FINAL

PROPOSED LIMPOPO EAST CORRIDOR STRENGTHENING PROJECT

Proposed construction of 110km 400kV power line from Foskor MTS to Spencer MTS within the Mopani District Municipality, Limpopo Province

VISUAL IMPACT ASSESSMENT

Prepared as part of the Environmental Impact Assessment process undertaken in terms of the National Environmental Management Act 107 of 1998

9 February 2018

PROJECT NO: VIA_160617.DC

Produced for:

Eskom

On behalf of:

Diges Consulting

zone | land | solutions

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

LIST OF ANNEXURES

1 INTRODUCTION

1.1 BACKGROUND AND PURPOSE OF REPORT

Eskom Holdings SOC Ltd. undertook a load profile for the Limpopo Province which showed that the Spencer Main Transmission Substation (MTS) will reach a peak demand of 318MVA by 2018. In line with this profile, Eskom Transmission Grid Planning initiated a study to investigate solutions to address the transformation constraints at the Spencer MTS, as well as the 275kV transmission network constraints on the network supplying the Spencer MTS supply zone.

In order to resolve these network constraints, the proposed Limpopo East Corridor Strengthening Project was initiated. The latter project entails the upgrading of the Spencer MTS by adding a 400/132kV transformation yard and 1x500MVA, 400/132kV transformer. A new 400/275kV transformation will also be established at the Foskor MTS while a new 400kV power line with a total length of approximately 110km will be constructed between the Foskor MTS and Spencer MTS.

This Visual Impact Assessment (VIA) is undertaken as a result of the findings of the Final Scoping Report prepared by Diges Group for the proposed Limpopo East Corridor Strengthening Project (dated September 2017). As a result, this VIA is undertaken as part of the Environmental Impact Assessment (EIA) process being facilitated by Diges Group, in terms of the National Environmental Management Act 107 of 1998 (NEMA).

The purpose of this report is therefore to assess the proposed activity in terms of the *Guidelines for Involving Visual and Aesthetic Specialists in the EIA Process and the NEMAEIA Regulations of 2014*.

1.2 COMPONENTS OF THE REPORT

The aspects addressed in this report are as follows:

a) Description of the methodology adopted in preparing the report.
b) Description of the receiving environment.
c) Description of the view catchment area, view corridors, viewpoints and receptors.
d) Identification and evaluation of potential visual impacts associated with the proposed activity and the alternatives identified, by using the established criteria, including potential lighting impacts at night.

e) Identification in terms of best practical environmental option in terms of visual impact.

f) Addressing of additional issues such as:

- Impact on skyline.
- Negative visual impact.
- Impact on aesthetic quality and character of place.

g) Assumptions made and uncertainties or gaps in knowledge.

h) Recommendations in respect of mitigation measures that should be considered by the applicant and competent authority.

1.3 STUDY METHODOLOGY AND BRIEF

As stated previously, this VIA was undertaken in accordance with the *Guideline for Involving Visual and Aesthetic Specialists in EIA Processes*, as issued by the Western Cape Government's Department of Environmental Affairs and Development Planning during 2005[1].

The VIA was undertaken in distinct steps, each of which informed the subsequent steps. Figure 1 below summarises the methodology adopted for undertaking the assessment.

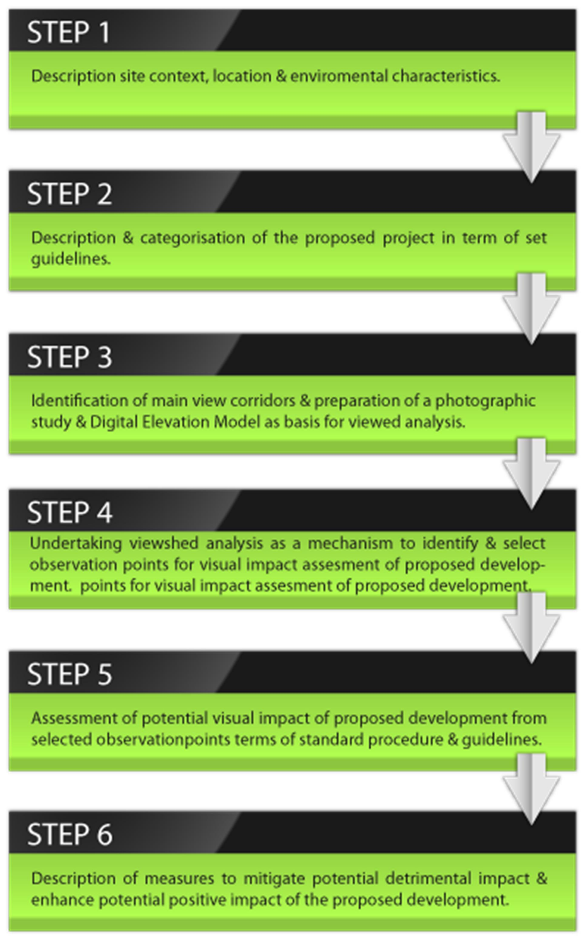

Figure 1: Methodology adopted for the VIA.

The Final Scoping Report (Diges, 2017) presents Plan of Study (PoS) to be undertaken during the Environmental Impact Assessment Phase. In accordance with this PoS, the Terns of Reference for the Visual Impact Assessment is as follows:

- *Determine of the extent of the study area*
- *Identify and describe the landscape character of the study area;*
- *Identify of the elements of visual value and -quality that could be affected by the proposed project;*

[1] No similar policy exists for the Limpopo Province. However, the Guidelines are based upon universally accepted principles and are therefore applicable to the said project.

- *Identify the landscape and visual receptors in the study area that will be affected by the proposed project and assess their sensitivity;*
- *Indicate the potential landscape and visual impacts;*
- *Assess the significance of the landscape and visual impacts; and*
- *Recommendations of mitigation measures to reduce and/or alleviate the potential adverse landscape and visual impacts.*

1.4 SUPPLEMENTARY DOCUMENTATION

This report is to be read together with Annexure 2 (Selected observation point viewsheds and assessments), which provides an identification of selected observation points and visual assessment of the proposed activity from each of these points.

1.5 GAPS IN KNOWLEDGE, ASSUMPTIONS AND LIMITATIONS

This assessment was undertaken during the impact assessment phase of the project and is based on the Final Scoping Report dated September 2017 of Diges Group As well as the other documentation relating to the project provided by Diges for the mentioned project.

Assessments of this nature generally suffer from a number of defects that must be acknowledged:

- **Limited time:** A comprehensive assessment requires a systematic assessment of t he environment at different times of the day. Such luxury is not always possible and therefore most assessments are based on observations made at a specific time of day. Educated estimates are made, where applicable, based on the knowledge of the area.
- **Availability of literature:** A thorough assessment requires that all relevant literature on the subject matter is studied, acknowledged and incorporated in the report. Due to a range of factors, forward planning documents are not always available for all spheres of government.

2 LANDSCAPE CHARACTER AND VISUAL AMENITY

Since the late 1980s and early 1990s, the European Landscape Convention adopted the following definition of landscape that has since been widely adopted: *Landscape is an area, as perceived by people, whose character is the result of the action and interaction of natural and/or human factors'* (Council for Europe, 2000).

This definition was expanded as follows by Sanwick, C. and Land Use Consultants (2002): *'Landscape is about the relationship between people and place. It provides the setting for our day-to-day lives. The term does not mean just special or designated landscapes and it does not only apply to the countryside. It results from the way that different components of our environment - both natural (the influences of geology, soils, climate, flora and fauna) and cultural (the historical and current impact of land use, settlement, enclosure and other human interventions) - interact together and are perceived by us. People's perceptions turn land into the concept of landscape'*.

Landscape results from the interplay of the physical, natural and cultural components of our surroundings and the way that people perceive these interactions. Different combinations of these elements create the distinctive character of landscapes in different places, allowing different landscapes to be mapped, analysed and described. Character is not just about the elements or the 'things' that make up a landscape, but also embraces the aesthetic and perceptual factors that make different places distinctive (GLVIA, 2002).

When the inter-relationships between people and landscape is considered this introduces related, but very different considerations, notably the views that people have of the landscape and the effects of change on their visual amenity. When a landscape is changed in some way there is a probability that the change will be seen by someone and often by several different groups of people. This may affect both particular views of the landscape and have an effect on the overall pleasantness of the surroundings that people enjoy - which is what visual amenity means.

A visual impact assessment should therefore be concerned with how the surroundings of individuals or groups of people may be specifically affected by change in the landscape. This result in assessing potential changes in specific views and in the general visual amenity experienced by general observers in particular places.

3 THE AFFECTED ENVIRONMENT

3.1 LOCALITY

The proposed Limpopo East Corridor Strengthening Project is located in the Mopani District of South Africa in the Limpopo Province. The project stretches for approximately 110km between the Foskor and Spencer substations and, hence, traverses across 4 local municipalities within the district, namely Maruleng, Greater Tzaneen, Greater Letaba and Ba-Phalaborwa.

The Mopani District is bordered by Mozambique in the east, the Vhembe District Municipality through Thulamela & Makhado municipalities in the north, the Mpumalanga province through Ehlanzeni District Municipality (Bushbuckridge, Thaba-Chweu and Greater Tubatse) in the south and, to the west, the Capricorn District Municipality (Molemole, Polokwane & Lepelle-Nkumpi).

The Mopani region in the Lowveld is widely regarded as one of the last unspoilt corners of Africa. The Great Olifants River, one of the most prominent in the region, meanders through the Kruger National Park forming the southern border of the province.

To conserve and extend its legacy of vast expanses untouched by the passage of time, the Kruger National Park has been incorporated into the Gaza-Kruger-Gonarezhou Park, a transfrontier conservation area stretching over 35 000 square kilometres covering Mozambique, Zimbabwe and South Africa. This area is to become part of the proposed Great Limpopo Transfrontier Park. Already, many of the conservation areas bordering on the Kruger National Park have removed their fences and now from part of the Greater Kruger National Park, resulting in huge traversing areas of unspoilt wilderness.

Within these areas and the many other game and nature reserves in the region the full splendour of Africa's wildlife can be enjoyed. The Mopani Valley is not only rich in wildlife, but offers spectacular scenery of mountains, rivers and dams, a rich history and many cultural attractions. The contrasts in climate, scenery and landscape are both striking and dramatic (https://wildliferesorts.org/limpopo-resorts/mopani.html).

Figure 2: Panoramic photograph of the vast expanses of the Kruger National Park.

The district is named Mopani because of the abundance of nutritional Mopani worms found in the area. By virtue of the Kruger National Park being part of Ba-Phalaborwa and Greater Giyani municipalities, Mopani District is part of the Great Limpopo Transfrontier Park, the park that combines South Africa, Mozambique and Zimbabwe (MDM IDP 2016).

There are 16 urban areas (towns and townships), 354 villages (rural settlements) and a total of 125 Wards in the Mopani District.

Figure 3: Photograph of the landscape in the vicinity of Gravelotte.

Mopani District Municipality has good comparative advantage on Eco-tourism due to its proximity to Kruger National Park which is an Eco-tourism hotspot of international importance. It boasts of indigenous forests, biospheres, wetlands, endangered species (Modjadji cycads) as well as cultural heritage.

There are a number of conservation areas within the affected environment. According to the Draft Mopani Bioregional Plan, protected areas including a portion of the Kruger National Park (KNP) cover 31.7% of Mopani District and private reserves cover an additional 10.2%. The Associated Private Nature Reserves (APNR) represents the bulk of the Private Nature Reserves (PNR) that is within the project area. The APNR is comprised of:

- Timbavati Private Nature Reserve;
- Umbabat Private Nature Reserve;
- Klaserie Private Nature Reserve; and
- Balule Private Nature Reserve

These areas are not formally protected by law but are considered to be conservation areas which also represent part of the Kruger to Canyons Biosphere Region (Diges, 2017).

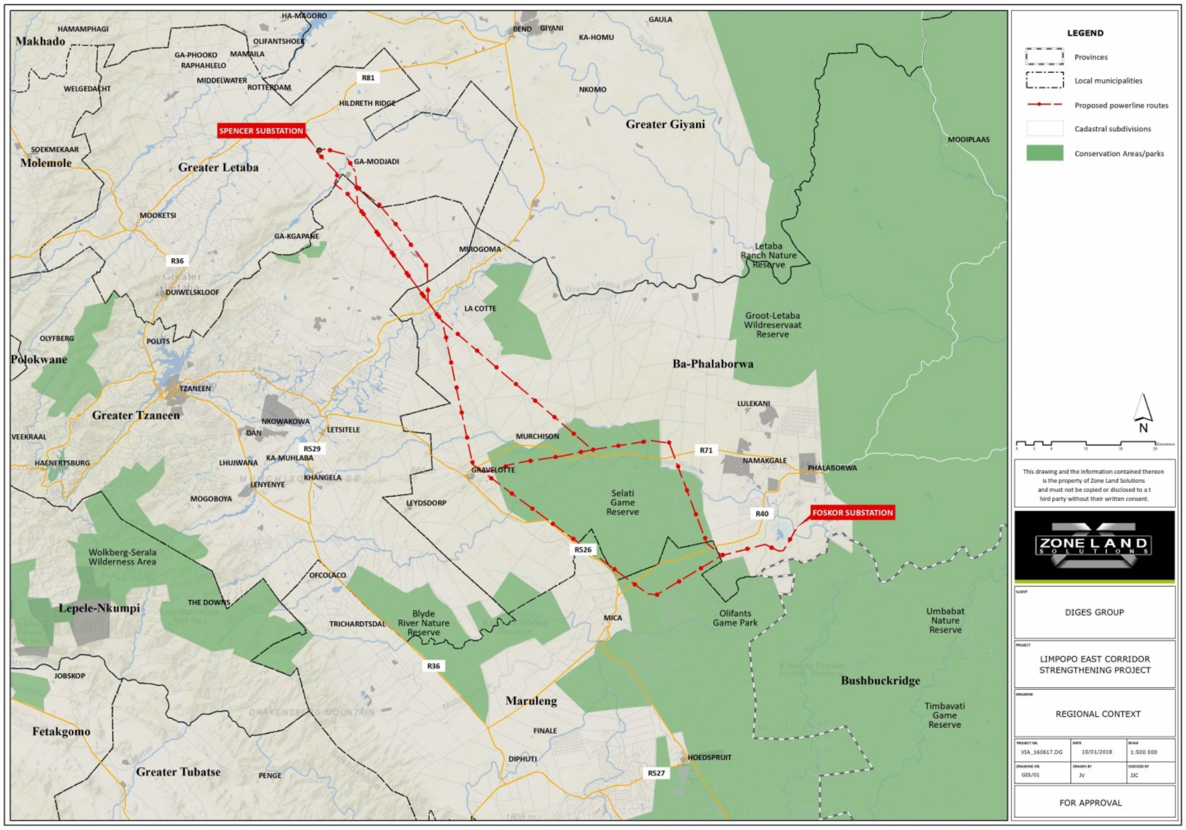

Figure 4: Regional context of the project site.

3.1.1 Key Economic Sectors

The economy of the Mopani District is based on three primary sectors, mining, agriculture and to a certain degree, tourism.

Mining has been the dominant sector in Mopani since 1996, and in 2006 accounted for 31% of the gross value added. The mines employ over 2000 people and an additional 450 contractors, and contribute an estimated 80% of Ba-Phalaborwa Municipality's GGP (MDM IDP, 2017).

Mining development has a potential to contribute over R6300 million in direct investments through the different ventures/prospecting in the district. Mining development could in the short term form the corner stone of economic growth not only in the district but also in the whole of Limpopo Province (MDM IDP, 2017).

The major mining activities in the region are concentrated in Phalaborwa in the Phalaborwa Mineral complex which has been declared a Spatial Development Initiative (SDI). The objectives of the SDI is to exploit the unutilized and underutilized potentials of the area by combining private and public sector resources in a sustainable manner.

Other significant mineral zones in the region are the Murchison Greenstone Belt (Gravellotte towards Leewkop in the Kruger National Park [KNP]), Giyani Greenbelt-from KNP in the south Western direction to the town of Giyani, and Rooiwater Complex Northern flank of Murchison.

The district (Lowveld region) contributes significantly towards the activity of agriculture on the provincial level. About 50% of the farm income in the province in horticulture is earned in the district. Agriculture dominates the economy in Tzaneen, Maruleng and Letaba although it is also significant in other districts. The land capability favours those local municipalities although the sector with some potential is spread more broadly across the district.

The most important irrigation schemes in the region are Lower Letaba, Blyde irrigation and Middle Letaba. The region has future agricultural potential highly concentrated in subtropical fruit, citrus fruit production and vegetables. Unutilized potential is estimated at between 10 000 to 70 000 hectares.

Figure 5: Irrigated agriculture along the Greater Letaba River (Source: Google Streetview, 2017).

Tourism is internationally recognized as one of the world's fastest-growing industries and the engine that drives growth and development.

In Mopani District Municipality, tourism also plays an important role. The indigenous forests, biospheres, nature reserves, wetlands, endangered species as well as Kruger National Park offer several opportunities for tourism. These include opportunities for eco-tourism, as well as tourism associated with the variety of historical and cultural interests found within the district. Mopani District is also considered the home of the big five due to abundance of such animals in Kruger National Park and surrounding private game farms and nature reserves (Diges, 2017).

Figure 6: The Kruger Park Gateway Airport plays an important role through wich tourism can be promoted and direct access to tourism offerings are ensured.

3.1.2 Description of the Landscape Character

The Mopani District is predominantly characterised by plains and undulating plains, with the south-western boundary formed by the high mountains of the escarpment. Elevations range from around 200m above sea level on the plains to more than 2200m above sea level at the highest points of the escarpment (Mopani District Bioregional Plan, 2016).

Due to the length of the proposed power line corridors, the terrain the alternative power line corridors traverse across differ and they are characterised by:

a) Irregular plains with low ridges: This terrain was observed in areas surrounding Foskor and Selati Game Reserve;
b) Plains with open low hills: This terrain was observed in areas surrounding Spencer substation;
c) Open low mountains;
d) High hills; in areas surrounding Murchison and Gravelotte near Alternative 2;
e) Level plains with some relief in in areas surrounding Murchison and Gravelotte near Alternative 2; and
f) Plains with open high hills in areas surrounding Spencer Substation (Diges, 2017).

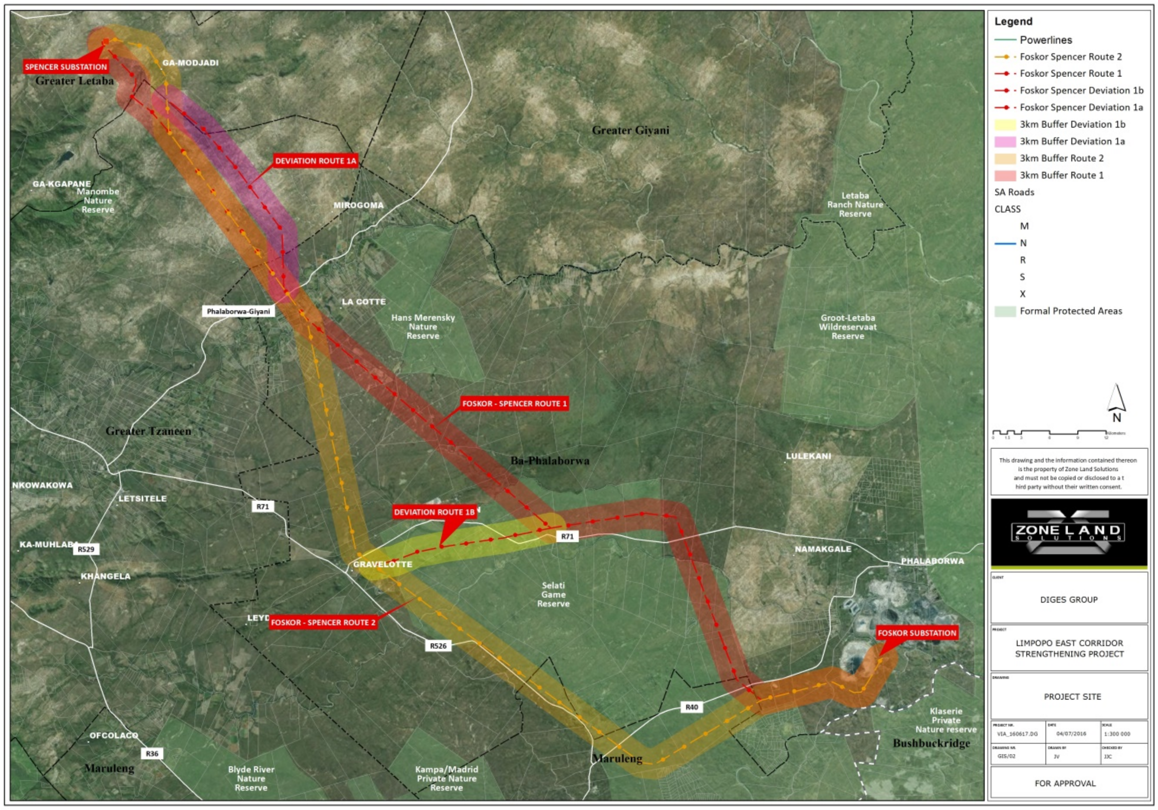

Figure 7: Aerial perspective of the project site indicating the existing uses on site and the surrounding properties as well as the respective corridor alternatives.

