation of contaminated land; compliance and enforcement; and for matters connected therewith.
Hazardous Substance Act	Hazardous Substance Act, 1973 (56 of 1973)	The Hazardous Substances Act controls the production, import, use, handling and disposal of hazardous substances. Under the Act, hazardous substances are defined as substances that are toxic, corrosive, irritant, strongly sensitising, flammable and pressure-generating under certain circumstances and may injure, cause ill-health or even death in humans.
Gas Act	Gas Act, 2001 (48 of 2001)	The Gas Act 48 of 2001 intends:

Aspect	Relevant Legislation	Brief Description
		• to promote the orderly development of the piped gas industry; • to establish a national regulatory framework; • to establish a National Gas Regulator as the custodian and enforcer of the national regulatory framework; and • to provide for matters connected therewith. The objects of this Act are to- (a) promote the efficient, effective, sustainable and orderly development and operation of gas transmission, storage, distribution, liquefaction and regasification facilities and the provision of efficient, effective and sustainable gas transmission, storage, distribution, liquefaction, re-gasification and trading services; (b) facilitate investment in the gas industry; (c) ensure the safe, efficient. economic and environmentally responsible transmission, distribution, storage, liquefaction and re-gasification of gas; (d) promote companies in the gas industry that are owned or controlled by historically disadvantaged South Africans by means of licence conditions so as to enable them to become competitive; (e) ensure that gas transmission, storage, distribution, trading, liquefaction and re-gasification services are provided on an equitable basis and that the interests and needs of all parties concerned are taken into consideration; (f) promote skills among employees in the gas industry; (g) promote employment equity in the gas industry; (h) promote the development of competitive markets for gas and gas services; (i) facilitate gas trade between the Republic and other countries; and

Aspect	Relevant Legislation	Brief Description
		(j) promote access to gas in an affordable and safe manner.
Electricity Regulation Act	Electricity Regulation Act, 2006 (Act 4 of 2006)	The Electricity Regulation Act 4 of 2006 intends: • to establish a national regulatory framework for the electricity supply industry; • to make the National Energy Regulator the custodian and enforcer of the national electricity regulatory framework; • to provide for licences and registration as the manner in which generation, transmission, distribution, trading and the import and export of electricity are regulated; and • to provide for matters connected therewith.
Conservation	Mpumalanga Nature Conservation Act, 1998 (Act No. 10 of 1998)	This Act makes provision with respect to nature conservation the Mpumalanga province. It provides for, among other things, protection of wildlife, hunting, fisheries, protection of endangered fauna and flora as listed in the Convention on international Trade in Endangered Species of Wild Fauna and Flora, the control of harmful animals, freshwater pollution and enforcement.
Climate Change	Climate Change Bill (2018)	The objects of the Act are to: a) provide for the coordinated and integrated response to climate change and its impacts by all spheres of government in accordance with the principles of cooperative governance; b) provide for the effective management of inevitable climate change impacts through enhancing adaptive capacity, strengthening resilience and reducing vulnerability to climate change, with a view to building social,

Aspect	Relevant Legislation	Brief Description
		economic, and environmental resilience and an adequate national adaptation response in the context of the global climate change response; c) make a fair contribution to the global effort to stabilise greenhouse gas concentrations in the atmosphere at a level that avoids dangerous anthropogenic interference with the climate system within a timeframe and in a manner that enables economic, employment, social and environmental development to proceed in a sustainable manner. The National Greenhouse Gas Emission Reporting Regulations have been promulgated in terms of NEM: AQA for the purpose of introducing a single national reporting system for the transparent reporting of greenhouse gas emissions. The regulations apply to the categories of emission sources listed in Annexure 1 to the regulations and include electricity production exceeding 10 MW. Tier 1 reporting is required as a minimum, with a five year grace period applicable before reporting of the lower tiers.

5.1 POLICIES AND GUIDELINES

The following guideline documents have been considered in the preparation of this report:

- Department of Environmental Affairs (DEA) Integrated Environmental Management Guideline Series 7, Public Participation in the EIA Process as published in Government Gazette No. 33308, 18 June 2010;
- Implementation Guidelines (published for comment) in Government Notice 603 of 2010;
- Integrated Environmental Management Information Series (Booklets 0 to 23) (DEAT, 2002 – 2005).

6 DESCRIPTION OF THE NEED AND DESIRABILITY OF THE PROPOSED ACTIVITY

This section provides justification for the need and desirability of the proposed development with a focus on its associated benefits and importance to both the locals and the region at large.

6.1 MOTIVATION FOR THE DEVELOPMENT

In 2012, the Minister of the Department of Mineral Resources and Energy indicated the need for new energy generation capacity that should be procured from hydro, coal, and gas sources to support South Africa's baseload energy mix and generation from gas and cogeneration as part of the medium-term risk mitigation project programme. The determinations require that 3126MW of baseload and/or mid-merit energy generation capacity is needed from gas-fired power generation to contribute towards energy security. The gas required for such power generation will be from both imported and domestic gas resources.

In the absence of available natural gas within South Africa and to ensure new capacity is delivered in timescales corresponding with the objectives of the medium-term risk mitigation project, it is recognised that it will be necessary to import gas, in the form of either Liquefied Natural Gas or compressed natural gas. Consequently, the Gas to Power Programme is designed as a potential means to catalyse the importation of such gas. It is anticipated that Eskom Holdings (SOC) Limited, in its capacity as the single buyer of electrical energy, will be the sole buyer of electrical capacity and energy generated under the Gas to Power Programme.

The initial period of the development of South Africa's gas industry could be anchored on demand provided by the Gas –to- Power Programme. In support of the vision for the South African gas programme, the DMRE is developing an LNG to Power Independent Power Producer Procurement Programme (IPPPP). Therefore, Third Party Access will be a fundamental aspect of the LNG to Power IPP Programme. This will enable the development of gas demand by third parties and the associated economic development.

DNG Energy is championing the use of LNG for road and maritime transport, specifically for mini-bus taxis, trucks, buses, and shipping, as a first step in contributing to sustainable development. DNG Energy is creating a pan African LNG supply network. Over the next five years, the company will be investing around USD5 billion to bring this affordable energy alternative to the market. The environmental, social, and economic benefits that come with the use of LNG include helping the country meet its targets in reducing greenhouse gas emissions, driving economic growth, and improving the lives of all citizens.

With development and expansion infrastructure programmes planned for South Africa, Mozambique, and Nigeria in the first instance, DNG Energy is looking at the LNG value chain from source to consumption holistically. The transport

of the LNG from the exporting countries to South Africa will happen predominantly via sea. DNG Energy has commissioned South African Shipyards to build an 8,000 tons LNG barge, the largest vessel by weight ever built on the African continent, and it will come into service in the near future.

At a national level, South Africa is facing significant electricity shortages as well as water scarcity. The proposed project aims to supply additional electricity to the national grid, without intensive use of water, while also being approximately 40% less CO2 intensive than conventional coal-fired electricity generation. Significantly, with the proposed maximum project generation at 1000 MW, the project will reduce the risk of rolling electricity blackouts. The benefit of the proposed facility and its location and contribution will furthermore allow for the increased focus on developing desired industrial capabilities, “host regions” for development, and comprehensive planning and design to accommodate the diverse regional development needs and contexts.

Gas-to-power generation has increased significantly in the past few years, with gas overtaking coal as the main energy source in some countries. Electricity generation from natural gas offers greater efficiency and lower CO2 emissions than coal and other operational advantages such as compact generators and lower water use.

Furthermore, the natural gas discoveries in southern Africa have increased the potential for gas-to-power generation in this country. The development of the gas-powered sector will likely accelerate in the near future.

6.2 BENEFITS OF THE PROJECT

Natural gas is expected to play a central role in supporting Africa’s drive to achieve electricity connection for nearly 600 million people without access to the grid, to reduce widespread reliance on coal for power generation, and to fast-track the continent’s slowed industrial expansion

Consequently, this project aims to respond to the government initiative, which is driven by the need to diversify the country energy sources and created a balanced and more sustainable energy mix. The proposed project will ensure the following:

- Create opportunities within the gas space;
- Reduce greenhouse gas emission;
- Ensure a balanced and cleaner energy supply; and
- Improvement of South Africa’s socio-economic status.

The socioeconomic benefits expected from the development include the following:

- Short term, there will be minimal job opportunities during the construction of the proposed infrastructure. These include skilled, semi-skilled, and under-skilled labors, which could consist of locals (in and around the industrial area), including regional and national communities.
- Natural gas is capable of providing more than just electrical power; it will also provide direct heat and chemical feedstock for industrial processes, commercial and residential cooking and heating applications, as well as an alternative fuel source for transport. South Africa has already seen a partial reduction in electricity demand because of trends such as the increasing use of LPG for cooking and space heating.

There are several advantages of Gas-to-Power for the Western Cape and South African energy supply:

- A gas power plant is far less complex than a coal-fired power plant and hence has shorter construction times, which is crucial in addressing South Africa's current short-term electricity demands.
- In terms of environmental impacts, a gas-powered plant has approximately 40% less CO_2 emissions per unit of power than coal, due partly to greater efficiency, but mainly due to the hydrogen content. Rapid start-up, ramp-up, and ramp-down times enable gas power systems to follow variable and rapidly to change generation patterns of renewable energy sources.
- New gas field discoveries on the east and west coasts of Southern Africa, as well as the development of stranded reserves, have opened the possibility of increased imports of gas, either via pipeline or in the form of liquefied natural gas (LNG).
- Gas-fired power plants are the first choice to balance the variability of renewables, and co-location of gas-to-power and Renewable Energy (RE) would seem to be a logical step. It may provide leverage for the development of shale gas power. The co-location of Gas power plants with RE seems to be a logical conclusion.

6.3 SUPPORTING STRATEGIES

At the regional level, the project would contribute to improvements in the socioeconomic status of the adjacent communities and the region at large. At the national level, the project would contribute to implementing South Africa's new energy policy as embodied in the White Paper on Energy (Department of Minerals and Energy, 1998), which highlights that amongst others, coal plays a central role in the socio-economic development of our country, while simultaneously providing the necessary infrastructural economic base for the country to become an attractive host for foreign investments in the energy sector. The priorities to which this project would contribute are laying the groundwork for enhancing cleaner energy supply. Several national policy documents, including the White Paper on the Energy Policy of South Africa, approved in 1998; the National Development Plan ("NDP"); the draft Integrated Energy Plan; and the Integrated Resources Plan 2010–2030 present the case for natural gas as a significant contributor to South Africa's energy mix.

7 DESCRIPTION OF THE PROCESS FOLLOWED TO REACH THE PROPOSED PREFERRED, SITE AND LOCATION WITHIN THE SITE

The identification of alternatives is a crucial component of the EIA process. The identified alternatives are assessed in terms of environmental acceptability, technical and economic feasibility during the EIA process, wherein the preferred alternative is highlighted and presented to the Authorities.

South Africa has proposed a 20-years Integrated Resource Plan (IRP) outlining a new power generation program to 2030. The program will use various renewable energies and natural gas to produce electricity. The site selection process focused on reviewing the IRP and associated documents that address current and future development in and around the area. The selection of project site alternatives was based primarily on the DMRE's pre-feasibility study that technically determined the broad location based on the need of the project. Further, a detailed public consultation is being undertaken to assess the viability of the selected sites to meet the need and desirability of the project. Within the larger area, other technical alternatives will be assessed to ensure that the most feasible options are considered in consideration of their functionality and the environment. The public participation will also enhance the selection of alternatives in that it will allow the various stakeholders to comment on the proposed options and make recommendations meaningfully.

Consideration of specialist and technical input will culminate in selecting the preferred alternative. After approval by the Department, the EAP recommends that the exact footprint within the approved corridor alternative site be determined. Such will be achieved by undertaking a walk down with the specialist team, particularly the wetland, heritage, and avifauna. The profiling of the powerline will seek to avoid sensitive environments as far as practically possible.

Further, a detailed public consultation is underway to assess the viability of the selected options, resulting in the identification of more options for consideration to determine the economic need and desirability of the project.

7.1 DETAILS OF ALTERNATIVES CONSIDERED

This section describes the alternatives/ options considered and includes the location and route alignments options as well as no-go alternatives which are discussed below.

7.1.1 TECHNICAL ALTERNATIVES

7.1.1.1 Power generation technology

DNG Energy has considered various technology options which include the OCGT and Reciprocating Engine. Several aspects including technical, economic and environmental are considered in selecting the most suitable technology. However, of the many technologies available the project is considering either the OCGT or the reciprocating engine.

Reciprocating internal combustion engines, which are typically used for backup, standby, or emergency power, are now becoming increasingly popular for larger utility-scale power generation applications, especially in areas with high levels of electricity generation from intermittent sources such as wind and solar. The recent increase in natural gas or dual-fuel capable reciprocating internal combustion engine units has been driven in part by advancements in engine technology that increase operational flexibility and by changes in natural gas markets that have generally provided ample supply and relatively stable fuel prices.

7.1.1.1.1 Open Cycle Gas Turbine (OCGT)

From higher efficiency and lower costs to faster, cleaner, higher quality power generation, gas turbines have many advantages:

- Cheaper, cleaner, faster power –turbines provide cheaper power, a better-quality grid and cleaner power with lower emissions, when compared to reciprocating engines. They can be installed quickly (in as little as a few weeks) to help alleviate frequent outages, making them especially well-suited for utility and industrial applications.
- Higher efficiency with lower costs - A highly efficient turbine in a combined cycle can consume only about 2 mL/MWh of lube oil per year—200 times less than a reciprocating engine. That can translate to a savings of more than $1 million per year for a 100 MW power plant.
- Higher efficiency with lower costs - Gas turbines need maintenance only once a year, or when they have been in operation for 4,000 hours. These engines can save more than 13,000 man-hours over a 3-year maintenance cycle.
- Plant availability and fuel flexibility - Gas turbines have the highest availability of any thermal power technology. It can be replaced in a power plant, such as a utility or power plant, within a few days for a major inspection, which translates to higher availability—98.2%
- Plant availability and fuel flexibility - With the ability to operate on a wide spectrum of fuels (e.g., natural gas, LPG, isopentane, ethanol, diesel, and Coke Oven gas), gas turbines can allow power customers to switch between fuels to save money, all without stopping, and without a power reduction. Using diverse fuel sources doesn't just increase reliability, it also results in significant fuel savings—from $12 million up to $43 million per year.
- Getting power to the grid, wherever it's needed - Because they are small and modular, turbine engines can be transported, installed and commissioned in as little as 3 months. They can be installed outdoors with

minimal foundation requirements, making them an advantageous energy solution for any region across Africa that needs fast, clean, reliable power.

- Getting power to the grid, wherever it's needed - gas turbines feature a power turbine and high-pressure shaft that work together to respond quickly to grid frequency fluctuations, helping create a more stable and reliable grid.
- Smaller and more stable - Because they have about 22 times more power output per unit than comparable high-speed diesel reciprocating engines, gas power plants take up less space.

7.1.1.1.2 Reciprocating Engines

- High-speed reciprocating engines—can require up to 50 times more maintenance events per year.
- The power generated by reciprocating engines, average to about 93% availability.
- Fuel costs of a high-speed reciprocating engine are high.
- Fuel savings range based on a natural gas price of $1–4/MMBTU and a diesel gas price of $6–12/MMBTU (One million British Thermal Units)
- In comparison to OCGT which take 6 – 8 months, Reciprocating Engines can take up to 12-18 months to construct.
- Require bigger space for similar energy output, compared to OCGT.

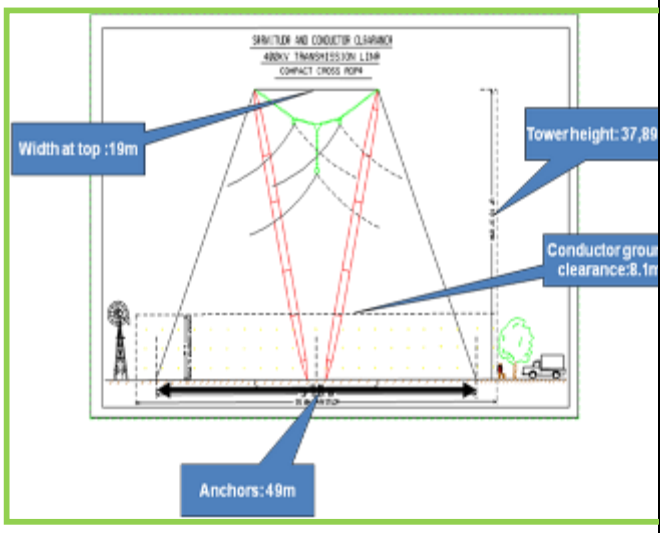
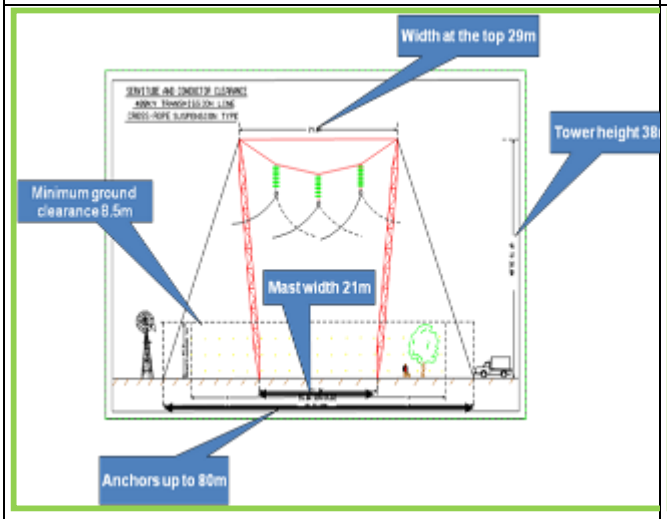
7.1.2 STRUCTURAL ALTERNATIVES FOR THE POWERLINE

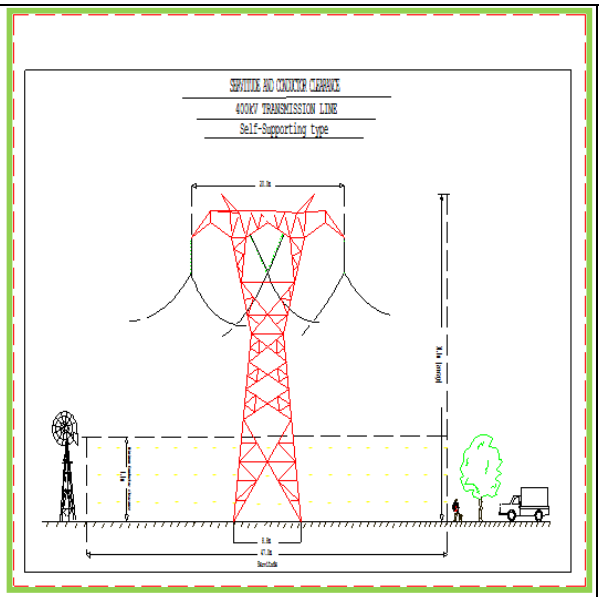
Several design alternatives have been proposed for the proposed transmission powerline, and they include one or more of the following single circuit pylons:

- Cross-Rope suspension type;
- Self-supporting type; and
- Guyed V towers.

