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ENVIRONMENTAL IMPACT ASSESSMENT DRAFT BASIC ASSESSMENT REPORT

ESKOM IMPOFU-NGWEDI 132KV LINE PROJECT
DATE 24 NOVEMBER 2015

Executive Summary

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1 INTRODUCTION

This EIA application is for the proposed augmentation of the 132kV electricity supply infrastructure for the Maseve project.

The Maseve mine is a platinum group metals mine, which is managed and operated by Platinum Group Metals RSA Pty Ltd. (PTM). The Maseve mine adjoins the Frischgewaagd-Ledig Project. It also shares a boundary with the Styldrift mine and the Bafokeng Rasimone Platinum Mine.

Bulk electricity supply infrastructure is needed to augment the supply to the above-mentioned mining project on the farm Frischgewaagd 96 JQ, in the Rustenburg Local Municipality. One 132kV overhead power line will be constructed from the existing Eskom Impofu Substation to the Eskom Ngwedi Main Transmission Station (MTS). Once constructed, Eskom will ultimately take over the ownership of the infrastructure and operate and maintain it.

Maseve Investments 11 (Pty) Ltd (the applicant) appointed **Texture Environmental Consultants** as the independent environmental assessment practitioner (EAP) to undertake the Environmental Impact Assessment (EIA) for the proposed electricity supply project. The EIA will conform to the National Environmental Management Act 107 of 1998 and to the Environmental Impact Assessment Regulations published in GN R982/2014 - R985/2014 of 8 December 2014.

This report provides information about the electricity supply infrastructure which is being developed, i.e. the 132kV overhead power line from the existing Eskom Impofu Substation to the Eskom Ngwedi MTS, and its scope is restricted to this component of the project.

2 STUDY APPROACH

The approach followed by the consultants was based on the specifications for the Basic assessment report in terms of the Environmental Impact Assessment Regulations, 2014, promulgated in terms of the National Environmental Management Act, 1998 (Act No. 107 of 1998), as amended.

In short, the study approach followed by the Consultants, entailed the following steps:

- Preliminary site investigations to determine the scope of works of the project and to familiarise with the sites were done by the EIA Consultants, the client and specialists in September 2015.
- Specialist ecological input was obtained to investigate the flora, fauna and the general biophysical environment in an attempt to identify the potential impacts of the project.
- The proposed development is covered by the National Heritage Resources Act which incorporates heritage impact assessments in the Environmental Impact Assessment process. A Phase 1 Heritage Impact Assessment was therefore done by a specialist to identify the potential impact on heritage resources.
- The National Heritage Resources Act 25 of 1999 in addition requires that all heritage resources, that is, all places or objects of aesthetic, architectural, historical, scientific, social, spiritual, linguistic or technological value or significance be protected. Fossil heritage of national and international significance is found within all provinces of the RSA. Therefore Palaeontological input was requested.
- Input from an avifauna specialist was obtained to determine the impact of the proposed project on birds.
- In addition, input was provided by a wetland and aquatic specialist to determine the impact on surface water.
- During September 2015 the specialists conducted site investigations.
- The first phase of the Public Participation Programme (PPP) commenced on 22 September 2015 allowing for a 30-day comment period. It included the identification of key stakeholders, the distribution of information letters (BID) with a request for registration and comments, as well as advertising of the project in the local and regional press and on site.
- In addition, notification of an information meeting on 5 November 2015 was submitted to all I&APs on 22 October 2015. The purpose of this meeting was to furnish all interested parties with information regarding the extent of the project, the proposed alternatives, and the extent of the Environmental Impact Assessment Process.
- Written comment was received in the notification phase from:

- South African Civil Aviation Authority
- North West Province Department of Rural, Environment and Agricultural Development: Environmental Services
- Endangered Wildlife Trust
- Eskom Transmission, AME Land Management
- A draft Basic Assessment Report was compiled with the main aim to identify issues, potential impacts and potential alternatives associated with this project. It included a description of the status quo of all relevant environmental components as well as the proceedings of the PPP and communication with registered Interested & Affected Parties (I&APs).
- On 24 November 2015 the draft Basic Assessment Report was distributed for comment.
- The due date for comment to the draft Basic Assessment Report is 15 January 2016. This allows for a comment period of 30 days, with cognisance of the festive season.
- Subsequent to the above, the final BAR will be submitted to DEA. The final BAR will include all concerns raised to the draft BAR and the responses thereto. The Consultants (EAPs) shall ensure that all concerns raised are addressed in appropriate detail in the final Basic Assessment Report.

3 PROJECT DESCRIPTION

Bulk electricity supply infrastructure is needed to augment the supply to the above-mentioned mining project on the farm Frischgewaagd 96 JQ, in the Rustenburg Local Municipality. One 132kV overhead power line will be constructed from the existing 132kV Eskom Impofu Substation to the Ngwedi Main Transmission Station (MTS).

4 PROJECT LOCALITY

The study area is situated within the grounds of the Maseve Mine, approximately 6km southwest of Sun City and 35km northwest of Rustenburg, within the Rustenburg Local Municipality in the North West Province. The site is to the east of the R565 secondary road passing between Rustenburg and Sun City Resort in a northerly direction.

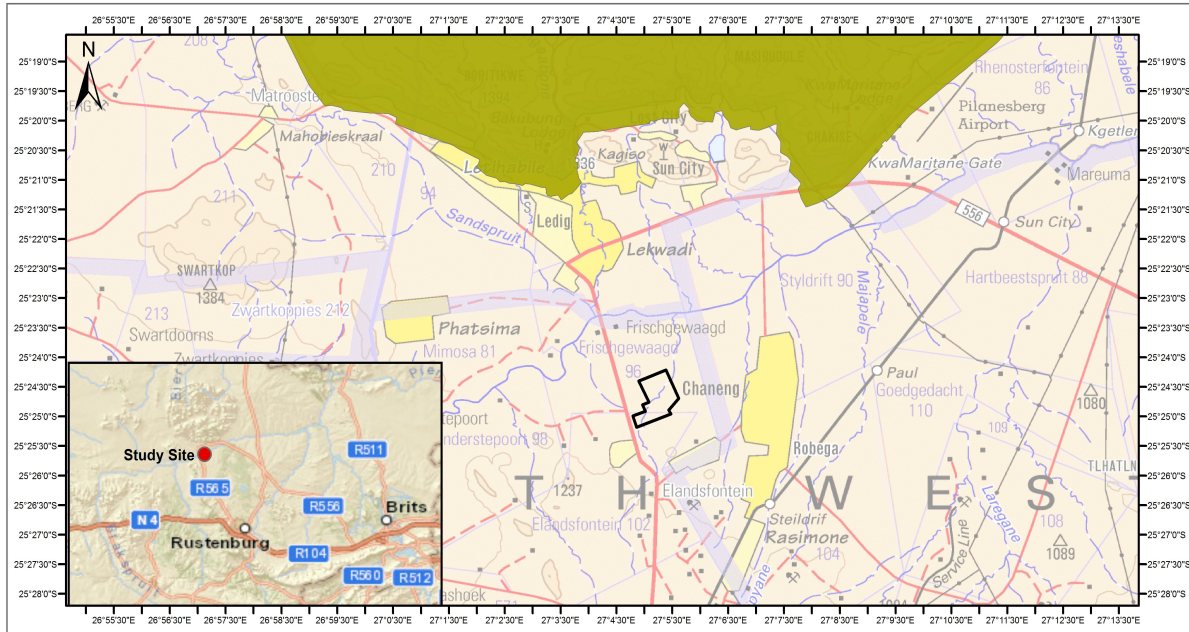
The study area is within a new, active and developing mining complex. Large areas of the study area consist of roads, powerlines, a powerline servitude for large transmission lines, electrical substations, soil stockpiles, buildings and other mining-related infrastructure.

Ngwedi MTS is a 400/132kV Eskom transmission substation currently being under construction and located on the northern section of the study area. The existing Impofu 132kV substation is located on the south western side of the study area.

During field investigations various powerline servitude alternatives within the larger study area were investigated. The best options will be determined through the environmental and specialist studies, as well as public opinion.

The proposed project is set out in the Location Maps below.

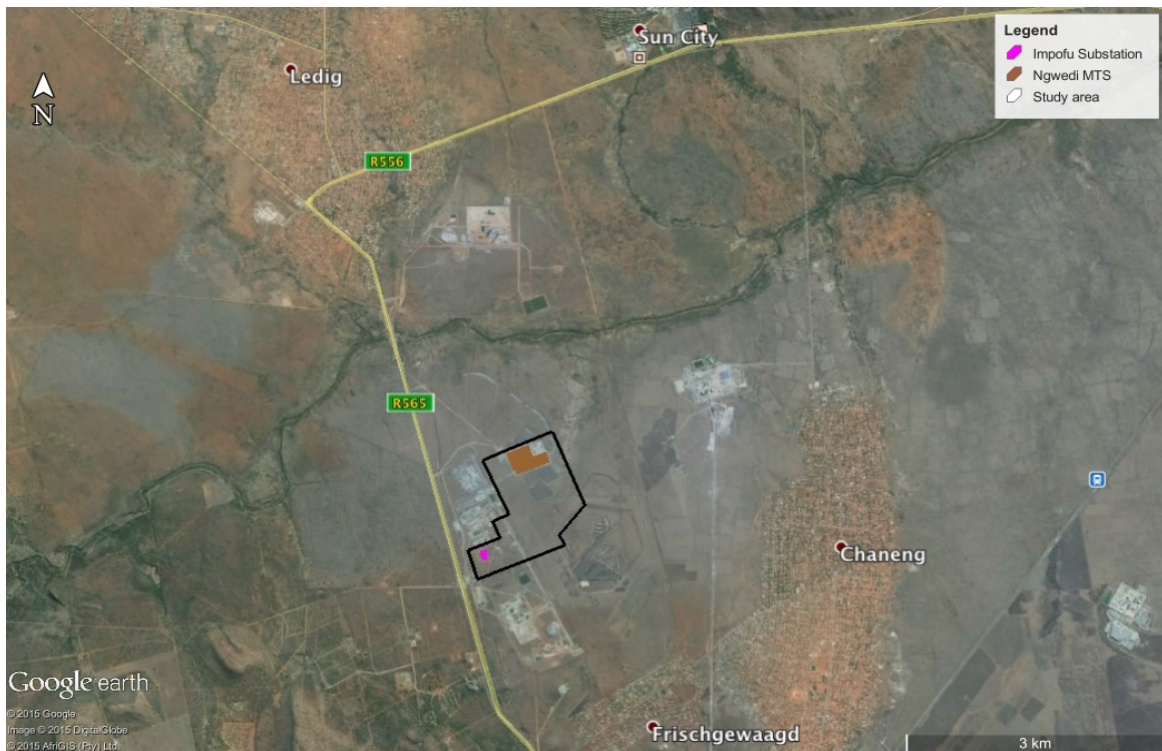
ESKOM IMPOFU - NGWEDI 132KV LINE PROJECT