The landscape of the proposed powerline route varies in height from about 330m above mean sea level to 720m amsl. The powerline route crosses several depressions and river corridors that run in an easterly direction across the district to eventually flow into the Lago Massingir Dam in Mozambique.

The proposed powerline route traverses through several diverse ecosystems which support many threatened fauna and flora. These ecosystems mostly include savanna and grasslands. More than half of the Mopani District is covered by endemic and near endemic vegetation and 9 ecosystems are listed as threatened in the National Biodiversity Assessment of 2011 (NBA).

The powerline is also situated in the Savanna biome which covers approximately 68% of the Mopani District. The remainder is made up of Grassland (16%) and Forest (10%) biomes. Azonal vegetation is found in patches along rivers and wetlands, such as the Little and Great Letaba Rivers.

In terms of the underlying vegetation type, Mucina and Rutherford (2012) identify at least 5 vegetation types along the route of the proposed powerline. These vegetation types include the following:

- **Tsende Mopaneveld (SVmp5)**

  This vegetation type occurs on slightly undulating plains with medium-high shrubby savanna, with some trees and a dense ground layer around the Hans Merensky Nature Reserve in the west to the vicinity of Letaba Rest Camp in the east.

- **Lowveld Rugged Mopaneveld (SVmp6)**

  This vegetation type occurs on the rugged area of the Olivants River Valley south of Phalaborwa. The landscape features of the vegetation type is characterised by slightly to extremely irregular plains with sometimes steep slopes and a number of prominent hills. Vegetation is more open in the north-eastern parts of this unit outside the Kruger National Park. The vegetation type is regarded as least threatened.

- **Phalaborwa-Timbavati Mopaneveld (SVmp7)**

  This vegetation type occurs in a band about 40km east and west of Phalaborwa and is characterised by open tree savanna on undulating plains with the sandy uplands dominated by *Colophospermum mopane* trees. The vegetation type is also regarded as least threatened with some 38% statutorily conserved in the Kruger National Park and a similar proportion in the private Selati Game Reserve.

- **Granite Lowveld (SVl3)**

  The vegetation type is distributed in Limpopo and Mpumalanga Provinces, Swaziland and marginally also KwaZulu-Natal. In the project area, it can be found in areas surrounding Murchison and Spencer Substation. Vegetation is characterized of dense thicket to open savanna with *Acacia nigrescens*, *Dichrostachys cinerea*, *Grewia bicolor* in the woody layer. The dense herbaceous layer contains the dominant *Digitaria eriantha*, *Panicum maximum* and *Aristida congesta*. The vegetation type is classified as vulnerable with a target for conservation set at 19%. 17% is statutorily conserved in the Kruger National Park. Approximately the same amount conserved in private reserves mainly the Selati, Klaserie, Timbavati, Mala Mala, Sabi Sand and Manyeleti Reserves.

Figure 8: Photograph of the typical Granite Lowveld vegetation.

- **Gravelotte Rocky Bushveld (SVI7)**
  Gravelotte Rocky Bushveld is found in the Murchison Range in the Gravelotte area including surrounding mountains and hills including Ga-Mashishimale north of Mica and Seribana. The vegetation type is characterised by open deciduous to semi-deciduous woodland on rocky slopes and inselbergs, contrasting strongly with the surrounding plains. Some 7% is conserved in a small proportion of the area in the northern part of the Selati Game Reserve.
- **Tzaneen Sour Bushveld (SVI8)**
  This vegetation type is found near the Spencer substation and is characterized of deciduous, tall open bushveld with a well-developed, tall grass layer, occurring on low to high mountains with undulating plains mainly at the base of and on the lower to middle slopes of the north-eastern escarpment. At places on the footslopes, this vegetation becomes very dense and is transitional to forest in kloofs on the eastern slopes of the Drakensberg. *A. ataxacantha* and *Trema orientalis* are prominent pioneer species here.

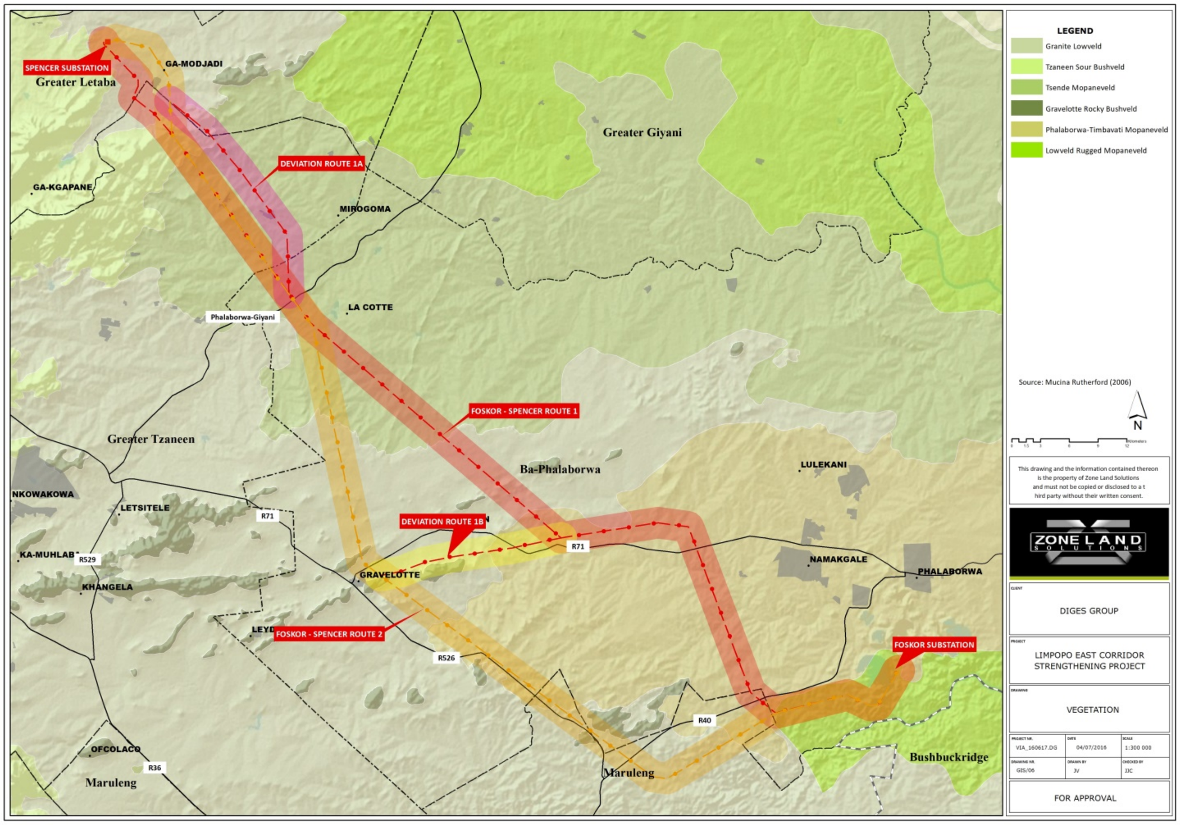

Figure 9: Vegetation types in the study area.

The Phalaborwa area on average receives approximately 360mm of rain per annum, with most of the rainfall occurring during mid-summer. The average midday temperatures range from approximately 24°C in July to 31°C in January. The region is the coldest during July when the mercury drops to 8.0°C on average during the night (http://www.saexplorer.co.za/south-africa/climate/phalaborwa_climate.asp).

4 PROJECT SITE DESCRIPTION AND PROPOSED INFRASTRUCTURE

The project involves the following activities:

- Construction and operation of ±110km 400kV power line from the existing Foskor substation to Spencer substation;
- Extension of the Spencer substation by adding/constructing 400/132kV transformation yard and 1x500MVA, 400/132kV transformer; and
- The construction of a transformer oil holding dam with a capacity of $120m^3$.

4.1 LIMPOPO CUSTOMER LOAD NETWORK

The load profile undertaken by Eskom Holdings SOC Ltd. in 2015 for the Limpopo Transmission Network indicated that there is an expected growth within Limpopo Customer Load Network. To reinforce the province's transmission system and ensure reliable supply of electricity, several projects have been planned such as extending 400kV and 275kV power lines and installation of additional transformers at existing substations. This report will focus on one of the projects, namely the Limpopo East Strengthening Project (Diges, 2017).

4.2 POLOKWANE CUSTOMER LOAD NETWORK

Mining operations, residential, agricultural and industrial activities in some parts of Limpopo Province are supplied by the Polokwane Customer Load Network (PCLN) which is comprised of 4 substations with Spencer 275/132kV substation being one of them. Spencer substation is located approximately 37km south west of Giyani and is currently fed by 275kV power lines from Tabor and Witkop substations located approximately 86km and 136km respectively. In addition, the substation is equipped with 2x250MVA, 275/132kV transformers. There are 132kV power lines which link into distribution substations within the area and that also interconnect Spencer and Foskor MTS with the distribution substations. The load profile undertaken for the Province showed that Spencer substation will be having a peak demand of 318MVA by 2018. Eskom Transmission Grid Planning therefore initiated a study to investigate possible alternatives and solutions to address the transformation constraints at Spencer MTS, as well as 275kV transmission network constraints on the network supplying Spencer MTS supply zone.

Figure 10: Photograph of the Spencer substation.

4.3 PROJECT COMPONENTS

The activities identified to address the constraints in the network entail the following:

a) An approximate 110km, 400kV power line from Foskor MTS near Phalaborwa to Spencer MTS near Mohlabaneng village. Two alternative corridors and two deviations from these corridors have been identified.

b) A 400/132kV transformation yard and 1 x 500MVA, 400/132kV transformer which will cater for the proposed 400kV power line coming from Foskor MTS. This extension will require a footprint area of ±9 ha.

c) A transformer oil holding dam with a capacity of 120m^3. The oil dam is required to contain any spillage from the 1 x500MVA, 400/132kV transformer and to prevent pollution to the environment thereby ensuring compliance with Environmental Legislation.

4.3.1 New 400kV Power Line

A pylon or electricity tower is a tall structure used to support an overhead power line. They are used in high-voltage AC and DC systems, and come in a wide variety of shapes and sizes. Typical height ranges from 15 to 55m. The Foskor-Spencer powerline will consist of 400kV overhead lines carried on lattice steel towers of varying heights. The average span between two towers will vary between 300 and 400m with an average span of 350m between supports.

The conductor cables used to carry current are held up by the pylons. The conductor cables are bare, meaning they are insulated by the air alone. The distance between each conductor, and between the conductors and the ground, ensures that they remain insulated.

The insulator strings, usually made of glass, insulate the pylon from the live cable. The higher the voltage of the line, the more insulators are required. More recent composite insulators have a glass-fibre core with silicon sheds for insulation and are used to connect the conductors to the towers. Composite insulators are lightweight and resistant to both vandalism and pollution.

Shield wires, which do not carry an electric current, typically run above the conductor cables to provide lightning protection.

The type of terrain encountered, as well as the underlying geotechnical conditions determines the choice of foundation. The actual size and type of foundation to be installed will depend on the soil bearing capacity (actual sub-soil conditions).

The servitude width for a 400kV distribution line is about 55m (27.5m on either side of the centre line of the powerline). However, the cross rope suspension tower requires a width of 75m at the tower location.

Services Access for construction traffic will be required and maintained to all sites during the construction phase. The width of the access roads will be less than 6m. Services access arrangements for maintenance and fault repairs will have to be arranged with the relevant land owners prior to the implementation of the project.

Although the power line towers that will be utilized for this project have not been decided, three tower structures types are generally used for 400kV power lines. The various types are as follows:

4.3.1.1 Cross Rope Suspension Tower

The towers are supported by stays or guys to stabilize the towers. This tower is easy to assemble and the structure requires less galvanized steel than the guyed V tower making it lighter. Forces from the earthwires, tower guys, and conductors are transferred only to the two mast peaks, thus eliminating direct bending moments in the structure and resulting in cost savings in the order of 50% per tower. The tower has an average height of 40m and requires a servitude of 55m (Diges, 2017). However, the cross rope suspension tower requires a width of 75m at the tower location.

4.3.1.2 Guyed Suspension Tower

The tower has one large foundation and four guys therefore four smaller foundations. They provide the best protection from lightning impulses due to ground wire and cross arm configuration. Tower cross bar helps with the live maintenace. The towers have an average height of 33m.

4.3.1.3 Self-Supporting Tower

This is a typical Eskom designed self-supporting tower and utilizes a V assembly to allow for compaction of the phases. The structure is optimized to carry 190KN glass insulators which support quad zebra conductors. Commonly used before the cheaper guyed and cross rope structures were designed.

Figure 11: Example of a self-supporting tower (left). Example of a cross-rope suspension tower (right).

4.3.2 Substation Upgrade and holding dam

As mentioned above, the Spencer substation also needs to be extended/ upgraded to establish the 400/132kV transformation yard and the 1x500MVA, 400/132kV transformer. In addition, a transformer oil holding dam with a capacity of 120m^3 will also be constructed. The area required for this extension is approximately ±9 hectares. The proposed upgrade/ extension works will entail the following activities:

- Cut and fill grading;
- Placement and compaction of structure fill to serve as a foundation for equipment;
- Grading to maintain drainage patterns;
- Installation of equipment and structure foundations;
- Construction of bund walls, oil drainage pipes and oil holding dam;
- Construction of formal drainage and storm-water control measures;
- Installation of structures and equipment; and
- Erection of a fence around the perimeter of the substation.

4.4 PROPOSED POWER LINE CORRIDORS

To construct and operate a 400kV power line from Foskor MTS to Spencer MTS, Eskom identified and evaluated two corridor alternatives to identify the preferred corridor. The power line corridor alternatives are as follows:

4.4.1 Corridor Alternative 1

Route alternative 1 is approximately 112km in length and traverse across four Local Municipalities namely: Maruleng, Ba-Phalaborwa, Greater Tzaneen and Greater Letaba. The corridor starts at the Foskor MTS within the Foskor mine in Phalaborwa and run along existing powerlines for extended periods. The powerline crosses landscapes categorised by mining activities, nature reserves, game farms and commercial agricultural holdings. As the powerline approach the Spencer substation, the landscape changes to settlements practicing subsistence farming and rural residential villages.

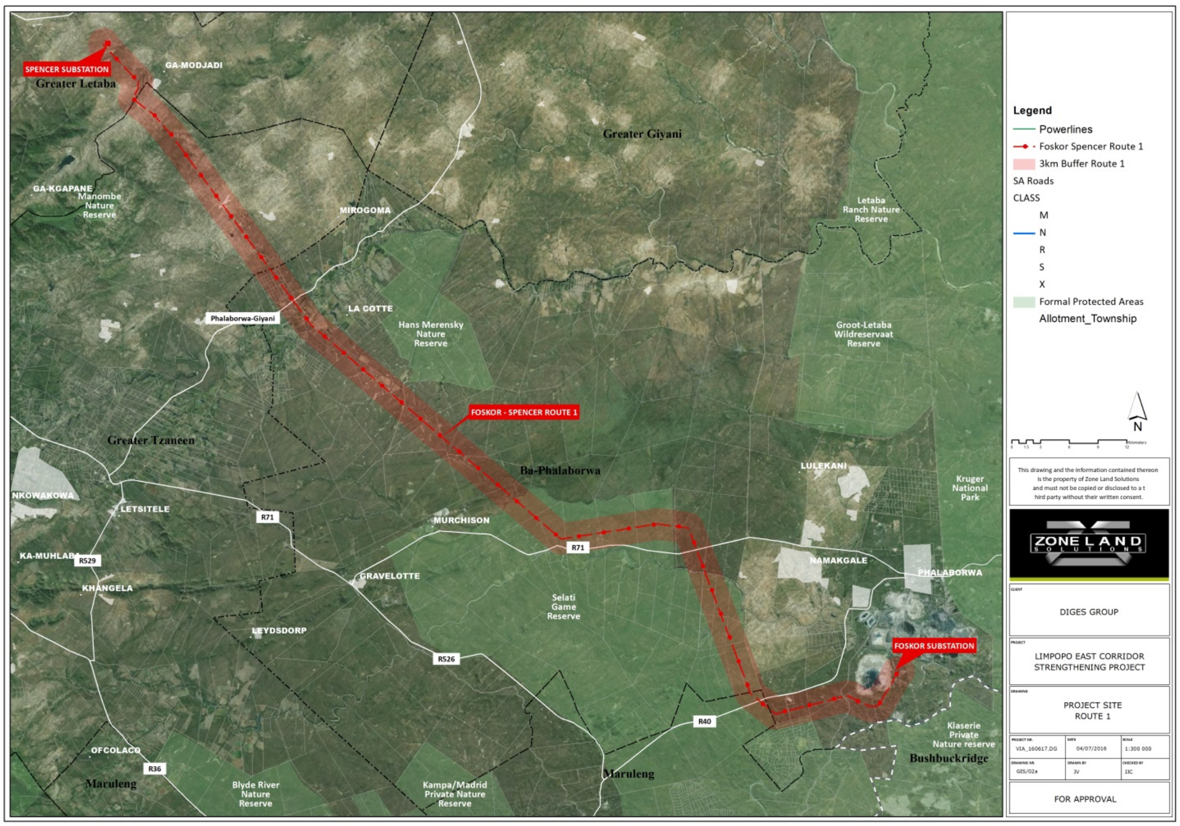

Figure 12: Corridor Alternative 1.

4.4.2 Corridor Alternative 2

This alternative largely follows the same alignment of Alternative 1. The corridor does however follow a slightly longer alignment at 121km and cut across Balule Nature Reserve and the southern-south east border of the Selati Game Reserve. The corridor will run parallel to the R526, traversing across the Ga-Selati River where after it will traverse the outskirts of Gravelotte with Consolidated Murchison Mine and the airport to the east.