These are illustrated in Table 7 below. It is important to note that the topography will largely dictate the types of towers to be used. From this perspective, it should be noted that where the line crosses steep, undulating terrains and when it changes direction at an angle, there will be a need to use self-supporting towers.

Table 8: Design alternatives for the powerline

	
Guide V tower	**Photographic Guide V tower**
	
Cross rope suspension tower.	**Photographic illustration of a Cross rope suspension tower.**

	
Self-supporting suspension tower.	**Self-supporting suspension tower.**

None of the above options have been dismissed and remain alternatives depending on the terrain and topography. Taking into consideration aspects such as visual; the selection of the pylons to be used for the proposed powerline will take the potential impacts into consideration.

7.1.2.1 Underground vs above ground powerline

Two technical alternatives have been identified for the proposed project, i.e., the overhead powerline and underground cabling. Instead of constructing the proposed powerline above ground, underground construction is considered to be an alternative. The advantages of the underground alternative would include a reduced impact on bird interaction and a distinct visual impact benefit.

However, for the proposed development, the underground powerline alternative would not be the most feasible owing to the nature of the soil (sandy). This could cause major technical problems and would have significant environmental implications. Technically, underground cables need to be insulated against the surrounding soil. On low voltage reticulation networks (11kV & 22kV), the heat generated by the cable is low enough for standard insulation to be used; however, on larger power lines (i.e., 400kV as proposed), the method of electrical and heat insulation becomes more burdensome.

Control of electrical losses and heat is critical for underground cables. As a result, cables are as much as four times the diameter and ten times the weight of equivalent overhead lines. Heat control is also a factor in the laying of the cables. The three phases of low and medium voltage cables (up to 132kV) can be placed in the same trench, while the phases for high voltage cables must be spaced apart, typically in a flat formation.

Bush fires, lightning strikes, and bird-related faults make up 80% of faults on overhead transmission power lines in South Africa; however, such risks are not associated with underground cables. Further, faulting on underground cables is rare. When faults occur on overhead lines, they are usually re-energised by automatically reclosing the circuit-breaker within a few seconds of the fault. More serious faults, such as a damaged line may be easily found and repaired within a few days at most. Underground cables have faults that are almost exclusively permanent, requiring inspection and correction on site. This usually requires excavating a section of the powerline. As a result, finding the location of faults is not easy unless there is clear evidence of excavation damage. Therefore, the search and repair of underground cables can take several weeks. This may severely compromise the network of the operation.

Economically, costs vary and are dependent on terrain, land use and size of the powerline. However, underground cabling is in orders of magnitude greater than overhead power lines. There is not much expertise for higher voltage underground cabling in the country; thus, such expertise would have to be sourced from the international market. In terms of maintenance, underground cables are reported to be much more reliable, but outages are more challenging to fix as it is harder to find the faults, and therefore the outages last much longer. The lifespan for underground cables is reported to be much shorter, about half that of overhead power lines.

The underground option is not viable for this development, particularly given the length, voltage, and nature of the soil. As such, it will not be assessed further during this phase.

7.2 NO-GO ALTERNATIVE

Under GN R.982, consideration must be given to the option not to act, in which an alternative is usually considered when the proposed development is envisaged to have significant adverse environmental impacts that mitigation measures cannot ameliorate effectively. There would be no economic benefits, i.e., extended employment for local communities. The no-go alternative would be the option of not undertaking the development of the proposed project. It would imply that the current electricity supply network is not strengthened, industrial development in the area will be hindered and the integration of potential renewable energy in the area will not be possible. Should the no-go alternative be adopted, the country will be deprived of a much needed essential service, particularly given the already existing energy supply challenge countrywide. Furthermore, the identified benefits will not materialize. The no-go alternative will be used as a baseline throughout the assessment process against which potential impacts will be compared and assessed in the EIR.

8 PUBLIC PARTICIPATION PROCESS

Public Participation Process (PPP) is any process that involves the public in problem-solving and decision-making; it forms an integral part of the Scoping and EIA process. The PPP provides I&APs with an opportunity to provide comments and raise issues of concern or to make suggestions that may result in enhanced benefits for the project.

On the 15th of March 2020, the President of South Africa announced the COVID-19 pandemic as the National State of Disaster, which was followed the country's locked down. Subsequently, on the 5th of June 2020, the Department of Environment, Forestry, and Fisheries (DEFF) issued a Directive, which purpose is to curtail the threat posed by the COVID-19 pandemic; alleviate, contain and minimise the effects of the national state of disaster, in particular, to provide directions to ensure fair licensing processes and public participation process as required by the law.

The Public Participation approach adopted in this plan is in line with the process contemplated in Regulation 39 through 44 of the EIA Regulations of 2014 as amended in terms of the National Environmental Management Act, 1998 (Act 107 of 1998), and Annexures 2 and 3 of Government Notice No 43412 of 5th of June 2020. The Notice requires that the EAP must ensure that:

- All reasonable measures are taken to identify potentially Interested and Affected Parties (I&APs); and
- Participation by registered I&APs facilitated such that they are provided with a reasonable opportunity to comment on the application.

Chapter 6, Regulation 39 through to 44, of the EIA Regulations, stipulates that the person conducting a public participation process must take into account any relevant guidelines applicable to public participation as contemplated in section 24J of the Act and must give notice to all potential interested and affected parties of an application or proposed application which is subjected to public participation by.

Public Participation principles hold that those affected by a decision have the right to be involved in the decision-making process. The primary objectives of conducting the PPP is to provide I&APs with an opportunity to express their concerns and views on issues relating to the proposed project. The principles of public participation are to ensure that the PPP:

- Communicates the interests of and meet the process needs of all participants;
- Seek to facilitate the involvement of those potentially affected;
- Involves participants in defining how they participate; and
- Is as inclusive and transparent as possible; it must be conducted in line with the requirements of Regulations as amended.

8.1 APPROACH AND METHODOLOGY

The public participation approach adopted in this plan is in line with the process contemplated in Regulation 39 through 44 of the EIA Regulations as amended in terms of NEMA and Annexures 2 and 3 of Government Notice No 43412 of 5th of June 2020.

8.1.1 IDENTIFICATION OF INTERESTED AND AFFECTED PARTIES

The identified parties include pre-identified government and land owners. Further, an opportunity has been given to I&APs to register. The stakeholders identified include the following:

- Mpumalanga Department of Agriculture and Rural Development and Land Administration
- Mpumalanga Department of Human Settlements, Water and Sanitation;
- Mpumalanga Department of Transport and Public Works;
- N4 Trans African Concessions (TRAC)
- Mpumalanga Heritage Resources Agency;
- South African Heritage Resource Agency;
- Wildlife and Environmental Society of South Africa;
- Ehlanzeni District municipality;
- Nkomati Local Municipality; and
- Eskom SOC Limited – Transmission.

8.1.2 PUBLIC PARTICIPATION DATABASE

In accordance with the requirements of the EIA Regulations under Section 24 (5) of NEMA, Regulation 42 of GN R. 982, a register of I&APs must be kept by the public participation practitioner. In fulfilment of this requirement, such a register is compiled and details of I&APs including their comments will be updated throughout the project cycle. The database is attached as **Appendix D2.**

8.1.3 SITE NOTICES

A2 size notices will be fixed at different conspicuous locations within and around the proposed project study area, and photographic evidence included in the Final Scoping Report. Identified locations include the boundary of the proposed site, the Eskom Khanyazwe substation, the Malelane public library, along the N4, as well as around the shopping center around the proposed area site.

8.1.4 PLACEMENT OF AN ADVERTISEMENT IN THE LOCAL NEWSPAPER

An advertisement has been placed on Lowvelder newspaper on the 15th October 2020 to inform I&APs of the proposed project, availability of the Scoping Report, and public meetings. The Draft Scoping Reports will be placed for review and comment at the Public library and other surrounding public areas on the 19th of October 2020 for 30 days.

8.1.5 PUBLIC MEETINGS

In line with the requirements of the COVID-19 Regulations, and in the interest of the health and safety of our communities, all engagements, including public meetings will be conducted virtually. A zoom meeting has been scheduled, and the details published in The Lowvelder newspaper.

8.2 A SUMMARY OF ISSUES RAISED BY INTERESTED AND AFFECTED PARTIES

The issues, comments, and concerns raised during the public participation process, together with the responses provided by the Environmental Assessment Practitioner (EAP), will be incorporated into the Issues and Response Report.

9 DESCRIPTION OF THE ENVIRONMENTAL ATTRIBUTES ASSOCIATED WITH THE ALTERNATIVES FOCUSING ON THE GEOGRAPHICAL, PHYSICAL, BIOLOGICAL, SOCIAL, HERITAGE AND CULTURAL ASPECTS

This section outlines parts of the socio-economic and the biophysical environment that are likely to be affected during the construction, operational, or during the decommissioning phase of the proposed development. Based on (1) the description of the project (as discussed earlier), and (2) the knowledge of the existing environment; the potential interactions between the project and the environment are presented. Moreover, the potential impacts of the project on the human environment, socio-economic conditions, physical and cultural resources are also presented.

9.1.1 SOCIO-ECONOMIC DESCRIPTION

This section presents the socio-economic aspects focusing on the Province and Municipalities within which the proposed study area is located.

9.1.2 PROVINCIAL DESCRIPTION OF THE PROPOSED PROJECT

Mpumalanga Province is located in the north-eastern part of South Africa. The province borders two of South Africa's neighbouring countries viz. Mozambique and Swaziland; and other South African provinces namely; Gauteng, Limpopo, KwaZulu-Natal and Free State Provinces. Mpumalanga is characterised by the high plateau grasslands of the Middleveld, which rolls eastwards for hundreds of kilometres. In the north-east, it rises towards mountain peaks and terminates in an immense escarpment (www.municipalities.co.za).

The Mpumalanga Province covers an area of 76 495km² and has a population of approximately 4 335 965 (IDP, 2017). The capital city of Mpumalanga is Mbombela (previously known as Nelspruit) and other major cities and towns include Emalahleni (previously known as Witbank), Standerton, eMkhondo (previously known as Piet Retief), Malelane, Ermelo, Barberton and Sabie. The province is divided into three district municipalities namely, Gert Sibande, Ehlanzeni

and Nkangala Districts. The three districts are further subdivided into 17 Local Municipalities of which the proposed development falls within the Nkomazi Local Municipality of the Ehlanzeni District Municipality.

9.1.3 DISTRICT MUNICIPALITY WITHIN WHICH THE STUDY AREA IS LOCATED

The proposed development will be undertaken within the Ehlanzeni District Municipality, which is a Category C municipality in the Mpumalanga Province which comprises of five local municipalities i.e. Bushbuckridge, Mbombela, Thaba Chweu, Umjindi and Nkomazi (www.municipalities.co.za), the District's headquarters are in Mbombela. The economic growth within the district is through the Maputo Corridor and tourism development. The proximity to the Gauteng province opens opportunities to a larger market, which is of benefit to the district's agricultural and manufacturing sectors. The main economic sectors within the District include mining, manufacturing, energy and agriculture.

The district municipality is also rich in terms of its biodiversity and mineral resources. Gold mines are operating at Barberton and Pilgrims Rest and chrome mines at Lydenburg. The future development of the Eastern Limb of the Bushveld Complex directly west of Lydenburg will also influence on the future land use patterns within the Thaba Chweu Local Municipality.

The biodiversity within Ehlanzeni also plays a significant role in terms of boosting the tourism industry with the Kruger National Park as one of the major destinations for international and domestic tourism. Tourism, like agriculture, is among other land-use patterns, which uses land extensively because of the availability of natural resources.

9.1.4 LOCAL MUNICIPALITY WITHIN WHICH THE PROPOSED STUDY AREA IS LOCATED

The proposed development is located within the Nkomazi Local Municipality which is a Category B municipality with a total area of 4 787km² within the Ehlanzeni District Municipality. The municipality is strategically placed between Swaziland (north of Swaziland) and Mozambique (east of Mozambique). It is also bounded by Kruger National Park to the north and City of Mbombela Local Municipality to the west. It is the smallest of four municipalities in the district, making up 17% of its geographical area. It is linked with Swaziland by two provincial roads, and with Mozambique by a railway line and the main national road (N4), which forms part of the Maputo Corridor.

9.1.5 CLIMATIC CONDITION OF THE PROPOSED AREA

Mpumalanga has a sub-tropical climate characterised by hot summers and mild to cool winters shifting to cold and frosty conditions in the Highveld regions. World Climate Data presented in the province's Vulnerability Assessment Report shows that the current mean annual temperatures are highest in the north-west and northeast regions of the province, while mean annual precipitation tends to increase towards the eastern regions of the Province. The province is characterised by summer rainfall and thunderstorms, except the escarpment area which receives fair levels of precipitation throughout the year (MCCVA, 2015). Mpumalanga has an average temperature of 20˚C. Middelburg, in

the heart of the Highveld, experiences summer rain and has a summer (October to February) to winter (April to August) range of around 19ºC with average temperatures in the contrasting seasons, of 26ºC and 8ºC. Figure 3 below shows that the average temperature for the Nkomazi Local Municipality is between 22.1 ºC and 23.7 ºC.

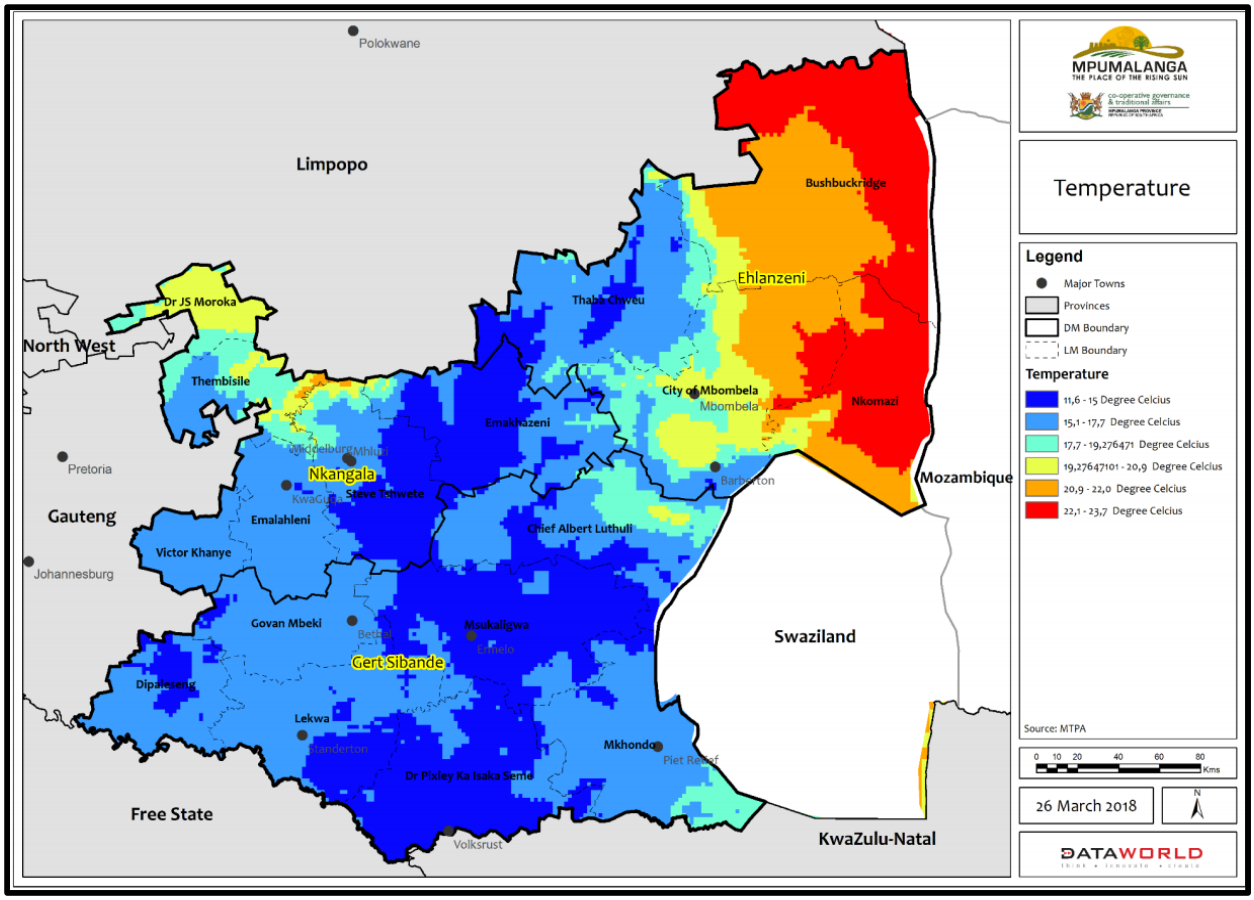


Figure 4: Temperature in Mpumalanga (Mpumalanga Development Spatial Framework, 2018).