Legend

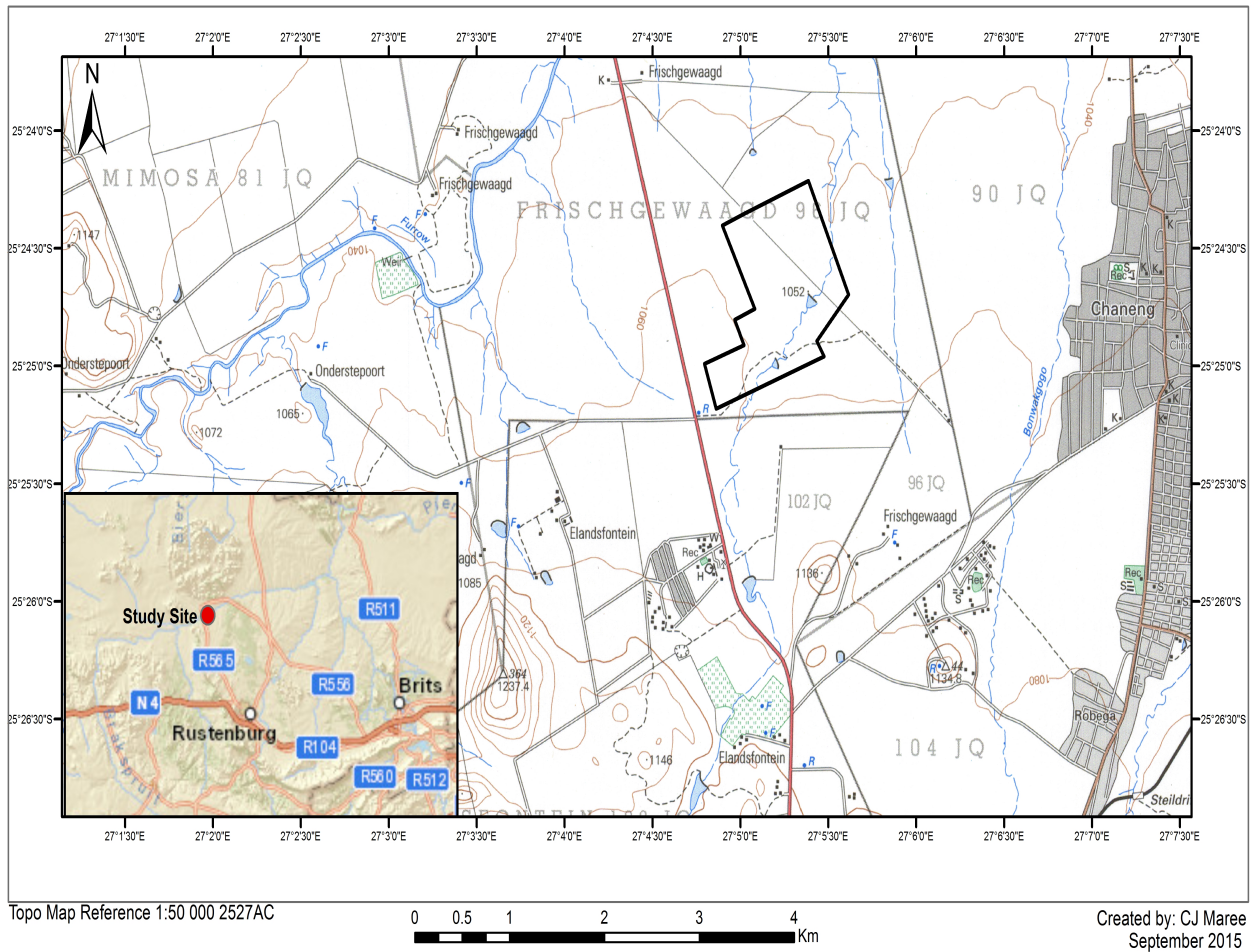
- Pilanesberg Nature Reserve
- Study Area

Created by: CJ Maree
October 2015




Figures 1&2: Study area location

ESKOM IMPOFU - NGWEDI 132kV LINE PROJECT



Legend

 Study Area

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Figure 3: Site location

5 PROPERTY DESCRIPTIONS

The proposed power line alignment is on the farm Frischgewaagd 96 JQ, Portions 7, 10 and 14, in the Rustenburg Local Municipality in the North West Province.

6 TOPOGRAPHY

The topography of the study area is flat plains and lowlands, with no undulating hills or valleys. No rocky ridges or rocky outcrops are present in the study area.

The average slope across the study area is 1 - 3%. The direction of the slope is predominantly from west to east and northeast and from north to south. The overall drainage and thus slope of the study area can be described by the drainage line that runs from the southwest to the northeast and north across the study area.

7 PROJECT COMPONENTS

The full scope of works includes the construction of:

- 1 x 132kV overhead power line of approximately 1.5km long from the Impofu substation to Ngwedi Main Transmission Station (MTS).

Alternative Route 1 (preferred route) and Alternative 2 are shown in the maps below (Figure 4).