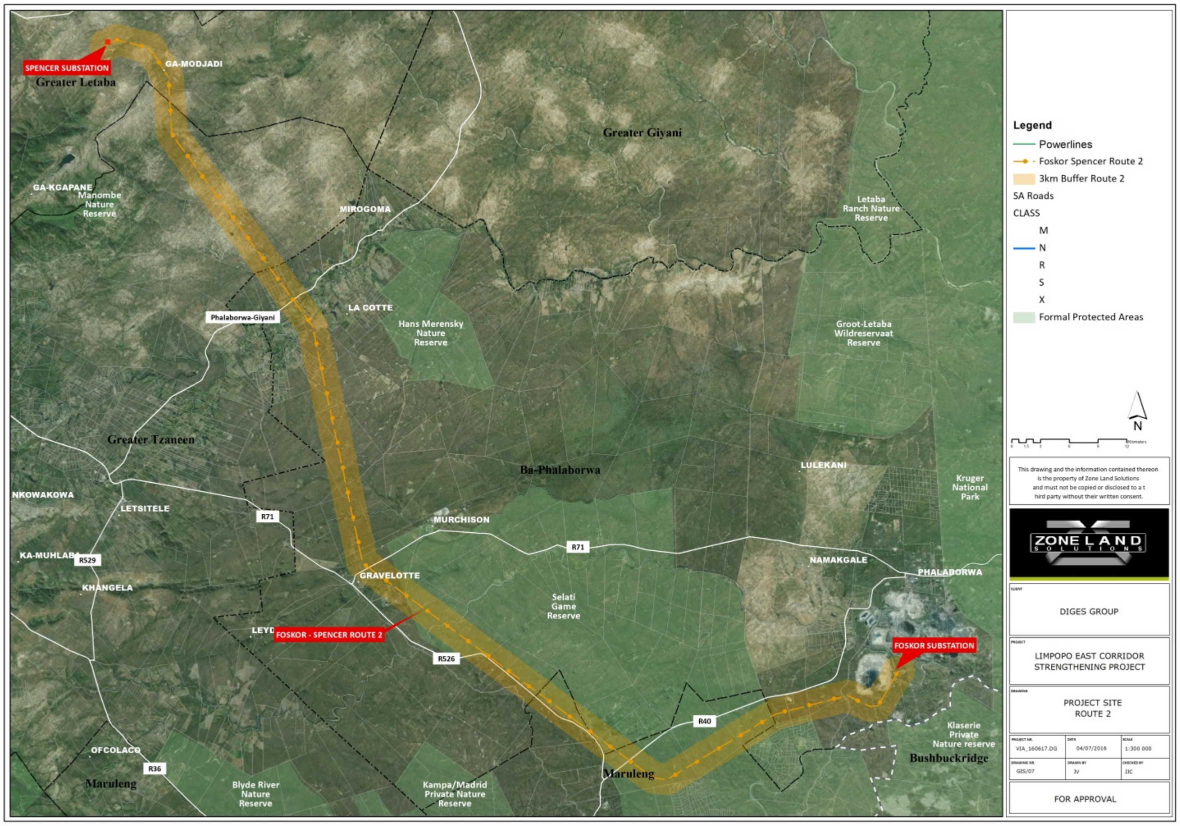

Figure 13: Corridor Alternative 2.

4.4.3 Foskor-Spencer Deviation 1a

Deviation 1a aims to avoid some inaccessible areas within the built up areas. The deviation is 23km starting from corridor alternative 1 and 2 at the agricultural plots north of Groot-Letaba River and running for 5.6km in a north-easterly direction.

This part of the deviation corridor will cross the Lerwatlou River and traverse across the open woodland and bushland. The corridor will traverse through and at the outskirts of villages such as Ga-Mawa, Ooghoek, Gamela, Rampede for 17km towards corridor alternatives 1 and 2.

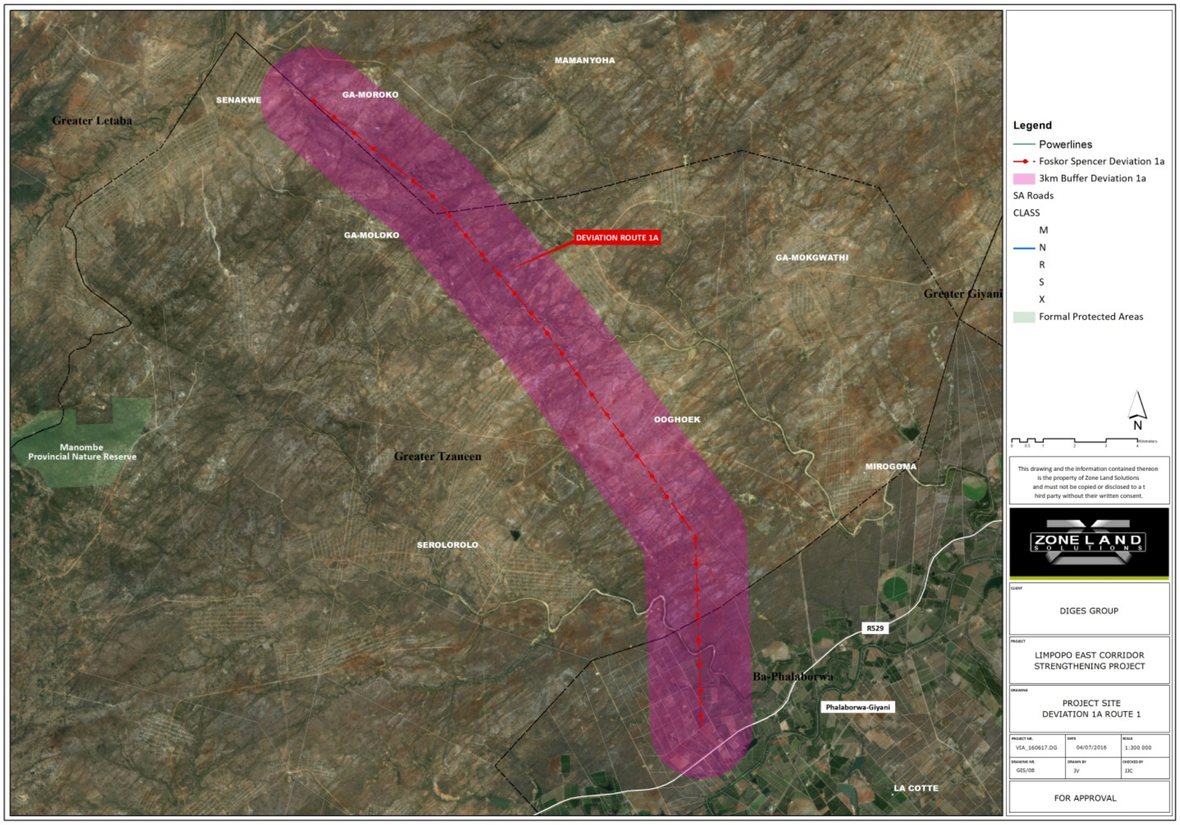

Figure 14: Corridor Alternative 1.

4.4.4 Foskor-Spencer Deviation 1b

This deviation aims to avoid the area being utilised by the Department of Defence. The use of this deviation combines both Corridor Alternatives 1 and 2 and the length of the corridor is 125km. The corridor deviates at Gravelotte running in a westerly direction parallel to the existing 132kV powerline. The deviation cut across the north-western border of Selati Game Reserve.

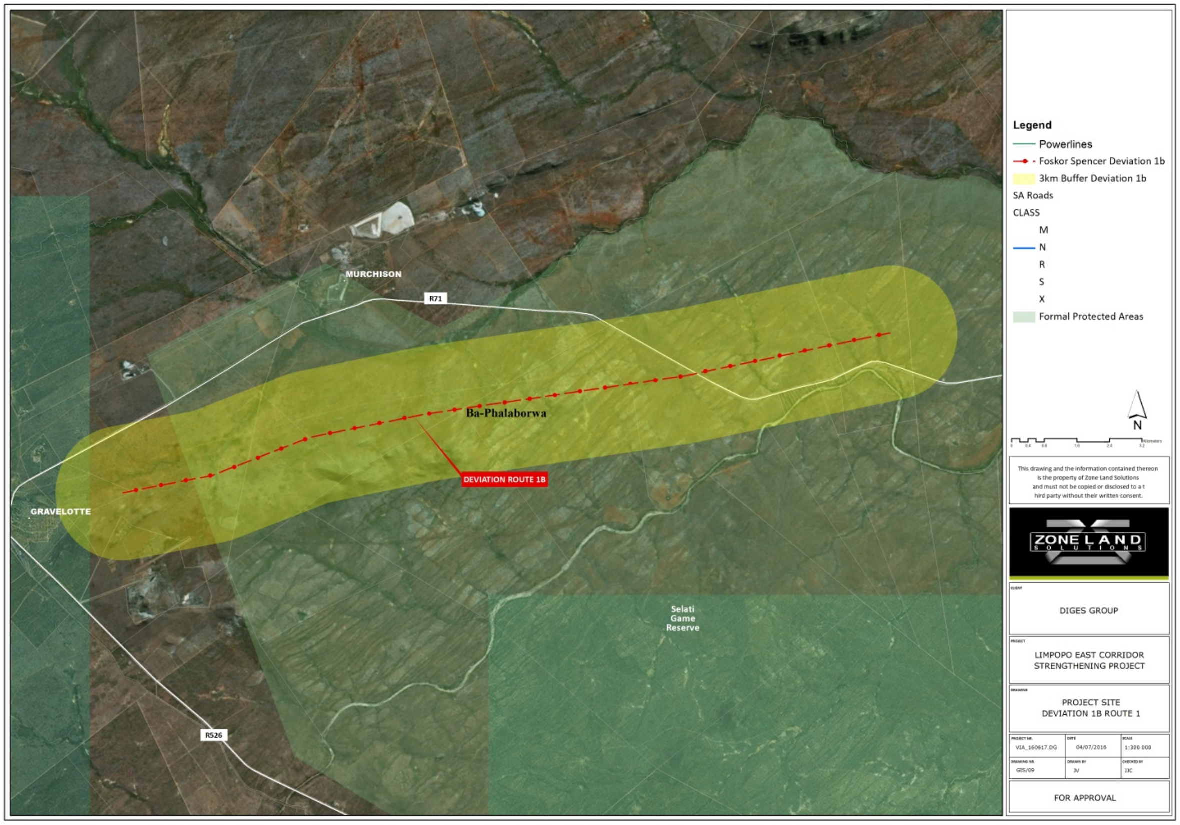

Figure 15: Corridor Alternative 1.

5 POLICY CONTEXT

5.1 NATIONAL DEVELOPMENT PLAN

During November 2011, the National Planning Commission published a document titled *The National Development 2030: Our Future – Make it Work* as a broad strategic framework which sets out a coherent and holistic approach to confronting poverty and inequality.

As its main goals, the National Development Plan[2] (NDP) focuses on the following:

- Eliminate income poverty – Reduce the proportion of households with a monthly income below R419 per person (in 2009 prices) from 39% to zero.
- Reduce inequality – The Gini coefficient should fall from 0.69 to 0.6.

2 National Planning Commission (2011). National Development Plan 2030 – Our Future Make it Work. Shereno Printers.

The NDP identifies 15 themes that as objectives and actions that will give effect to the overarching goal. These themes include the following:

a) Economy and employment
b) Economic infrastructure
c) Environmental sustainability and resilience
d) Inclusive rural economy
e) South Africa in the region and the world
f) Transforming Human Settlements
g) Improving education, training and innovation
h) Health care for all
i) Social protection
j) Building Safer Communities
k) Building a capable and developmental state
l) Fighting corruption
m) National building and social cohesion

In as far as the proposed project is concerned, the theme concerning *Economic Infrastructure* will be given effect to in the following manner.

(i) Economic Infrastructure

As introduction to this theme, it is stated that *South Africa needs to maintain and expand its electricity, water, transport and telecommunications infrastructure in order to support economic growth and social development goals. It is also stated that policy planning and decision-making often requires trade-offs between competing national goals. For instance, the need to diversify South Africa's energy mix to include more renewable energy sources, which tend to be variable in terms of production, should be balanced against the need to provide a reliable, more affordable electricity supply.*

The objectives of this theme echo, to a large degree, that of the theme below, namely that:

- The country would need an additional 29 000MW of electricity by 2030. About 10 900MW of existing capacity is to be retired, implying new build of more than 40 000MW.
- At least 20 000MW of this capacity should come from renewable sources.

The actions identified to achieve these goals include the following:

- Move to less carbon-intensive electricity production through procuring at least 20 000MW of renewable energy, increased hydro-imports from the region and increased demand-side measures, including solar water heating.
- Move Eskom's system operator, planning, power procurement, power purchasing and power contracting functions to the independent system and market operator and accelerated procurement of independent power producers.
- Ring-fence the electricity distribution businesses of the 12 largest municipalities (which account for 80 percent of supply), resolve maintenance and refurbishment backlogs and develop a financing plan, alongside investment in human capital.
- Revise national electrification plan and ensure 90 percent grid access by 2030 (with balance met through off-grid technologies).

The plan states that, over the short term, policy needs to respond quickly and effectively to protect the natural environment and mitigate the effects of climate change. Over the long term, however, it is believed that with realistic, bold strategies and global partnerships, South Africa can manage the transition to a low-carbon economy at a pace consistent with government's public pledges, without harming jobs or competitiveness.

The proposed project is therefore in line with the themes of the NDP.

5.2 MOPANI DISTRICT MUNICIPALITY INTEGRATED DEVELOPMENT PLAN AND SPATIAL DEVELOPMENT FRAMEWORK

The vision of the Mopani District Municipality Integrated Development Plan is *'To be the Food Basket of Southern Africa and thè Tourism Destination of Choice'.*

The mission of Mopani District Municipality is:

- *To provide integrated sustainable equitable services through democratic responsible and accountable governance.*
- *Promoting the sustainable use of resources for economic growth to benefit the community.*

In support of the vision and mission, the Mopani District Municipality has identified the following Key Performance Areas (KPAs), goals and strategic objectives.

Table 1: KPAs, goals and strategic objectives of the IDP.

KPA	GOAL	STRATEGIC OBJECTIVE
Municipal Transformation and Organisational Development	Efficient, effective and capable workforce	To inculate entrepreneurial and intellectual capabilities.
	A learning institution	To strengthen record keeping and knowledge management
Basic service delivery	Sustainable infrastructure development and maintenance	To accelerate sustainable infrastructure and maintenance in all sectors of development.
	Clean, safe hygenic environment, water and sanitation services.	To have integrated infrastructure development.
	Safe, healthy living environment.	To improve community safety, health and social well-being.
Local Economic Development	Growing economy (through agriculture, mining, tourism and manufacturing).	To promote economic sectors of the District.
Spatial Rationale	Sustainable, optimal, harmonious and integrated land development	To have efficient, effective, economic and integrated use of land space.
Financial Viability	Reduced financial dependency and provision of sound financial management	To increase revenue generation and implement financial control system
Good Governance and Public Participation	Democratic society and sound governance	To promote democracy and sound governance.

Of particular relevance in the KPA relative to Local Economic Development. As a strategy to its developmental issues, the IDP lists the poor electricity supply and substations to be upgraded and that liaising should take place with Eskom to provide electricity.

The Spatial Development Framework forms an integral part of the IDP. The overall purpose of the Mopani District Municipality Spatial Development Framework, is to spatially represent the District's Vision and how it intend to reach it. It provides direction towards a future District spatial structure and form that can facilitate sustainable growth and development at the economic, community and environmental dimensions.

Spatial development within the Mopani District will support a development pattern that provide a conducive, functional and sustainable environment for the District to optimise the full potential of its natural resources found in world renown tourism destinations, high potential agriculture land, and mining activities. A functional hierarchy of settlements and development nodes, will be interlinked through a well-defined network of development corridors that provide regional and cross-border accessibility and development linkages between the district and economic activity or growth areas. Lastly, the spatial development framework seek to establish an integrated and sustainable spatial pattern and improved accessibility to social, infrastructural, economic and municipal services to all communities in the district.

The spatial development goals emanating from the spatial vision statement are defined as follow:

a) The establishment of an optimal, functional and integrated spatial pattern, integrating the urban and rural areas.
b) To strengthen and develop the district growth points and prevent urban sprawl.
c) To establish sustainable settlements that is able to generate economic activities.
d) To create a conductive environment for the establishment of tourist destination opportunities.
e) To establish strong economic and transportation linkages with Sub-Saharan countries and regional, national and international tourism markets.
f) To protect natural resources and development areas from any development that may sterilize or have a significant negative impact on it.
g) Spatial Justice.
h) Spatial Sustainability
i) Spatial Resilience
j) Good Administration

No specific or direct reference is made in the SDF to large infrastructure projects such as the proposed powerline and MTS substation as it relates to the construction or upgrading of infrastructure networks. The SDF does, however, refer to principles which should be adhered to such #(e) above.

5.3 KRUGER TO CANYONS BIOSPHERE RESERVE

The proposed powerlines partially fall within the Kruger to Canyons Biosphere Reserve. Biosphere reserves are designated regions in the world where important ecosystems and protected areas lie adjacent to human settlements, and are established to promote solutions to reconcile the conservation of biodiversity and its sustainable use.

The Kruger to Canyons (K2C) Biosphere Reserve was registered by UNESCO on the 20th of September 2001. It became the 411th Biosphere Reserve site to be registered in 94 countries worldwide, acknowledging the global significance of Greater Kruger bioregion, the eastern savannahs and escarpment of South Africa.

The biosphere bridges the Limpopo and Mpumalanga provinces, and it is at the interface of the Eastern Transvaal Drakensberg Escarpment and the Central Lowveld. It is a unique area made up of public, provincial, and private nature and game reserves and natural resource areas. The private nature reserves in the Central Lowveld region, Klaserie, Umbabat, Thornybush, Timbavati, Sabi Sand, Kapama, Balule, Selati, Makalali, Karongwe and the Blyde-Olifants Conservancy is the largest privately owned nature reserve complex in the world. Including the recently declared escarpment protected areas, half a million hectares of land has been returned to nature (C-Plan, 2007).

The spatial implication for the proposed powerlines and associated infrastructure is that the environmental areas be protected and that the tourism potential of these areas is exploited, taking cognisance of the impact of such development on the environment.

In terms of the designation, the majority of the powerline falls within areas that have been designated as **transition area** (i.e. bona fide development area). Various policy documents states that *'in this area, local communities, management agencies, scientists, non-governmental organisations (NGOs), cultural groups, economic interest groups and other stakeholders work together to manage and develop the area's resources in a sustainable manner'.*

Certain parts of the powerlines will also fall within the designated **buffer zones**. Buffer zones surround or are contiguous to the core area. Activities are organized so they do not hinder the conservation objectives of the core area, but rather help to protect it. The buffer zone might be an area for experimental research, or may involve ways to manage natural vegetation, agricultural land, forests, fisheries or ranchland to enhance overall quality of production while conserving natural processes and biodiversity. This zone may also accommodate education, training, tourism, and recreation facilities. In many biosphere reserves the buffer zone is regarded as an area in which human use is less intensive than what might be found in the transition zone (http://www.watertonbiosphere.com/biosphere-reserves/three-functions-three-zones/).

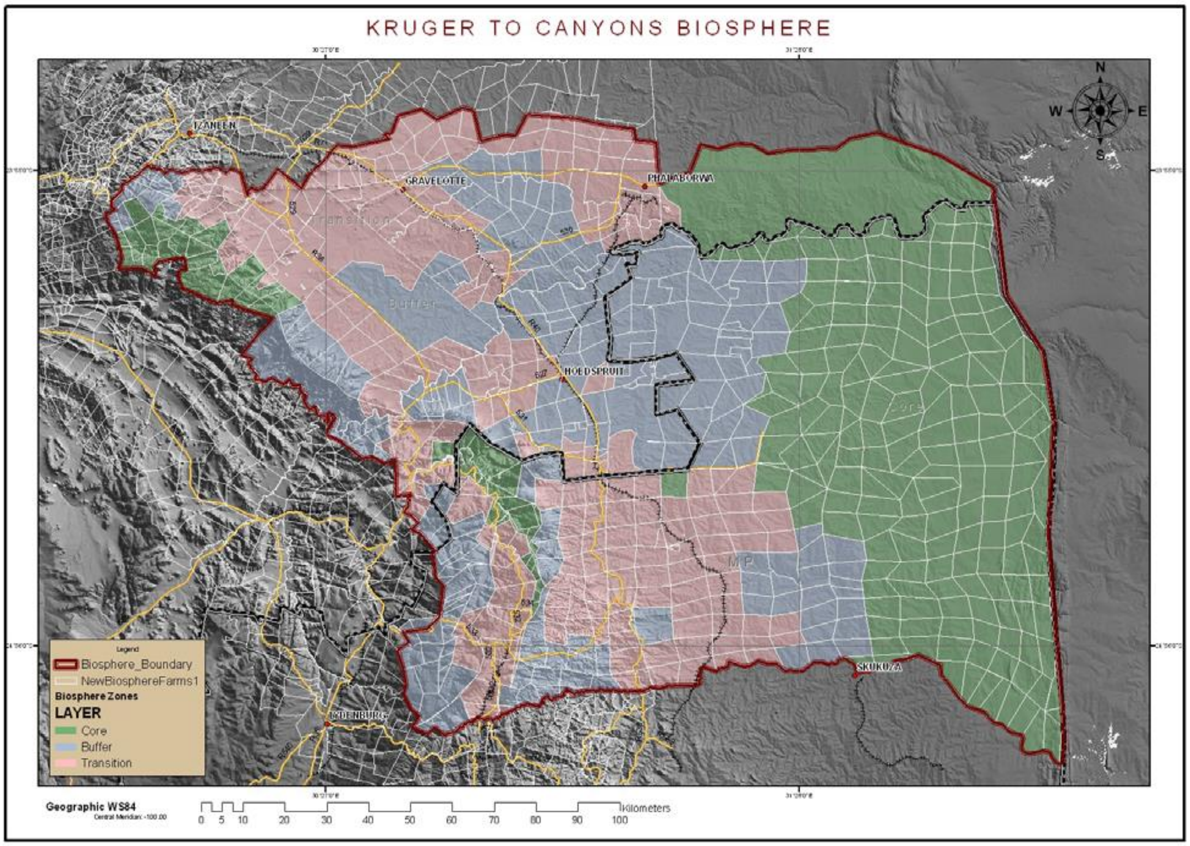

Figure 16: Designated zones of the Kruger to Canyon Biosphere Reserve (Source: http://www.unesco.org/new/fileadmin/MULTIMEDIA/HQ/SC/images/kruger2canyons_map.jpg).