The region experiences a summer-rainfall area separated by the escarpment into two, namely, (a) the Highveld, which is characterised by cold frosty winters and moderate summers, and the (b) Lowveld which is characterised by mild winters and subtropical climate. During winter the Highveld and Escarpment sometimes experience snow. The annual rainfall occurs mainly during summer in the form of heavy thunderstorms. Given its location between the Drakensberg Escarpment and Vaal River traversing through Mpumalanga, the diverse climate in the region makes the production of a wide variety of crops possible. The Lowveld is subtropical and due to its latitude and proximity to the warm Indian Ocean, it is also renowned for citrus and subtropical fruits. The Highveld is comparatively much cooler, due to its altitude, produces much of the summer grains, such as maize and grain sorghum. Exotic trees, plantations such as gum and wattles cover most of the hills on the Escarpment as it receives the most precipitation, with all other areas being moderately hydrated by mostly thunderstorms. Figure 5 below shows that the mean annual rainfall in Malelane is between 593.1mm and 748mm.

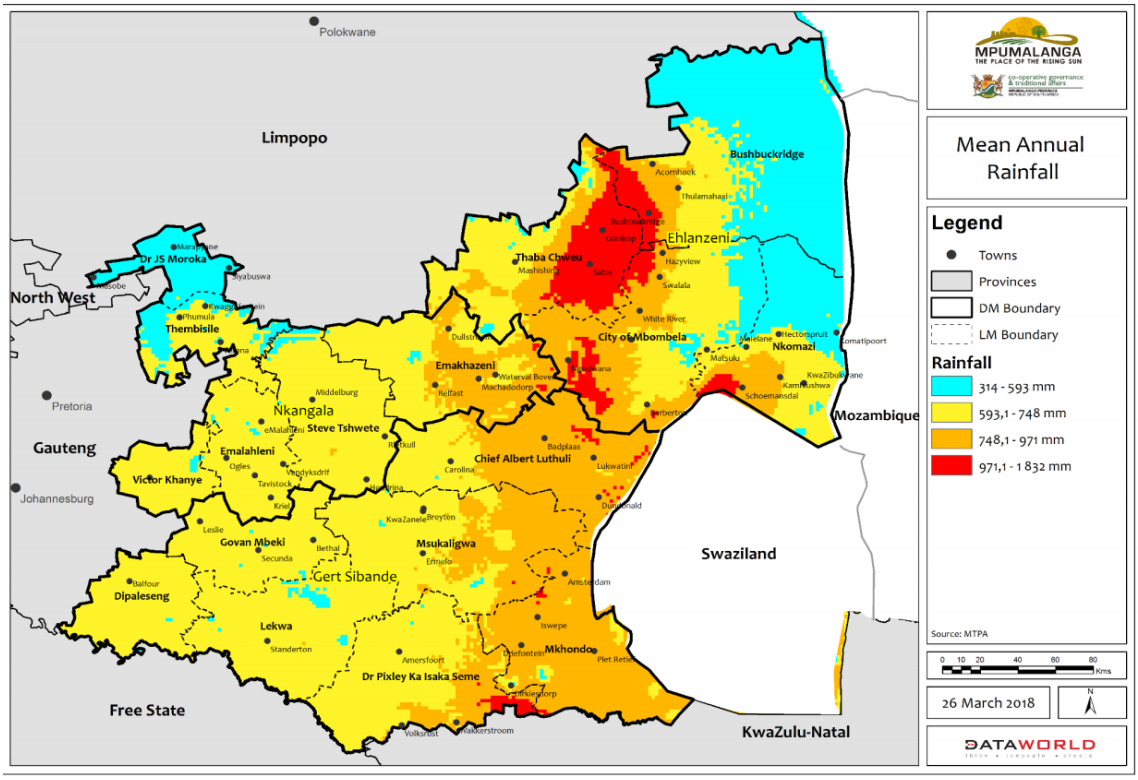


Figure 5: Mean annual rain fall in Mpumalanga (Mpumalanga Development Spatial Framework, 2018).

9.1.6 GEOLOGY WITHIN THE STUDY AREA

Mpumalanga contains within its boundaries evidence of the earliest phases of the history of the world. The Province is characterised by the presence of most the geological formations in the country such as the Witwatersrand Supergroup (gold ore resources), Bushveld Complex (platinum group of minerals), and the Basement Complex geological formations. The Basement Complex is found in the Lowveld as scattered patches in the Southern Highveld (McCarthy and Rubidge, 2005). The stratum consists of various rocks such as dolerite, granite gabbro, gneiss, norite, tuff, and shale. The Barberton Supergroup represents the greenstone belts in Mpumalanga. The greenstone is economically important and made up of valuable deposits such as many golds, antimony, copper-zinc, iron, asbestos, talc, mercury, magnesite, and gemstone. The Lowveld region of the province is underlaid by African Cratonic Basement rocks which date more than 2 billion years, with the Highveld region made up of Karoo Sequence sedimentary rocks of a younger, Carboniferous to Permian age.

A large proportion of Nkomazi Local Municipality is underlain with quartz monzonite (30.7%) to the south and central region. Basalt is the second most dominant (16.5%) geology type, located to the east. The northwestern part is predominantly underlain with arenite and lava. The least occurring geology types are ultramafic rocks, granophyre, gabbro and dolorite. According to Figure 6, the study area is characterized by the following land types:

- Ea75 – predominantly mafic and ultramafic lavas and schists with banded ironstone and chert of the Tjakastad formation (Onverwacht Group); some mafic to felsic sediments and schists of the Moodies Group (Barberton Sequence).
- Fb162 – Greywacke, shale and chert of the Sheba Formation (Fig Tree Group); mafic and altramafic schists and lavas, as well as banded ironstone and chert of the Tjakastad formation (Onverwacht Group); shale, quartzite, conglomerate and basalt of the Moodies Group.

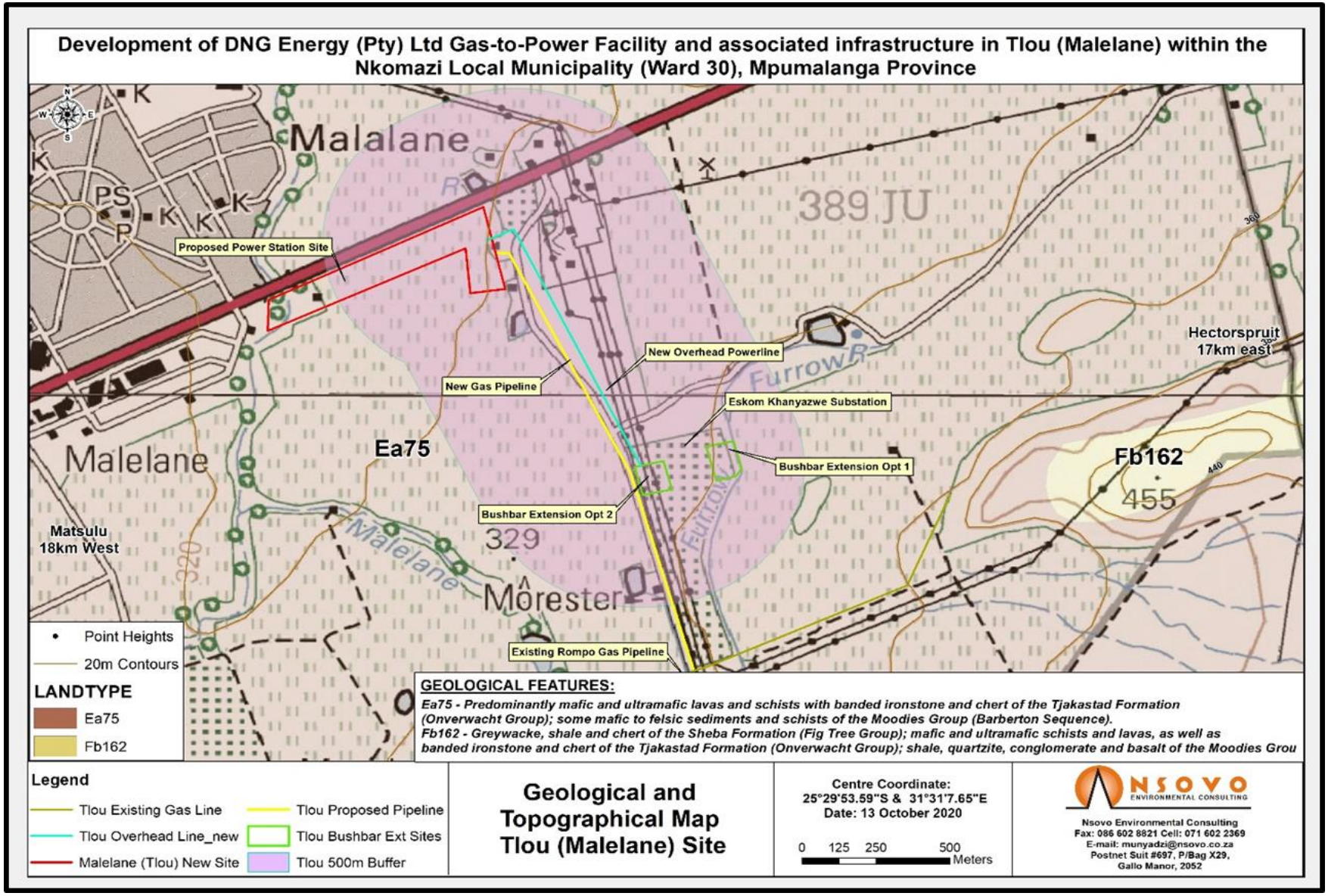


Figure 6: Geological map of the study area

9.1.7 TOPOGRAPHY OF THE STUDY AREA

The topography of Mpumalanga region is a varied one, comprising of the Highveld (high lying) and the Lowveld (low lying) regions. Mpumalanga is mainly situated on the high plateau grassland known as Highveld. The Highveld stretches for hundreds of kilometres eastwards, until it rises towards mountain peaks and deep valleys of the Escarpment in the north-east. From the escarpment, it plunges hundreds of meters down to the low-lying area known as the Lowveld. The Province's landscape is characterised by the Northern Drakensberg escarpment, grasslands, numerous valleys, mountain passes, rivers, waterfalls, wetlands, and forests. The Bushveld includes the southern part of the famous Kruger National Park area. The central part of the province, being a part of the escarpment, is mountainous and consists of alpine grasslands and the Afromontane forest. The Lowveld region is mostly flat with some rocky outcrops, where the study area is located.

9.1.8 HYDROLOGY

The proposed study area falls under the Komati Catchment Area and quaternary catchment X24D. The quaternary Catchment receives 816.11 mm/annum. There are no NFEPA wetlands that have been noted around the site, however, two artificial wetlands are present to the east of the gas pipeline and south of the site. The Malelane River is noted on the western boundary of the site. There are no NFEPA Rivers that were noted in proximity to the site. Refer to Figure 7 below for the hydrological map.

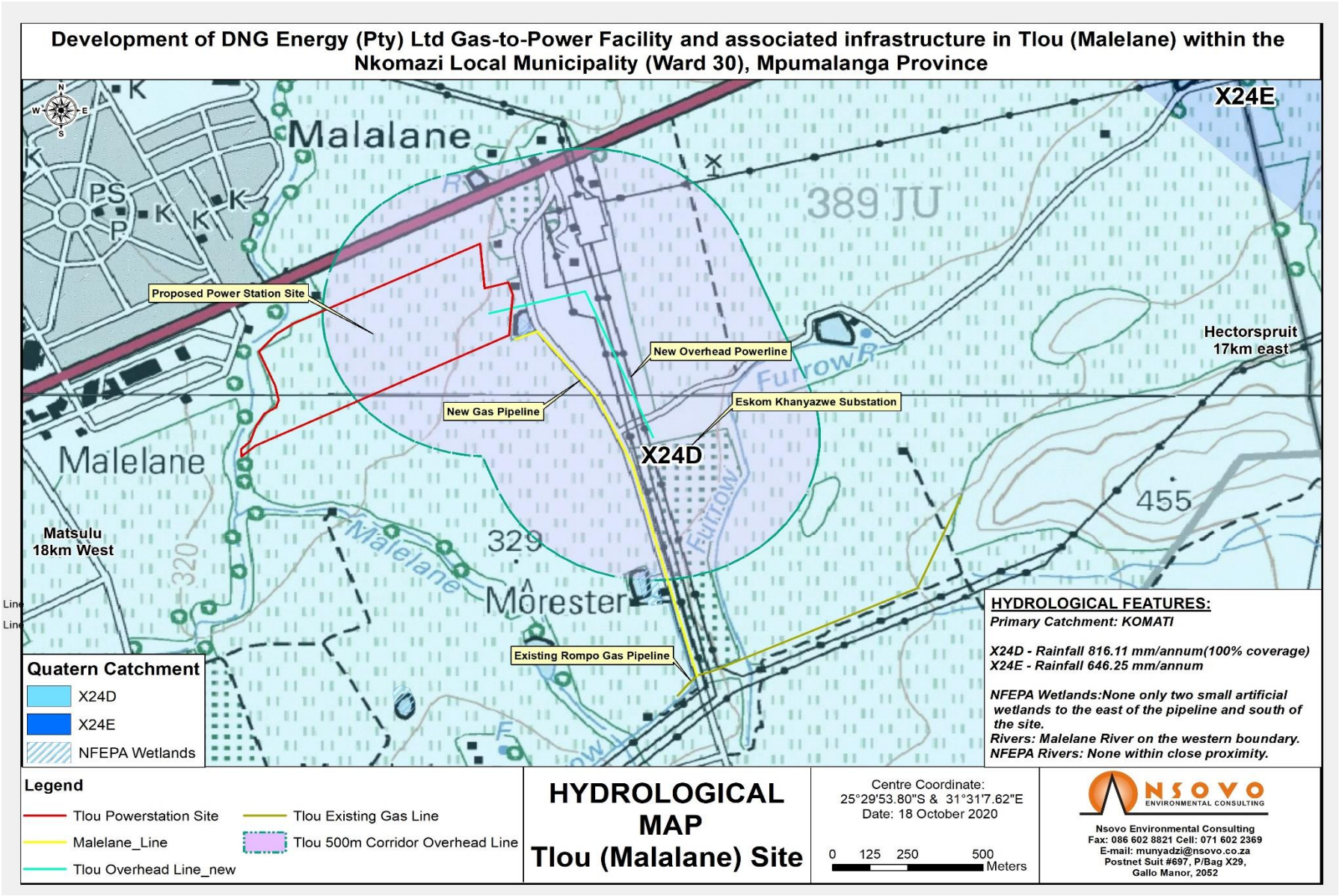


Figure 7: Hydrological map of the proposed location.

9.1.9 SITES OF ARCHAEOLOGICAL AND CULTURAL SIGNIFICANCE

In general, historic sites are associated with colonial era white settlers, colonial wars, industrialisation, recent and contemporary African population settlements, and contemporary ritual sites dating to the last hundred years. However, recent historic period sites and features associated with the, African communities, settler and commercial farming communities are on record in the project area environment. The affected general landscape is associated with historical events such as white settler migration; this is confirmed by the predominant commercial farming by white farmers. No listed specific historical sites are on the proposed development sites.

The entire site earmarked for the proposed development is degraded from current land uses such as access road, Eskom distribution power line and sugarcane cultivation. There is no evidence suggesting any potential of recovering archaeological remains during earth moving activities. There is an established associated infrastructure development, roads and other associated infrastructures across the entire project receiving area. The field survey did not identify any cultural heritage resources or archaeological resources within an area earmarked for the proposed development.

Whether burial sites are known or not on record, from a heritage perspective, burial grounds and gravesites are accorded the highest social significance threshold. They have both historical and social significance and are considered sacred. Wherever they exist they may not be tempered with or interfered with during any proposed development. It is important to note that the possibility of encountering human remains during subsurface earth moving works anywhere on the landscape is ever present. Although the possibility of encountering previously unidentified burial sites is low along the area earmarked for development due to heavily degraded environment by means of agricultural activities, should such sites be identified during subsurface construction work, they are still protected by applicable legislations and they should be protected.

Figure 8 below shows the heritage and palaeontological map for the study area. The map shows that the study area has low sensitivity in terms of heritage and palaeontological classification for the gas-to-power facility, powerline and gas pipeline routes.