ESKOM IMPOFU - NGWEDI 132kV LINE PROJECT

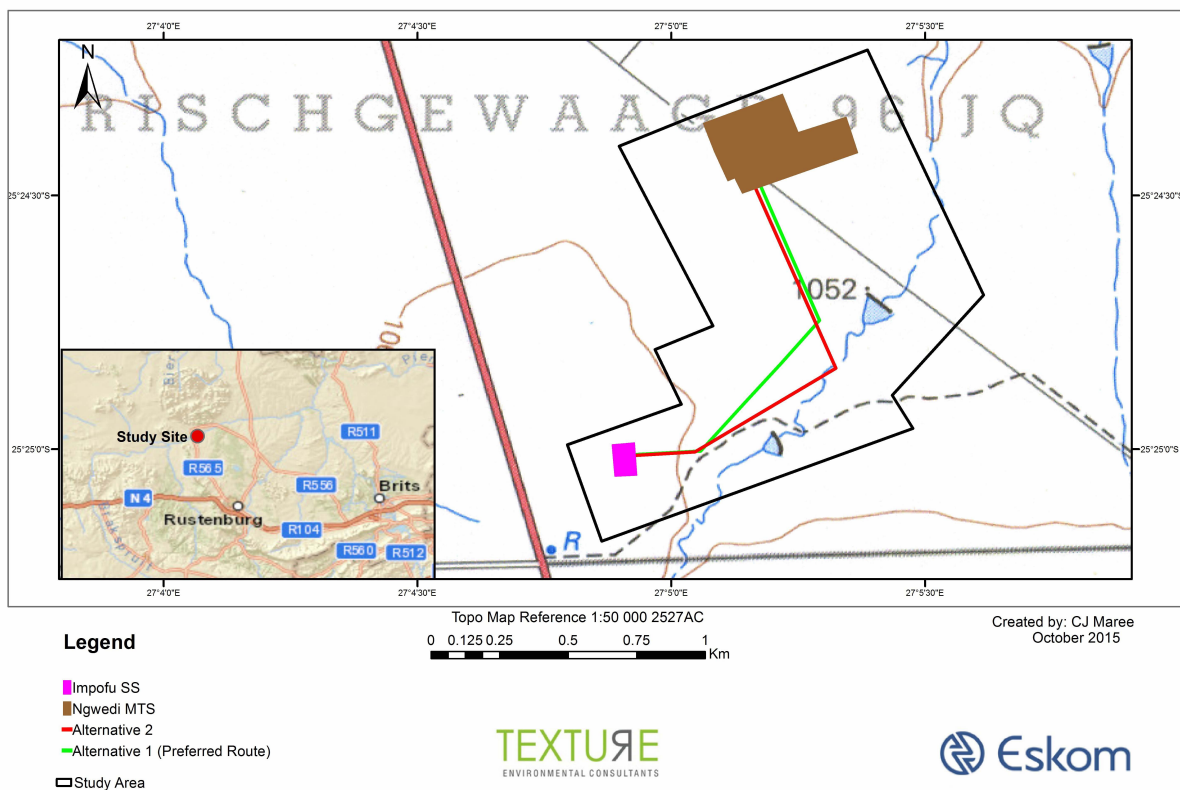


Figure 4: Overview map indicating the site on the Maseve Mine area

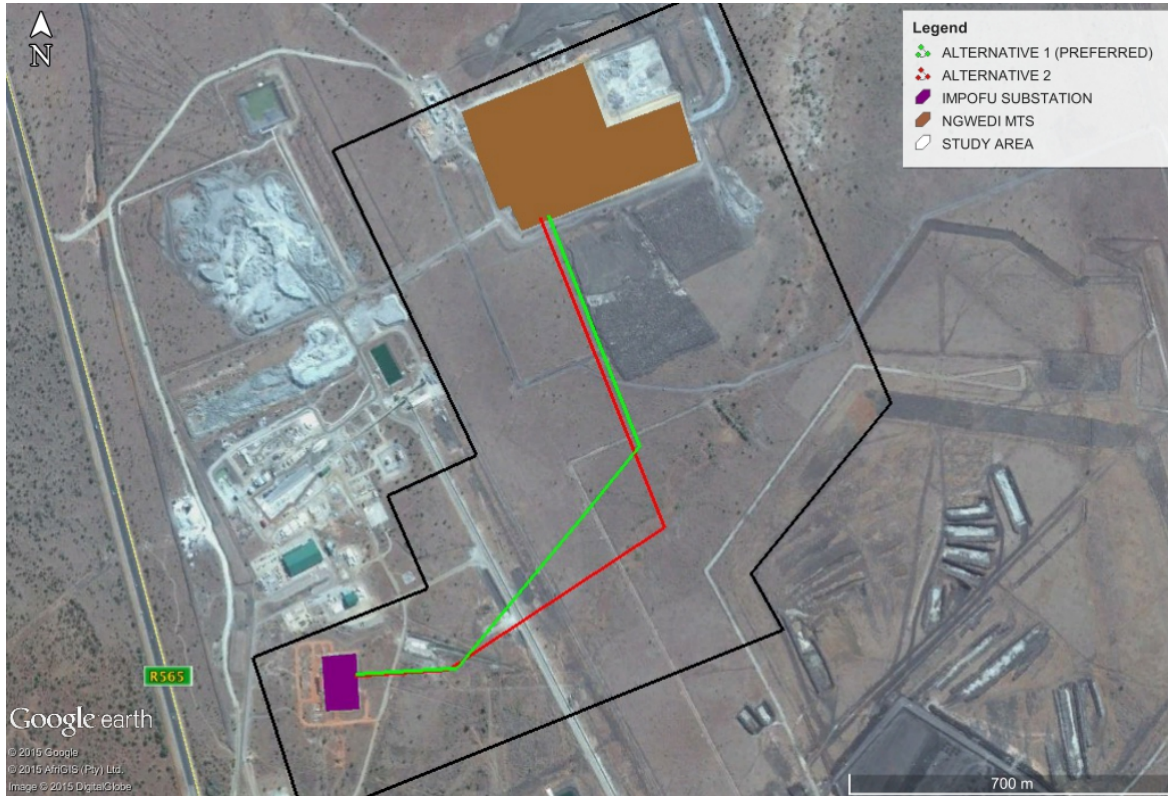


Figure 5: Overview map indicating the Route Alternatives as investigated. The green line is the preferred alignment for the overhead power line

8 SURROUNDING LAND USES

The study area is situated within an area that, up until a few years ago, was a mixture of open bushveld and agricultural land in the form of cultivation. Most of the study area was cultivated, that is ploughed up, over the years. This is also evident in the area of the drainage line that runs through the study area.

Presently, the study area is situated within a new, active and developing mining complex. Large areas of the study area consist of roads, powerlines, powerline servitudes for large transmission lines, electrical substations, soil stockpiles, buildings and other mining-related infrastructure.

9 NEED FOR THE PROJECT

In 2012, the Government adopted the National Infrastructure Plan, wherein it highlighted that South Africa would be embarking on a process to accelerate infrastructure development, in order to deal with service delivery backlogs and to build a platform for future economic growth and employment. This infrastructure growth would be spearheaded by Strategic Infrastructure Projects (SIPs), which are large-scale infrastructure projects that were also projected to have numerous environmental impacts, which in turn could trigger many EIAs. SIP 10 states that: Electricity Transmission and Distribution for All, has been identified as a major infrastructure development need by the Presidential Infrastructure Coordinating Committee (PICC). This project is therefore in line with the above-mentioned SIP.

The proposed activity will provide support to electrical infrastructure that will contribute to sustainable economic growth, provide for sustainable human settlements and support the mining industry.

Eskom Holdings Ltd is mandated by the South African Government to ensure the provision of reliable and affordable power to South Africa. Eskom's core business is in the generation, transmission (transport), trading and retail of electricity.

The reliable provision of electricity by Eskom is critical for industrial development and related employment and sustainable development in South Africa. As electricity cannot practically be stored on a significant scale, power is generated and delivered over long distances at the instant that it is required. In South Africa, thousands of kilometers of high voltage Transmission lines (i.e. 765kV, 400kV and 275kV Transmission lines) transmit this power to Eskom's major substations. At these major substations, the voltage is down-rated and distributed to smaller substations all over the country via Distribution lines (e.g. 132kV, 88kV and 66kV power lines). Here the voltage is down-rated further for distribution to industry, business, farms and homes. In order to maintain a reliable power supply within the entire network, the voltages at all substations are required to be within certain desired limits. If the network is operated at voltages which are below these limits, voltage collapse problems and power outages may be experienced.

Demand for electricity in the Rustenburg area is increasing rapidly due to various mining developments. The peak electricity load required in this area is further anticipated to increase significantly in the near future due to planned mining developments underway.

Therefore the proposed extension and strengthening of the Distribution network is of utmost importance. As mentioned, bulk electricity supply infrastructure is needed to augment the supply to the Maseve mining project on the farm Frischgewaagd 96 JQ, in the Rustenburg Local Municipality. Once constructed, the ownership, operation and maintenance of the overhead power line will be transferred to Eskom.

10 LISTED ACTIVITIES ASSOCIATED WITH THE PROJECT AS APPLIED FOR

A Basic Assessment (BA) process for this proposed project is being undertaken by Texture Environmental Consultants. The listed activities for the proposed Eskom Impofu-Ngwedi 132kV line project are the following:

Table 1: Listed Activities

Listed Activity	Activity/Project Description
<p>GN R983/2014 Activity 11 The development of facilities or infrastructure for the transmission and distribution of electricity - (i) outside urban areas or industrial complexes with a capacity of more than 33 but less than 275 kilovolts</p>	<p>The construction of 1 x 132kV overhead power line of approximately 1,5km long from the existing Eskom Ngwedi Main Transmission Station (MTS) to the 132kV Eskom Impofu substation.</p>
<p>GN R985/2014 Activity 13 The clearance of an area of 1 hectare or more of vegetation where 75% or more of the vegetative cover constitutes indigenous vegetation - e) In North West: i) Outside urban areas, in: hh) Areas within 10 kilometres from national parks or world heritage sites or 5 kilometres from any other protected area identified in terms of NEMPAA or from the core areas of a biosphere reserve.</p>	<p>The study area is 6km from the Pilanesberg Nature Reserve (Formal protected area) which is also a Priority Bird Area (IBA). The reserve is legally defined as a provincial nature reserve in terms of the National Environmental Management: Protected Areas Act, 2003 (Act No. 57 of 2003) (NEMPAA). Indigenous vegetation will be cleared for the 31m wide servitude x 1370m of powerline = 42 470m² = 4.247 ha</p>

Description of Listed activities associated with the Project's activities

10.1 GN R983/2014 Activity 11: Construct one 132kV power line outside an urban area

One x 132kV Overhead line from the Impofu Substation to the Ngwedi MTS

132kV Design specifications

It is proposed to construct one 132kV overhead power line over approximately 1,5km from the existing Eskom Impofu substation to the Eskom Ngwedi MTS. Ngwedi MTS is currently under construction. The proposed structure type for the 132kV overhead power line is the monopole steel structure. In general, these structures could be placed 220-350 meters apart, for the length of a power line. The structures for a power line are between 14 and 30 meters high, depending on the terrain and existing land use. The flatter the terrain, the shorter the structures as well as the distance between the structures needs to be. The conductor attachment height on a pole is typically about 13m (for

20m intermediate poles) and more for longer poles, depending on the pole length. Ground clearances will adhere to the requirements of the Occupational Health and Safety Act (Act No. 58 of 1993) of 6.3m and 7.5m.

Strain poles have an average planting depth of 2m while intermediate pole planting depths vary between 2.6m (for 20m poles) and 3m (for 24m poles) or more depending on the pole length. The pole foundation is dependant on the soil type and varies in size and consists of a 8:1 good soil:cement mix that are compacted in 200mm layers. A concrete cap of 1.2m x 1.2m is cast around the pole to "seal" the soil around the pole from oxygen - to control oxidation or rust on the pole and to prevent erosion damage to the foundations.

Should the structures be 21m high above ground then the planting depth of the structure could be calculated as follows: For a structure that need to be 21m above ground, the planting depth will be 0.6 meters plus 10% of the height of the structure above ground = 0.6 meters plus 2.1 meters = structure is planted 2.7 meters deep. Should stays be needed then the stays will be at a 45° angle to the structure and planted 21meters from the structure into the ground.

Where the site is relatively flat, single structures without stays will be used, except for where the power line has to change direction.

Servitude requirements

Generally, 132kV power lines require a servitude width of 31 meters (15,5 meters on either side of the centre line of the power line). A servitude area is a no building area, except for Eskom structures. Usually, normal farming activities may continue in a servitude with the exception that no trees may be planted or high structures may be erected. The 132kV line will be constructed adjacent and parallel to the existing 132kV lines that turn in to Impofu Substation. The separating distance from each other is generally 21 meters. Relevant to this project is that the site investigated for the lines is flat and stays will not be used except at turns in the route.