6 POTENTIAL 'TRIGGERS' OR KEY ISSUES

A 'trigger' is a characteristic of either the receiving environment or the proposed project which indicates that visibility and aesthetics are likely to be key issues and may require further specialist involvement (DEA&DP, 2005).

The 'triggers', as it relates to the proposed project refer to the following:

Table 2: Potential triggers.

KEY ISSUE	FOCAL POINTS
a) Nature of the receiving environment:	*Areas with protection status, such as national parks or nature reserves.*
	Areas with intact or outstanding rural or townscape qualities.
	Areas with a recognised special character or sense of place
	Areas lying outside a defined urban edge line.

	Areas of important tourism or recreational value.
	Areas with important vistas or scenic corridors.
b) Nature of the project:	*High intensity type projects including large-scale infrastructure.*
	Possible visual intrusion in the landscape.

6.1 DEVELOPMENT CATEGORY

Based upon the 'triggers' and key issues and the environmental context summarised above, the proposed activity is categorised as a **Category 5 Development**.

This categorisation is based upon the *Guidelines for Involving Visual and Aesthetic Specialists in EIA Processes*, which lists the following categories of development:

Box 3: KEY TO CATEGORIES OF DEVELOPMENT

Category 1 Development: e.g. nature reserves, nature-related recreation, camping, picnicking, trails and minimal visitor facilities.

Category 2 Development: e.g. low-key recreation/resort/residential type development, small-scale agriculture/nurseries/narrow roads and small-scale infrastructure.

Category 3 Development: e.g. low density residential/resort type development, golf or polo estates, low to medium-scale infrastructure.

Category 4 Development: e.g. medium density residential development, sport facilities, small-scale commercial facilities/office parks, one-stop petrol stations, light industry, medium-scale infrastructure.

Category 5 Development: e.g. high density township/residential development, retail and office complexes, industrial facilities, refineries, treatment plants, power stations, wind energy farms, power lines, freeways, toll roads, large-scale infrastructure generally. Large-scale development of agriculture land and commercial tree plantations. Quarrying and mining activities with related processing plants.

Based upon the above categorization and the assessment criteria provided in the *Guidelines for Involving Visual and Aesthetic Specialists in EIA Processes* it is expected that a **'moderate to very high visual impact'** could be expected as a result of the proposed activity (refer to the table below).

The objectives of the VIA described in this report is to:

a) determine whether such broad impact categorisation is appropriate and if not, to determine an appropriate category of impact;

b) formulate and implement measures or interventions that would mitigate any detrimental impacts to the extent that the activity will be acceptable.

Table 3: Categorization of expected visual impact (DEA&DP, 2005).

Type of environment	Type of development				
	Category 1	**Category 2**	**Category 3**	**Category 4**	**Category 5**
Protected/wild areas of international or regional significance	Moderate visual impact expected	High visual impact expected	High visual impact expected	Very high visual impact expected	Very high visual impact expected
Areas or routes of high scenic, cultural, historical significance	Minimal visual impact expected	Moderate visual impact expected	High visual impact expected	High visual impact expected	Very high visual impact expected
Areas or routes of medium scenic, cultural or historical significance	Little or no visual impact expected	Minimal visual impact expected	Moderate visual impact expected	**High visual impact expected**	High visual impact expected
Areas or routes of low scenic, cultural or historical significance/disturbed	Little or no visual impact expected. Possible benefits	Little or no visual impact expected	Minimal visual impact expected	Moderate visual impact expected	High visual impact expected
Disturbed or degraded sites / run-down urban areas / wasteland	Little or no visual impact expected. Possible benefits	Little or no visual impact expected. Possible benefits	Little or no visual impact expected	Minimal visual impact expected	Moderate visual impact expected

7 VIEWSHED ANALYSIS

7.1 DOMINANT VIEW CORRIDORS

As a first step of this VIA, a survey was undertaken to determine the existence of significant view corridors associated with the project site. A view corridor is defined as *'a linear geographic area, usually along movement routes, that is visible to users of the route'* (DEA&DP, 2005).

When determining dominant view corridors, one has to take into consideration the class of the road, the dominance and nature of the town/settlement/neighbourhood/district in which direction it travels and the distance from the proposed activity. In this regard, the corridors listed below relate directly to the proposed powerline.

Having regard for the above, the following dominant *view corridors* were identified in the immediate vicinity of the proposed powerline, namely:

a) **R71** The main movement corridor between Tzaneen in the west and Phalaborwa in the east.

b) **R40** The R40 is a regional tourist route between Phalaborwa in the north and Nelspruit in the south, passing through the towns of Hazyview and Hoedspruit R319. The R40 eventually crosses into Swaziland south of Baberton.

c) **R526** The regional road between Gravelotte in the west and the R40 in the east.

d) **R529** Another main movement corridor that connects with the R36 at Manchabeni in the south and follows a northern alignment past the Hans Merensky Nature Reserve and connects with the R81 south of Giyani.

7.2 RELEVANT TOPOGRAPHIC AND PHYSICAL CHARACTERISTICS

A further key aspect affecting the potential visual impact of any proposed activity is the topography of the project site and the surrounding environment and the existence of prominent biophysical features from where the project site is visible. The topography and the major ridgelines of the area were subsequently determined and mapped by using a *Digital Elevation Model*[3].

As illustrated by the DEM below, the route of the proposed powerline is located at a mean elevation of approximately 5500m above sea level. The DEM shows that the route of the proposed powerline is located on generally flat to undulating terrain. These plains make way for steeper mountainous terrain located to the west of the project site. The DEM also shows the

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3 A Digital Elevation Model (DEM) is a geographic information system-based outcome generated from contours for a specific area. In this instance, 20m contour intervals for reference sheet no. 2330ad, 2330bc, 2330da, 2330dc, 2330dd, 2430ba, 2430bb and 2431aa were used to calculate the DEM for the region.

depressions in the landscape associated with the major river corridors as it drains in an eastern direction. It is also evident that there are not prominent ridges or topographical manifestations within the immediate vicinity of the powerline, from where the latter could potentially be visible.

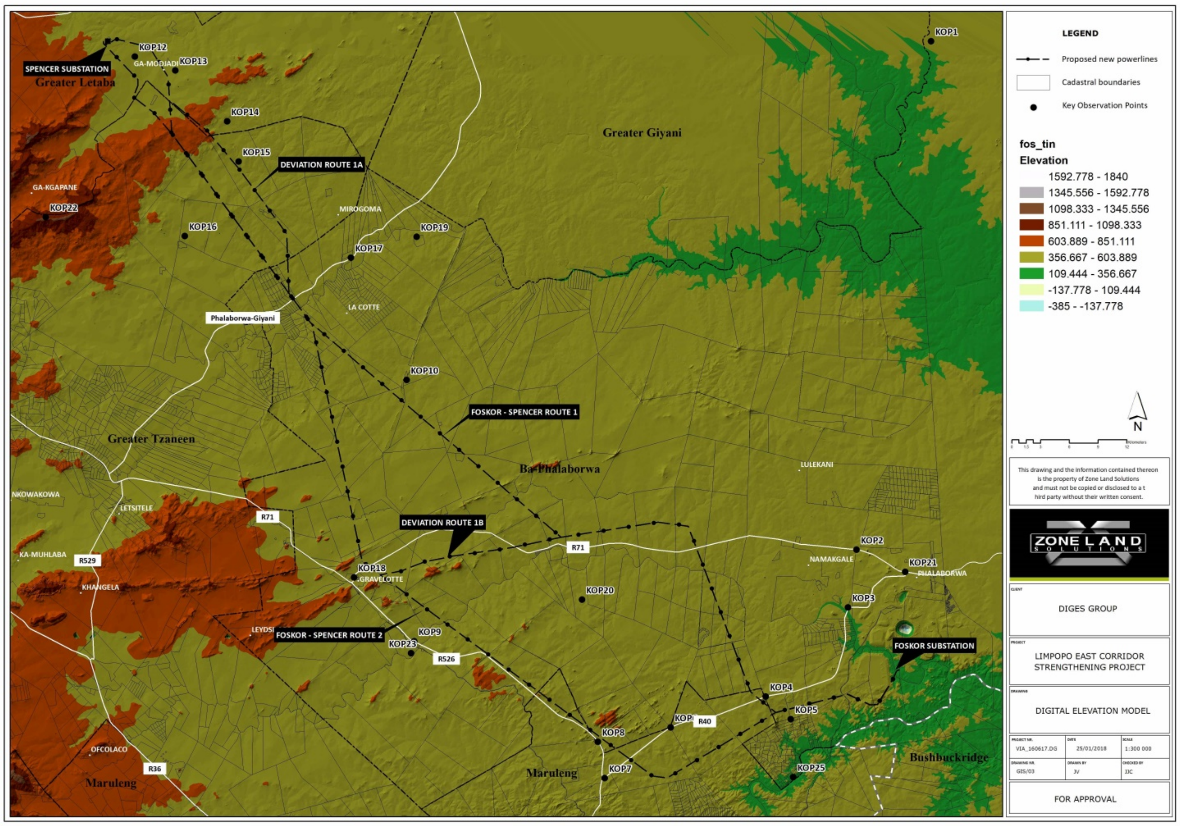

Figure 17: Digital Elevation Model illustrating the landscape of the area and the dominant view corridors in the region.

7.3 PHOTOGRAPHIC STUDY AS SUPPLEMENTARY COMPONENT

In order to quantify and assess the visibility and potential impact of the proposed activity and to provide a basis for selecting appropriate observation points outside of the project site, a photographic study and analysis was undertaken in the vicinity of the project site. The analysis identified several observation points with similar characteristics and assessments outcomes. A selection of Key Observation Points is therefore included under Annexure 2.

Figure 18: Photograph illustrating the existing infrastructure and landscape character of the subject area.

8 DIGITAL VIEWSHED ANALYSIS

The photographic study summarised above was supplemented with a digital viewshed analysis based upon the Digital Elevation Model (refer to Figure 17). As stated previously, the purpose of these two steps was to provide a basis for the identification and selection of appropriate observation points outside the project site for the VIA.

The viewshed[4] analysis was undertaken in accordance with the *Guideline Document for involving Visual Specialists in EIA Processes*. Geographic Information Systems (GIS) technology was used to analyse and map information in order to understand the relationships that exist between the observer and the observed view. Key aspects of the viewshed are as follows:

- It is based on a *single viewpoint* from the highest point of the project site.
- It is calculated at an average 40m above the existing natural ground level to reflect the highest point of the proposed activity.
- It represents a '*broad-brush' designation*, which implies that the zone of visual influence may include portions that are located in a view of shadow and it is therefore not visible from the project site and *vice versa*. This may be as a result of landscape features such as vegetation, buildings and infrastructure not taken into consideration by the DEM.

[4] A viewshed is defined as *'the outer boundary defining a view catchment area, usually along crests and ridgelines. Similar to a watershed'*. A Viewshed Analysis is therefore the study into the extent to which a defined area is visible to its surroundings.

- The viewshed generated from each of the selected observation points referred to in Annexure 2 is calculated at 1.7m above the natural ground level to reflect the average height of person either walking or sitting in a vehicle.

As illustrated by the generated viewsheds below (refer to Figures 19 - 22), the *zone of visual influence*[5] was determined for each of the route alternatives. In general, the viewsheds coincide with the major topographical features in the landscape. The viewsheds are relative uniform across the landscape but are more prominent in closer proximity to the powerlines, as can be expected. As a result of the combination of the relative flat landscape and the height of the proposed powerlines, the viewsheds stretches in excess of 60km from the powerlines.

The GIS-generated viewsheds illustrate a theoretical *zone of visual influence*. This does not mean that the proposed activity would be visible from all observation points in this area. The distance radii indicating the various viewing distances from the project site, as well as the major view corridors, are also illustrated on the figures below.

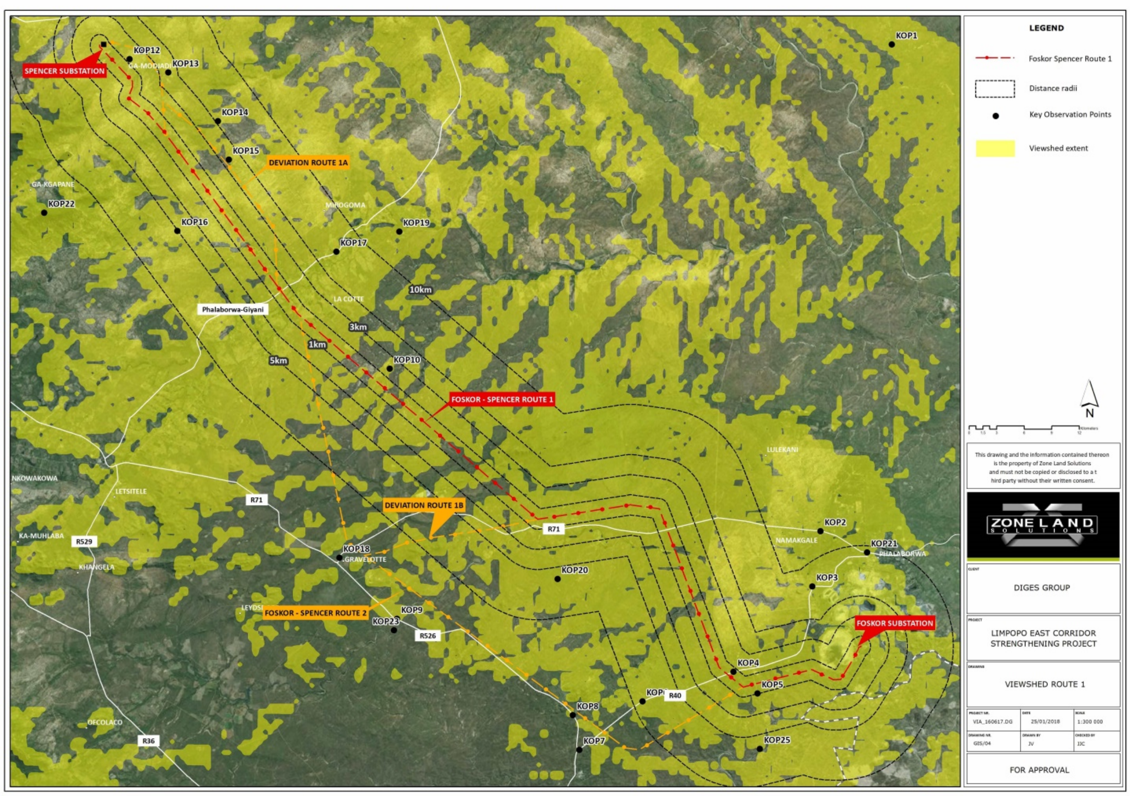

Figure 19: Viewshed generated for Route 1.

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5 Zone of visual influence is defined as 'An area subject to the direct visual influence of a particular project'.

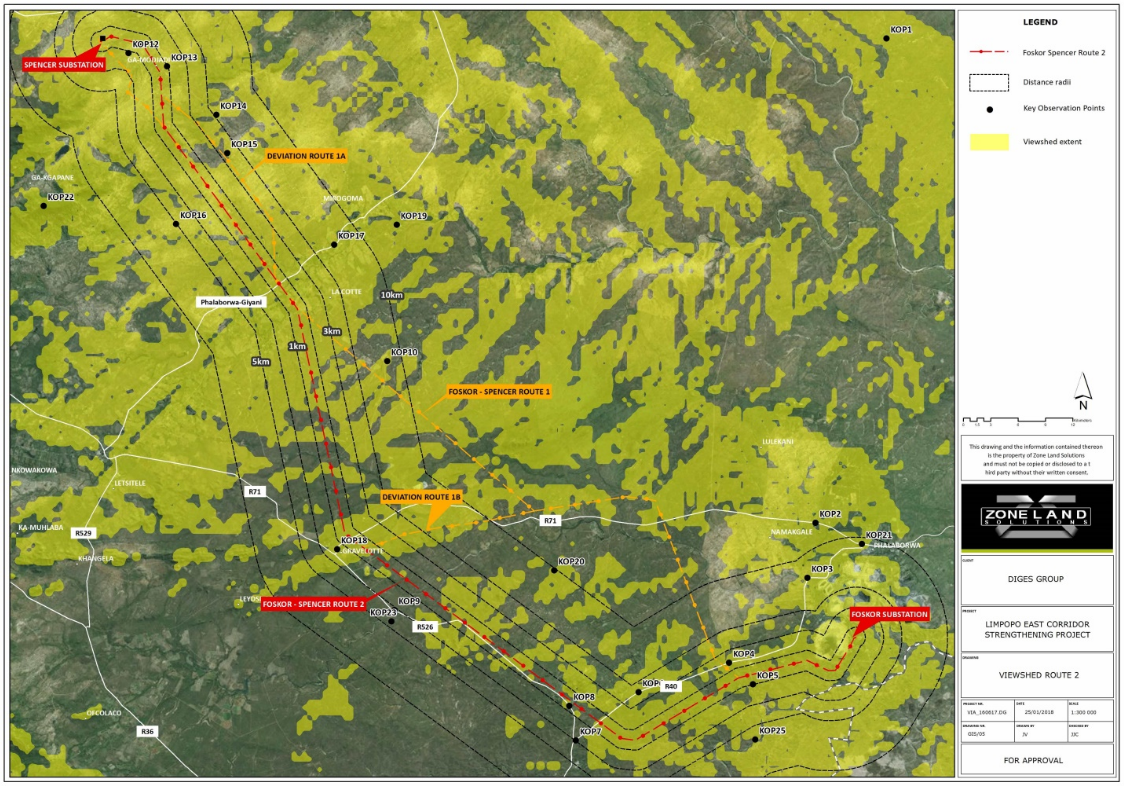

Figure 20: Viewshed generated for Route 2.

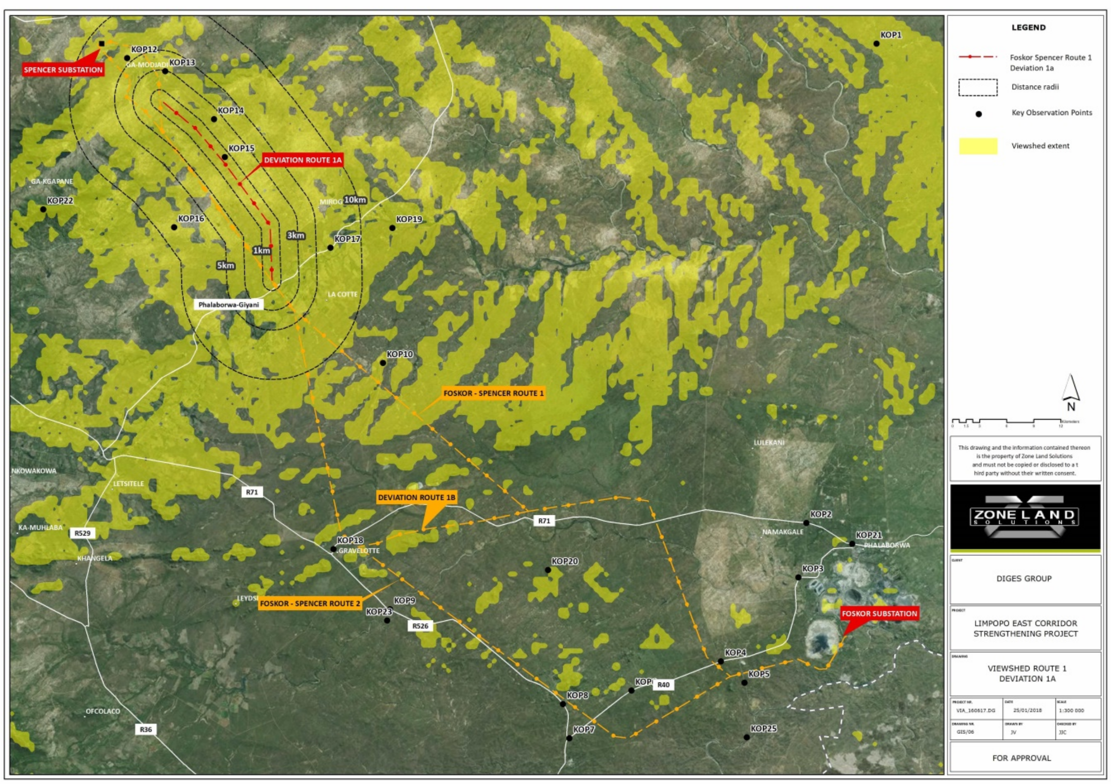

Figure 21: Viewshed generated for Route 1 Deviation 1a.