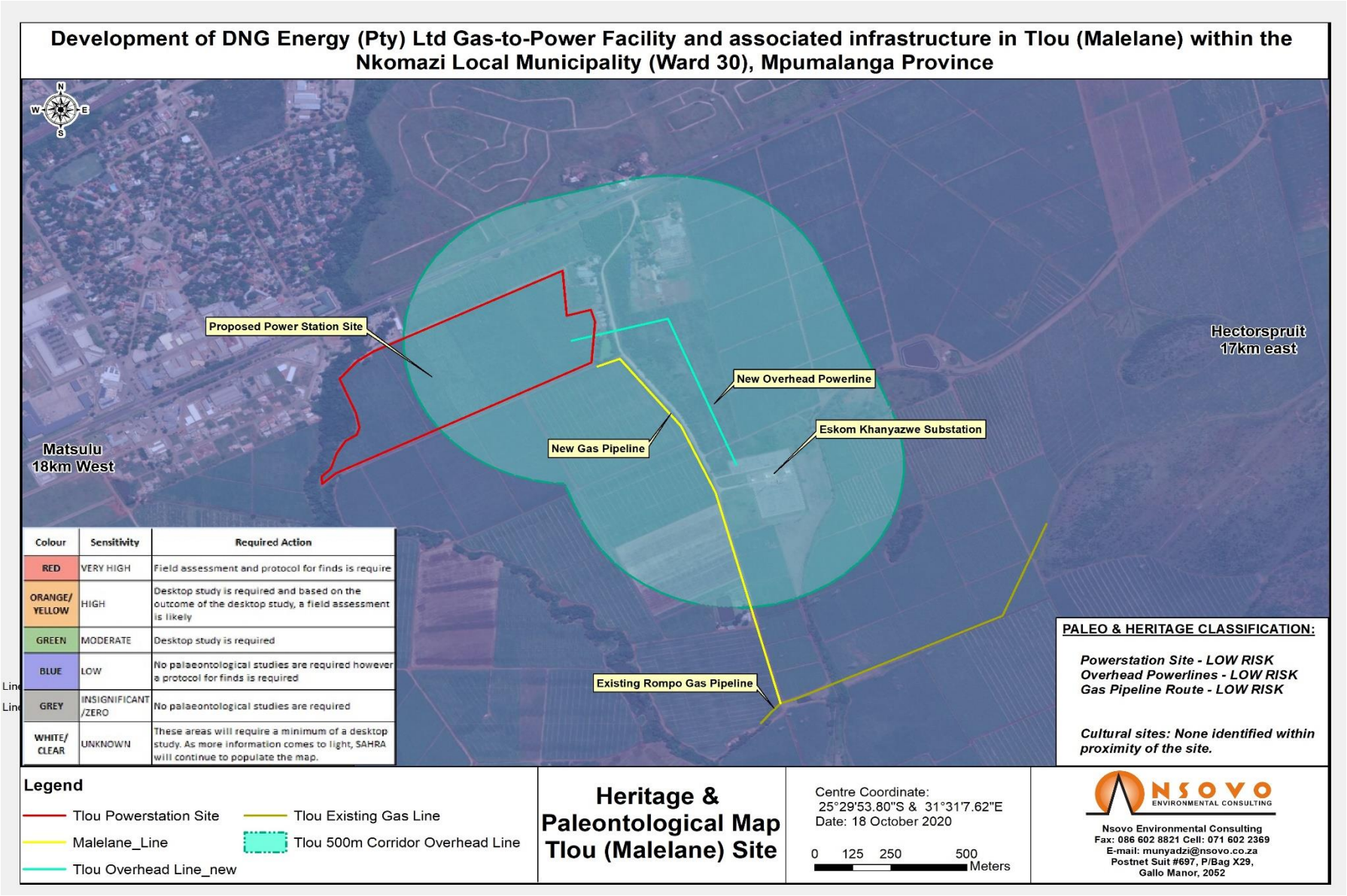


Figure 8: Heritage and paleontological map around the study area.

9.1.10 AIR QUALITY AND POLLUTION

Air quality is defined to include noise and odour as well as addressing all sources of air pollution (i.e. point, area and mobile sources). The Mpumalanga Air Quality Management Plan has been developed to comply with the National Environmental Management: Air Quality Act, 39 of 2004 and more specifically, to provide guidance on Air Quality Management in the Ehlanzeni District Municipality. The Plan identifies air pollution sources in the proposed locations as follows:

- Railway line (Train);
- Agricultural activities;
- Biomass burning (veld fires);
- Domestic fuel burning (wood and paraffin);
- Vehicle emissions;
- Waste treatment and disposal;
- Dust from infrastructural development;
- Dust from unpaved roads; and
- Other fugitive dust sources such as wind erosion of exposed areas.

There are few sources of air pollutants within the immediate and around the proposed area. The motor vehicle along the N4 may result in elevated ambient concentrations of particulates and Nitrogen Oxides (NO_2) at times. Dust generation is expected from the agricultural areas around the study area.

9.1.11 SUMMARY OF THE BIODIVERSITY CHARACTERISTICS ASSOCIATED WITH THE STUDY AREA

The study area falls within an area characterised as follows:

- **Biome:** The study area is within the Savanna Biome.
- **Bioregion:** The study area is located within the Lowveld Bioregion.
- **Vegetation Type:** The study area is situated within the Granite Lowveld vegetation type.

National Threatened Ecosystems 3 (2011)

Based on the biodiversity desktop study undertaken, the study area is within an ecosystem of Least Concern. The sensitivity of the ecosystem associated with the study area should be ground-truthed with a formal site visit. The NEMBA provides for listing threatened or protected ecosystems, in one of four categories: critically endangered (CR), endangered (EN), and vulnerable (VU) or protected. The purpose of listing threatened ecosystems is primarily to reduce the rate of ecosystem and species extinction. This includes preventing further degradation and loss of structure, function, and composition of threatened ecosystems. The purpose of listing protected ecosystems is primarily

National Biodiversity Assessment (2018)

The study area falls within a least concerned vegetation type (Granite Lowveld) that is currently well protected (WP). Ecosystem types are categorised as "not protected", "poorly protected", "moderately protected" and "well protected" based on the proportion of each ecosystem type that occurs within a protected area recognised in the Protected Areas Act, 2003 (Act No. 57 of 2003), and compared with the biodiversity target for that ecosystem type. The ecosystem protection level status is assigned using the following criteria:

- If an ecosystem type has more than 100% of its biodiversity target protected in a formal protected area either A or B, it is classified as Well Protected;
- When less than 100% of the biodiversity target is met in formal A or B protected areas it is classified it as Moderately Protected;
- If less than 50% of the biodiversity target is met, it is classified it as Poorly Protected; and
- If less than 5% it is Hardly Protected.

SAPAD (South Africa Protected Areas Database) (2019, Q4); SACAD (South Africa Conservation Areas Database) (2019, Q4); NPAES (National Protected Areas Expansion Strategy) (2009)

The SAPAD4 (2019, Q4) and NPAES (2009) database indicate that the Kruger National Park is situated ± 2 km north of the study area (Figure 9). NPAES (2009) additionally indicates the Informal Dumaneni Reserve (Conservation Area System) located approximately 2.3 km south east of the proposed gas pipeline. No other protected areas are located within 10 km of the study area. Refer to Figure 10 below for the nationally protected and informally protected areas associated with the study area.

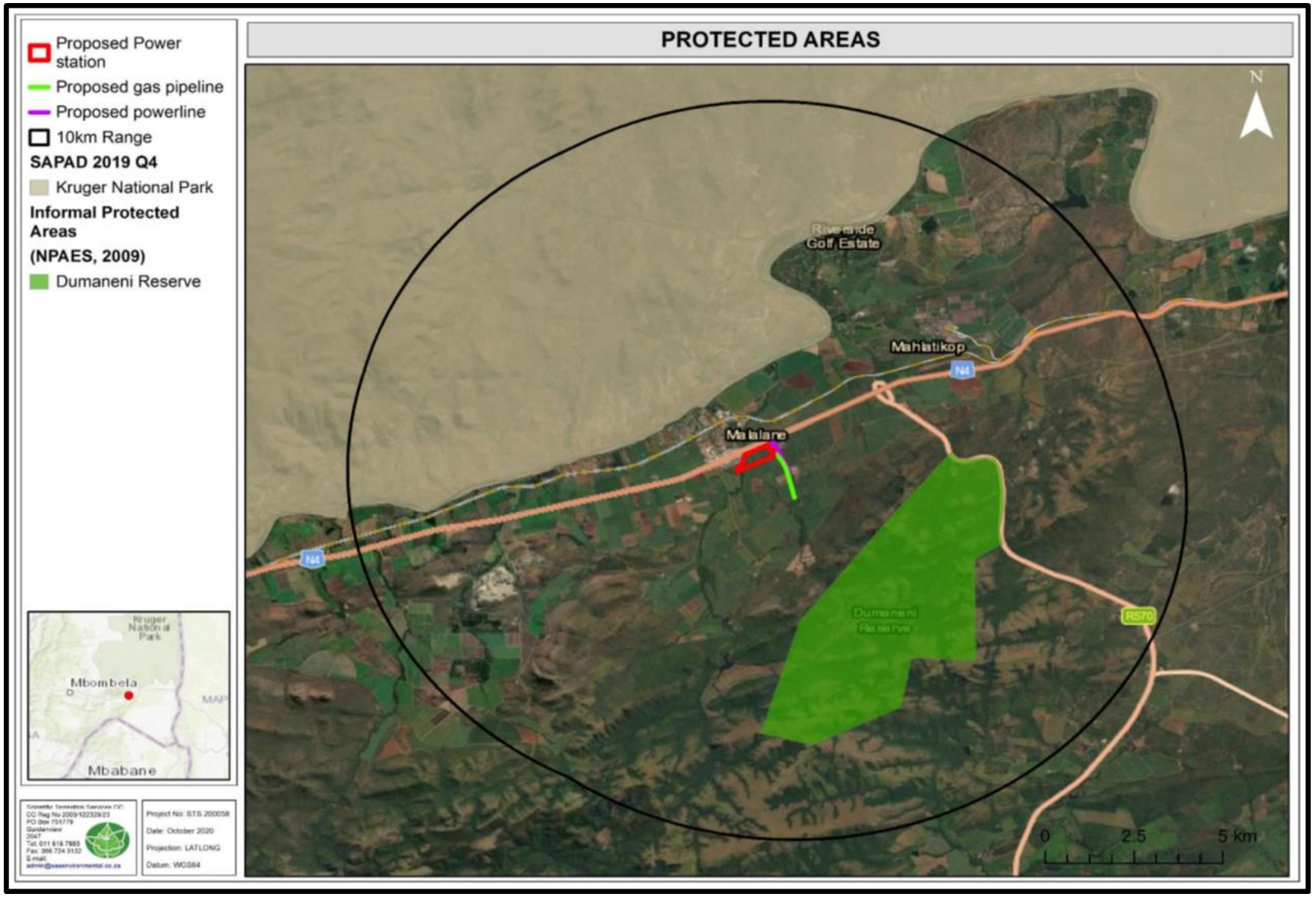


Figure 9: Nationally protected and informally protected areas associated with the study area (various databases).

IBA (Important Bird Area) (2015)

The Kruger National Park is identified as an IBA as well. It harbours globally threatened species, regionally threatened species and restricted range and biome-restricted species (Refer to Appendix C2 – Biodiversity Specialist Report for detailed list of species).

National Web Based Environmental Screening Tool (2020)

- Terrestrial Sensitivity - the Terrestrial Sensitivity for the entire study area is considered to have a Low Sensitivity.
- Plant Species - for the Plant Species theme, the study area is considered to have a Medium Sensitivity due to the potential presence of the sensitive species *Caesalpinia rostrata*.
- Animal Species - for the Animal Species theme, the study area is considered to have a Medium Sensitivity due to the potential presence of sensitive species such as *Reptilia-Kinixys natalensis* (Natal hinge-back tortoise); Mammalia-*Lycaon pictus* (African wild dog); *Dasymys robertsii* (Robert's shaggy rat) and Aves-*Ciconia nigra* (Black Stork).

Mpumalanga Biodiversity Sector Plan (MBSP) (2014)

- Ecological Support Area (ESA): Protected Area (PA) Buffer - the entire study area is situated within an ESA Protected Area Buffer, associated with the Kruger National Park. These are areas surrounding protected areas that moderate the impacts of undesirable land-uses that may affect the ecological functioning or tourism potential of PAs. Buffer distance varies according to reserve status: National Parks - 10 km; Nature Reserves - 5 km buffer; and Protected Environments — 1 km buffer.
- Heavily Modified - the majority of the study area is classified as an area that is "Heavily Modified". These are areas currently modified to such an extent that any valuable biodiversity and ecological functions have been lost.
- Other Natural Areas - the remaining portions of the study area are classified as "Other Natural Areas". These areas have not been identified as priority in the current systematic biodiversity plan but retain most of their natural character and perform a range of biodiversity and ecological infrastructural functions.

Refer to Figure 10 below for Ecological Support Areas (ESA) Protect Area Buffer and modified area relating to the study area.

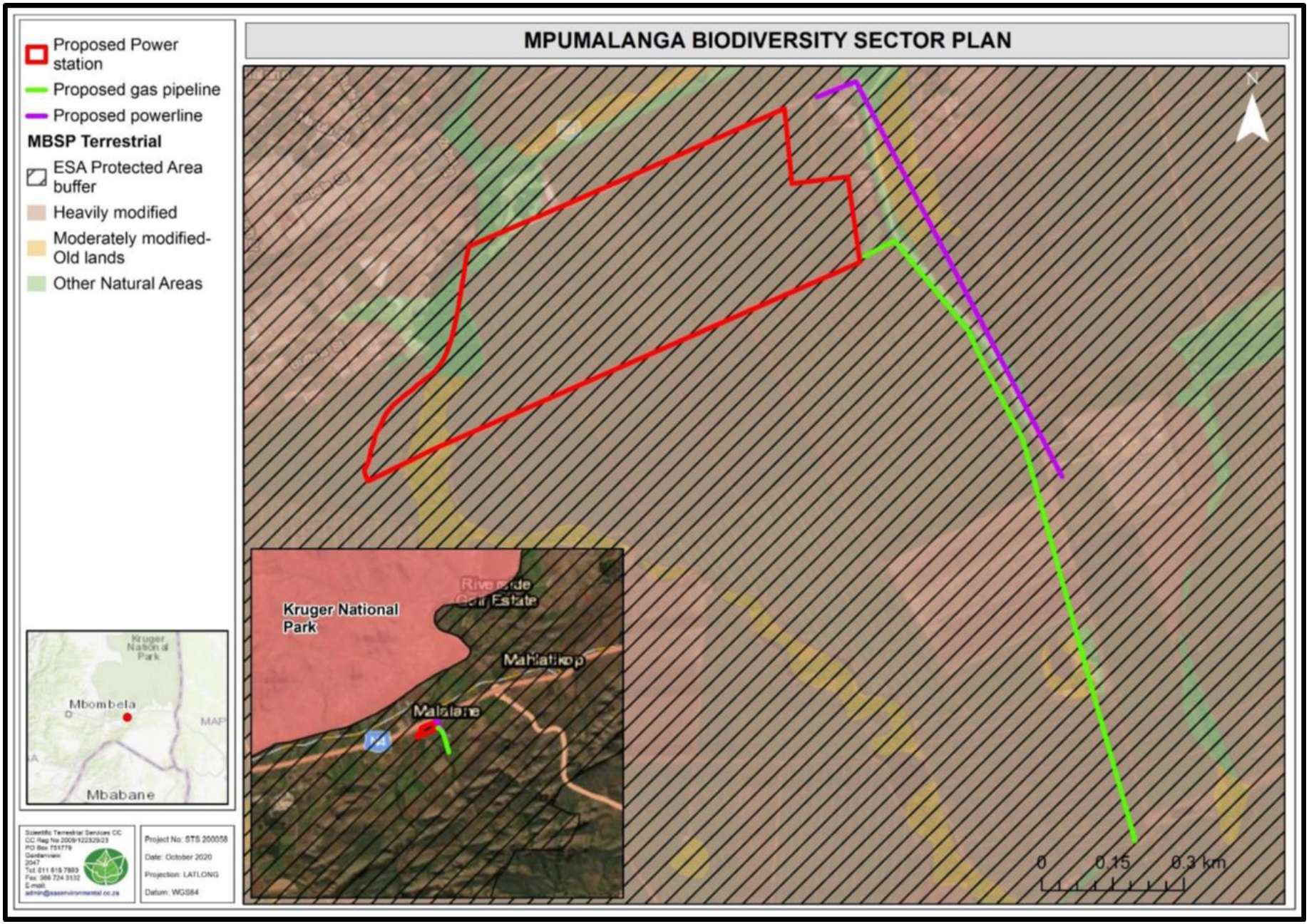


Figure 10: Ecological Support Areas (ESA) Protect Area Buffer and modified area relating to the study area, according to MBSP

9.1.12 FAUNAL AND FLORAL STRUCTURE AND COMPOSITION

Based on the preliminary desktop assessment, the study area is not located within a protected area, however, it is situated approximately 2 km south of the Kruger National Park. According to the Mpumalanga Biodiversity Sector Plan (MBSP, 2014) the north eastern portion of the study area is located within an Ecological Support Area (ESA) local corridor, and a small portion of the power station and the majority of the proposed gas pipeline is located within an irreplaceable Critical Biodiversity Area (CBA). The remaining portions of the study area is located within areas classified as either "heavily modified" or "other natural areas".

The southern and a portion in the north east of the study area has a very high terrestrial sensitivity according to the National Web-based Environmental Screening Tool (2020). This is attributed to the CBA 1 and ESA within the study area, as well as being a study area for land-based protected areas expansion. The study area is considered to have a medium sensitivity for plant species due to the potential presence of the sensitive species such as *Pavetta zeyheri* subsp. *microlancea.* For the Animal Species theme, the majority of the study area is considered to have a medium sensitivity due to the potential presence of sensitive species such as Sensitive species 2 and Aves – *Circus ranivorus* (African marsh harrier) and *Sagittarius serpentarius* (Secretarybird). Scattered portions throughout the study area is considered to be of high animal sensitivity due to sensitive species such as Aves – *Ephippiorhynchus senegale* (saddle-billed stork). Refer to Figure 11 below for sensitivity map.