The EIA will seek to authorise a **corridor** for the power line and not just for the actual servitude width of the power line. The maps indicate/highlight the whole area that was investigated to inform DEA on the area that is part of the authorisation. Refer to Figures 1-5. The total area investigated is the area marked with a black margin. The wider corridor will allow for potential amendments to the EA (at a later stage).

10.2 GN R985/2014 Activity 13: Clearance of an area of 1 hectare or more of vegetation where 75% or more of the vegetative cover constitutes indigenous vegetation

Clearance of vegetation for the power line servitude

The vegetation of the study area is representative of Zeerust Thornveld. However, the study area is small and is confined within a mining complex. A few acacia thorn trees are present with little to no middle layer and a fairly well developed grassy, lower layer. The upper layer of thorn trees is made up of short thorn trees with no tall, large canopy trees present. Although the study area is within mixed bushveld, the 'mix' of trees is not well represented. This is mainly due to historic cultivation and farming practices. The vegetation of the study area in general is not in a pristine state.

The study area is 6km from the Pilaansberg Nature Reserve (Formal protected area) which is also a Priority Bird Area (IBA). The reserve is legally defined as a provincial nature reserve in terms of the National Environmental Management: Protected Areas Act, 2003 (Act No. 57 of 2003) (NEMPAA).

Vegetation will be cleared for the 31m wide powerline servitude x 1370m of powerline. Therefore a total area of 42 470m² will be cleared for construction purposes. This equals an area of 4.247 hectares.

11 FEASIBLE AND REASONABLE ALTERNATIVES

The following alternatives have been identified and are described as follows:

11.1 Site alternatives

1 The 132kV line from Impofu substation to Ngwedi MTS

The EIA will seek to authorise a **corridor** for the power line and not just for the actual servitude width of the power line. The maps (Figures 1-5) indicate/highlight the whole area that was investigated to inform DEA on the area that is part of the authorisation. The wider area that was investigated will allow future potential amendments to the EA should it be necessary (at a later stage).

Table 2: Co-ordinates of the corners of the site (wider area) that is investigated (indicated on locality maps with a black border)

Description	Lat (DDMMSS)	Long (DDMMSS)
North East	25°24'12.97"S	27° 5'23.23"E
North West	25°24'24.43"S	27° 4'54.05"E
South East	25°24'57.72"S	27° 5'28.29"E
South West	25°25'10.62"S	27° 4'51.88"E

Route Alternative 1 (preferred alternative)

Route Alternative 1 is the preferred route alternative for the proposed 132kV powerline.

Route 1 runs from the existing Impofu Substation to the Ngwedi MTS, which is presently under construction. The entire route is within the main complex of the mine. The length of the line is short, at only about 1,4km.

The route exists the Impofu Substation in an easterly direction, then turns northeast and then north. It enters the Ngwedi MTS from the south end.

The veld through which the servitude passes is predominantly open grassland with a few, short thorn trees/ shrubs. No sensitive areas are crossed and no watercourses either.

Route Alternative 2

Route Alternative 2 is the alternative route investigated as a possible option for the proposed 132kV powerline. It is however, not the preferred route.

Route 2 also runs between Impofu Substation and Ngwedi MTS. The entire route is within the mine complex in disturbed areas and open grassland bushveld. Route 2 is also short, but slightly longer than Route 1, at approximately 1,5km in total length.

Both route alternatives follow the exact same servitude when leaving / entering the two electrical stations (Impofu and Ngwedi).

The central section of Route 2 turns within the delineated area of the small drainage line. This is seen as a sensitive area, eventhough the drainage line is highly seasonal in nature, seldom active and has little to no distinct riparian zone.

Table 3: Coordinates provided for the centre line of the power line route

Route Alternatives	Latitude (S)	Longitude (E)
Alternative Route 1 (Preferred Route)		
Starting point (Impofu Sub)	25°25'0.65"S	27° 4'55.73"E
Middle point	25°24'48.50"S	27° 5'14.19"E
End point (Ngwedi MTS)	25°24'28.72"S	27° 5'10.20"E
Alternative Route 2		
Starting point (Impofu Sub)	25°25'0.65"S	27° 4'55.73"E
Middle point	25°24'50.41"S	27° 5'19.37"E
End point (Ngwedi MTS)	25°24'28.72"S	27° 5'10.20"E

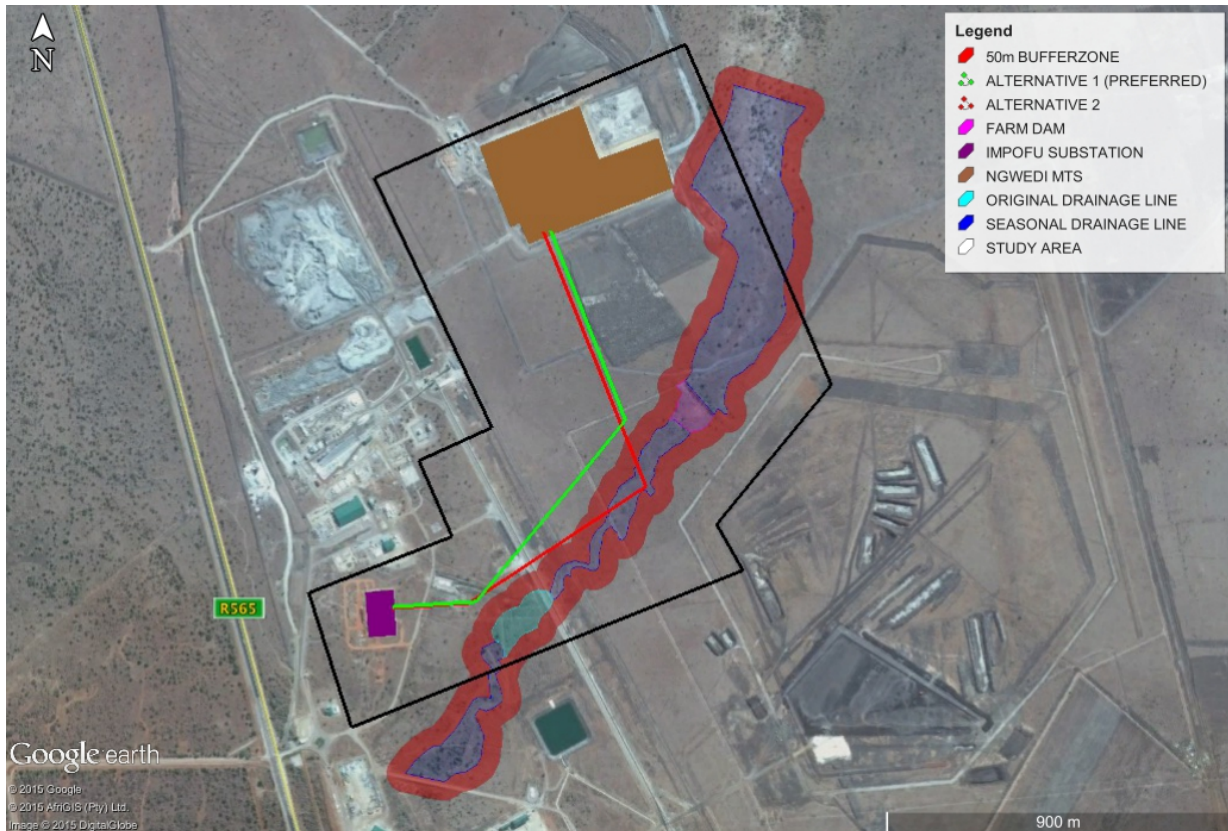


Figure 6: Overview map indicating the Route Alternatives as investigated

11.2 Technology alternatives

Alternative Distribution of Electricity

Alternative ways of distributing electricity have been investigated in several studies. Of particular concern is the problem of collision of birds with overhead powerlines. Several investigations dealing with the collision problem have focused on finding suitable mitigation measures. The most proactive measures are: power line route planning (and the subsequent avoidance of areas with a high potential for bird strikes) and the modification of power line designs (this option includes line relocations, underground burial of lines, removal of over-head ground wires, and the marking of ground wires to make them more visible to birds in flight). In many instances, decisions on power line placement and possible mitigation measures are however eventually based on economic factors. The relocation of an existing line is the last option that is usually considered when trying to mitigate avian collisions. The huge expense of creating a new line and servitude usually cannot be justified unless there are biologically significant mortalities. Underground burial of power lines is another option available to managers in areas of high collision risk. This will obviously eliminate collisions, but the method has many drawbacks. This costs of burying lines can be from 20-30 times (or more) higher than constructing overhead lines, and such costs are related to the line voltage, type and length of cable, cable insulation, soil conditions, local regulations, reliability requirements, and requirement of termination areas. Limitations of cable burial include: no economically feasible methods of burying extra high voltage lines have been developed, there is a potential to contaminate underground water supplies if leakage of oil used in insulating the lines occurs, and extended outage risks due to the difficulty in locating cable failures. Therefore this alternative could not be considered a viable one.

11.3 No-go alternative

It is suggested that **to maintain the status quo is not the best option for the macro environment.**

The reliable provision of electricity by Eskom is critical for industrial development and related employment and

sustainable development in South Africa. If the network is operated at voltages which are below these limits, voltage collapse problems and power outages may be experienced.

Demand in the Rustenburg area is increasing rapidly due to various mining developments. The peak electricity load required in this area is further anticipated to increase significantly in the near future due to planned mines underway.

As mentioned, bulk electricity supply infrastructure is needed to augment the supply to the Maseve mining project on the farm Frischgewaagd 96 JQ, in the Rustenburg Local Municipality. Once constructed, the 132kV overhead line will be transferred to Eskom, who will become the owner and operator thereof.

This proposed project is therefore part of the infrastructure to improve the supply of electricity to the network. Should this application not be approved then the supply will not be reliable and this can result in major disturbances in provision to the customer base. The No-Go development alternative could therefore not be considered the responsible way to manage the site.