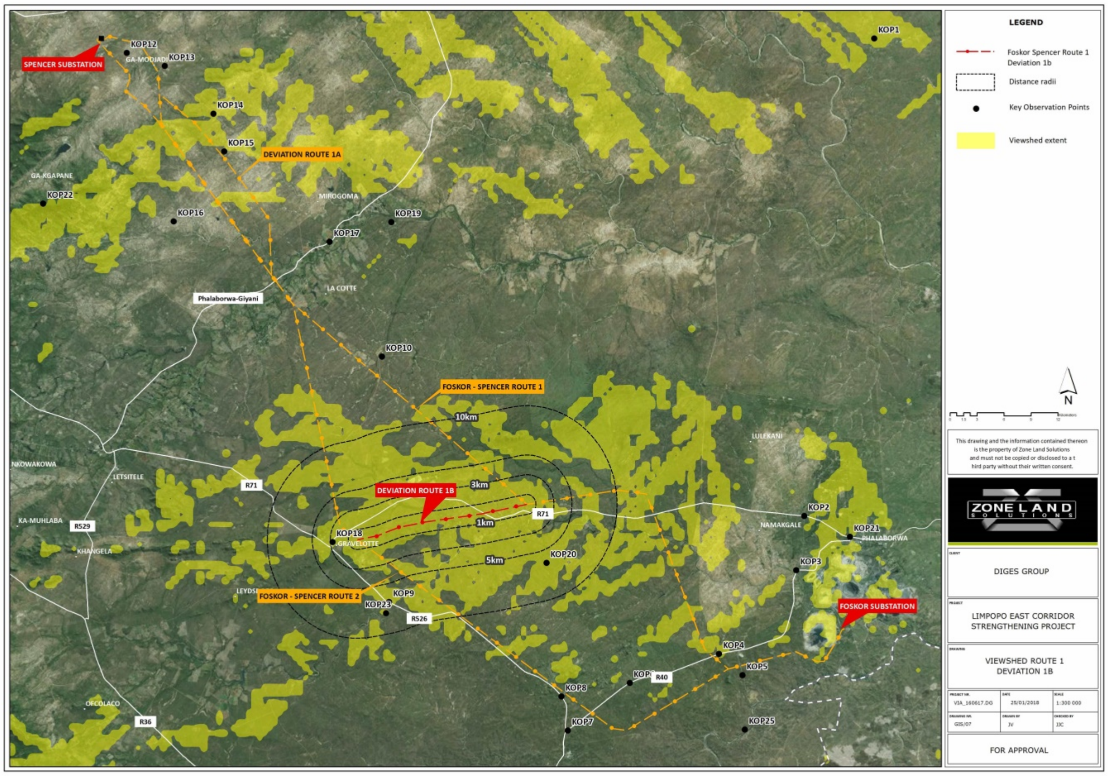

Figure 22: Viewshed generated for Route 1 Deviation 1b.

8.1 KEY ASPECTS OF THE VIEWSHED

The distance between the observer and the observed activity is an important determinant of the magnitude of the visual impact. This is due to the visual impact of an activity diminishing as the distance between the viewer and the activity increases. Viewsheds are categorised into three broad categories of significance, namely:

a) Foreground: The foreground is defined as the area within 1km from the observer within which details such as colour, texture, styles, forms and structure can be recognised. Objects in this zone are highly visible unless obscured by other landscape features, existing structures or vegetation.

b) Middle ground: The middle ground is the area between 1km and 3km from the observer where the type of detail which is clearly visible in the foreground becomes indistinguishable. Objects in the middle ground can be classified as visible to moderately visible, unless obscured by other elements within the landscape.

c) Background: the background stretches from approximately 3km onwards. Background views are only distinguishable by colour and lines, while structures, textures, styles and forms are often not visible (SRK Consulting, 2007).

9 VISUAL IMPACT ASSESSMENT

9.1 SELECTION OF OBSERVATION POINTS

A number of Key Observation Points (KOPs) were provisionally identified and selected within the defined viewshed for the visual assessment in accordance with the selection criteria stipulated in the Visual Guidelines. These KOPs correspond with movement routes, residential areas and general populated areas, commercial and institutional areas in the region. As a result of the similarity in the assessment results of the KOPs, the description and assessment of only a selected few KOPs are included in Annexure 2.

KOPs selected for the assessment are generally located at the intersection between the zone of visual influence and the defined view corridors (refer to Section 5.1 above). The view corridors are those areas that are accessible to the general observer.

9.2 ASSESSMENT PROCESS

The identified *observation points* were categorised and assessed as summarised in the table below.

Table 4: VIA methodology and process.

KEY	DESCRIPTION
NUMBER	Each observation point was allocated a reference number.
CO-ORDINATES	The co-ordinates of each of the observation points are provided.
ALTITUDE	The altitude of the observation point was provided in meters above sea level.
DESCRIPTION	A brief description where the observation point is located is provided.
TYPE	Each observation point is categorised according to its location and significance rating. These criteria include the following: • Tourist-related corridors, including linear geographical areas visible to users of a route or vantage points. • Residential areas. • Institutional areas. • Commercial areas. • Recreational area.
PHOTOGRAPH	A photograph was taken from each observation point in the direction of the project site to verify the digitally-generated viewshed.
PROPERTY LOCATION	The location of the property was described a *foreground*, *middle ground* or

	background.
PROXIMITY	The distance between the observation point and the project site was provided in kilometres.
VISUAL SENSITIVITY OF RECEPTORS	The visual impact considered acceptable is dependent on the type of receptors. A *high* (i.e. residential areas, nature reserves and scenic routes or trails), *moderate* (e.g. sporting or recreational areas, or places or work), or *low* sensitivity (e.g. industrial, mining or degraded areas) was awarded to each observation point.
VISUAL EXPOSURE	Exposure or visual impact tends to diminish exponentially with distance. A *high* (dominant or clearly visible), *moderate* (recognisable to the viewer) or *low* exposure (not particularly visible to the viewer) rating was allocated to each observation point.
VISUAL ABSORPTION CAPACITY (VAC)	The potential of the landscape to conceal the proposed activity was assessed. A rating of *high* (effective screening by topography and vegetation), *moderate* (partial screening) and *low* (little screening) was allocated to each observation point.
VISUAL INTRUSION	The potential of the activity to fit into the surrounding environment was determined. The visual intrusion relates to the context of the proposed activity while maintaining the integrity of the landscape. A rating of *high* (noticeable change), *moderate* (partially fits into the surroundings) or *low* (blends in well with the surroundings) was allocated.
DURATION	With regard to roads, the distance (in kilometres) and duration (in seconds) for which the property will be visible to the road user, were calculated for each observation point.

9.3 SUMMARY OF ASSESSMENT

Based on the viewshed analysis and the preceding sections, the envisaged visual impact of the proposed activity was assessed in accordance with the criteria for visual impact assessments (DEA&DP, 2005). The findings of the assessment from selected observation points are included under Annexure 2.

9.3.1 Assessment Criteria

It is stated in the DEA&DP's Visual Guidelines that to aid decision-making, the assessment and reporting of possible impacts requires consistency in the interpretation of impact assessment criteria. The criteria that specifically relate to VIAs were therefore described in Table 3 and Annexure 2.

The potential visual impact of the proposed activity was assessed against these criteria, with reference to the summary of criteria in Box 12 of the Visual Guidelines. Table 5 provides a description of the summary criteria used to determine the impact significance.

Table 5: Summary of criteria used to assess the potential impacts of the proposed activity.

CRITERIA	CATEGORY	DESCRIPTION	RATING
Nature of Impact	N.A.	The nature of the impact refers to the visual effect the proposed activity would have on the receiving environment. The nature of the development proposals are described in the preceding sections.	
Extent of Impact	Footprint	Impact extends only as far as the activity.	1
	Site	Impact limited to the whole or portion of site.	2
	Regional	Impact affecting neighbouring properties, towns, routes.	3
	National	Impact affecting large parts of the country.	4
	International	Impact affecting areas across international boundaries.	5
Duration of Impact	Short term	Impact shorter than construction period.	1
	Short to Medium	Impact relevant through to end of construction.	2
	Medium Term	Impact up to end of development phase.	3
	Long Term	Impact continues for entire operational lifetime.	4
	Permanent	Impact to occur irrespective of migratory measures.	5
Magnitude of Impact	Minor	Visual and scenic resources not affected.	2
	Low	Will not result in impact on processes.	4
	Medium	Affected to a limited scale.	6
	High	Scenic and cultural resources are significantly affected.	8
	Very high	Result in complete destruction of patterns.	10
Probability of Impact	Improbable	Impact will probably not happen.	1
	Possible	Very low possibility of impact occurring.	2
	Likely	Possibility that the impact will occur.	3
	Highly likely	Most likely that impact will occur.	4
	Definitive	Impact will occur regardless of preventative measures.	5
Reversibility of Impact	Reversible	Impact can be reversed after cause or stress is removed or remedial steps have been taken.	90-100%
	Partly reversible	Impact can be partly reversed.	6-89%
	Irreversible	The activity will lead to a permanent impact.	0-5%
Resource Loss	No loss	Mitigation steps following the impact will lead to conditions similar prior to impact, e.g. grazing veld.	90-100%
	Partly destroyed	Partial loss or destruction of resource.	1-89%
	Irreplaceable	Conditions prior to impact are permanently lost and mitigation is unlikely to restore previous environmental state.	0%
Significance of Impact	The significance is calculated by combining the criteria in the following formula: **S = (E+D+M)P** S = Significance		

	E = Extent D = Duration M = Magnitude P = Probability		
	Zero	No impact	0
	Low	Where it will not have an influence on the decision.	<30
	Medium	Where it should have an influence on the decision unless it is mitigated.	30-60
	High	Where it would influence the decision regardless of any possible mitigation.	>60
Status of Impact	Positive	Impacts have positive socio-economic and environmental benefits.	
	Negative	There are negative socio-economic and environmental impacts.	

9.4 ASSESSMENT OF IMPACTS

9.4.1 Assessment of Impact on the Landscape Character

Scenic landscapes, historic settlements and the sense of place which underpins their quality are being eroded by inappropriate developments that detract from the unique identify of towns. Causes include inappropriate development, a lack of adequate information and proactive management systems (WCPSDF, 2014).

The sensitivity of the landscape character is an indication of '*the degree to which a particular landscape can accommodate change from a particular development, without detrimental effects on its character*' (GLVIA, 2002). A landscape with a high sensitivity would be one that is greatly valued for its aesthetic attractiveness and/or have ecological, cultural or social importance through which it contributes to the inherent character of the visual resource (Axis Landscape Architect, 2014).

A landscape sensitivity rating was adapted from GOSW (2006) and applied in the classification of the study area into different sensitivity zones.

Table 6: Landscape character sensitivity rating (adapted from GOSW, 2006).

	DESCRIPTION
Low Sensitivity	These landscapes are likely to: • Have distinct landforms; • Have a strong sense of enclosure that reduces visual sensitivity; • Have been affected by man-made features; • Have reduced tranquillity; • Have little inter-visibility with adjacent landscapes; and • Exhibit a low density of sensitive landscape features.
Moderate sensitivity	These landscapes are likely to: • Have moderately prominent landforms that provide some form of enclosure; • Have been affected by some man-made features; • Have little inter-visibility with adjacent landscapes; and • Exhibit a moderate density of sensitive landscape features.
High sensitivity	These landscapes are likely to: • Have poorly defined landforms; • Be open or exposed with a remote character and an absence of man-made features; • Be highly visible from adjacent landscapes; and • Exhibit a high density of sensitive landscape features.

Having regard for the Mopani region, it is argued that the sense of place of the area is largely intact. As a result, the sense of place of the area is commonly associated with natural resources, which has strong linkages to the tourism sector, and subsistence agriculture. The landscape character of the area is therefore considered to be **moderate to high sensitivity**. Due to the extensive nature of the project, it is also contended that defined areas are of low sensitivity.

The table below attempts to summarise the significance of the activities in relation to the landscape character.

Table 7: Impact table summarising the significance of visual impact on the landscape character.

NATURE:	Potential visual impact on the landscape character and sense of place.			
	Without Mitigation	**Score**	**With Mitigation**	**Score**
EXTENT	Regional	**3**	Local	**2**
DURATION	Long term	**4**	Long term	**4**

MAGNITUDE	Medium	**6**	Medium	**6**
PROBABILITY	Likely	**3**	Possible	**2**
SIGNIFICANCE	Medium	**39**	Low	**24**
STATUS	Negative		Negative	
IRREPLACEABLE LOSS OF RESOURCE?	No		No	
CAN IMPACTS BE MITIGATED?	Partially			
CUMULATIVE IMPACTS:	It is expected that the cumulative effect of the proposed activity would be indirect/secondary as the impact would be experienced over time. The cumulative effect would also be synergistic (e.g. incremental development resulting in a loss of character of the area). In areas where the powerline will run parallel to existing powerline, the cumulative impact is expected to be additive (e.g. the sum of all the effects).			
RESIDUAL IMPACTS:	It is argued that the status quo could be regained if the activity would be removed altogether.			

9.4.2 Assessment of Impact on Tourist Value of the Area

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 activity. The visual receptors are grouped according to their location and significance. Differentiation is made between:

a) Tourist-related and areas of cultural significance.

b) Motorists along roads.

c) Residential areas and farmstead.

d) Recreational areas.

Tourists are regarded as visual receptors of exceptional high sensitivity. Their attention is focused towards the landscape which they essentially utilise for enjoyment purposes and appreciation of the quality of the landscape.

Residents of the affected environment are classified as visual receptors of high sensitivity owing to their sustained visual exposure to the proposed development as well as their attentive interest towards their living environment.

Motorists are generally classified as visual receptors of low sensitivity due to their momentary view and experience of the proposed development. As a motorist's speed increases, the sharpness of lateral vision declines and the motorist tends to focus on the line of travel (USDOT, 1981). This adds weight to the assumption that under normal conditions, motorists will show low levels of sensitivity as their attention is focused on the road and their exposure to roadside objects is brief.

Motorists on scenic routes will present a higher sensitivity. Their reason for being in the landscape is similar to that of the tourists and they will therefore be categorised as part of the tourist viewer group (Axis Landscape Architects, 2014).

Table 8: Impact table summarising the significance of visual impact on the tourism value of the area.

NATURE:	**Potential visual impact on the tourism value of the area.**			
	Without Mitigation	**Score**	**With Mitigation**	**Score**
EXTENT	Regional	**3**	Local	**2**
DURATION	Long term	**4**	Long term	**4**
MAGNITUDE	Medium	**6**	Low	**4**
PROBABILITY	Likely	**3**	Possible	**2**
SIGNIFICANCE	Medium	**39**	Low	**20**
STATUS	Negative		Negative	
IRREPLACEABLE LOSS OF RESOURCE?	No		No	
CAN IMPACTS BE MITIGATED?	Partially			
CUMULATIVE IMPACTS:	It is expected that the cumulative effect of the proposed activity would be indirect/secondary as the impact would be experienced over time. The cumulative effect would also be synergistic (e.g. incremental development resulting in a loss of character of the area). In areas where the powerline will run parallel to existing powerline, the cumulative impact is expected to be additive (e.g. the sum of all the effects).			
RESIDUAL IMPACTS:	It is argued that the status quo could be regained if the activity would be removed altogether. Provided that the site is rehabilitated to its current state, the visual impact will also be removed.			

It is submitted that many other receptors are located in the immediate vicinity of the route of the proposed powerline. In addition to the users of scenic routes, these sensitive receptors represent tourist-related areas in the various game lodges or nature reserves. As illustrated by the results of the assessment included under Annexure 2, only those receptors in the immediate vicinity of the proposed powerline will be visually impacted upon by the new infrastructure. Receptors situated further away tend not to be impacted by the proposed activity due to the visual absorption capacity of the landscape within which the project site is located.

9.4.3 Assessment of Reflectivity and Glare of Structures

Glare is an adverse consequence of using large smooth and polished surfaces as a building material. Glare is characterised by alight, often reflected, within the field of vision that is brighter than the surroundings resulting in visual discomfort or impairment. Glare also occurs when the light level of a region is brighter than the level to which the eyes are adapted.

The impact of glare source depends on the nature of the receptor, the size of the source relative to the visual field, the position of the source within the visual field and intensity of the source. Glare can pose, at minimum, a nuisance and in other cases can create a safety risk. Areas of particular sensitivity include roads, airports and rail as individuals are guiding vehicles and are required to visually scan their environment without averting their gaze (www.rwdi.com).

It is noted from the information provided that the infrastructure will be more than likely be galvanised and allowed to oxidise over time, thus minimising its reflective capabilities. These should be actively managed to prevent a potential negative visual impact.

Table 9: Impact table summarising the significance of visual impact of reflectivity and glare of structures.

NATURE:	**Potential visual impact of reflectivity and glare of structures.**			
	Without Mitigation	**Score**	**With Mitigation**	**Score**
EXTENT	Regional	**3**	Local	**2**
DURATION	Long term	**4**	Long term	**4**
MAGNITUDE	Medium	**6**	Low	**4**
PROBABILITY	Medium	**3**	Low	**2**
SIGNIFICANCE	Medium	**39**	Low	**20**
STATUS	Negative		Negative	
IRREPLACEABLE LOSS OF RESOURCE?	No		No	
CAN IMPACTS BE MITIGATED?	Yes			
CUMULATIVE IMPACTS:	It is expected that the cumulative effect of the proposed activity would be			

	direct as the effects would occur at the same time and in the same space as the activity. The cumulative effect would also be synergistic (the incremental addition of the substation to the area already improved with large powerlines).
RESIDUAL IMPACTS:	It is argued that the status quo could be regained if the activity would be removed altogether. Provided that the site is rehabilitated to its current state, the visual impact will also be removed.

10 IMPACT STATEMENT

The on-site verification from the selected Key Observation Points and the viewsheds generated from the latter points indicated that the proposed powerline and substation will be clearly visible from most observation points in the foreground of the project. This is primarily due to the undulating landscape and natural bushveld vegetation, which provides a natural high visual absorption capacity and, hence, prevents long-distance views onto the project installation. It is also worth mentioning that the visual impact is not equal along the length of the powerline. The impact of the respective alternatives is more pronounced near tourist facilities, roads and residential areas. Similarly, the impact is less severe in rural areas, industrial complexes and areas where the proposed powerline will be erected in the same route corridor as similar large overhead powerline infrastructure.

To this end, the results of the viewshed analysis from defined Key Observation Points, together with photographs indicating the actual view has been included under Annexure 2.

The results of the Visual Impact Assessment for the proposed Limpopo East Corridor Strengthening Project consequently found that the overall visual impact of the route alternatives is summarised as being of a **medium to high negative significance** in the vicinity of sensitive receptors and a **low negative significance** in the vicinity of less sensitive receptors.

a) The proposed powerline will, in parts, add to the existing infrastructure in the area which might have an additive cumulative effect. Similarly, the additive cumulative impact will still be less than a new impact on virgin soil.

b) Although the proposed powerline will be developed on a relatively flat (undulating) terrain, the height of the structures might result in a potential impact on the skyline.

c) The proposed powerline will traverse landscapes of high scenic and conservation value. The powerline will, however, in places be located relatively far from the scenic routes and not have a direct impact on all sensitive receptors.

d) All forward planning documents reference the importance of services infrastructure to supply in the needs of the greater community. The documents also do not specifically note that such installations could not be considered in the area.