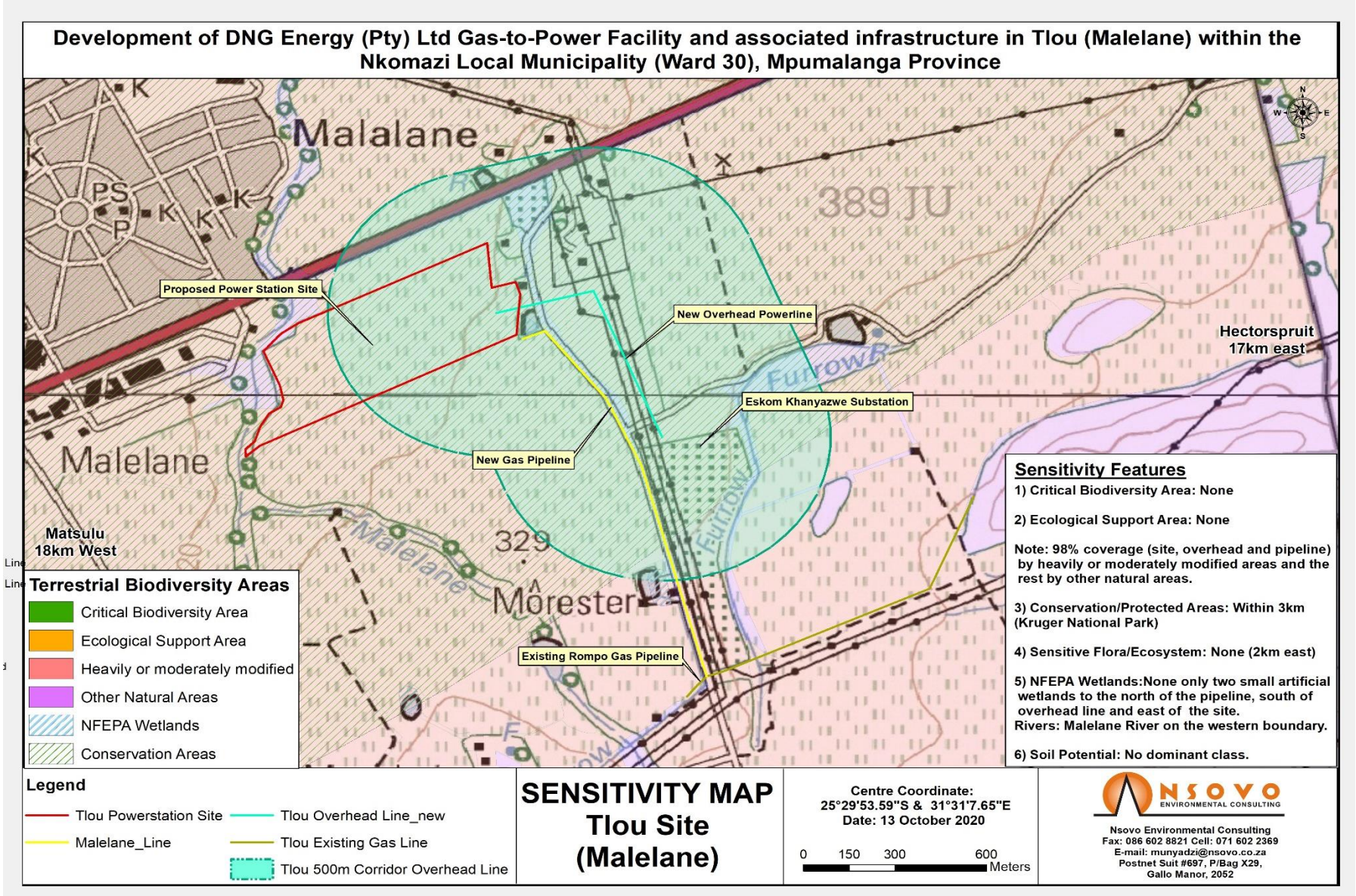


Figure 11: Sensitivity map of the study area

The desktop analysis indicates that, several floral and faunal Species of Conservation Concern (SCC), were identified as having the potential to be observed within the study area, according to the Plant of Southern Africa online database and the Mpumalanga State of Environment Report. As these species are provincially important, should they be present within the study area, they will require rescuing and relocation to a similar habitat within the vicinity of the study area before any construction activities commences. Thus, a field assessment would be required to establish whether suitable habitat exists to support these species within the study area.

9.1.13 SOIL AND LAND CAPABILITY

The agricultural sector plays an essential role in the fight against poverty and securing food security for the people of Mpumalanga. The role of agriculture in supplying employment to unskilled workers, ensuring food security to rural people as well as stimulating other sectors in the value chain such as manufacturing and trade makes it an important sector towards attainment of growth and development. The current land utilisation by agriculture is determined by the natural resources such as soils, water and climate, and land ownership. Land utilised for commercial farming is about 90% of the total farm land whilst for small scale/emerging farming is less than 10%. In terms of agricultural production, summer cereals and legumes (sunflower seed, sorghum, dry beans, soy beans, potatoes, cotton and maize) dominate then Highveld region, while sub-tropical and citrus fruit and sugar are grown extensively in the Lowveld (Malelane area). Figure 12 shows the soil and agricultural potential of the study site. It can be noted that the site is underlain by Agricultural Pot 1 type, which is the Glenrosa and/or Mispah from, lime rare or absent in upland soils but generally present in low-lying soils.

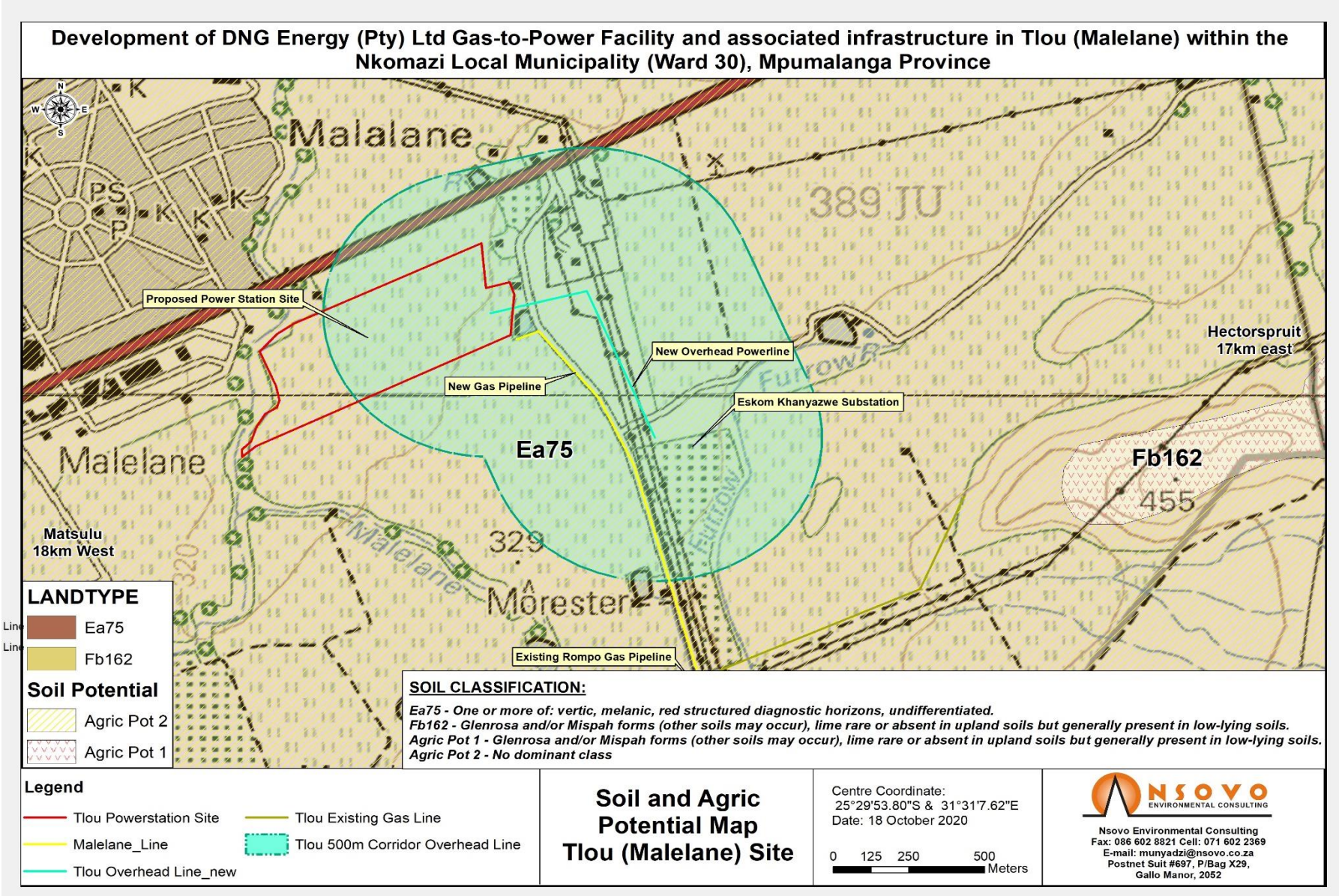


Figure 12: Soil and agricultural potential around the study area.

9.1.14 SENSORY ASPECTS

9.1.15 NOISE

In terms of the Noise Regulations a noise disturbance is created when the prevailing ambient noise level is exceeded by 7.0dBA or more. Noise is part of our daily exposure to different sources which is part of daily living and some of these physical attributes which may at times be part of the ambient levels that people get used to without noticing the higher levels. Two aspects are important when considering potential impacts of a project:

- The increase in the noise levels, and;
- The overall noise levels which will be created by the proposed activities.

There will be an upwards shift in the immediate environmental noise levels during the construction phase on a temporary basis and a more permanent basis during the operational phase in the vicinity of the different mine expansion activities. It is not anticipated that the noise increase at the abutting residential areas will exceed the prevailing ambient noise levels during the construction, operational and decommissioning phases. A detailed noise assessment will be undertaken during the EIA phase to determine the direct and indirect impacts, as well as an assessment of the identified impacts.

9.1.16 VISUAL ASPECTS

Visual appreciation or dislike is subjective and thus what is aesthetically pleasing to some can be displeasing to others. The visual analysis of a landscape the impact of new developments and structures tends to be complicated and it is evident from previous experience that when dealing with reaction to landscape changes, a large diversity of opinion exists. In this regard, it is imperative that the applicant be sensitive from a visual impact perspective, to the requirements of the local people, notably rural communities, and farmers. Many topographical features influence this environment and these features will need to be utilized when selecting an alignment so as to minimize visual impacts and intrusions.

The study area consists of large areas of agricultural land used for commercial purposes. There are few human settlements, like small towns and agricultural communities and the landscape is degraded around these settlements. Within the receiving environment, specific viewers (visual receptors) experience different views of the visual resource and value it differently. They will be affected because of alterations to their views due to the proposed project. The visual receptors included in this study are:

- Residents;
- Tourists; and
- Motorists.

The study area is moderately populated, with lower population in the farming communities and higher population in the towns. The residents close to the proposed study area are in Malelane town and may experience a low degree of visual

intrusion. The entire study area is considered to have a high tourism potential, mostly because of the Kruger National Park as well as proximity to the N4 route connecting to Mozambique.

9.1.17 CLIMATE CHANGE IMPACT

Scientific opinion suggests that the continued emission due to human activities of greenhouse gases, principally carbon dioxide and methane, may bring about significant and long-term changes to the functioning of the earth's atmosphere. Of great uncertainty still are the possible impacts and damage attributable to such climate change, although indications are that their scale could be significant. According to the White Paper on Energy, South Africa is responsible for 1,6% of global greenhouse gas emissions and the country's energy sector is the single largest source of greenhouse gas emissions in Africa, being dependent on coal for more than 75% of the country's primary energy needs during 1997. This level of emissions is also mainly as a result of the high level of coal use by the electricity generation and synthetic fuels industries, and the high level of industrialisation producing high energy content products. In order to fulfil the national energy policy of making clean, affordable and appropriate energy available to all sectors of the population, a balanced least-cost mix of energy supply is promoted. Although the country is faced with obligations to reduce its greenhouse gas emissions in the near future, international governance of this problem is an evolving area.

Burning liquid natural gas releases methane, a potent greenhouse gas. Methane is the naturally occurring product of the decay of organic matter. Methane accounts for 10.55% of greenhouse-gas emissions created through human activity. According to the Intergovernmental Panel on Climate Change, methane has a global warming potential 21 times greater than that of carbon dioxide over a 100-year timeline.

10 METHODOLOGY FOR ASSESSING THE SIGNIFICANCE OF POTENTIAL IMPACTS

The assessment of impacts is largely based on the Department of Environmental Affairs and Tourism's (1998) Guideline Document: Environmental Impact Assessment Regulations. The assessment will consider impacts arising from the proposed activities of the project both before and after the implementation of appropriate mitigation measures.

The impacts are assessed according to the criteria outlined in this section. Each issue is ranked according to extent, duration, magnitude (intensity) and probability. From these criteria, a significance rating is obtained, the method and formula is described below. Where possible, mitigation recommendations have been made and are presented in tabular form.

The criteria given in the Table below will be used to conduct the evaluation. The nature of each impact will be assessed and described in relation to the extent, duration, intensity, significance and probability of occurrence attached to it. This will be assessed in detail during the EIA phase.

Table 9: Methodology used in determining the significance of potential environmental impacts

Status of Impact

The impacts are assessed as either having a:

negative effect (i.e. at a `cost' to the environment),

positive effect (i.e. a `benefit' to the environment), or

Neutral effect on the environment.

Extent of the Impact

(**1**) Site (site only),

(**2**) Local (site boundary and immediate surrounds),

(**3**) Regional (within the City of Johannesburg),

(**4**) National, or

(**5**) International.

Duration of the Impact

The length that the impact will last for is described as either:

(**1**) immediate (<1 year)

(**2**) short term (1-5 years),

(**3**) medium term (5-15 years),

(**4**) long term (ceases after the operational life span of the project),

(**5**) Permanent.

Magnitude of the Impact

The intensity or severity of the impacts is indicated as either:

(**0**) none,

(**2**) Minor,

(**4**) Low,

(**6**) Moderate (environmental functions altered but continue),

(**8**) High (environmental functions temporarily cease), or

(**10**) Very high / Unsure (environmental functions permanently cease).

Probability of Occurrence

The likelihood of the impact actually occurring is indicated as either:

(**0**) None (the impact will not occur),

(**1**) improbable (probability very low due to design or experience)
(**2**) low probability (unlikely to occur),
(**3**) medium probability (distinct probability that the impact will occur),
(**4**) high probability (most likely to occur), or
(5) Definite.

Significance of the Impact

Based on the information contained in the points above, the potential impacts are assigned a significance rating (**S**). This rating is formulated by adding the sum of the numbers assigned to extent (**E**), duration (**D**) and magnitude (**M**) and multiplying this sum by the probability (**P**) of the impact.

S=(E+D+M)P

The significance ratings are given below

(**<30**) low (i.e. where this impact would not have a direct influence on the decision to develop in the area),
(**30-60**) medium (i.e. where the impact could influence the decision to develop in the area unless it is effectively mitigated),
(**>60**) high (i.e. where the impact must have an influence on the decision process to develop in the area).

11 DESCRIPTION OF THE ENVIRONMENTAL ISSUES AND POTENTIAL IMPACTS INCLUDING CUMULATIVE IMPACTS IDENTIFIED

This section describes the potential impacts that the proposed project may pose on the receiving environment. Impacts associated with the relevant environmental components within the study area as identified, have been assessed based on the EAP's opinion as well as consultation with specialist studies. Refer to the Tables below, for the potential impacts identified.

11.1 SUMMARY OF POTENTIAL ENVIRONMENTAL IMPACTS IDENTIFIED

Potential environmental impacts identified during the Scoping phase are described in Table 11 below. This is not an exhaustive list but insight into the potential impacts associated with the proposed project. It must be borne in mind that the EIA phase may identify more potential impacts and will assess them in more detail.

Table 10: Potential Environmental Impacts Identified

Aspect	Nature	Description
Employment	Positive-No mitigation required	Job creation and investments into the project will result in opportunities during the planning and design phase. This impact will typically be limited to skilled engineers and planning professionals. The proposed project will result in very limited opportunities for the skilled local community during the construction phase.
Air Pollution	Negative	Potential air pollutant during construction may be dust emanating from site preparation and excavations. Given the nature and magnitude of the proposed project. Mitigation measures such as dust suppression can reduce the impact to become site-specific.
Fauna and Flora	Negative	Numerous faunal SCC are expected to occur within the Mpumalanga Province; however, a site visit will have to be undertaken to determine whether these species will occur within the study area or proximity thereof. Should any development activities take place, care should be taken to avoid collision with these species (SSC listed as threatened by the IUCN and Mpumalanga Nature Conservation Act are of particular concern). Hunting and trapping of faunal species (common and SCC) are prohibited and if any faunal species are encountered within the focus area it should be rescued and relocated to similar suitable habitat within the vicinity of the focus area. With the Kruger National Park located within 2 km of the focus area the likelihood of avifaunal SCC migrating between the Park and surrounding areas, including the focus area, or utilising the surrounding areas for foraging, is high. This will, however, have to be confirmed with a site visit from a suitably qualified specialist.