12 SPECIALIST INPUT

Specialist input was obtained to investigate the impact of the various alternatives that could accomplish the purpose of the project. The specialists investigated a corridor of 2000 metres wide. The specialist input is summarised as follows:

12.1 Biodiversity Assessment

The report identified the following:

12.1.1 Terrestrial Ecology

Vegetation

The study area is within the Central Bushveld Bioregion of the Savanna Biome. The only veldtype present is Zeerust Thornveld, also known as Mixed Bushveld.

Priority species

No red data (endangered & threatened) fauna or flora species were observed during field investigations. An orange data plant species (*Brunsvigia radulosa*) was observed in the study area. The status of this species is Least Concern (LT). According to the SANBI database no red data plant species have been recorded in the study area.

Protected trees in the study area

There are no protected trees within the study area.

Fauna

No large- or medium-sized mammals or other wild faunal species were observed during field investigations, with the exception of some common bird species. The habitats present in the study area are not ideal for most of priority species of the region.

12.1.2 Aquatic Ecology

Drainage regions

The study area is situated within the primary drainage area (PDA) of A and the quaternary drainage area (QDA) of A22F. The study area is within the Crocodile (West) & Marico Water Management Area (WMA 3) and under the jurisdiction of the newly proposed Limpopo Catchment Management Agency (CMA 1). Currently not all CMAs are operational.

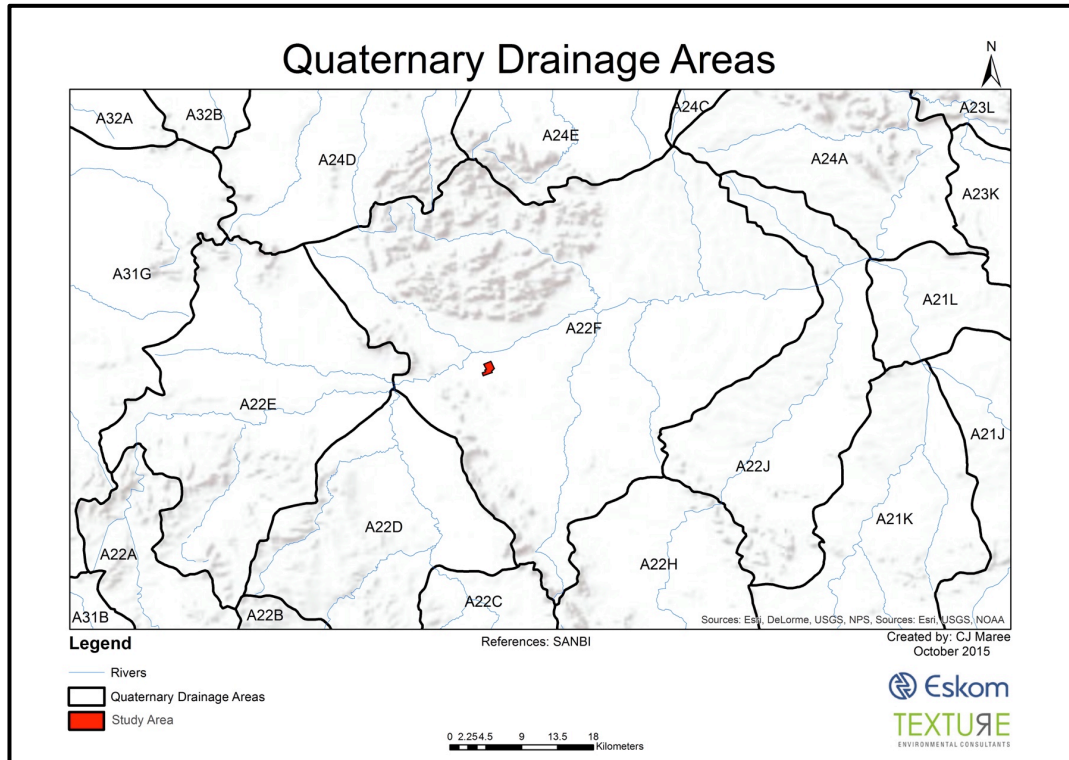


Figure 7: Quaternary drainage areas (QDAs)

Watercourses in the study area

No large rivers or streams, be they perennial or non-perennial in nature, are present in the study area. The closest river is the Elands River which is a large, perennial river approximately 1,4km north of the northern boundary of the study area. The study area and the surrounding region is a flat plains area with few rivers or streams. A few prominent drainage lines are present. A single, prominent drainage line is present in the study area. This drainage line is highly seasonal, with a very small catchment area and flows in a northeasterly and northerly direction and eventually into the Elands River. There are no wetlands, including pans, in the study area.

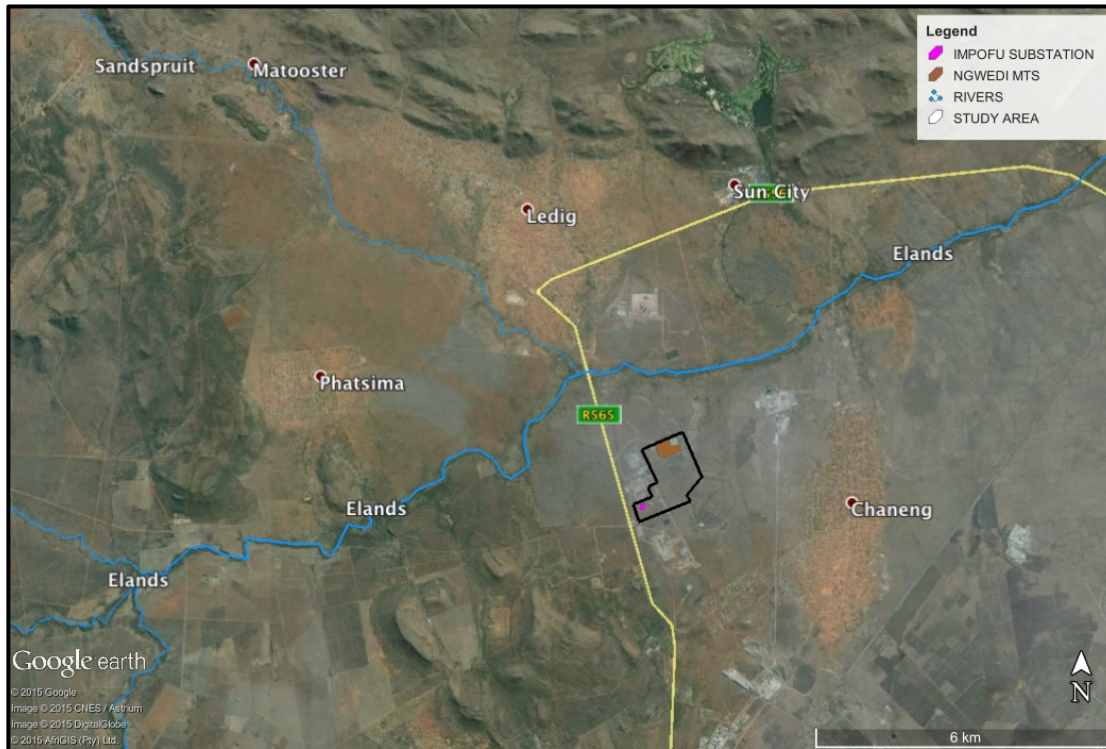


Figure 8: Rivers in the region

Potential Water Use Licence (WUL) requirements

A small non-perennial drainage line runs through the study area. In terms of the proposed construction of the 132kV powerline there are two likely route alternatives.

Route alternative 1 (Preferred route) does not impeded on or come within the delineated area of the drainage line, nor within the 50m bufferzone. Should Alternative 1 be used, as the powerline servitude then there will be no need for a WULA.

Route alternative 2 turns with the channel of the drainage line. It is highly likely that should Route alternative 2 be used that a WULA would be required. As a minimum a GA would be required. This is the main reason that Route Alternative 1 is the preferred route.

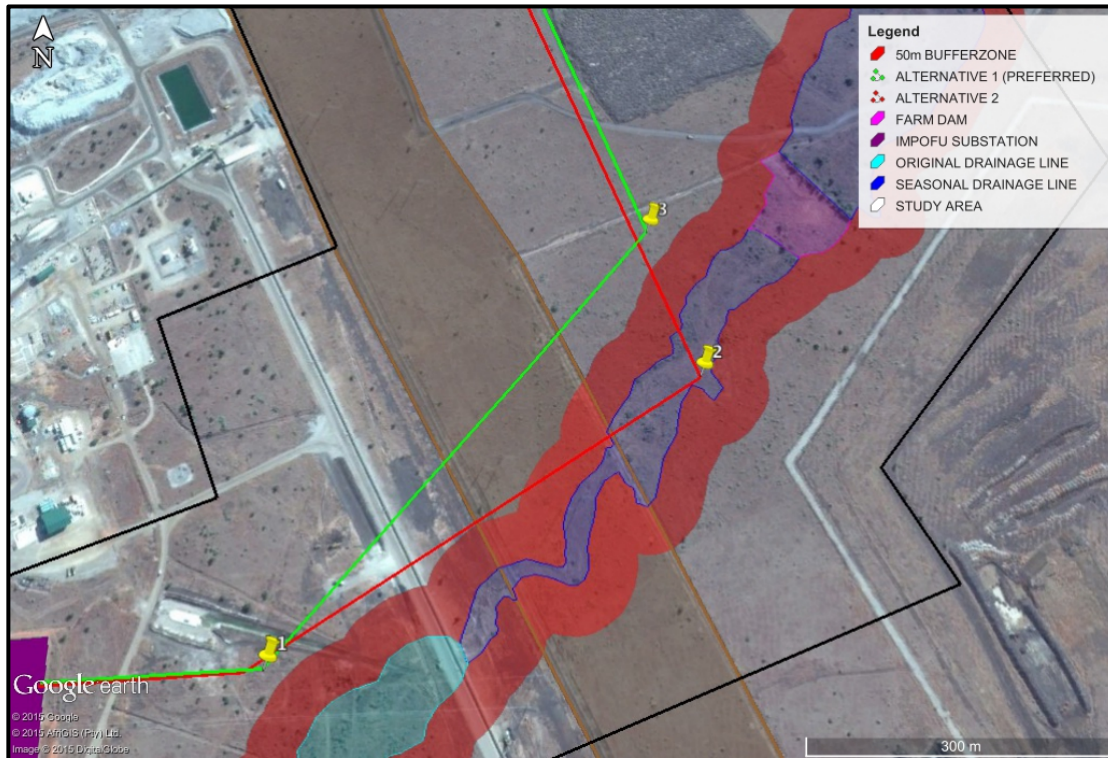


Figure 9: Potential WULA area along Route Alternative 2

Sensitivity analyses

The ecological sensitivity of the study area is determined by combining the sensitivity analyses of both the floral and faunal components. The highest calculated sensitivity unit of the two categories is taken to represent the sensitivity of that ecological unit, whether it is floristic or faunal in nature. (Table 4)