It is therefore concluded that the sense of place, and most other expected impacts of the proposed activity, will not alter to such an extent where users might experience the visual landscape in a less appealing or less positive light.

10.1 RECOMMENDATIONS AND PROPOSED MITIGATION MEASURES

The following mitigation measures should be implemented:

a) Concentrate powerline in or near existing corridors to prevent proliferation of the natural landscape.
b) Keep disturbed areas to a minimum.
c) No clearing of land to take place outside the demarcated footprints.
d) The contractor should maintain good housekeeping on site to avoid litter and minimise waste.
e) Erosion risks should be assessed and minimised.
f) The steel components should not be painted but be galvanised and allowed to oxidise naturally over time. The grey colour produced in this process will help to reduce the visual impact.
g) New road construction must be kept to a minimum. Where new roads are required, they should be two-track gravel roads, maintained to prevent dust plumes and erosion. Utilise existing roads and tracks to the extent possible.
h) Those parts of the substation that require the protection of paint should be painted in colours chosen from a palette that is matched to the natural colours found in the surrounding landscape.
i) Create stormwater channels alongside access roads and divert stormwater in the natural veld at regular intervals along the road.
j) All contractors to adhere to a construction phase Environmental Management Plan.

11 ENVIRONMENTAL MANAGEMENT PROGRAMME

The management plan tables aim to summarise the key findings of the visual impact report and to suggest possible management actions in order to mitigate the potential visual impacts.

Table 10: Environmental Management Programme – Construction Phase

OBJECTIVE:	**Mitigate the potential visual impact associated with the construction phase.**	
Project component/s	Construction site	
Potential Impact	Visual impact of general construction activities and associated impacts.	
Activity/risk source	Potential impact on sensitive receptors within the foreground.	
Mitigation: Target/Objective	Minimal visual intrusion by construction activities and general acceptance and compliance with Environmental Specifications.	
Mitigation: Action/control	**Responsibility**	**Timeframe**
An Environmental Control Officer (ECO) must be appointed to oversee the construction process and ensure compliance with conditions of approval.	Eskom	Pre-construction
Demarcate sensitive areas and no-go areas with danger tape to prevent disturbance during construction.	Eskom / contractor	Pre-construction
Plan construction times in such a manner to have the least impact on surrounding properties.	Eskom / contractor	Pre-construction
Keep disturbed areas to a minimum.	Eskom / contractor	Throughout construction
Identify suitable areas within the construction camp for fuel storage, temporary workshops, eating areas, ablution facilities and sashing areas.	Eskom / contractor	Throughout construction
Institute a solid waste management programme to minimise waste generation on the construction site and recycle where possible.	Eskom / contractor	Throughout construction
Reduce and control dust through the use of approved dust suspension techniques as and when required.	Eskom / contractor	Throughout construction
Construction to occur only during daytime. Should the ECO authorize night work, low flux and frequency lighting shall be used.	Eskom / contractor	Throughout construction
Rehabilitate all disturbed areas in accordance with the EMPr.	Eskom / contractor	Throughout construction
Performance Indicator	Construction site is confined to the demarcated areas identified on a Development Plan. No transgression of the Environmental Specifications visible and natural processes occurring freely outside boundaries of the construction site.	
Monitoring	Monitoring to be undertaken by an appointed Site Engineer who will enforce compliance with the Environmental Specifications.	

Table 11: Environmental Management Programme – Operational Phase

<table>
<tr><th>OBJECTIVE:</th><th colspan="2">Mitigate the possible visual impact associated with the operational phase.</th></tr>
<tr><td>Project component/s</td><td colspan="2">MTS and overhead powerlines</td></tr>
<tr><td>Potential Impact</td><td colspan="2">Potential visual intrusion in the area and damage to the natural environment.</td></tr>
<tr><td>Activity/risk source</td><td colspan="2">Potential impact on sensitive receptors within the foreground.</td></tr>
<tr><td>Mitigation: Target/Objective</td><td colspan="2">An activity that results in the least visual impact on all receptors.</td></tr>
<tr><td>Mitigation: Action/control</td><td>Responsibility</td><td>Timeframe</td></tr>
<tr><td>Maintain the general appearance of the installation as a whole.</td><td>Eskom / contractor</td><td>Throughout operational phase</td></tr>
<tr><td>Monitor land surface in the vicinity of the substation, access roads and pylons to prevent loss of vegetation and first signs of desertification.</td><td>Eskom / contractor</td><td>Throughout operational phase</td></tr>
<tr><td>Maintain access roads to prevent scouring and erosion, especially after rains.</td><td>Eskom / contractor</td><td>Throughout operational phase</td></tr>
<tr><td>Performance Indicator</td><td colspan="2">Well maintained activity that has little or no impact on the environment. All actions to be measured against the Operational Phase Environmental Management Plan.</td></tr>
<tr><td>Monitoring</td><td colspan="2">ECO to undertake monitoring functions for 1 year after the construction has been completed to ensure compliance and effectiveness of mitigation measures. Management thereafter to be undertaken by the responsible entity.</td></tr>
</table>

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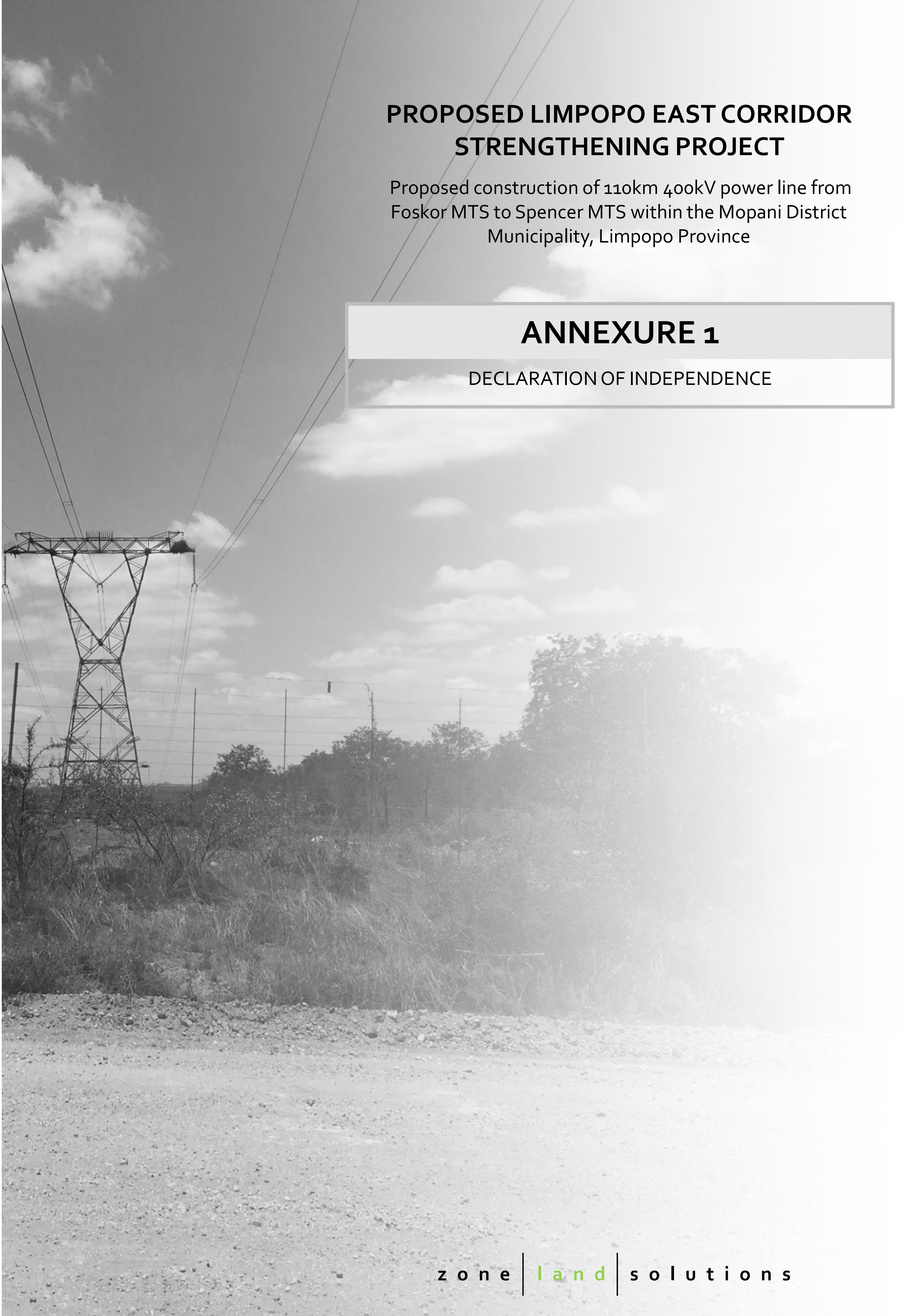
ZONE LAND SOLUTIONS
7 FEBRUARY 2018



PROPOSED LIMPOPO EAST CORRIDOR STRENGTHENING PROJECT

Proposed construction of 110km 400kV power line from Foskor MTS to Spencer MTS within the Mopani District Municipality, Limpopo Province

ANNEXURE 1

DECLARATION OF INDEPENDENCE

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Declaration of Independence

I, Jacques Louis Volschenk, representing Zone Land Solutions (Pty) Ltd., hereby declares that I am an independent consultant appointed to provide specialist input for a VIA assessment. I confirm that I have no personal financial interest in the project other than remuneration for the VIA study itself, and neither I nor Zone Land Solutions (Pty) Ltd. will benefit in any other way from the outcomes of this VIA study. I further declare that opinions expressed in this report have been formulated in an objective manner without interference from any third party.

Jacques Volschenk

Print Name

Signature

05 February 2018

Date

CURRICULUM VITAE – Jacques Louis Volschenk

Profession : Town and Regional Planner (SACPLAN registration No. A/208/2010)
Specialisation : Town Planning-related applications, Project Management, Visual Impact Assessments
Work experience : 1 year in-service training at the City of Cape Town (1999)
10 years' experience in a leading integrated Town and Regional Planning Firm
Zone Land Solutions – Specialist Visual Impact Assessment

SKILLS BASE AND CORE COMPETENCIES

During my tenure as Professional Town Planner, I have been exposed to a wide range of projects within the realm of the planning profession. This enabled me to develop certain interests for which specific skills and tools have been acquired throughout the years.
To this extent, I find the field of development planning particularly interesting and challenging. The manner in which I have experienced development planning, require of a planner to perform a multitude of functions in a development process, key of which is a coordinating and managing role. The skills set needed to be successful in the profession also enabled me to expand my capabilities and into the realm of GIS-based visual assessments. The other key skills that I have acquired to excel in this field are:

☐ Development coordination and facilitation,
☐ Project management,
☐ Preparation of land development plans and report writing,
☐ Integrated environmental management, and
☐ Planning research.

TERTIARY EDUCATION

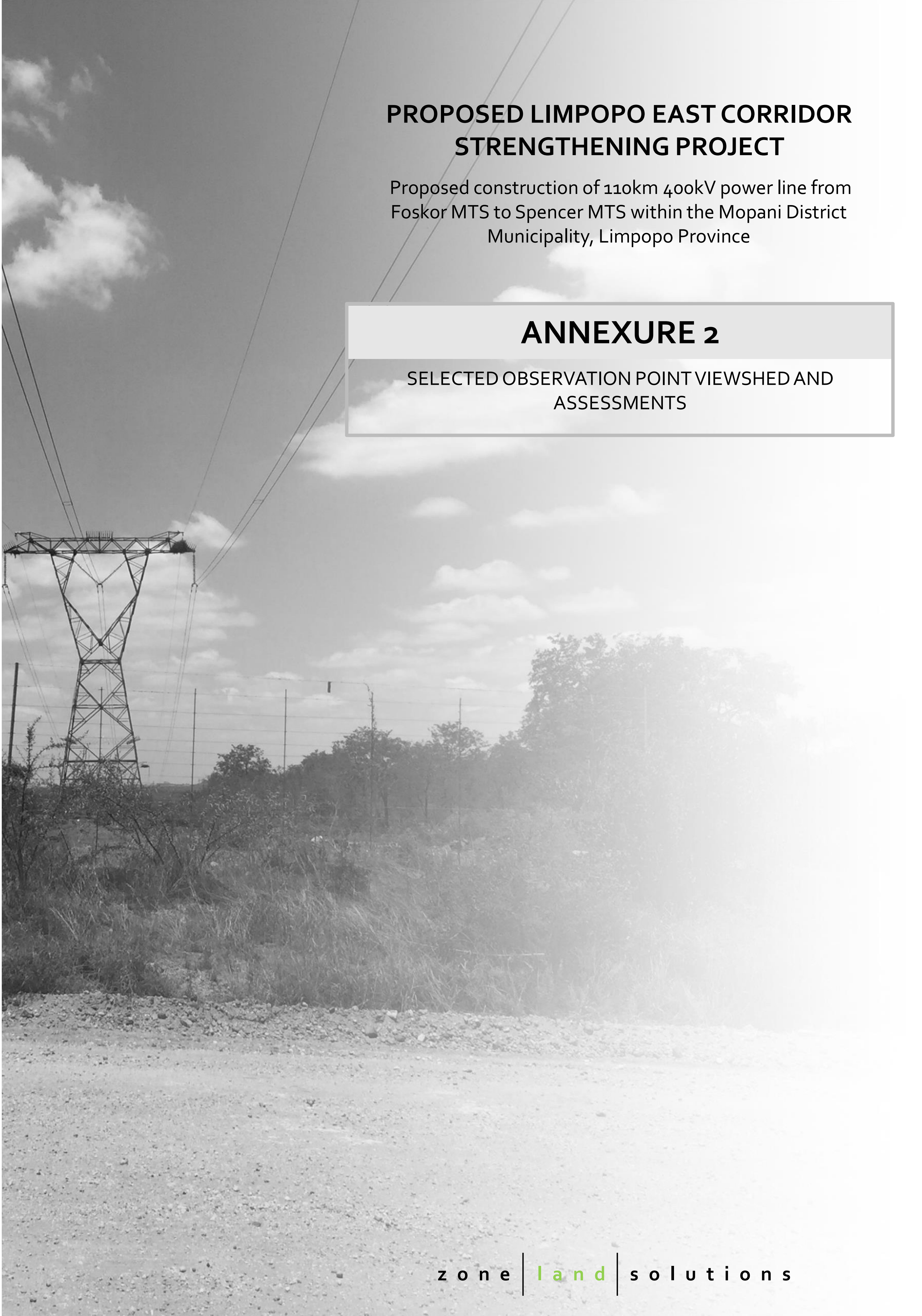
☐ Cape Peninsula University of Technology (previously Cape Technikon), Cape Town. ND: Town and Regional Planning. 2000
☐ Cape Peninsula University of Technology, Cape Town. BTech: Town and Regional Planning. 2001

EMPLOYMENT HISTORY

Refer above.

SELECTED RECENT RELEVANT PROJECT EXPERIENCE

- **Ceder Lake Resort and Conference Centre**
- **Eskom Juno - Gromis Power line**
- **Eskom Agulhas MTS**
- **Devonvale Golf and Wine Estate**
- **Hartenbosch Lifestyle Village and Garden Walk Precinct**
- **Linksfield- Visual Impact Assessment for mixed use township encompassing Residential, Commercial, Light Industrial, Educational, Community, Retail, Offices, Showrooms and Mixed Uses on the site**
- **SAMSUNG Head Office Building -Visual Rendering and Impact Assessment for City of Cape Town**
- **Ngululu Resources Coal Mine – Visual Impact Assessment**
- **Koudelager Colliery – Keaton Energy**
- **Ukhahlamba World Heritage Site – Lodge Development in Kwazulu-Natal**
- **Springbok / Klipdam photovoltaic solar energy facility, Northern Cape**
- **Machadodorp photovoltaic solar energy facility**
- **Venetia PV Plant Phase 1**



PROPOSED LIMPOPO EAST CORRIDOR STRENGTHENING PROJECT

Proposed construction of 110km 400kV power line from Foskor MTS to Spencer MTS within the Mopani District Municipality, Limpopo Province

ANNEXURE 2

SELECTED OBSERVATION POINT VIEWSHED AND ASSESSMENTS

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1 SELECTED OBSERVATION POINT ASSESSMENTS

The selected *observation points* were categorized and assessed in terms of the following assessment criteria.

KEY	DESCRIPTION
NUMBER	Each observation point was allocated a reference number.
CO-ORDINATES	The co-ordinates of each of the observation points are provided.
ALTITUDE	The altitude of the observation point was provided in meters above sea level.
DESCRIPTION	A brief description where the observation point is located is provided.
TYPE	Each observation point is categorized according to its location and significance rating. These criteria include the following: a) Tourist-related areas. b) Corridors, including linear geographical areas visible to users of a route or vantage points. c) Residential Areas/Farmstead. d) Areas of cultural significance. e) Recreational areas.
PHOTOGRAPH	A photograph was taken from each observation point in the direction of the project site to verify the digitally generated view-shed.
PROPERTY LOCATION	The location of the property was described as *foreground*, *middle ground* or *background*.
PROXIMITY	The distance between the observation point and the project site was provided in kilometres.
VISUAL SENSITIVITY OF RECEPTORS	The visual impact considered acceptable is dependent on the type of receptors. A high (e.g. residential areas, nature reserves and scenic routes or trails), moderate (e.g. sporting or recreational areas, or places of work), or low sensitivity (e.g. industrial, mining or degraded areas) was awarded to each observation point.
VISUAL EXPOSURE	Exposure or visual impact tends to diminish exponentially with distance. A high (dominant or clearly visible), moderate (recognizable to the viewer) or low exposure (not particularly visible to the viewer) rating was allocated to each observation point.
VISUAL ABSORPTION CAPACITY (VAC)	The potential of the landscape to conceal the proposed development was assessed. A rating of high (effective screening by topography and vegetation), moderate (partial screening) and low (little screening) was allocated to each observation point.
VISUAL INTRUSION	The potential of the development to fit in with the surrounding environment was determined. The visual intrusion relates to the context of the proposed development while maintaining the integrity of the landscape. A rating of high (noticeable change), moderate (partially fits into the surroundings) or low (blends in well with the surroundings) was allocated.
DURATION	With regard to roads, the distance (in kilometres) and duration (in seconds) for which the property will be visible to the road user, were calculated for each observation point.

2 KEY OBSERVATION POINT 3

KOP1 is situated at the intersection of Makuhushani Road and the R40 north of the proposed powerline. The figure and photograph below verify that the proposed powerline would not be visible from this point. The proximity of the observation point in relation to the powerline result in the visual impact to be negligible from this point.