Aspect	Nature	Description
		Identified impacts and mitigation measures relating to the flora and fauna with conservation concern are listed in Table 12 below.
Noise	Negative	In South Africa, the assessment of noise levels in the environment is governed by the South African Bureau of Standards (SABS) noise standard 0103 – 'The measurement and rating of environmental noise concerning annoyance and to speech communication' (SABS 1994). Additional SABS standards cover the measurement of noise over different distances from the source (SABS 0357 – 'The calculation of sound propagation by the Concave method'), and standards for different sectors (e.g. industry). There will be an upwards shift in the immediate environmental noise levels during the construction phase temporarily and a more permanent basis during the operational phase. The noise increase at the abutting residential properties will however not exceed the prevailing ambient noise levels during the construction, operational and decommissioning phases as it will be below the threshold value of 7.0dBA. According to the SABS 0103 acceptable noise levels at day time is 45dBA, and a noise intrusion is disturbing if it exceeds 7dBA or more.
Waste	Negative	Naturally, the inhabitation of the land will result in the accumulation of various forms of waste in the area. The aesthetic value of the area would decrease if such waste is not collected and disposed of appropriately. Waste material will be generated during the construction phase. Such waste may accumulate from the workers' campsite or litter left around the work area by the construction staff. Other waste substances may accumulate from cement bags amongst other construction material. The impact of waste is definite and will last for the duration of the construction phase as well as the operational phase, although reduced.

Aspect	Nature	Description
Soil	Negative	Movement of heavy machinery, as well as vegetation clearance, may cause destabilisation of soils which then become susceptible to erosion. The continuous movement of vehicles over the land during the construction phase may leave it susceptible to erosion.
Heritage	Negative	The heritage significance of the proposed site has been assessed in terms of the National Heritage Resources Act, 1999 (No 25 of 1999). No sites of heritage significance were noted within the immediate vicinity of the site or surrounding areas.
Surface Water	Negative	The proposed site is within two non-perennial rivers. The impact on water quality, if any, could be sedimentation, decrease in quality and possible contamination of surface water and groundwater. This could result from fuel spillages, sewer systems, liquid waste, etc. An increased volume of stormwater runoff, peak discharges and frequency, as well as the severity of flooding, is therefore often characteristic of the transformed catchment. The impact on water is site-specific but can be local or regional if proper measures are not put in place. There may be a need to apply for a Water Use Licence (WUL) or General Authorisation with DWS considering the proximity of the study area to surface water bodies.
Hazardous substances	Negative	The risk of spillage of a variety of hazardous substances may occur during the use of heavy machinery, construction vehicles and construction vessels. For example, spillage may occur as a result of fuel leaks, refuelling, or collision. Hydrocarbons are toxic to aquatic organisms and precautions must be taken to prevent them from contaminating the marine environment. This impact can be mitigated successfully if the contractor implements a rigorous environmental management and control plan to limit ecological risks from accidents. All fuel and oil must be stored with adequate spill protection and no leaking vehicles should be permitted on site. Intentional disposal of any substance into the marine environment is strictly prohibited, while accidental spillage must be prevented, contained and reported immediately.

Aspect	Nature	Description
Visual Impact	Negative	The visual impact of an object in the landscape decreases quickly as the distance between the observer and the object increases. The visual impact at 1km is approximately a quarter of the impact viewed from 500m, and the visual impact at 2km is one-eighth of the impact viewed from 500m. Therefore, objects appear insignificant in any landscape beyond 5km. The visibility of the proposed gas to power station would be a function of several factors, including landform, vegetation, views and visibility, genius loci (or sense of place), visual quality, existing and future land use, landscape character and scale. The proposed activity will change the visual character of the site, however, it must be noted that there are already existing infrastructures such as Eskom Khanyazwe substation Local variations in topography and man-made structures could cause local obstruction of views in certain parts of the viewshed.
Socio-economic Environment	Negative/Positive	The socio-economic aspect has both positive and negative impacts. The significance of positive socio-economic benefits associated with the proposed development exceeds the significance of negative socio-economic impacts. For example, the proposed project will create employment opportunities over the medium and long term. These include skilled, semi-skilled and under-skilled labours which could consist of locals within the study area as well as regional and national communities. The negative socioeconomic consequences associated with the project include that, for example, the proposed development within the sugar cane farm. The proposed gas-to-power facility and associated infrastructure will impact on the agricultural potential of the area.
Climate	Negative	Local climate conditions do not appear to be of significant concern to the proposed project. In a broader scale, the project will have no direct significant impact on the local and/or global climate change. The associated indirect impacts will be assessed in detail during the EIA phase.
Topography	Neutral	The topography of the study area is flat.

Aspect	Nature	Description
Tourism	Negative	The proposed site is close to the N4 Maputo Corridor which is used by a tourist visiting the Kruger National Park and Mozambique. Therefore, the positioning of the gas-to-power facility must take into consideration the potential impact on tourism in the area.
Traffic	Negative	Construction material and equipment will be delivered to the site during the construction phase, it is therefore expected that traffic will be negatively impacted especially on the N4.

Further, the potential impacts associated with the proposed project will also include impacts on:

- Biodiversity (flora and fauna);
- Heritage;
- Wetland;
- Air quality;
- Socio-economic; and
- Visual impacts.

The following section presents the impacts and mitigation measures by the specialists as well as the EAP. Table 12 below highlight the identified impacts for both the construction and operational phases of the project. Impacts relating to the decommissioning phase as well as rehabilitation will be comprehensively addressed in the EIA phase.

Table 11: Identified impacts and mitigation measures relating to the proposed project

Aspect	Impact Description	Mitigation Measures
PRE-CONSTRUCTION PHASE		
Site preparation before the commencement of the proposed development	The proposed power facility may impact on the skills of the local personnel through teaching and learning. Providing businesses an opportunity to supply goods and services during construction and operation.	• There could be initiatives developed to contribute towards educating and developing necessary skills for the locals to take advantage of opportunities associated with the proposed development. • Local businesses could be incubated and developed to be able to take opportunities in the construction and operation of the proposed project which is highly technical.
Employment expectations and an influx of migrant labour.	Providing employment opportunities during the construction and operational phases.	• When appointing subcontractors, DNG Energy should give preference to appropriate subcontractors/SMMEs located in the surrounding communities.
Employment	Providing employment opportunities during the construction and operational phases. The proposed facility may impact on the skills of the local personnel through teaching and learning.	• Employment of skilled, semi-skilled and unskilled labours in the construction of proposed project within the receiving environment and Inkomazi Local Municipality. • Skills development initiative to prepare locals to have necessary skills to take up employment opportunities with the proposed project in line with their Labour Plan and the associated Employment Equity and Skills Development Plans. • DNG Energy must promote the creation of employment opportunities for women and youth. The positions reserved for the youth and women may only be filled with persons outside of

Aspect	Impact Description	Mitigation Measures
		these categories if it can be demonstrated that no suitable persons can be employed from these categories.
CONSTRUCTION PHASE		
Noise and vibration	Noise may be generated by construction activities (e.g. earthmoving vehicles, service vehicles, generators drilling etc.). It is expected that this noise may have an impact of fauna residing in the proposed area or that habitat within the Malelane river. In addition, the facility is in close proximity to the CBD as well as residential area, which may have an impact if not well managed.	• Ensure that all construction equipment is well serviced as per the manufacture's manual throughout the construction phase. • The requirements of the Noise Control Regulations (2013) must be adhered to.
Impact of waste generation and disposal	Construction waste is expected which will impact on the environment through soil and water contamination. Waste can also have an impact on biodiversity. Waste has a negative impact on the visual aesthetics of an area. This impact is rated as 'medium' without	• Inform all staff about sensitive marine species and the responsible disposal of construction waste. • Suitable handling and disposal protocols must be clearly explained and sign boarded. • All domestic and general waste generated must be disposed of responsibly. • All reasonable measures must be implemented to ensure there is no littering and that construction waste is adequately managed. • Staff must be regularly reminded about the detrimental impacts of pollution on marine species and suitable handling and disposal protocols must be clearly explained and sign boarded.

Aspect	Impact Description	Mitigation Measures
	mitigation and is reduced to 'low' with proper mitigation.	• The 'reduce, reuse, recycle' policy must be implemented where possible.
The effect of spillages of hazardous substances on surface water resources	Hydrocarbon-based fuels or lubricants spilt from construction vehicles, construction materials that are not properly stockpiled, and litter deposited by construction workers may be washed into the surface water bodies. Should appropriate ablution facilities not be provided for construction workers at the camps, the potential exists for surface water resources and surroundings to be contaminated by raw sewage. The utilisation of watercourses for disposal of water used for washing could decrease the abundance and diversity of aquatic macro-invertebrates inhabiting the section of the Malelane river and riparian areas further downstream. Contaminated runoff from concrete mixing and sediment release	• Construction vehicles are to be maintained in good working order to reduce the probability of leakage of fuels and lubricants; • A concrete bund with adequate storage capacity should be used to accommodate substances such as fuel, oil, paint, herbicide and insecticides, as appropriate, in well-ventilated areas; • Storage of potentially hazardous materials must be far removed from preferential flow paths and or stormwater infrastructure. These materials include fuel, oil, cement, bitumen etc.; • Surface water draining off contaminated areas containing oil and petrol would need to be channelled towards a sump which will separate these chemicals and oils; • Concrete is to be mixed on mixing trays only, not on exposed soil; Concrete and tar shall be mixed only in areas which have been specially demarcated for this purpose; • After all the concrete / tar mixing is complete all waste concrete / tar shall be removed from the batching area and disposed of at an approved waste dump. • Any proclaimed weed or alien species that germinate during the operational period shall be cleared by hand before flowering; • The re-release of clean water from clean and dirty water separation infrastructure must be diffused and not reach stream habitat as concentrated flows where it will have serious negative impacts. • The storm water plan must include adequate attenuation facilities to ensure that peak flows do not cause negative impacts on streams. • Caution must be taken to ensure building materials are not dumped or stored within the proximity of the streams;

Aspect	Impact Description	Mitigation Measures
	including hydrocarbon spillages may infiltrate into the groundwater.	• Emergency plans must be in place in the case of spillages. • All stockpiles must be protected from erosion, stored on flat areas where run-off will be minimised and be surrounded by bunds; for a minimum amount of time necessary; • A phased planned approach must be taken when construction is initiated. Areas must only be stripped directly before construction and only expose soils to erosion for the minimum period necessary. Where possible, re-vegetation of areas must be implemented as soon as possible.
Potential groundwater contamination caused by construction activities	Contaminated runoff from concrete mixing and sediment release including hydrocarbon spillages may infiltrate into the groundwater.	• Place drip trays under stationary machinery, only re-fuel machines at the temporary fuelling station, install temporary structures to trap fuel spills at the temporary fuelling station. • Immediately clean oil and fuel spills and dispose of contaminated material (soil, etc.) at licensed sites only. • Equip the site with sufficient ablution facilities. Secure chemical toilets to ensure that they do not blow over in windy conditions. • Do not release any pollutants, including sediment, sewage, cement, fuel, oil, chemicals, hazardous substances, waste water, etc., into the environment. • Compile a procedure for the storage, handling and transport of different hazardous materials and ensure that it is strictly adhered to. • Ensure vehicles and equipment are in good working order and drivers and operators are trained with respect to actions to be taken in the case of a fuel spill or leak. • Ensure that good housekeeping rules are applied.
Traffic	During the construction phase, increased heavy vehicle traffic will be expected. Without management, such increased traffic loads may	• The delivery of construction material and equipment should be limited to hours outside peak traffic times (including weekends) prevailing on the surrounding roads where possible; • Existing access roads must be used;

Aspect	Impact Description	Mitigation Measures
	negatively impact existing traffic flow. Further unmanaged construction vehicles may decrease road safety for other road users and uncontrolled movement of construction vehicles may result in unnecessary impacts on the environment through vegetation and habitat destruction. The proposed site is adjacent to the N4, which is a major road leading to the Mozambican border. Without mitigation, this impact may be high, however, implementation of mitigation measures may result in medium/low significance.	• Delivery vehicles must comply with all traffic laws and bylaws; • Inform communities of planned construction activities that would affect vehicle/ pedestrian traffic.
Change in local land use in the affected area for the proposed project.	The proposed site is currently under agricultural, as such, the proposed activity will reduce the area marked for agricultural purposes.	• d
Water availability	Increase in pressure for water demand and allocation to support the construction of the proposed project	• Construction related vehicles should be restricted to daylight hours and the workweek if at all possible. Thus, it is recommended that trucks should not be operated after sunset or over weekends.

Aspect	Impact Description	Mitigation Measures
		• Roads must be adequately maintained to prevent deterioration of roads surfaces due to heavy vehicle traffic. Road maintenance should not be the sole responsibility of the ELM or the Department of Public Works. • Safe travelling speeds must be determined, and measures implemented to ensure that these restrictions are enforced.
Impact on biodiversity	The impact on terrestrial biodiversity is considerable during the construction phase. Most of the identified impacts are of medium significance with mitigation measures. Such impacts include: • Loss of indigenous vegetation • Loss of exotic vegetation • Loss of or displacement of fauna • Increase in alien invasive vegetation • Loss of ecological function Nonetheless, there are no identified CBAs or ESAs within the study area; 90% of the study area is covered by heavily or moderately modified areas and 10% by other natural areas. Conservation or Protected Areas are	• Avoid or minimise loss of sensitive habitats. • Avoid any disturbance to the No-Go habitats (Protected Areas). • Minimise the physical destruction of any remaining primary vegetation, especially in or near wetland areas. In general, minimise clearing and operations in habitats with a High sensitivity rating and clearly delineate and maintain a no-go buffer of at least 100 m around such habitats. • Use existing gravel roads and already disturbed areas to access the facility as far as possible to avoid the creation of new roads or access routes across natural areas. • Avoid blocking and/or destruction of any streams/rivers and wetlands. • After the final layouts of the operation components has been approved and before any new groundwork's, conduct a thorough footprint investigation (during summer) to assess all Protected or Threatened plant species (population location and its size). • Parking and operational areas should be regularly inspected for hazardous substances spills and covered with an impermeable or absorbent layer (with the necessary storm water control). • If filling material is to be used, this should be sourced from areas free of invasive species, and alien plant control measures are to be applied to all areas used for sourcing fill materials. • Efforts must be taken to minimise the footprint of short-duration activities and/or linear infrastructure. Efforts to minimise such footprints will include grouping all infrastructure to the

Aspect	Impact Description	Mitigation Measures
	within the km of the site (Kruger National Park).	same servitude and/or as close as possible to existing and planned long-term physical disturbances; this will reduce habitat fragmentation.
Impact on Floral Species of Conservation Concern	The key activities associated with development activities that may affect the ecology of the area include: • The utilisation of temporary tracks to the footprint areas; • Alien species proliferation due to edge effects caused by vegetation clearing for access roads and site establishment; • Trenching for the establishment of the gas pipeline, should the proposed gas pipeline be underground. • Site levelling; • Digging for the pylons of the powerlines.	• A walkdown/active search for Floral SCC must be conducted within the focus area before any activities taking place. • Floral SCC encountered within the footprint, are to be either protected in situ or relocated as appropriate. This specifically relates to species which can potentially be successfully rescued and relocated, provided that permit application for the disturbance of these protected species is approved. • Keep the proposed development footprint as small as possible. • As far as possible development within sensitive habitat units must be avoided. • All disturbed areas must be concurrently rehabilitated during construction of access roads and vegetation clearing for temporary contractors laydown areas. • The existing integrity of flora surrounding the focus area should be upheld and no activities should occur outside the footprint area. • Edge effect control needs to be implemented to avoid further habitat degradation outside of the proposed footprint area. • All sensitive areas are to be demarcated and access into these areas should minimised as far as possible.
Impact on Faunal Species of Conservation Concern	The key activities associated with the impact on Faunal Species of Conservation Concern are similar for Floral Species listed above.	• The proposed development footprint areas should remain as small as possible and where possible be confined to already disturbed areas; • As far as possible development within sensitive habitat units must be avoided;

Aspect	Impact Description	Mitigation Measures
		• Edge effects of all development activities, such as erosion and alien plant species proliferation, which may affect faunal habitat within surrounding areas, need to be strictly managed; • All disturbed areas must be concurrently rehabilitated; • All informal fires in the vicinity of the development footprint should be prohibited; and • No trapping or hunting of fauna is to take place.
Impact on soils and agriculture	The loss of topsoil in South Africa is a national concern and thus erosion control should be taken seriously. Soil erosion may occur during the construction phase due to: • Excavations particularly on steep slopes • Ineffective storm water management • Excessive use of gravel roads • Use of heavy machinery or vehicles Construction activities may lead to the compaction of disturbed soils further to this the exposure of the soil to environmental factors increases the likelihood of erosion. The removal of surface vegetation will	• Any disturbance of high potential agricultural soils must be actively avoided, should this be not feasible, the footprint of the proposed power facility should be clearly demarcated to restrict the planned activities within infrastructure footprint as far as possible, thus minimising edge effects and reducing the extent and overall significance of impact; • An adequate storm water management plan must be carefully designed and implemented in order to avoid erosion of topsoil on adjacent arable soils throughout all the phases. In this regard, special mention is made of: ○ Sheet runoff from cleared areas, paved surfaces and access roads needs to be curtailed; ○ Runoff from paved surfaces should be slowed down by the strategic placement of berms; and ○ All stockpiles and waste stockpiles must have berms and/catchment paddocks at their toe to contain runoff of the facilities; • Construction activities should be scheduled to coincide with low rainfall period as far as possible. These periods have may reduce erosive runoffs and wind impacts; • As the footprints of the proposed development are not vegetated, it is best to be regularly dampened with water to suppress dust during the construction phase, especially when strong wind conditions are predicted according to the local weather forecast;

Aspect	Impact Description	Mitigation Measures
	cause exposed soil conditions where rainfall and high winds can cause mechanical erosion. Rainfall and inadequate drainage systems would lead to sediments washing down into wetlands and rivers, causing sedimentation. In addition, hardened surfaces and bare areas are likely to increase surface run off velocities and peak flows received by riparian habitat and wetlands. If adequate soil erosion measures are implemented during the construction phase of the proposed activity, this impact can be deemed to be of low significance. Where soils are highly erodible, adequate measures must be implemented to prevent undue soil erosion.	• Bare soils adjacent to the infrastructural areas can be vegetated with an indigenous grass mix, if necessary, to re-establish a protective cover, to minimise soil erosion and dust; • Erosion control is regarded critical as the majority of the soils are susceptible to erosion. • Compaction of soil can be mitigated by ripping the footprint and introducing both organic and inorganic fertilizers. • Unnecessary disturbances of the potentially arable soils outside the demarcated areas can be avoided where possible to minimise loss of arable soils; • The footprint should be ripped at 25 cm to alleviate compaction as part of rehabilitation; • The footprint should be re-vegetated with a grass seed mixture as soon as possible, preferably in spring and early summer to stabilise the soil and prevent soil loss during the rainy season.
Impact on heritage	The entire site earmarked for the proposed development is degraded from current land	• The proposed development should be approved to proceed as planned under observation that proposed dimension of the gas plant do not extend beyond the study area. The foot print impact of the proposed development and associated infrastructure should be kept to minimal to limit the possibility of encountering chance finds.