Table 4: Ecological sensitivity analysis

Ecological community	Floristic sensitivity	Faunal sensitivity	Ecological sensitivity	Development Go-ahead
Bushveld	Medium/Low	Medium/Low	Medium/Low	Go-Slow
Drainage line	Medium	Medium	Medium	Go-But

According to the analyses of floristic, faunal and overall ecological there are no high sensitivity areas or habitats. In other words, there are no 'No-Go' areas within the study area. these include the powerline servitudes. The map below shows the sensitivity of the total study area. The area demarcated as having a sensitivity rating of HIGH is the drainage line.

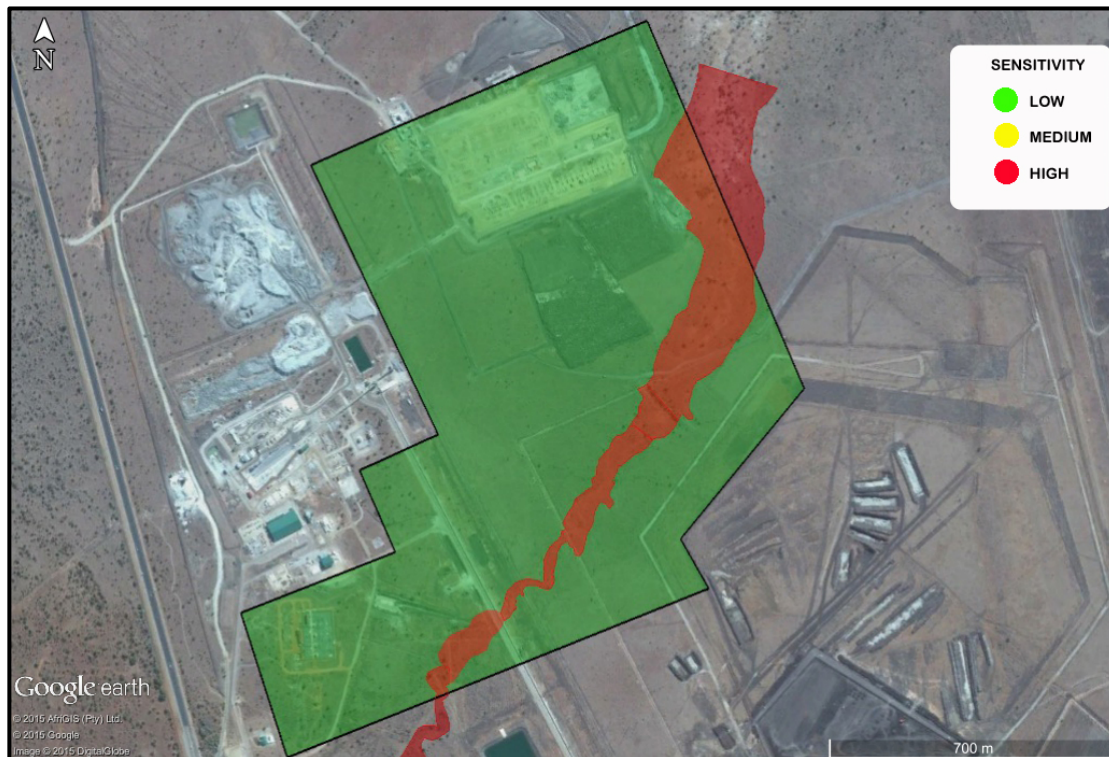


Figure 10: Sensitivity map

Fatal flaws/ No-Go areas

As far as the proposed powerline servitude is concerned, there are no fatal flaws and the project may go ahead. There are no 'No-Go' areas within the study site.

Priority areas

The study area in total and the proposed powerline servitude in particular does not fall within any priority areas. These priority areas include formal and informal protected areas (nature reserves); important bird areas (IBAs); RAMSAR sites; National fresh water ecosystem priority areas (NFEPA) and National protected areas expansion strategy (NPAES) areas. The study area also does not fall within a critical biodiversity area (CBA).

Impact assessment

The impacts of the activities related to the construction of the proposed powerline were rated. Mitigating measures are recommended to help reduce the sum of these impacts. The rated impacts before and after the implementation of mitigating measures are shown in the matrix below.

Table 5: Impact Assessment

Potential Impact on Habitat BEFORE Mitigating & Management Measures	
Criteria	Rating
Extent	1
Duration	3
Intensity	1
Probability of occurrence	3
Total	8
Rated as a MEDIUM negative impact before the implementation of mitigating and management measures	
Impact AFTER Mitigating and Management Measures	
Criteria	Rating

Extent	1
Duration	2
Intensity	1
Probability of occurrence	2
Total	6
Rated as a LOW negative impact after the successful implementation of all mitigating and management measures.	
Main mitigating measures reducing intensity are: <ul style="list-style-type: none"> • Rather use route alternative 1 instead of route alternative 2 • Positioning of poles (structures) to avoid any watercourses, riparian zones, drainage lines, pans and dams. Bufferzones of a minimum of 50m also to be implemented. • Any temporary storage or accommodation facilities to be setup in existing built up area or disturbed areas only. • No temporary facilities or portable toilets to be setup within the 50m bufferzone around the drainage line. • Ensure small footprint during construction phase. 	

Route alternative recommendations

Recommendations on the preferred route alternative in terms of biodiversity are made on the strength and combination of all the impacts and mitigating actions. As well as on the sensitivities of the various biophysical features, faunal habitats and vegetation types that each proposed route alternative impacts on. A summary comparison between the two alternative routes, as to the number of ecologically sensitive units each one potentially impacts on, river crossings, etc. is shown in Table 6.

Table 6: Comparison of Potential Impacts by Alternative Routes

Ecological Sensitive Units	Alternative Route 1	Alternative Route 2
Areas of High ecological sensitivity	0	0
No-Go areas in close proximity	0	0
No. of river & stream crossings	0	0
No. of major drainage line crossings	0	1
Rocky outcrops in corridor	0	0
Ridges in corridor	0	0
Major Wetlands encountered	0	0
Total impacts per route	0	1

When taking all impacts into account there is the issue of the higher potential impact in relation to watercourses by Alternative Route 2.

It is also highly likely that a WULA will be required for Route Alternative 2 in terms of a Section 21 (c) & (i) application should this route alternative be utilised.

Taking all of the above issues into account, the Ecological (Biodiversity) recommended line variant for the proposed project is: ALTERNATIVE ROUTE 1.

Mitigating measures

A number of mitigating and management measures have been recommended to reduce the impact of the project on the natural environment. These include measures for the construction and maintenance phases of the project.

Main mitigating measures reducing intensity are:

Construction Phase

- No temporary accommodation or temporary storage sites to be erected within 100m of the any river, stream, drainage line, pan, wetland or farm dam.
- No temporary facilities (including portable toilets) to be positioned within the 50m bufferzone of the drainage line.

- Only existing roads to be used by vehicles during construction.
- Positioning of the foundation slabs for the structures must be a minimum of 50m away from the edge of all drainage lines. That is, outside of the demarcated 50m buffer zones.
- No foundation slabs or structures to be erected directly within the main channel of any watercourse, including seasonal drainage lines even if dry at the time of construction.
- No foundation slabs or structures to be erected directly within the open water zone of a farm dam or any other artificial impoundment.
- No indigenous trees, shrubs or reeds outside of the powerline corridor to be removed. Patches of exotic trees within the corridor may be totally removed. The stumps of these trees to be treated with the recommended poisons to prevent budding and regrowth, but no poisons to be applied directly to the surrounding soils.
- No construction activities take place directly within the demarcated areas of any watercourse, including its' riparian zone. No vehicles to drive in the demarcated areas and no construction material to be stored or even placed temporarily in these areas.
- Existing watercourse crossings and existing roads must be used during construction and the transporting of materials and equipment. No new watercourse crossing to be created, including simply driving through a watercourse and thus creating a two-track vehicle path. Creating a new access across a watercourse will trigger the need for a water use licence (WUL)

Maintenance Phase

- Mechanical control of alien plants around disturbed areas to be implemented within three months of completion of construction. Thereafter every six months. These areas are mainly around the erected structures. Mechanical control to be of such a nature as to allow local, indigenous grasses and other pioneers to colonise the previously disturbed areas, thereby keeping out alien invasives.
- No chemical control (herbicides) of alien plants to be used. Herbicides could get into the water system and will have a detrimental effect on the environment.
- Areas around foundation slabs to be check before and after the summer rainy season for signs of soil erosion due to stormwater run-off. Such sites need to be modified and rehabilitated to prevent ongoing erosion. These sites need to be monitored more closely than other sites which show no or minimal signs of erosion.
- No inspection or other vehicles to drive through drainage lines, streams, rivers or wetlands, except where there are existing bridges, farm roads and other existing crossovers.