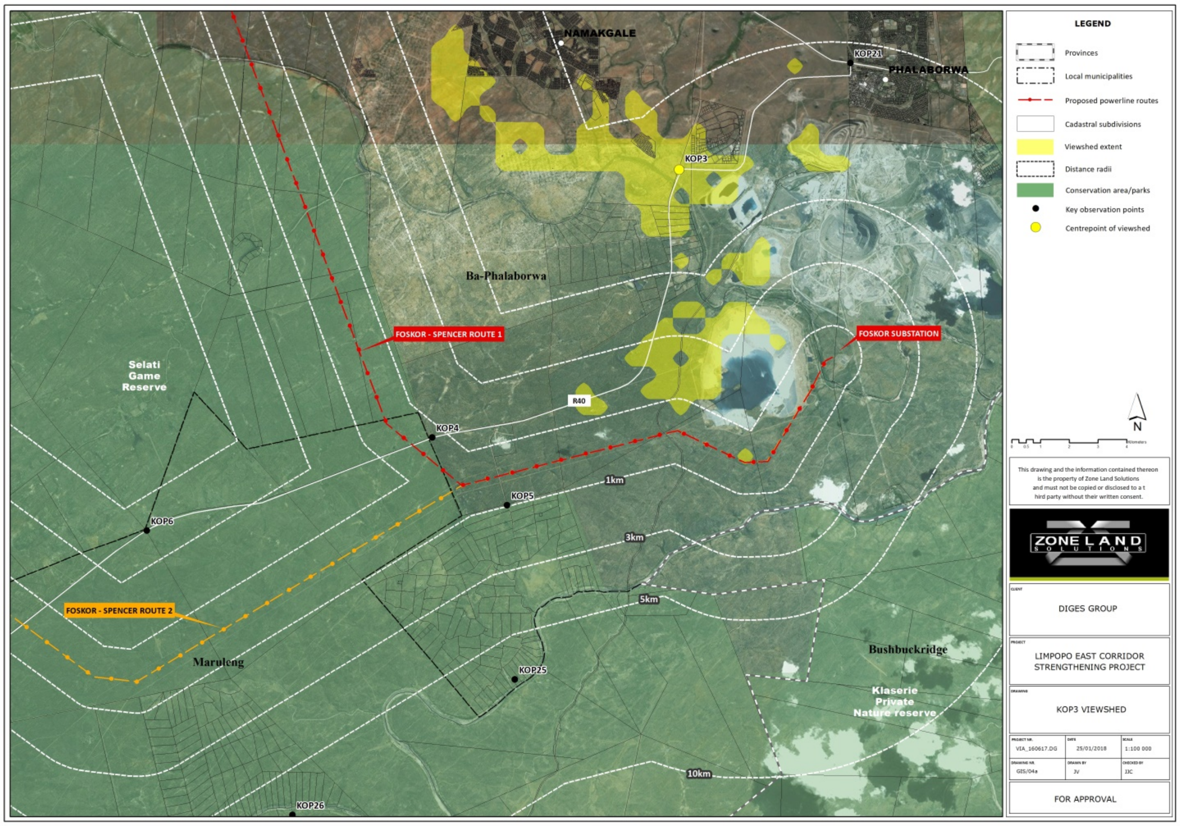


Figure 1: KOP3 Viewshed. Areas shaded yellow is theoretically visible from KOP3.

NUMBER:	KOP3	CO-ORDINATES:	S	E
ALTITUDE:	359m		26°08'28.76"	28°22'06.09"
DESCRIPTION:	KOP3 is located on the intersection of Makuhushani Road and the R40 north of the project site.			
TYPE:	Road	**PHOTO:**	Photograph 1	
PROP. LOCATION:	Background	**PROXIMITY:**	8km	
VISUAL SENSITIVITY:	Low			
VISUAL EXPOSURE:	Low	**VAC:**	High	
VISUAL INTRUSION:	Low	**DURATION:**	N/A	

Photograph 1: Westerly view towards the project site from KOP1 (Source: Zone Land Solutions).

2 KEY OBSERVATION POINT 5

KOP5 is situated at the entrance to the Balule Nature Reserve south of the proposed powerline. The GIS-generated viewshed indicate a very narrow zone of visual influence from this observation point. Despite a slight undulating landscape in the vicinity of the observation point, the figure and photograph below verify that the powerline might be visible from this point. This is primarily due to the proximity of the powerline to the observation point.

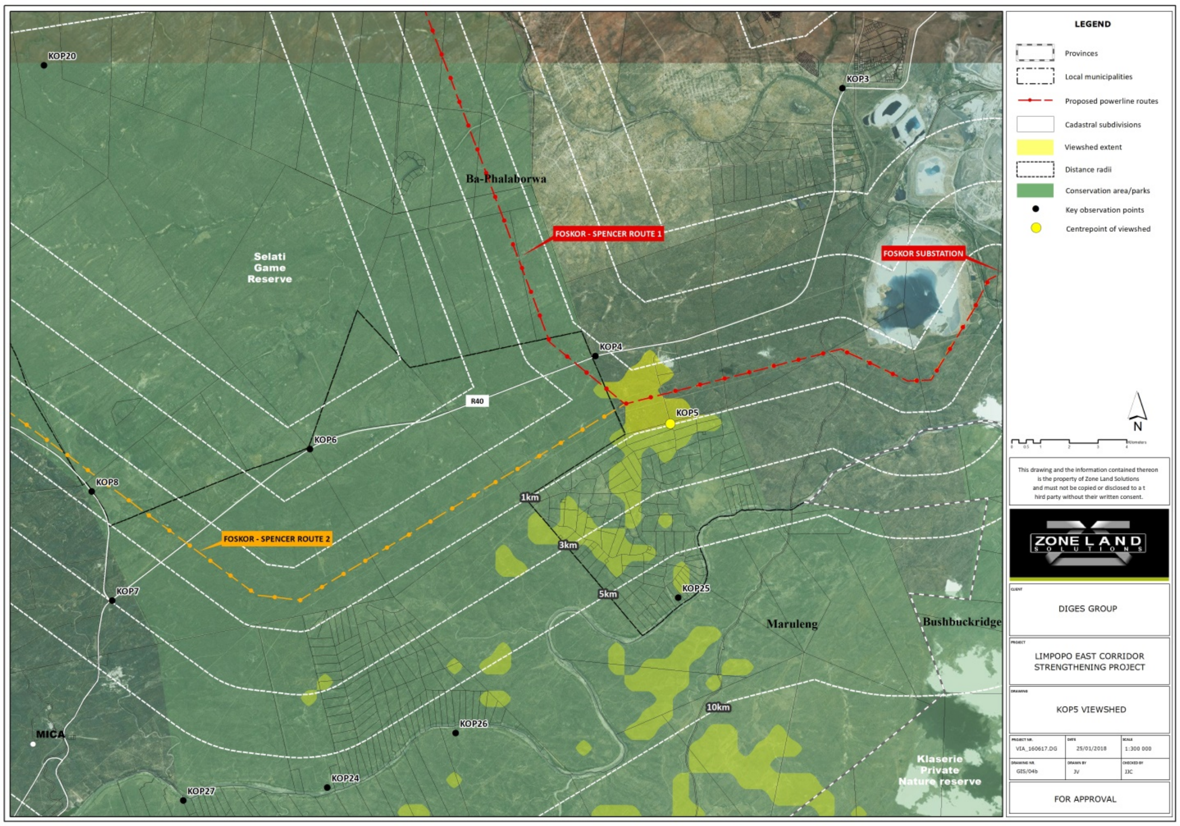


Figure 2: KOP5 Viewshed. Areas shaded yellow is theoretically visible from KOP5.

NUMBER:	KOP5	CO-ORDINATES:	S	E
ALTITUDE:	391m		24° 4.147'	31° 1.291'
DESCRIPTION:	KOP5 is located at the entrance to Balule Nature Reserve south of the project site.			
TYPE:	Tourism	**PHOTO:**	Photograph 2	
PROP. LOCATION:	Foreground	**PROXIMITY:**	1.05km	
VISUAL SENSITIVITY:	High			
VISUAL EXPOSURE:	Medium to high	**VAC:**	Medium to low	
VISUAL INTRUSION:	Medium	**DURATION:**	N/A	

Photograph 2: Northerly view towards the proposed powerline from KOP5 (Source: Zone Land Solutions).

Photograph 3: Photograph of the existing powerline in the vicinity of the Balule Nature Reserve (Source: Zone Land Solutions).

3 KEY OBSERVATION POINT 6

KOP6 is situated along the R40 at the entrance gate of the Maseke Game Reserve, approximately 5km north of the proposed powerline. Figure 3 below indicate the limited viewshed across the landscape from this observation point. The figures and photographs confirm that the topography of the landscape acts as a barrier to any potential views onto the powerline. The expected viewshed from this point is therefore negligible.

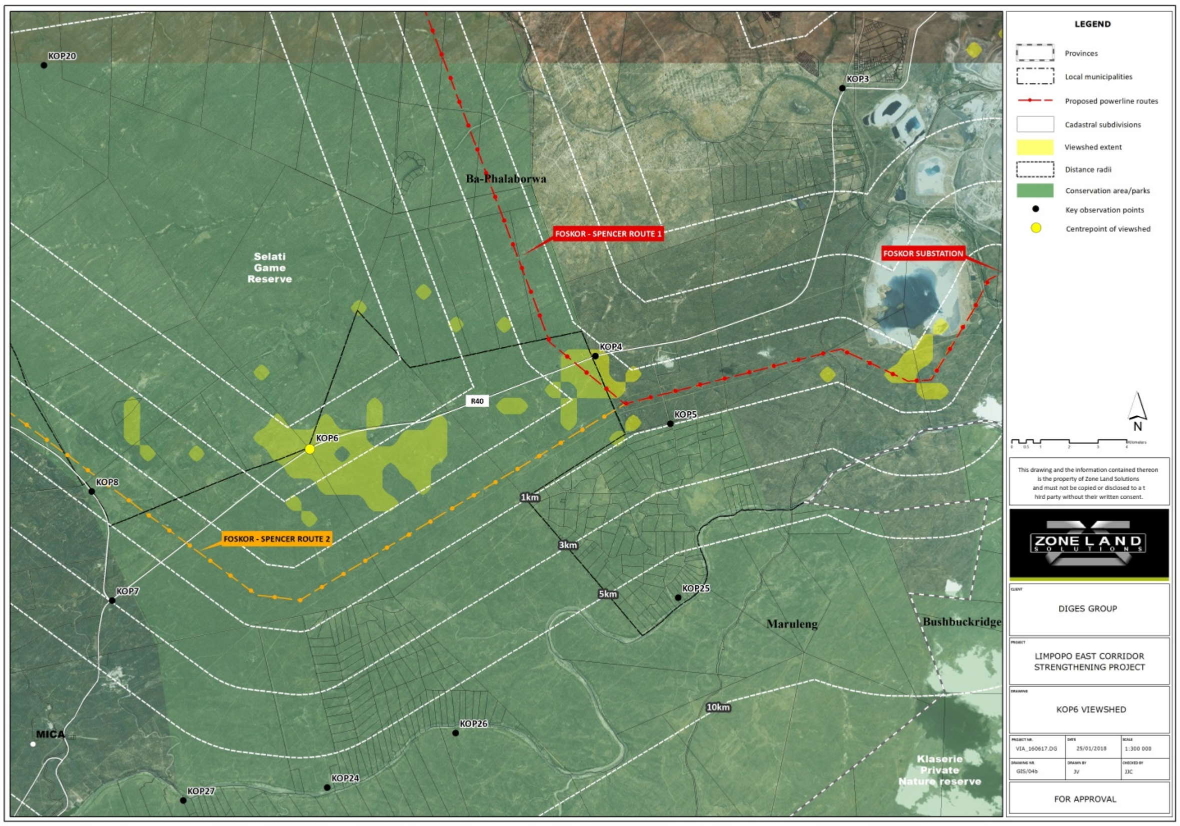


Figure 3: KOP6 Viewshed. Areas shaded yellow is theoretically visible from KOP6.

NUMBER:	KOP6	CO-ORDINATES:	S	E
ALTITUDE:	473m		24° 4.582'	30° 54.536'
DESCRIPTION:	KOP6 is located on the R40 road at the Maseke Game Reserve's Tintshaba Gate.			
TYPE:	Tourism	**PHOTO:**	Photograph 4	
PROP. LOCATION:	Middle ground	**PROXIMITY:**	4.90km	
VISUAL SENSITIVITY:	High			
VISUAL EXPOSURE:	Low	**VAC:**	High	
VISUAL INTRUSION:	Low	**DURATION:**	N/A	

Photograph 4: View towards the proposed powerline from KOP6 (Source: Zone Land Solutions).

4 KEY OBSERVATION POINT 8

KOP8 is situated on the R526 at the Boulders Game Ranch south of the proposed powerline. The GIS-generated viewshed indicates that the viewshed from this point is primarily located in the immediate vicinity of the observation point which isolated pockets in a southern and eastern direction. The photographic evidence supports this view and supports the notion that the visual impact from this point is expected to be high.

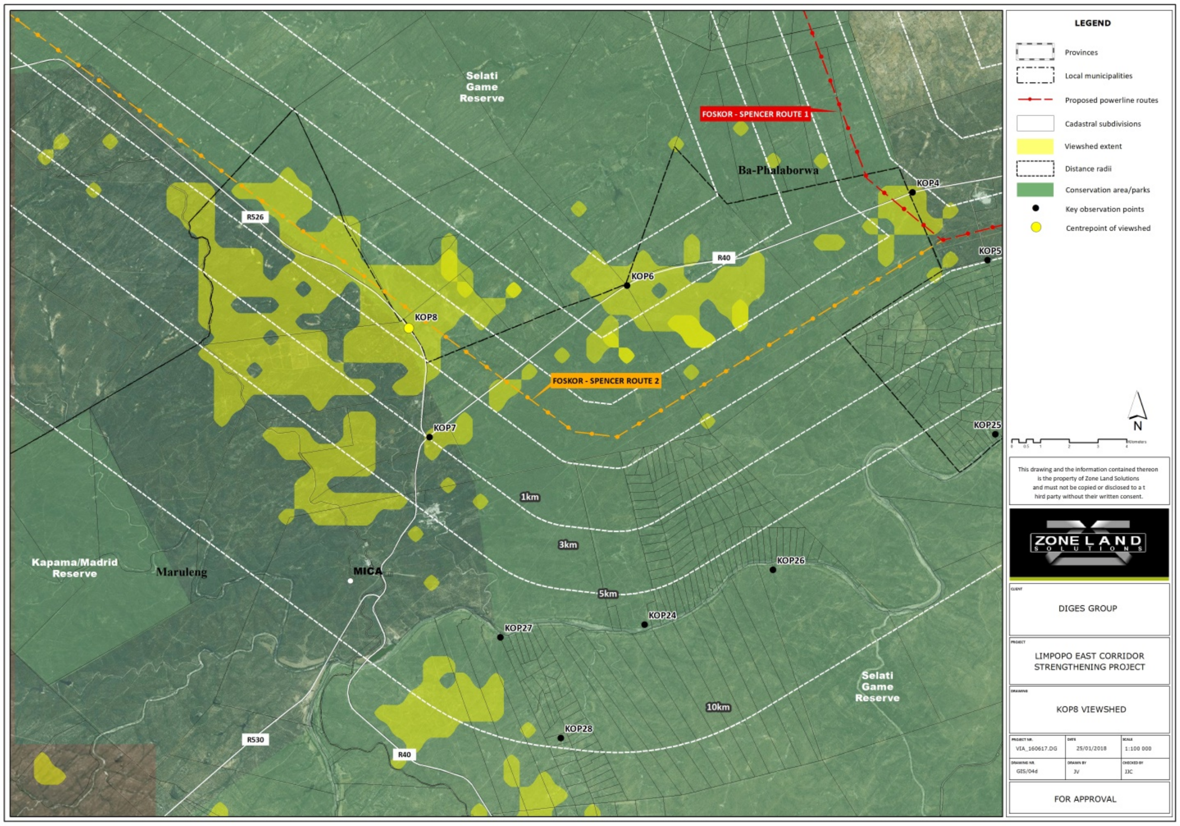


Figure 4: KOP8 Viewshed. Areas shaded yellow is theoretically visible from KOP8.

NUMBER:	KOP8	CO-ORDINATES:	S	E
ALTITUDE:	484m		24° 5.307'	30° 50.454'
DESCRIPTION:	KOP8 is situated on the R526 at the Boulders Game Ranch entrance south of the project.			
TYPE:	Tourism	**PHOTO:**	Photograph 5	
PROP. LOCATION:	Foreground	**PROXIMITY:**	0.5km	
VISUAL SENSITIVITY:	High			
VISUAL EXPOSURE:	Low	**VAC:**	Low	
VISUAL INTRUSION:	High	**DURATION:**	N/A	

Photograph 5: View towards the proposed powerline from KOP8 (Source: Zone Land Solutions).

5 KEY OBSERVATION POINT 13

KOP13 is situated in the Mohokone Village, east of the proposed powerline. The proposed powerline is expected to pass less than 1km from the observation point. With very little visual absorption capacity at this point, it is expected that the visual impact at this point is expected to be high.

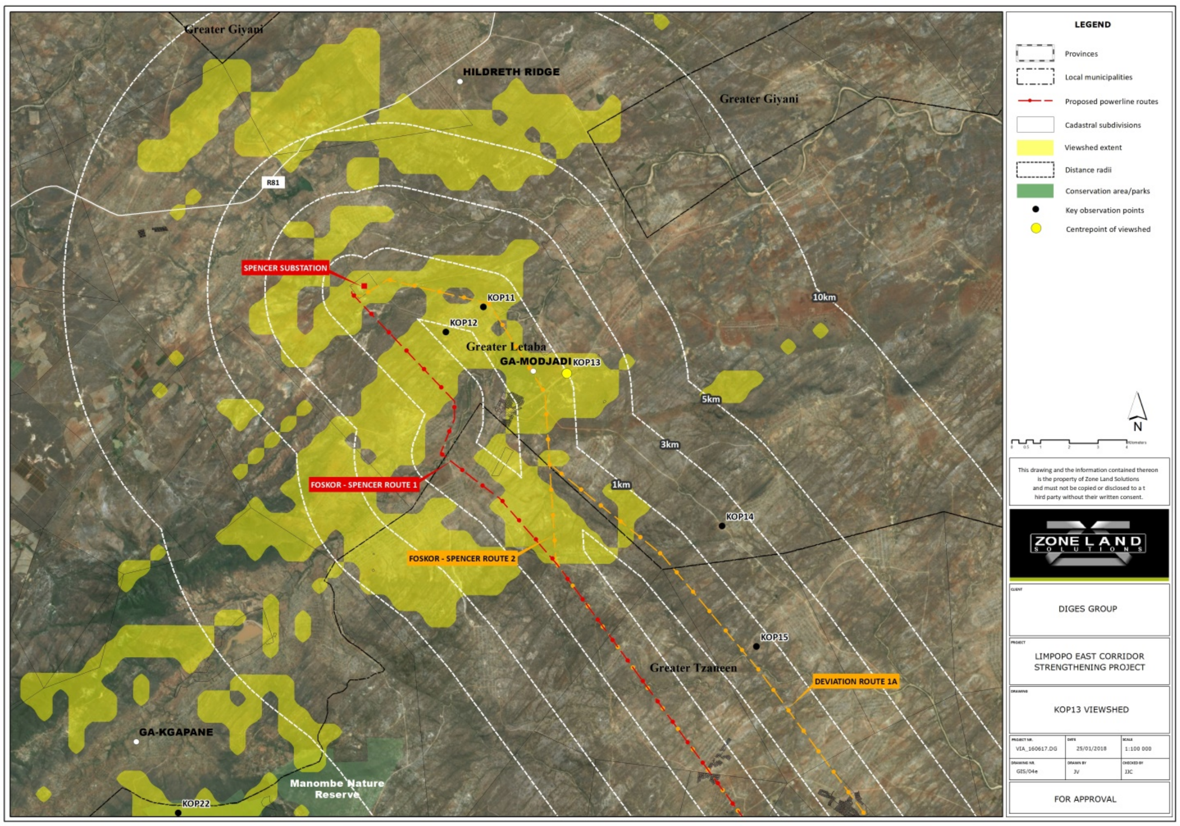


Figure 5: KOP13 Viewshed. Areas shaded yellow is theoretically visible from KOP13.

NUMBER:	KOP13	CO-ORDINATES:	S	E
ALTITUDE:	554m		23° 30.770'	30° 26.700'
DESCRIPTION:	KOP13 is situated at Mohokone Village south of the project.			
TYPE:	Residential	**PHOTO:**	Photograph 6	
PROP. LOCATION:	Foreground	**PROXIMITY:**	0.95km	
VISUAL SENSITIVITY:	High			
VISUAL EXPOSURE:	High	**VAC:**	Low	
VISUAL INTRUSION:	High	**DURATION:**	N/A	

Photograph 6: View from KOP12 towards the proposed powerline (Source: Zone Land Solutions).

6 KEY OBSERVATION POINT 14

KOP14 is located at the Tlhotlhokwe Primary School approximately 2km east of the proposed powerline. The GIS-generated viewshed indicated that the extent of the immediate zone of visual influence stretches as far as the proposed powerline. As there is very little visual absorption capacity in the region en route to the powerline, it is expected that a moderate to low visual impact could be expected from this point.