Aspect	Impact Description	Mitigation Measures
	uses such as access road, Eskom distribution power line and sugarcane cultivation. There is no evidence suggesting any potential of recovering archaeological remains during earth moving activities. There is an established associated infrastructure development, roads and other associated infrastructures across the entire project receiving area. The field survey did not identify any cultural heritage resources or archaeological resources within an area earmarked for the proposed development.	• Sites of low significance require minimum or no mitigation. Minimum mitigation recommended could be a collection of all surface materials and/ or detailed site mapping and documentation. No excavations would be considered necessary. • However, it is recommended that a Heritage Management Plan be compiled before project commences. This plan must be compiled by a professional archaeologist and be tailored made to ensure protection of heritage sites which are not directly affected by the proposed development but are within the 2km radius of the proposed development. The plan must also include a monitoring plan which must be taken at infrequent or irregular intervals. • Before construction, contractors should be given training on how to identify and protect archaeological remains that may be discovered during the project. The pre-construction training should include some limited site recognition training for the types of archaeological sites that may occur during the construction phase. This should be done by an accredited archaeologist. • If any chance archaeological or previously unknown grave(s), be exhumed or discovered during the course of construction work, activities on the proposed development area should be stopped within a radius of at least 10m of such indicator, and a heritage specialist monitoring the project be notified immediately. The area should then be demarcated by a danger tape. In the meantime, it is the responsibility of the Environmental Officer and the contractor to protect the site from publicity (i.e., media) until a mutual agreement is reached. It is mandatory to report any incident of human remains encountered to the South African Police Services, SAHRA staff member and professional archaeologist. Any measure to cover up the suspected archaeological material or to collect any resources is illegal and punishable by law under Section 35(4) and 36(3) of the National Heritage Resources Act, Act 25 of 1999.

Aspect	Impact Description	Mitigation Measures
		The developer should induct field worker about archaeology, and steps that should be taken in the case of exposing archaeological materials.
OPERATIONAL PHASE		
Visual Impact	The visibility analyses consider worst-case scenarios, using line-of-sight, based on topography. Within the receiving environment, specific viewers (visual receptors) experience different views of the visual resource, and value it differently. Viewers will be affected because of the alterations of the views as a result of the proposed development (gas to power facility and 275kV transmission line). The visual receptors included are tourists that visit the Kruger National Park, the local residents of Malelane, as well as migrants that travel between South Africa and Mozambique via the N4.	• It is recommended that a permeable steel structure be used for the pylons to create the lowest degree of visual obstruction; • Keep the construction sites and camps neat, clean and organised in order to portray a tidy appearance; • Screen the construction camp and lay-down areas; Rehabilitate disturbed areas around pylons as soon as practically possible after construction. This should be done to restrict extended periods of exposed soil. • Plant fast-growing endemic trees along the boundary of the facility, especially along the N4. The trees will with time create a screen and increase the biodiversity of the area. • Locate access routes so as to limit modification to the topography and to avoid the removal of established vegetation; • Utilise existing screening features such as dense vegetation stands or topographical features to place the construction camps and lay-down yards out of the view of sensitivity visual receptors;
Air pollution	The potential air pollutant during construction may be dust emanating from site preparation and	• Unnecessary clearing of vegetation must be avoided to limit dust generation.

Aspect	Impact Description	Mitigation Measures
	excavations during construction as well as exhaust fumes from construction vehicles. Given the nature and magnitude of the proposed development it is anticipated that if not mitigated the impact will be local in extent, short term, and of medium significance and this can be reduced to low with proper mitigation.	• Dust suppression techniques must be implemented. These techniques will include dampening the ground with a water truck, adhering to site speed limits etc. All construction staff must wear their dust masks whenever necessary. • Dust suppression techniques must be implemented, particularly during the winter period. • Vehicles travelling on site must keep the 30km/hr. speed limit. • Burning of any form in of waste material must not be allowed.
Increased noise levels during the operational phase. The operational phase of the Project will be undertaken over two phases (Phase 1 – OCGT with 620MW capacity and Phase 2 – CCGT with 1000MW capacity.	The following noise sources have been identified: • the air intake fans; • fans located on the air and steam condensers; • gas turbine, steam turbine and generator (normally within building); • ventilation fans located on the turbine generator building; and • Exhaust and flue stacks.	• Other noise modelling studies performed on similar technology (CCGT at Saldanha Bay) have indicated that noise impacts at night time during the operational phase are somewhat negligible compared to the daytime. Given that daytime levels are anticipated to be lower and noise generated during the day by the power plant may be masked by other noises from a variety of sources surrounding potentially noise-sensitive developments. • Given that the impact is anticipated to be low, monitoring is proposed if there are noise complaints or if people in the future settle closer than 2,000 m from the power plant. • In addition, it is proposed that a detailed noise impact assessment be conducted during the EIA phase.
Air quality and climate change [Combustion facilities using gas	Decreased ambient air quality. The scale of the impact is related to whether the predicted ambient	• Development and implementation of servicing programmes for all operational components of the facility.

Aspect	Impact Description	Mitigation Measures
primarily for steam raising for electricity generation are classified as Listed Activity in terms of Section 21 the NEM: AQA (Category 1, sub-category 1.4 (gas). LNG will be the primary fuel used for electricity generation with emissions of pollutants from the power plant which include oxides of nitrogen (NOX = NO + NO2) and carbon dioxide (CO), as well as greenhouse gases such as CO2 and CH4.]	concentrations of the pollutants exceed the limit values of the NAAQS in sensitive areas, i.e. residential or non-industrial areas. A detailed air quality impact will be undertaken during the EIA phase to determine actual human and environmental impacts of the emissions.	• Stocking of critical components to ensure the availability of spares in the event of mechanical faults.
Climate change impact	In the context of climate change impacts associated with GHG emissions from the proposed project, extent, duration, and frequency are the same irrespective of the project context and the scale of its GHG emissions. The extent of GHG	• It is important that the plant's thermal efficiency is being maximized throughout the life of the plant in order to reduce the gas consumption and therefore GHG emissions per unit of electricity (i.e. kWh or MWh) generated. The plant should seek to identify specific measures that can be implemented in order to maximise thermal efficiency and therefore minimise GHG intensity over time.

Aspect	Impact Description	Mitigation Measures
	impacts is global, the duration of the impact is permanent (residence time for CO2 in the atmosphere is approximately 100 years), and the frequency of the impact is constant. As such, GHG impact significance will be determined using benchmarks from international lender standards, further informed by reference benchmarks on the GHG intensity of electricity production for similar facilities and according to the grid emissions factor in South Africa, as well as an analysis of the Project's alignment with South Africa's energy and climate change policies. This will be studied further during the EIA phase.	• Whilst noting that, at present, the assumption is for the plant to operate for 8 400 hours per year (96% load factor) throughout its lifetime, it will be important to manage any changes to operating philosophy should these arise. • Whilst noting that any reduction in the operating time or load factor (i.e. annual power generation in MWh) is likely to result in decreased total annual emissions from the plant, such changes to cycling philosophies could have an adverse impact on thermal efficiency and GHG intensity per MWh generated as a result of increased start-ups and wear and tear on the plant. As such, the potential impact of any future changes in operating philosophy should be investigated and managed for example through upgrades to plant hardware and modifications to operating practices, as applicable. • The development and implementation of a GHG management plan is critical if GHG emissions from the plant are to be managed over time. Since GHG emissions are primarily driven by the fuel consumption at the plant and are closely linked to the plant's heat rate and thermal efficiency, this can take the form of a combined thermal efficiency and GHG management plan. Key elements of a thermal efficiency / GHG management plan include: ○ Development of an overarching policy statement indicating the Plant's commitments with respect to minimising GHG emissions and implementing actions to ensure optimum emissions management; • Measuring GHG emissions on an annual basis (2), which will require data on the total amount of gas consumed, its chemical properties, GHG emissions factor; and the consumption of any other fuels such as LPG for the black starts; and plant heat rate / thermal efficiency should be closely monitored over time as this is closely correlated to the GHG intensity of the plant.

Aspect	Impact Description	Mitigation Measures
		• Setting short, medium and long-term targets relating to maximising and maintaining heat rate / thermal efficiency and GHG intensity (t CO2e per MWh generated) over time, against which performance can be assessed; • Tracking South Africa's evolving GHG and energy related regulations, including the implications / requirements for the Plant of the proposed carbon tax, GHG reporting regulations, and energy reporting regulations, all of which are currently in draft form but likely to be finalised in 2016 or 2017. • Identifying and implementing heat rate improvement / GHG reduction projects, based on any deviations from expected heat rate and knowledge of required maintenance or upgrades. Internal and external energy audits should be used to help identify opportunities for performance improvement, and a business case can be developed for each area of opportunity to help prioritise projects. More significant projects can be implemented during the major maintenance overhauls as scheduled by the Plant; • Allocating responsibility to key individuals for managing and reporting on the GHG performance of the plant; • Communicating the Plan, including its key objective and any actions being taken, to staff working at the plant to ensure buy-in; • Encouraging employee participation in the GHG management plan, including contribution of ideas relating to opportunities for • improvement; and • Reporting progress over time with respect to annual gas consumption and GHG emissions, GHG reductions / heat rate improvements achieved, and progress against targets set.

11.2 CUMULATIVE IMPACTS

Cumulative impacts in relation to an activity, means the past, present and reasonably foreseeable future impacts of an activity, considered together with the impacts of activities associated with that activity, that in itself may not be significant, but may become significant when added to the existing and reasonably foreseeable impacts eventuating from similar or diverse activities (DEA, 2014 EIA Regulations). This section provides cumulative impacts ratings associated with the proposed project, which include the waste generation, traffic, socio-economic and visual impacts. Additional cumulative impacts will be assessed during the EIA phase. It also outlines the mitigation measures of each rated cumulative impacts as follows:

11.2.1 WASTE GENERATION

During the construction phase of the proposed power station, powerline and gas pipe line, there will be a variety of waste material produced within the study area.

11.2.2 VISUAL IMPACT

The proposed activity will change the visual character of the area particularly considering that the proposed site is located next to the national road (N4). Given the topography and the proximity to the national road and Malelane CBD, the impact can be considered definite and long term.

11.2.3 TRAFFIC IMPACT

During the construction phase, increased heavy vehicle traffic should be expected. Without management, such increased traffic loads may negatively impact existing traffic flow. Further unmanaged construction vehicles may decrease road safety for other road users.

11.2.4 SOIL AND LAND CAPABILITY

12 PLAN OF STUDY FOR EIA

The Scoping phase is fundamental as it allows for the identification of potential impacts on the environment, as well as facilitation of the process of compiling the EIA and Environmental Management Programme (EMPr). This report incorporates information from the client, specialist studies, site visits, literature reviews as well as previous environmental studies conducted in the area; it therefore, provides a comprehensive baseline of the environment of the study area.

This Scoping Process has followed the appropriate standards and procedure for the EIA application, as set out in the NEMA and the EIA Regulations of April 2017. The study includes a description of the various alternatives and indicates those alternatives, which should be pursued as part of the detailed assessment of the EIA process. Impact significance of the proposed activity on the environment will be assessed in the EIA phase with the assistance of the various specialist studies.

The purpose of this section is to outline how the EIA for the proposed development will proceed during EIA phase. The detailed assessment phase of the EIA process entails the integration of the specialist studies for those potential impacts evaluated to be of significance. Relevant mitigation measures will be included in the EMPr. This section provides specific terms of reference and impact assessment methodology for utilisation by the specialist team and EAP. The Plan of Study for EIA is intended to provide a summary of the key findings of the Scoping Phase and to describe the activities to be undertaken during impact assessment. The Plan of Study provides the following:

- A description of the alternatives to be considered and assessed within the preferred site, including the option of not proceeding with the activity;
- A description of the aspects to be assessed as part of the environmental impact assessment process;
- Aspects to be assessed by specialists;
- A description of the proposed method of assessing the environmental aspects, including a description of the proposed method of assessing the environmental aspects including aspects to be assessed by specialists;
- A description of the proposed method of assessing duration and significance;
- An indication of the stages at which the competent authority will be consulted;
- Particulars of the public participation process that will be conducted during the EIA process;
- A description of the tasks that will be undertaken as part of the environmental impact assessment process; and

Identification of suitable measures to avoid, reverse, mitigate or manage identified impacts and to determine the extent of the residual risks that need to be managed and monitored.

13 A DESCRIPTION OF THE ALTERNATIVES TO BE CONSIDERED AND ASSESSED WITHIN THE PREFERRED SITE, INCLUDING THE OPTION OF NOT PROCEEDING WITH THE ACTIVITY

The scoping phase assessed technical and structural alternatives of the Tlou gas-to-power facility, powerline and pipeline. These alternatives will be assessed further during the EIA phase. The preferred alternatives will be the alternative with the least environmental impacts as well as providing most benefits to the socio-economy.

13.1 POWER GENERATION ALTERNATIOVES

DNG Energy has considered various technology options which include the OCGT and Reciprocating Engine. Several aspects including technical, economic and environmental are considered in selecting the most suitable technology. However, of the many technologies available the project is considering either the OCGT or alternatively the reciprocating engine. These will be assessed further in the EIA Phase.

13.2 STRUCTURAL ALTERNATIVES FOR THE POWERLINE

Several structural alternatives have been proposed for the proposed transmission powerline, and they include one or more of the following single circuit pylons:

- Cross-Rope suspension type;
- Self-supporting type; and
- Guyed V towers.

13.3 NO-GO ALTERNATIVE

Under GN R.982, consideration must be given to the option not to act, in which an alternative is usually considered when the proposed development is envisaged to have significant adverse environmental impacts that mitigation measures cannot ameliorate effectively. The no-go alternative would be the option of not undertaking the development of the proposed project. A further assessment of the no-go alternative will be undertaken in the EIA Phase.

14 A DESCRIPTION OF THE ASPECTS TO BE ASSESSED AS PART OF THE ENVIRONMENTAL IMPACT ASSESSMENT

The following are aspects that have been identified and briefly describes as part of the Scoping Report. Further detailed assessment will be undertaken during the EIA phase:

- Biodiversity (flora and fauna);
- Soil, land use and land capability
- Heritage;
- Wetland;
- Traffic;
- Air quality;

- Socio-economic;
- Visual impacts; and
- Climate Change.

14.1 ASPECTS TO BE ASSESSED BY THE SPECIALISTS

During the draft scoping phase, two (2) specialist studies were undertaken and these are listed in section 9.3.2 above. The specialist reports are attached herein as **Appendix B**. The studies undertaken during the scoping phase assessed all the alternatives and will continue during the EIA phase. Additional studies that may become necessary during the EIA phase include the following:

- Air quality;
- Terrestrial flora;
- Terrestrial fauna;
- Noise Study;
- Heritage Impact Study;
- Palaeontology;
- Socio-economic; and
- Climate change.

14.2 A DESCRIPTION OF THE PROPOSED METHOD OF ASSESSING THE ENVIRONMENTAL IMPACTS

The description of the proposed method of assessing the duration and significance is included in Table 8 above.