12.2 Avifauna Impact Assessment

The Avifauna Impact Assessment indicated the following:

Bird Habitats

The habitat of the study area is fairly uniform and is primarily dry, open shrubby thornveld. The only other slightly, but hardly distinct differing habitat in terms of birds, is the dry drainage line. Due to the dryness and sporadic and highly seasonal nature of the drainage line there is no distinct, well-developed riparian zone.

There are no other bird habitats present such as rocky ridges, mountains, etc. within the study area.

Priority areas

The study area in total and the proposed powerline servitude in particular does not fall within any priority areas. These priority areas include formal and informal protected areas (nature reserves); important bird areas (IBAs); RAMSAR sites; National fresh water ecosystem priority areas (NFEPA) and National protected areas expansion strategy (NPAES) areas. The closest priority area is the Pilanesberg Game Reserve, which is just under 6km north of the study site. The Pilanesberg Game Reserve (Formal protected area) is also a Priority Bird Area (IBA). The study area also does not fall within a critical biodiversity area (CBA).

The closest IBAs to the study area are the Magaliesberg National Park (6km north) and the Magaliesberg range (25km south, southeast). Both of these areas are important in terms of raptors and vultures.

Sightings of priority bird species

The study area itself is not a hotspot for priority bird species, although sightings have been recorded of priority species such as vultures, buzzards and eagles. The closest and most important area for priority birds is the Pilaesberg and Magaliesberg, where there are vulture colonies. Due to the vast distances raptors and vultures cover while searching for food it is realistic to expect that on occasion some of these birds will traverse the study area and immediate region.

No priority birds were observed during site investigations in September 2015.

Conclusions and Recommended Route Alternative

A number of priority birds have previously been recorded in the area and region of the study area. These include large and medium-sized raptors and vultures such as Cape Vultures, Kestrel species and Eagle species. There are no known records of mortalities due to powerline collisions and electrocutions in the study area. Birds previously recorded in the larger area are listed in the appendices.

The study area is fairly urbanised, overly cultivated / grazed and utilised, creating an environment unsuitable for the hunting and foraging of large raptors and other large birds.

There is a lack of open, pristine grassland habitat for foraging and breeding of priority species ground birds that are susceptible to powerline impacts.

In addition, a lack of carrion and open, natural savanna areas for hunting and foraging for large scavenger birds such as Marabou storks and Vultures.

Calculations show that the additional negative impact on the avifauna of the region, due to the construction of the proposed powerline corridor will be low. Calculations further show that the implementation of recommended mitigating measures would further reduce the potential of these impacts.

Bird diverters are recommended across sensitive areas. The only sensitive section that will require BFDs is the seasonal drainage line area along Route Alternatives 1 & 2, between Pins 1 & 2 and Pins 3 & 4. Although not seen as highly necessary it is still recommended that BFDs be placed across these sections highlighted and marked (GPS coordinates) for the route finally decided upon. The GPS coordinates are shown in the table below.

Diverters must be placed along the line in such a way that they are not only over the water itself, but are also approximately 10m beyond the channel and riparian zones of the watercourses.

Table 7: GPS coordinates of sensitive bird areas

Map Ref.	Watercourse	Route	GPS Coordinates
1	Unnamed drainage line	Alt. 2	25°24'55.13"S; 27° 5'11.61"E
2	Unnamed drainage line	Alt. 2	25°24'46.40"S; 27° 5'17.60"E
3	Unnamed drainage line	Alt. 1	25°25'0.20"S; 27° 5'3.50"E
4	Unnamed drainage line	Alt. 1	25°24'44.88"S; 27° 5'17.48"E

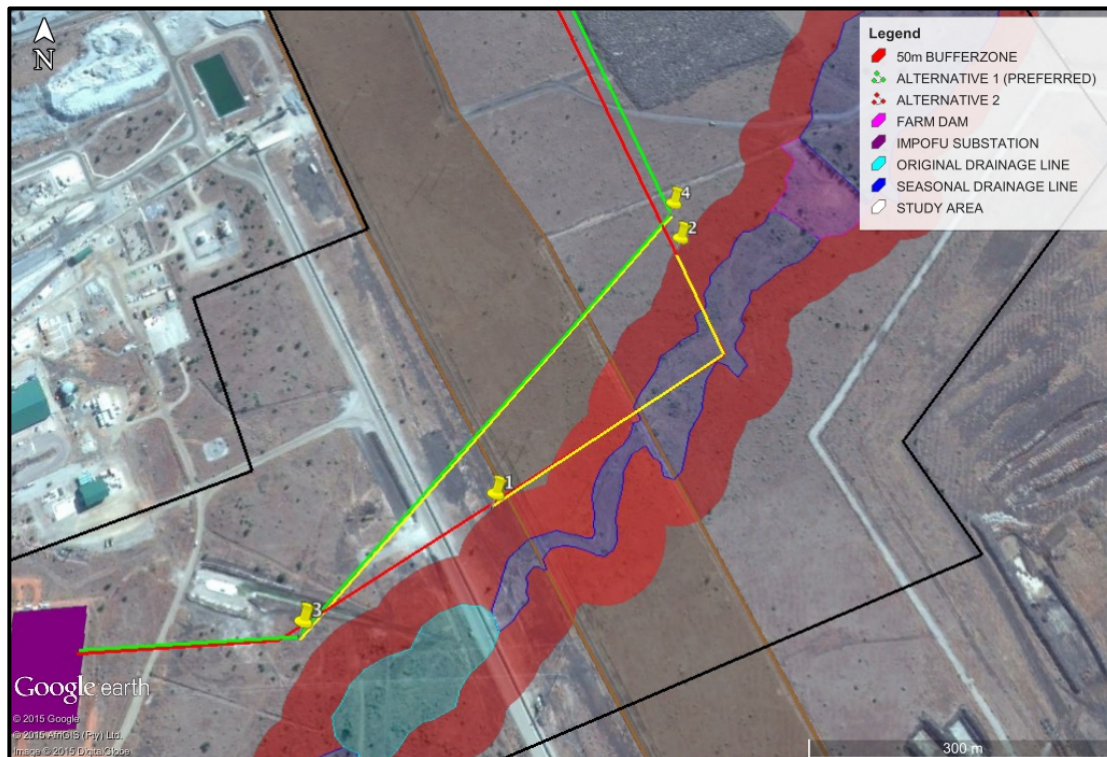


Figure 10: Sensitive areas requiring BFDs

Route Recommendations

The potential impact calculations look at the study site in general. In other words, whichever route alternative is used (Alternative 1 or Alternative 2) the overall impact on the environment in terms of habitat destruction and powerline interaction will be the same.

However, the sensitivity analysis highlights that Route Alternative 1 is less sensitive than Route Alternative 2, mainly in terms of nearness to watercourses. Route Alternative 2 crosses over and through the only watercourse (drainage line) in the study area. Although this drainage line is not an important bird habitat due to its' very dry and shallow nature, it is still important enough to give better impact ratings to Route Alternative 1.

The low potential impacts are also due to the numerous existing powerlines. This is always seen as a positive in terms of bird collisions. It would appear that powerlines along these open spaces and busy spaces are more visible to birds. Therefore, potentially less collisions than a new, isolated powerline in the middle of bushveld.

The recommended Route Alternative, in terms of avifauna is: **Route Alternative 1**.

Mitigating measures

The following mitigating and management measures are recommended. It is important that these are implemented and monitored in an effort to reduce the negative impacts on the environment and especially in terms of avifaunal electrocutions and collisions.

Construction phase

A steel mono-pole will be used for the new 132kV lines. Clearance between phases on the same side of the pole structure is approximately 2.2m for this type of design, and the clearance on strain structures is 1.8m. This clearance should be sufficient to prevent phase-to-phase electrocutions of birds on the towers. The length of the stand-off insulators is approximately 1.5m. If very large species (such as vultures) attempt to perch on a stand-off insulator, they are potentially able to touch both the conductor and the earthed pole simultaneously, thereby potentially resulting in a phase-to-earth electrocution. This is particularly likely when more than one bird sits on the same pole.

Electrocution refers to the scenario where a bird is perched or attempts to perch on the electrical structure and causes an electrical short circuit by physically bridging the air gap between live components and/or live and earthed components. Electrocution will not be a major risk in this instance for the following reasons:

The steel mono-pole is not a major electrocution hazard to birds, except in specific instances, and then only for vultures.

The presence of existing transmission lines which are higher than the proposed 132kV line (and without any risk of electrocution), will most likely serve as the preferred roosting and perching substrate for birds in the study area. No major electrocution risk is therefore foreseen for the new 132kV lines.

The most direct impact that the proposed line could potentially have on priority bird species is collisions with the overhead earth wire. Generally this impact is most likely to occur close to wetlands, farm dams and river courses, where the line skirts the water or where it crosses over it. Another collision hazard exists if the line crosses over patches of grassland, as this is the preferred habitat of many species. However, there are no large patches of ideal grassland for such birds to frequent

Taking all of the above into consideration the following mitigating measures during the construction phase are recommended:

- Sections of line that will require the application of bird flight diverters (BFDs) are indicated on the accompanying sensitivity maps. Sensitive sections will include dams, wetlands, rivers, streams, and drainage line crossings. The proposed BFD is the Double Loop Bird Flight Diverter. BFDs should be placed on the earthwires, staggered, alternating black and white, 10 metres apart.
- The construction of access roads in sensitive watercourses and any other water habitats should be avoided.
- No structures to be erected within 50m of the banks of any watercourse.