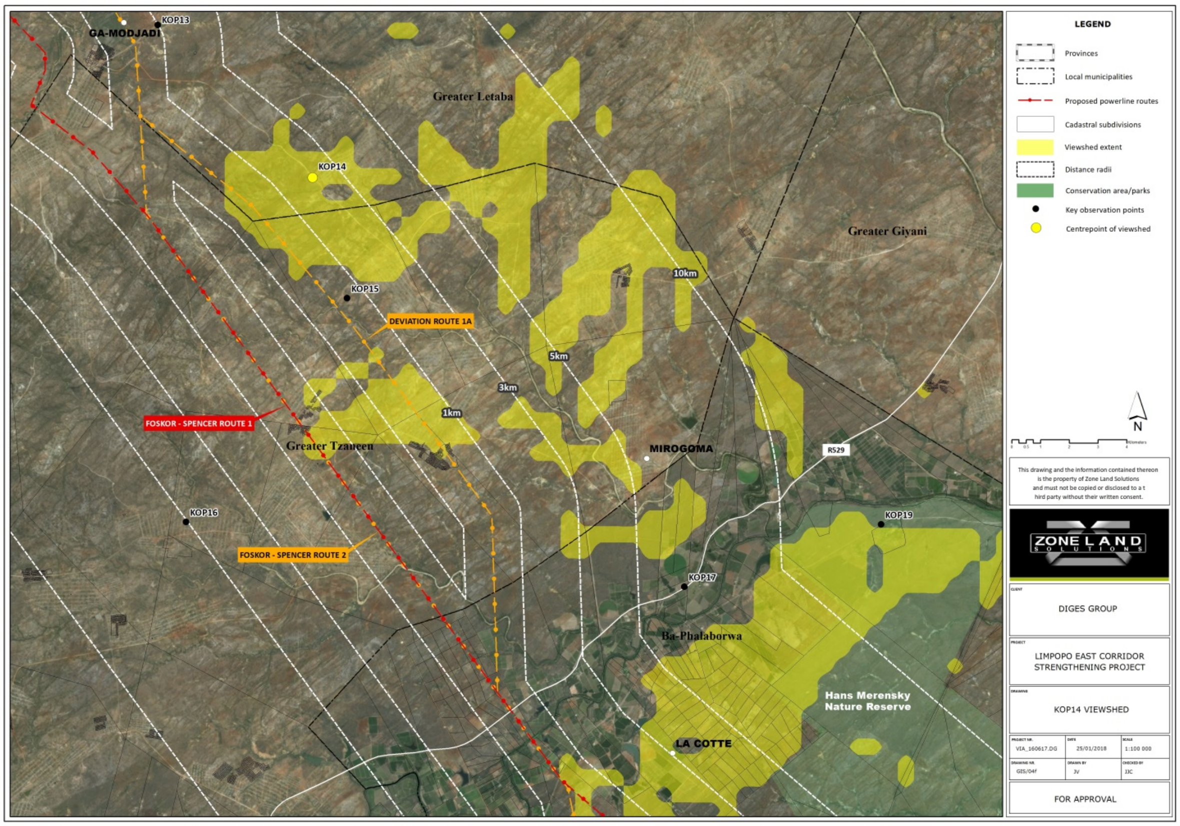


Figure 6: KOP14 Viewshed. Areas shaded yellow is theoretically visible from KOP14.

NUMBER:	KOP14	CO-ORDINATES:	S	E
ALTITUDE:	484m		23° 33.394'	30° 29.606'
DESCRIPTION:	KOP14 is situated at Tlhotlhokwe school east of the project.			
TYPE:	Institutional	PHOTO:	Photograph 7	
PROP. LOCATION:	Middle ground	PROXIMITY:	2.0km	
VISUAL SENSITIVITY:	Medium			
VISUAL EXPOSURE:	Medium to low	VAC:	Medium	
VISUAL INTRUSION:	Low	DURATION:	N/A	

Photograph 7: View from KOP16 towards the proposed powerline in the west (Source: Zone Land Solutions).

7 KEY OBSERVATION POINT 16

KO16 is located in the village of Nwamungololo approximately 5km west of the proposed powerline. The figure and photograph below illustrate that due to the distance from the proposed powerline and the landscape en route to the site, the visual impact is expected to be low.

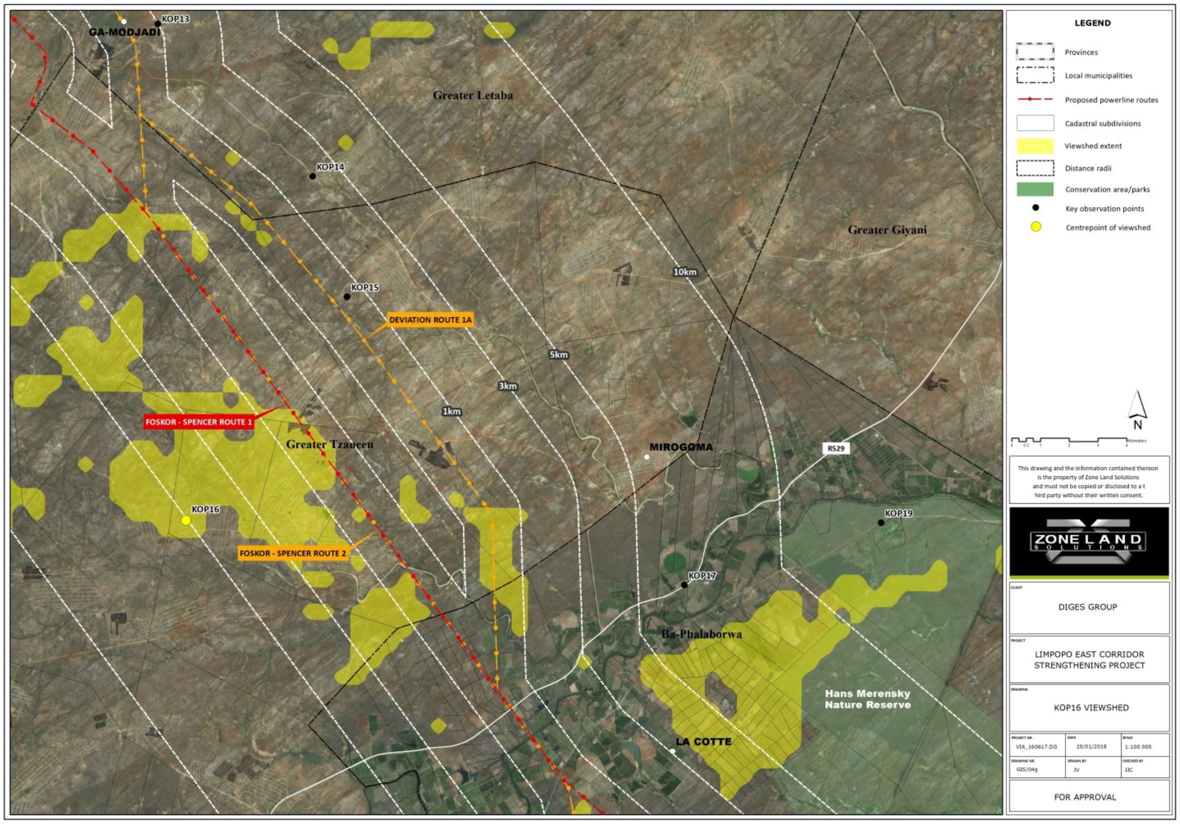


Figure 7: KOP16 Viewshed. Areas shaded yellow is theoretically visible from KOP16.

NUMBER:	KOP16	CO-ORDINATES:	S	E
ALTITUDE:	526m		23° 39.307'	30° 27.235'
DESCRIPTION:	KOP16 is situated next to the N'wamungololo school in Nwamungololo village.			
TYPE:	Institutional	**PHOTO:**	Photograph 8	
PROP. LOCATION:	Background	**PROXIMITY:**	4.7km	
VISUAL SENSITIVITY:	Medium			
VISUAL EXPOSURE:	Low	**VAC:**	High	
VISUAL INTRUSION:	Low	**DURATION:**	N/A	

Photograph 8: View from KOP16 towards the proposed powerline in the west (Source: Zone Land Solutions).

8 KEY OBSERVATION POINT 18

KOP18 is located in the village of Gravelotte, west of the proposed powerline. The observation point is located slightly more than 1km from the proposed powerline. However, as illustrated by the photograph below, the vegetation growth and subsequently the visual absorption capacity is of such a nature that the proposed powerline would not be visible from this observation point. As a result, a low to negligible visual impact could be expected from this point.

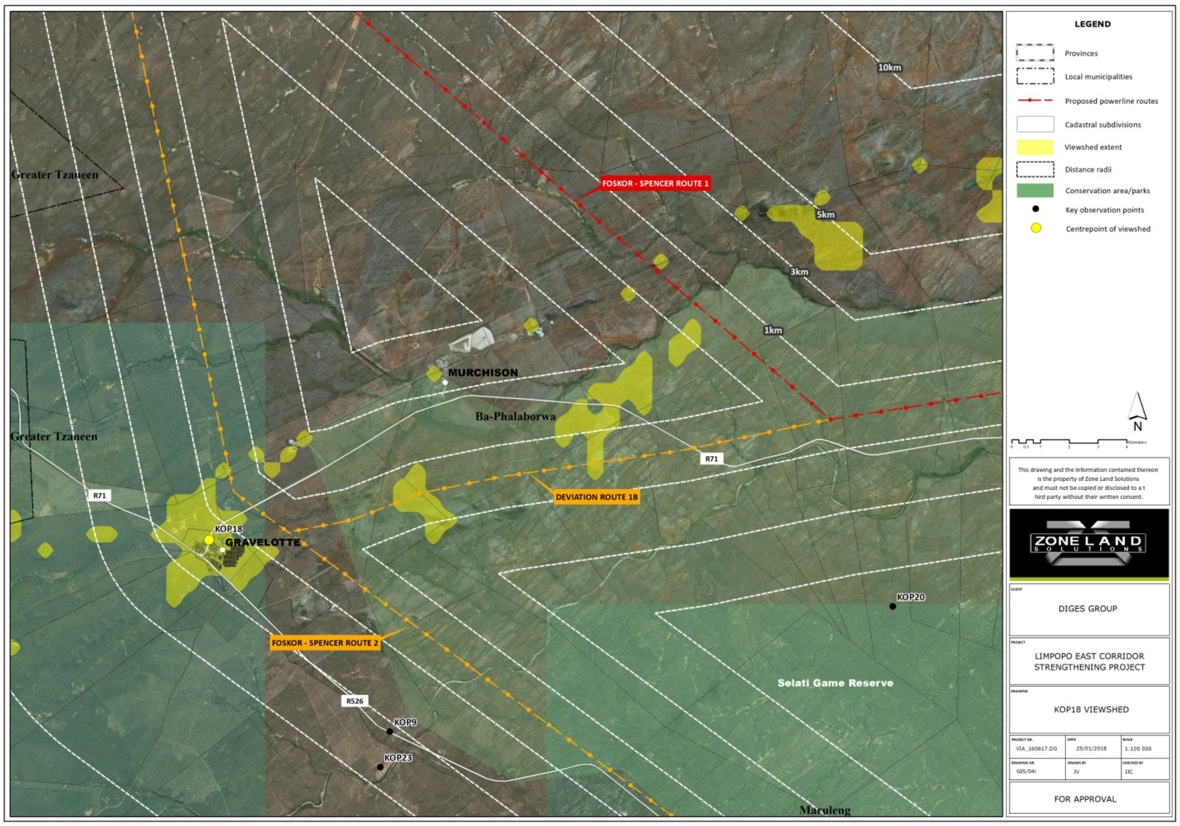


Figure 8: KOP18 Viewshed. Areas shaded yellow is theoretically visible from KOP18.

NUMBER:	KOP18	CO-ORDINATES:	S	E
ALTITUDE:	545m		23° 56.872'	30° 36.744'
DESCRIPTION:	KOP18 is situated on the R71 near the village of Gravelotte west of the project.			
TYPE:	Road	PHOTO:	Photograph 9	
PROP. LOCATION:	Middle ground	PROXIMITY:	1.1km	
VISUAL SENSITIVITY:	Low			
VISUAL EXPOSURE:	Low	VAC:	High	
VISUAL INTRUSION:	Low	DURATION:	12km @ 100km/h 7.2min eastwards	

Photograph 9: View from KOP18 towards the proposed powerline in the east (Source: Zone Land Solutions).

9 KEY OBSERVATION POINT 19

KOP19 is located at the entrance to the ATKV Eiland Spa situated in the Hans Merensky Nature Reserve near the Greater Letaba River. The proposed powerlines is in excess of 6.7km south of the observation point. Together with the latter, the visual absorption capacity is of such a nature that a negligible visual impact could be expected from this observation point.

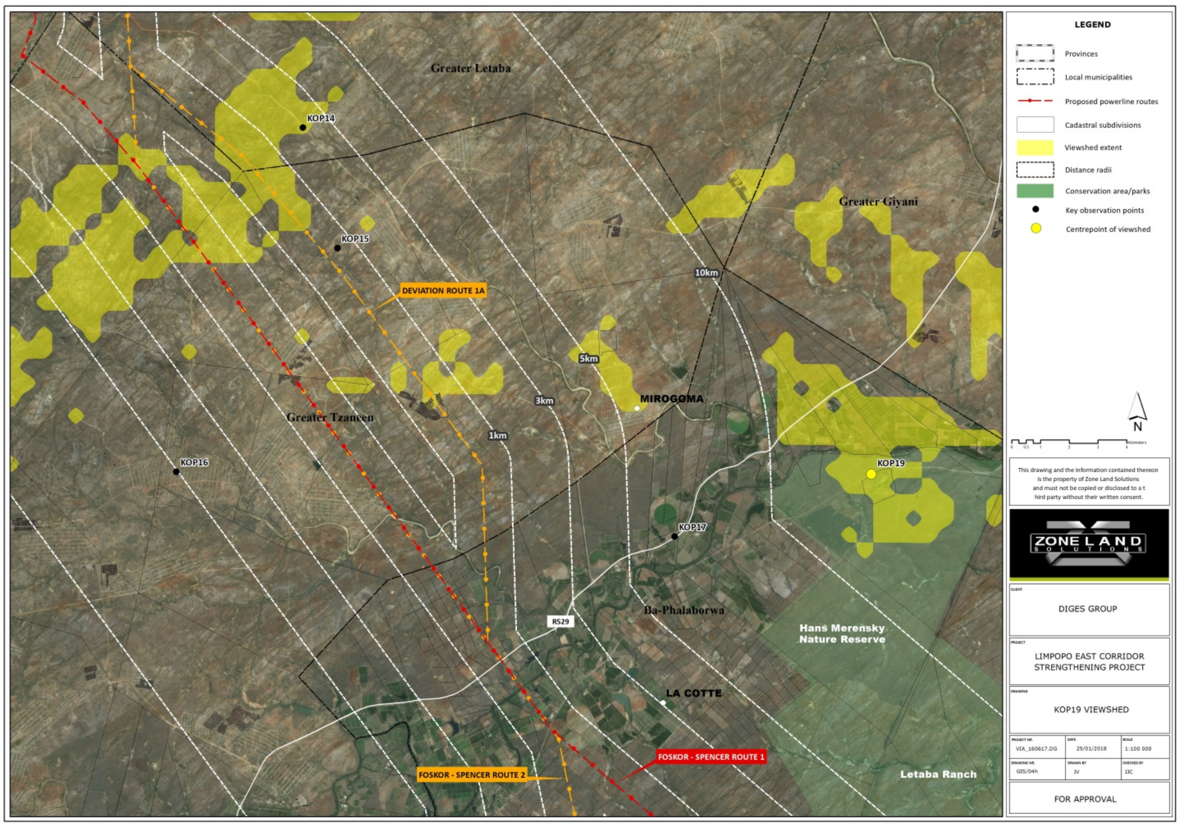
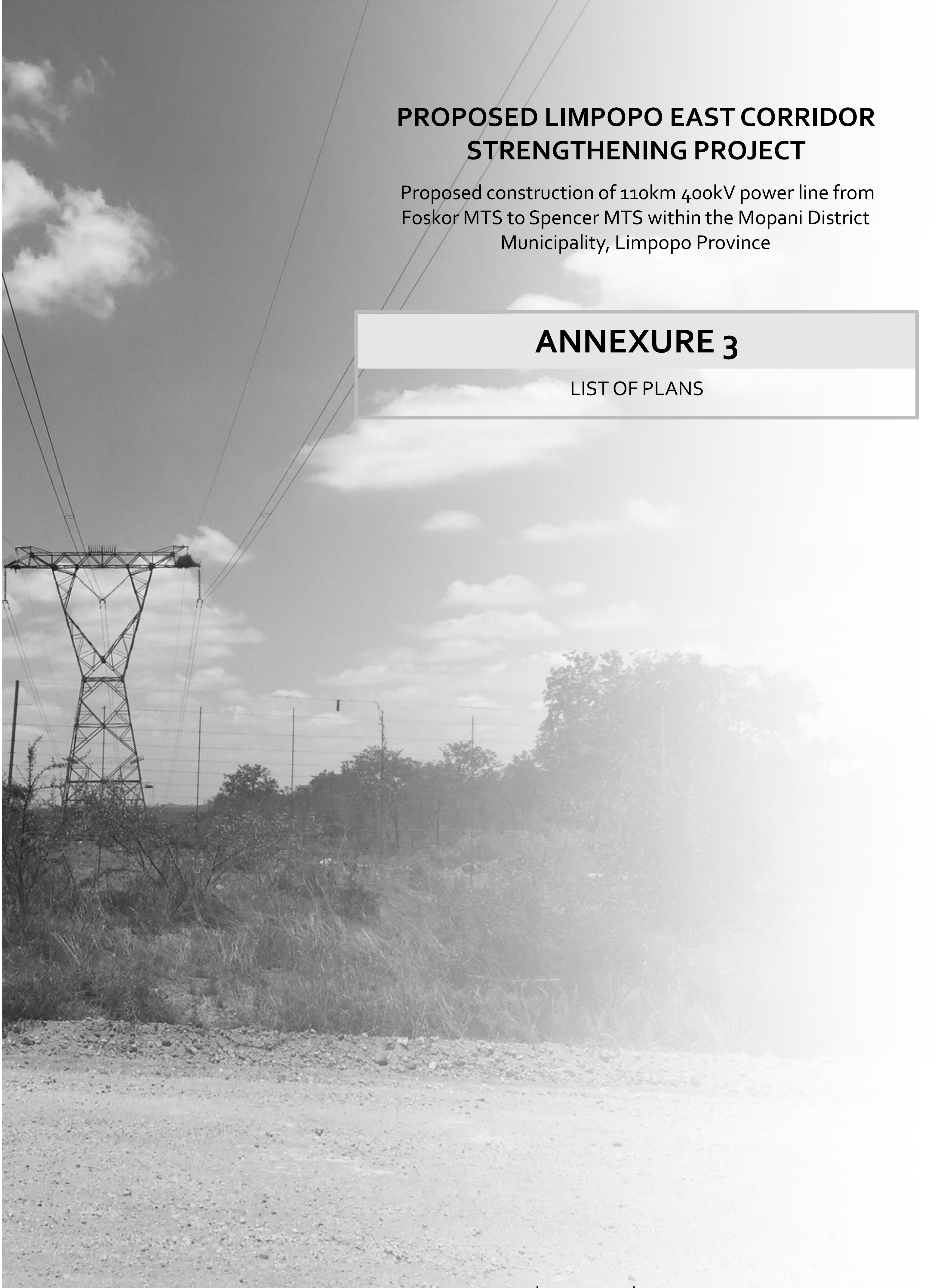


Figure 9: KOP19 Viewshed. Areas shaded yellow is theoretically visible from KOP19.

NUMBER:	KOP19	CO-ORDINATES:	S	E
ALTITUDE:	439m		30°40'15.03"	23°39'21.03"
DESCRIPTION:	KOP19 is situated at the Eiland Spa within the Hans Merensky Nature Reserve.			
TYPE:	Tourism	**PHOTO:**	Photograph 10	
PROP. LOCATION:	Background	**PROXIMITY:**	6.7km	
VISUAL SENSITIVITY:	High			
VISUAL EXPOSURE:	Low	**VAC:**	High	
VISUAL INTRUSION:	Low	**DURATION:**	N/A	

Photograph 10: View from KOP19 towards the proposed powerline in the south (Source: Zone Land Solutions).



PROPOSED LIMPOPO EAST CORRIDOR STRENGTHENING PROJECT

Proposed construction of 110km 400kV power line from Foskor MTS to Spencer MTS within the Mopani District Municipality, Limpopo Province

ANNEXURE 3

LIST OF PLANS

zone | land | solutions