14.3 AN INDICATION OF THE STAGES AT WHICH THE COMPETENT AUTHORITY WILL BE CONSULTED

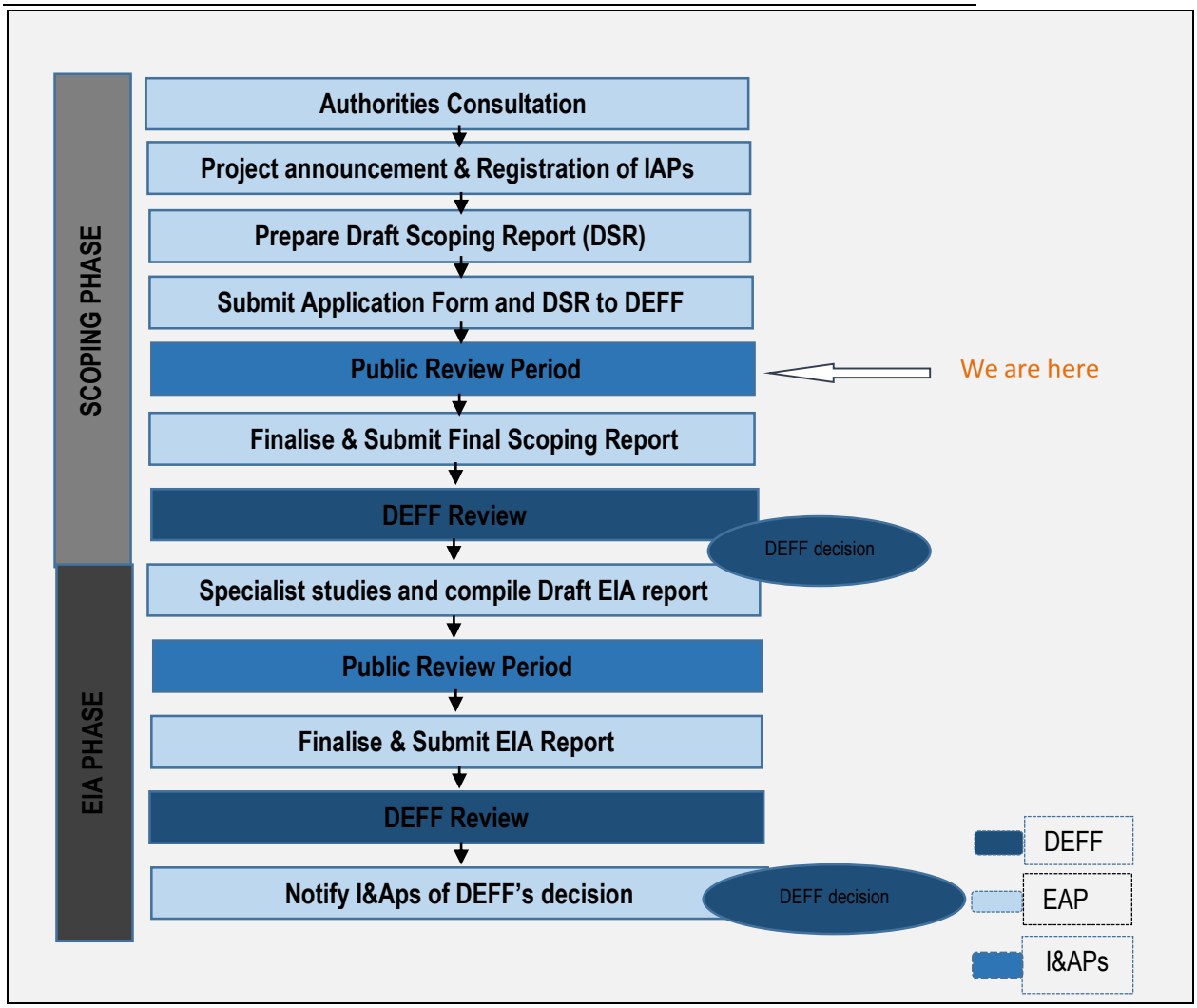


Figure 13: The different stages at which the Competent Authority will be consulted.

14.4 SCOPING PHASE

The draft Scoping Report together with the Application will be submitted to DEFF for review and comment. The EAP will consider the comments and prepare responses. In addition, the report will be sent to all stakeholders to review and comment for a period of 30 days, of which any comments or issues raised will be addressed appropriately. The final Scoping Report will be submitted to the DEFF for consideration.

14.5 ENVIRONMENTAL IMPACT ASSESSMENT PHASE

The draft Environmental Impact Report (EIR) will be prepared and distributed for public review and comments. Further, copies of the draft EIR will be submitted to the DEFF and stakeholders for comment. The final EIR which includes all comments received, specialist reports and recommendations will be submitted to DEFF for decision making.

The database of stakeholders developed during the scoping process will be used as a basis to ensure that those stakeholders involved in the Scoping Phase also participate in the EIA phase. The database will also be expanded to include I&APs that wish to be involved in the process. Registered I&APs will be informed of the availability of the draft EIR for review and will be given 30 days to provide their comments. The comments received will be incorporated into an updated Comments & Response Report (CRR).

Additional public consultation will take place in the form of public meetings and focus group meetings as appropriate. The purpose of the public meetings would be to present the findings of the draft EIR as well as the alternatives considered to the relevant stakeholders, registered I&APs and the affected landowners. The EAP will use this forum to provide more information about the proposed development including the specialist input, and to provide the stakeholders with the opportunity to further comment on the proposed development. In the event that the comments and issues raised highlight information that changes or influences the impact evaluation provided in the draft EIR, the necessary amendments will be made to the report. The Final EIR will be submitted to the DEFF, subsequent to the second phase of public consultation.

14.6 PARTICULARS OF THE PUBLIC PARTICIPATION PROCESS THAT WILL BE CONDUCTED DURING THE ENVIRONMENTAL IIMPACT ASSESSMENT PROCESS

The database of stakeholders developed during the scoping process will be used as a basis to ensure that those stakeholders involved in the Scoping Phase also participate in the EIA phase. The database will also be expanded to include I&APs that wish to be involved in the process. Registered I&APs will be informed of the availability of the draft EIR for review and will be given 30 days to provide their comment. The comments received during the review period will be incorporated into an updated Comments & Response Report.

Further public consultation will take place in the form of public meetings and focus group meetings as appropriate. The purpose of the public meetings would be to present the findings of the draft EIA Report as well as the alternatives considered to the relevant stakeholders, registered I&APs and the affected landowners. Nsovo will use this forum to provide more information about the proposed development including the specialist input, and also to provide the stakeholders with the opportunity to further comment on the proposed development. In the event that the comments and issues raised highlight information that changes or influences the impact evaluation provided in the draft EIA Report, the necessary amendments will be made, and the final EIA Report will be compiled and submitted to the DEFF.

14.6.1 ADVERTISING

The commencement of the EIA process i.e. the Scoping Phase was advertised in a local newspaper in English. The proposed project was further announced publicly through the following forms of information sharing:

- Newspaper adverts providing a description of the proposed development and location, as well as contact details of where more information can be obtained and announcing the availability of the draft Report for review and comment;
- A2 site notices in English will be placed at conspicuous locations along the study area. Notices will also be placed at the route alternative sites as well as at the Local Municipalities offices within the proposed study area; and
- Letters will be sent to key stakeholders.

Further advertising will take place during the EIA phase and will relate to the availability of the reports for public review and announcement of public meetings that will be held at strategically located sites, which will allow for maximum attendance.

14.6.2 INTERACTION WITH DEFF AND PROVINCIAL DEPARTMENTS

Interaction with DEFF and other provincial authorities with jurisdiction on the proposed development undertaken during the Scoping Phase will continue into the EIA Phase of the project. Further interaction will occur in the following manner:

- Submission of the final Scoping Report to DEFF;
- A consultation meeting with various stakeholders and I&APs as appropriate, to discuss the findings of the Draft EIR;
- Submission of the Draft EIRs following a public review period; and
- Notification of registered I&APs of the EA once it is issued.

The draft EIR will be reviewed by I&AP's, authorities and key stakeholders. Furthermore, the report will also be published and the made available on Nsovo (EAP) website for public review. The **Table** below shows some of the key stakeholders to be consulted:

Table 12 : I&AP's, authorities and key stakeholders to review draft EIR.

- Mpumalanga Department of Agriculture and Rural Development and Land Administration
- Mpumalanga Department of Water and Sanitation;
- Mpumalanga Department of Transport and Public Works;
- N4 Trans African Concessions (TRAC)
- Mpumalanga Heritage Resources Agency;
- South African Heritage Resource Agency;
- Wildlife and Environmental Society of South Africa;
- AGRI SA;
- Ehlanzeni District municipality;
- Nkomati Local Municipality; and
- Eskom SOC Limited – Transmission.

14.6.3 DEVELOPING A STRATEGY AND RESOLVING KEY ISSUES

A strategy for addressing and resolving key issues is to be developed and will include:

- Details on all assessments and investigations carried out;
- Use of the public participation meetings to present the findings of the reports and test the acceptability of priority issues and mitigations;
- Openly and honestly relating both positive and negative impacts of the proposed development during the public meetings; and
- Allowing the public to understand the consequences of the proposed development on the area and their livelihoods.

14.7 A DESCRIPTION OF THE TASKS THAT WILL BE UNDERTAKEN AS PART OF THE ENVIRONMENTAL IMPACT ASSESSMENT

The section below indicates the tasks that will be undertaken as part of the EIA process.

14.7.1 PREPARATION OF THE DRAFT EIR AND EMPR

The draft EIR and EMPr will be prepared as per Appendices 3 and 4 of the 2014 EIA Regulations and will include input from the specialist studies as indicated in Section 9.3.2 above. Contents of the draft EIR (Appendix 3) will include the following:

- Details and expertise of the EAP;

- Location of the activity;
- A plan which locates the proposed activity or activities applied for as well as associated structures and infrastructure at an appropriate scale;
- A description of the scope of the proposed activity;
- A description of the policy and legislative context within which the proposed development is located and an explanation of how the proposed development complies with and responds to the legislation and policy context;
- A motivation for the need and desirability for the proposed development, including the need and desirability of the activity in the context of the preferred location;
- A motivation for the preferred development footprint within the approved site;
- A full description of the process followed to reach the proposed development footprint within the approved site;
- A full description of the process undertaken to identify, assess and rank the impacts the activity and associated structures and infrastructure will impose on the preferred location through the life of the activity;
- An assessment of each identified potentially significant impact and risk including (i) and (vii) as per the Regulations;
- A summary of the findings and recommendations of specialist reports;
- Environmental Impact Statement inclusive of (i) to (iii) as per the Regulations;
- Recommendations from the specialist reports, the recording of proposed impact management objectives, and the impact management outcomes for the development for inclusion in the EMPr as well as for inclusion as conditions of authorisation;
- The final proposed alternatives which respond to the impact management measures, avoidance, and mitigation measures identified through the assessment;
- Aspects which were conditional to the findings of the assessment either by the EAP or specialist which are to be included as conditions of authorisation;
- A description of any assumption, uncertainties and gaps in knowledge which relate to the assessment and mitigation measures proposed;
- A reasoned opinion as to whether the proposed activity should or should not be authorised, and if the opinion is that it should be authorised, any conditions that should be made in respect of that authorisation;
- The period for which the environmental authorisation is required and the date on which the activity will be concluded, and the post construction monitoring requirements finalised;
- The undertaking under oath by the EAP in relation to (i) and (iv) as per the regulations;

An indication of any deviation from the approved Scoping Report, including the Plan of Study including (i) and (ii) as per the Regulations;

Contents of the EMPr (Appendix 4) will include the following:

- An EMPr must comply with Section 24N of the Act and include - details of the EAP who prepared the EMPr; and the expertise of that EAP to prepare an EMPr, including a curriculum vitae;
- A detailed description of the aspects of the activity that are covered by the EMPr as identified by the project description;
- A map at an appropriate scale which superimposes the proposed activity, its associated structures, and infrastructure on the environmental sensitivities of the preferred site, indicating any areas that any areas that should be avoided, including buffers;
- A description of the impact management objectives, including management statements, identifying the impacts and risks that need to be avoided, managed and mitigated as identified through the environmental impact assessment process for all phases of the development including (i) to (v) of the 2014 EIA Regulations as amended;
- A description of proposed impact management actions, identifying the manner in which the impact management outcomes contemplated above will be achieved, and must, where applicable, include actions as indicated on (i) to (iv) of the EIA 2014 Regulations as amended.
- The method of monitoring the implementation of the impact management actions contemplated above;
- The frequency of monitoring the implementation of the impact management actions contemplated above;
- An indication of the persons who will be responsible for the implementation of the impact management actions;
- The time periods within which the impact management actions contemplated above must be implemented;
- The mechanism for monitoring compliance with the impact management actions contemplated above;
- A program for reporting on compliance, taking into account the requirements as prescribed by the Regulations;
- An environmental awareness plan describing the manner in which-
- (i) the applicant intends to inform his or her employees of any environmental risk which may result from their work; and
- (ii) risks must be dealt with in order to avoid pollution or the degradation of the environment; and
- Any specific information that may be required by the competent authority.

14.7.2 PUBLIC PARTICIPATION PROCESS

The public participation process will be undertaken as indicated on Section 8 above.

14.7.3 PREPARATION OF THE FINAL EIA REPORT AND EMPR

The final EIR and EMPr will be prepared as per Appendices 3 and 4 of the 2014 EIA Regulations as amended, further, it will be submitted to DEFF in hard copy and electronic version (CD).

14.7.4 IDENTIFY SUITABLE MEASURES TO AVOID, REVERSE, MITIGATE OR MANAGE IDENTIFIED IMPACTS AND TO DETERMINE THE EXTENT OF THE RESIDUAL RISKS THAT NEED TO BE MANAGED AND MONITORED

The aspects that will be assessed have been identified and their potential impacts and mitigation measures are indicated on Sections 9.1 and will be elaborated further in the EMPr. The proposed method of assessing environmental aspects are included on Table 8 above.

15 UNDERTAKING UNDER OATH OR AFFIRMATION BY THE EAP

In undertaking the draft and final Scoping phases of the project the EAP has taken into consideration the requirements stipulated in the EIA 2014 Regulation as amended, as well as other relevant Acts and Regulations. The EAP hereby confirm that with the information available at the time of preparing the Scoping Report and the reports prepared by the specialists, the following has been considered in preparing this report:

- The correctness of the information provided in the report;
- The inclusion of comments and inputs from stakeholders and interested and affected parties; and
- Any information provided by the EAP to the interested and affected parties and any responses by the EAP to comments or inputs made by interested and affected parties.

Refer to **Appendix E** for the Declaration of the EAP.

15.1 AN UNDERTAKING UNDER OATH OR AFFIRMATION BY THE EAP IN RELATION TO THE LEVEL OF AGREEMENT BETWEEN THE EAP AND INTERESTED AND AFFECTED PARTIES ON THE PLAN OF STUDY FOR UNDERTAKING THE ENVIRONMENTAL IMPACT ASSESSMENT

The draft Plan of Study for EIA is part of the draft Scoping Report which will be made available to I&APs and Organs of State for a 30 days review and comment period. Comments/issues raised will be addressed and included in the Issues and Response Report (**Appendix D1**). No agreement between the EAP and I&APs is in place.

15.2 WHERE APPLICABLE, ANY SPECIFIC INFORMATION REQUIRED BY THE COMPETENT AUTHORITY

No specific information required by the authority; should it be required it will be included accordingly.

15.3 ANY OTHER MATTER REQUIRED IN TERMS OF SECTION 24(4) (A) AND (B) OF THE ACT.

This Report has been prepared in terms of NEMA, its respective 2014 EIA Regulations as well as other various Acts. Information that is required by the NEMA has been included in the Draft Scoping Report and will also be included in the EIA phase.

16 DESCRIPTION OF ANY ASSUMPTIONS, UNCERTAINTIES AND KNOWLEDGE GAPS

16.1 ASSUMPTIONS AND LIMITATIONS

It is assumed that technical data supplied by the client was correct and valid at the time of compilation of specialist studies and the draft Scoping Report. Furthermore, it is assumed that the alternatives presented by the client are feasible.

16.1.1 PUBLIC PARTICIPATION PROCESS

Given the magnitude of the project and the various extent and portions of farms in the area of which some are private and not easily accessible, it is likely that some I&APs were not reached. However, effort was made as part of the process to advertise on local media as well as placing of notices at noticeable places around the site.

16.1.2 LITERATURE REVIEWS IS VIEWED AS CORRECT

The compilation of the reports was based on various literature reviews and specialist input which were viewed as correct at the time. However, it is acknowledged that there might be some gaps in knowledge with regards to the literature reviewed although conceited efforts were made to attain as much information as possible.

16.1.3 HERITAGE STUDY

It is possible that the Phase 1 HIA may have missed heritage resources in the project area, as some heritage structures may lie below the surface and may only be exposed once development commence.

16.1.4 VEGETATION ASSESSMENT

There is a key difference between the approach of the ecological consultant and that of the ecological researcher. In consultancy, judgements must be made and advice provided that is based on the best available evidence, combined with collective experience and professional opinion. The available evidence may not be especially good, potentially leading to over-simplification of ecological systems and responses, and do contain a considerable deal of uncertainty.

17 FATAL FLAWS

No fatal flaws or highly significant impacts were identified during the scoping phase that would necessitate substantial redesign or termination of the project. Potential negative impacts have been identified and where the impacts were detrimental to the environment, alternatives were proposed together with mitigation measures.

The main impacts are outlined below, and recommended mitigation measures and a summary of site suitability and residual impacts will further be assessed in detail during the EIA phase. Such potential impacts include the following:

- Impacts on flora and fauna;
- Impacts on watercourses;;
- Impacts on heritage and archaeology;
- Visual impact to neighbouring communities, road users and tourist
- Impact on air quality due to the Power station.
- Impact on noise;
- Climate change impact; and
- Traffic impact;

The subsequent EIA phase will provide a detailed assessment of the identified aspect, rate the significance accordingly and propose mitigation measures as applicable. Based on all the findings and assessment of impacts by the EAP, the site is feasible for the proposed development and will therefore be assessed further in the EIA phase. The No-Go option will also be assessed comprehensively taking into consideration specialist studies that have been recommended as part of the PPP.

18 CONCLUSION

The Draft Scoping study was undertaken in accordance with the requirements of the NEMA and the EIA Regulations as well as associated Legislations. The technical alternatives have been proposed and the primary objective was to assess the suitability of the site for the intended use as well as to assess the impacts of the proposed Tlou gas-to-power facility, Powerline and gas pipeline. This report has comprehensively addressed the baseline environment which will form the backdrop of the impact assessment. Information provided has been supported by specialist studies that were undertaken and attached hereto.

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19 REFERENCES

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