Maintenance phase

The maintenance should have very little added impact on the physical environment in general and micro bird habitats in particular. The greatest risk is that of disturbance. Implementing the following mitigating measures will however further assist in reducing impact and disturbance to the avifaunal component.

- Only use existing roads and vehicle paths.
- Do not drive through watercourses unless over an official bridge.
- Avoid areas where birds are nesting.
- Ensure that all install BFDs are maintained and replaced if missing.

11.3 Heritage Impact Assessment

The main findings of the Heritage Impact Assessment are summarised as follows:-

A Heritage Impact Assessment (HIA) is the process to be followed in order to determine whether any heritage resources are located within the area to be developed as well as the possible impact of the proposed development thereon.

- A Phase I Heritage Impact Assessment (HIA) study was done and no heritage resources as outlined in Section 3 of the National Heritage Resources Act 25 of 1999 were found in the project area.

Recommendations/Mitigation

- Since no sites of cultural heritage significance were identified, this report is seen as sufficient mitigation and the proposed development may therefore continue.
- Therefore the proposed 132KV line may also be placed anywhere within the surveyed area.
- If any evidence of archaeological sites or remains (eg, remnants of stone-made structures, indigenous ceramics, bones, stone artefacts, ostrich eggshell fragments, marine shell and charcoal/ash concentrations), unmarked

human burials, or other categories of heritage resources are found during the proposed activities, SAHRA APM Unit (Colette Scheermeyer 021 462 4502) must be alerted immediately, and a professional archaeologist or palaeontologist, depending on the nature of the finds, must be contacted as soon as possible to inspect the findings. If the newly discovered heritage resources prove to be of archaeological significance, a Phase 2 rescue operation might be necessary.

11.4 Palaeontological Impact Assessment

The main findings of the Palaeontological Impact Assessment are as follows:-

The National Heritage Resources Act 25 of 1999 requires that all heritage resources, that is, all places or objects of aesthetic, architectural, historical, scientific, social, spiritual, linguistic or technological value or significance are protected. Fossil heritage of national and international significance is found within all provinces of South Africa. Heritage resources may not be excavated, damaged, destroyed or otherwise impacted by any development without prior assessment and without a permit from the relevant heritage resources authority.

- The development is taking place in an area covered by the Pyramid Gabbro-norite Formation (Vg), Rustenburg Layered Suite of the Bushveld complex.
- Fossils in South Africa mainly occur in rocks of sedimentary nature and not in rocks from igneous or metamorphic nature. Therefore, the palaeontological sensitivity is generally **INSIGNIFICANT or ZERO** for the Rustenburg Layered Suite and requires no palaeontological studies.

Recommendations/Mitigation

- The following should be conserved: if any palaeontological material is exposed during digging, excavating, drilling, or blasting SAHRA/PRHA must be notified. All construction activities must be stopped and a palaeontologist should be called in to determine proper mitigation measures.

12 IMPACT ASSESSMENT

The impacts that may result from the planning and design, construction, operational, decommissioning and closure phases as well as proposed management of identified impacts and proposed mitigation measures have been addressed in the Basic Assessment Report.

13 ENVIRONMENTAL MANAGEMENT PLAN (EMP)

An Environmental Management Plan was prepared to detail a plan of action to ensure that recommendations for preventing the negative environmental impacts (and where possible improving the environment) are implemented during the life-cycle of the project.

14 CONCLUSION

In summary the following is recommended for authorisation:

14.1 The 132kV line from Impofu Substation to Ngwedi MTS

The EIA will seek to authorise a **corridor** for the power line and not just for the actual servitude width of the power line. The maps attached in Appendix A indicates/highlights the whole area that was investigated to inform DEA on the area that is part of the authorisation. (Area indicated with a black border and co-ordinates in Table below). The wider area that was investigated will allow future potential amendments to the EA should it be necessary (at a later stage).

Table 7: Co-ordinates of the corners of the site (wider area) that is investigated

Description	Lat (DDMMSS)	Long (DDMMSS)
North East	25°24'12.97"S	27° 5'23.23"E
North West	25°24'24.43"S	27° 4'54.05"E
South East	25°24'57.72"S	27° 5'28.29"E
South West	25°25'10.62"S	27° 4'51.88"E

The EIA recommends Route Alternative 1 for construction

Table 8: Coordinates provided for the centre line of the route

Route Alternatives	Latitude (S)	Longitude (E)
Alternative Route 1 (Preferred Route)		
Starting point (Impofu Sub)	25°25'0.65"S	27° 4'55.73"E
Middle point	25°24'48.50"S	27° 5'14.19"E
End point (Ngwedi MTS)	25°24'28.72"S	27° 5'10.20"E
Alternative Route 2		
Starting point (Impofu Sub)	25°25'0.65"S	27° 4'55.73"E
Middle point	25°24'50.41"S	27° 5'19.37"E
End point (Ngwedi MTS)	25°24'28.72"S	27° 5'10.20"E

Route Alternative 1 is the preferred route alternative for the proposed 132kV powerline. The length of the line is short, at only about 1,4km. The route exists the Impofu Substation in an easterly direction, then turns northeast and then north. It enters the Ngwedi MTS from the south end. The veld through which the servitude passes is predominantly open grassland with a few, short thorn trees/ shrubs. No sensitive areas are crossed and no watercourses either.

Route Alternative 2 is the alternative route investigated as a possible option for the proposed 132kV powerline. It is however, not the preferred route. The entire route is within the mine complex in disturbed areas and open grassland bushveld. Route 2 is also short, but slightly longer than Route 1, at approximately 1,5km in total length. Both route alternatives follow the exact same servitude when leaving / entering the two electrical stations (Impofu and Ngwedi). The central section of Route 2 turns within the delineated area of the small drainage line. This is seen as a sensitive area, eventhough the drainage line is highly seasonal in nature, seldom active and has little to no distinct riparian zone.

When taking all impacts into account there is the issue of the higher potential impact in relation to watercourses by Alternative Route 2. As can be seen from a close up of the delineated watercourse, Alternative Route 2 will turn directly within the main channel of the drainage line. This is not acceptable in terms of the natural environment. It is also highly likely that a WULA will be required for Route Alternative 2 in terms of a Section 21 (c) & (i) application should this route alternative be utilised.

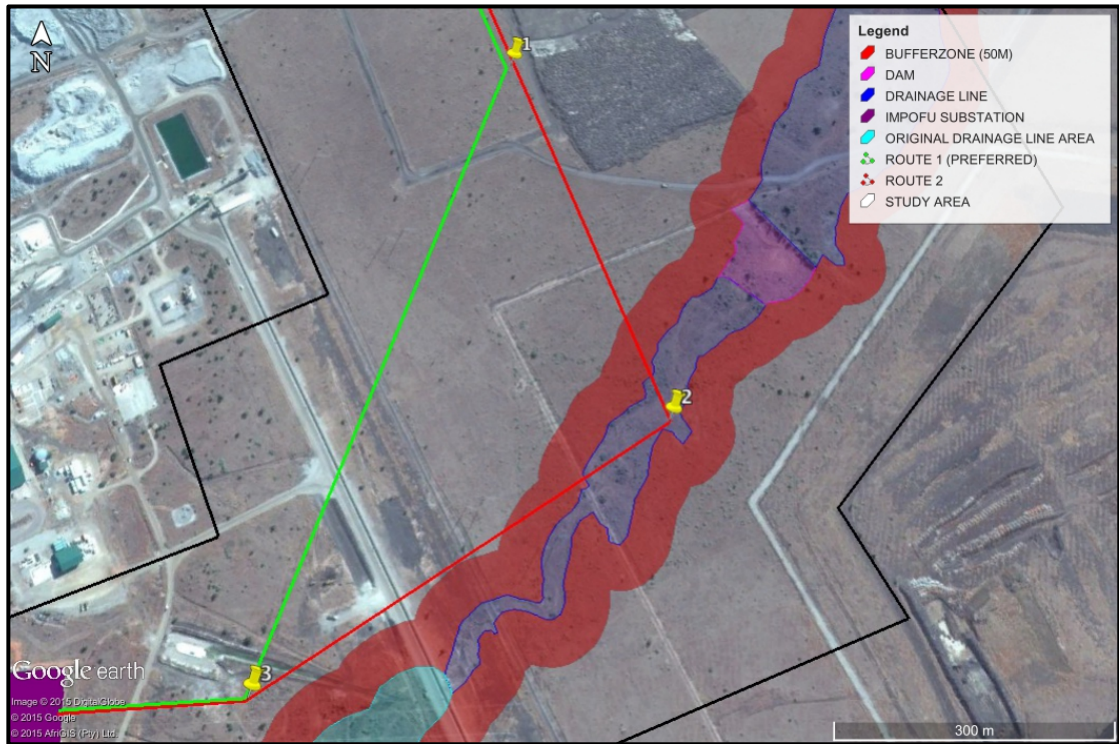


Figure 11: Potential WULA area along Route Alternative 2

Taking all of the above issues into account, the Ecological (Biodiversity) recommended line variant for the proposed project is: **Route Alternative 1**. From a Heritage (and Palaeontological) perspective there are no specific preference for any of the alternative routes. The Avifauna Impact Assessment confirms that Alternative 2 impacts directly on a drainage line. The drainage line is delineated along with a 50m bufferzone. It is recommended that Bird Flight Diverters be placed along Route Alternative 2 across these sections highlighted and marked (GPS coordinates). The recommended line variant route, also in terms of avifauna therefore is: **Route Alternative 1**.
