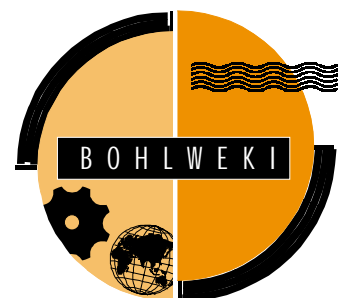




**ENVIRONMENTAL IMPACT ASSESSMENT REPORT FOR THE
PROPOSED IKAROS SUBSTATION AND ASSOCIATED 400 kV
TRANSMISSION LINE INFRASTRUCTURE, NORTH WEST
PROVINCE**

25 April 2002

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EXECUTIVE SUMMARY

1. OVERVIEW OF THE PROPOSED PROJECT

Eskom Transmission propose the construction of a new 400/132 kV substation (to be known as the Ikaros Substation) on the eastern side of Rustenburg. The supply of power to this substation is proposed via two parallel 400 kV Transmission lines to be looped in from the existing Matimba-Midas No 2 400 kV Transmission line (between Ellisras and Fochville). A loop-in consists of a new 400 kV powerline being turned in off an existing 400 kV Transmission line, to carry power to a substation for distribution. The loop is closed through a link back to the existing Transmission line via a parallel 400 kV line, thus allowing the flow of electricity to continue uninterrupted. With power being turned in to Ikaros, Eskom Transmission also propose the transfer of power on to the existing Bighorn Substation (near Marikana) to increase capacity. This requires the extension of this infrastructure.

The need for this additional power to the Rustenburg area is as a result of the increase of local mining operations. Electricity loads required by platinum and chrome mining and smelting in the Rustenburg area are expected to reach the combined firm capacities of the existing substations in the area (i.e. Bighorn, Trident and Ararat Substations) within the next two years. Therefore, additional Transmission capacity is required in this area to:

- a) Ensure reliable supply to consumers
- b) Provide for future increased energy demands

The extent of the study area, and the selection of corridors and substation sites within the study area, gives consideration to such aspects as ecological impact, social impact, visual impact, technical feasibility and cost. Following the investigations during the Scoping Phase (Bohlweki Environmental, 2002), the corridor and substation site alternatives which have been investigated by this EIA include:

Ikaros Substation Site: Sites A, B and C

Western Leg: Northern, Southern and N-S Composite corridors

Eastern Leg: Corridor parallel to the existing Trident-Bighorn 275 kV line

These alternatives are illustrated in Figure 1 overleaf.

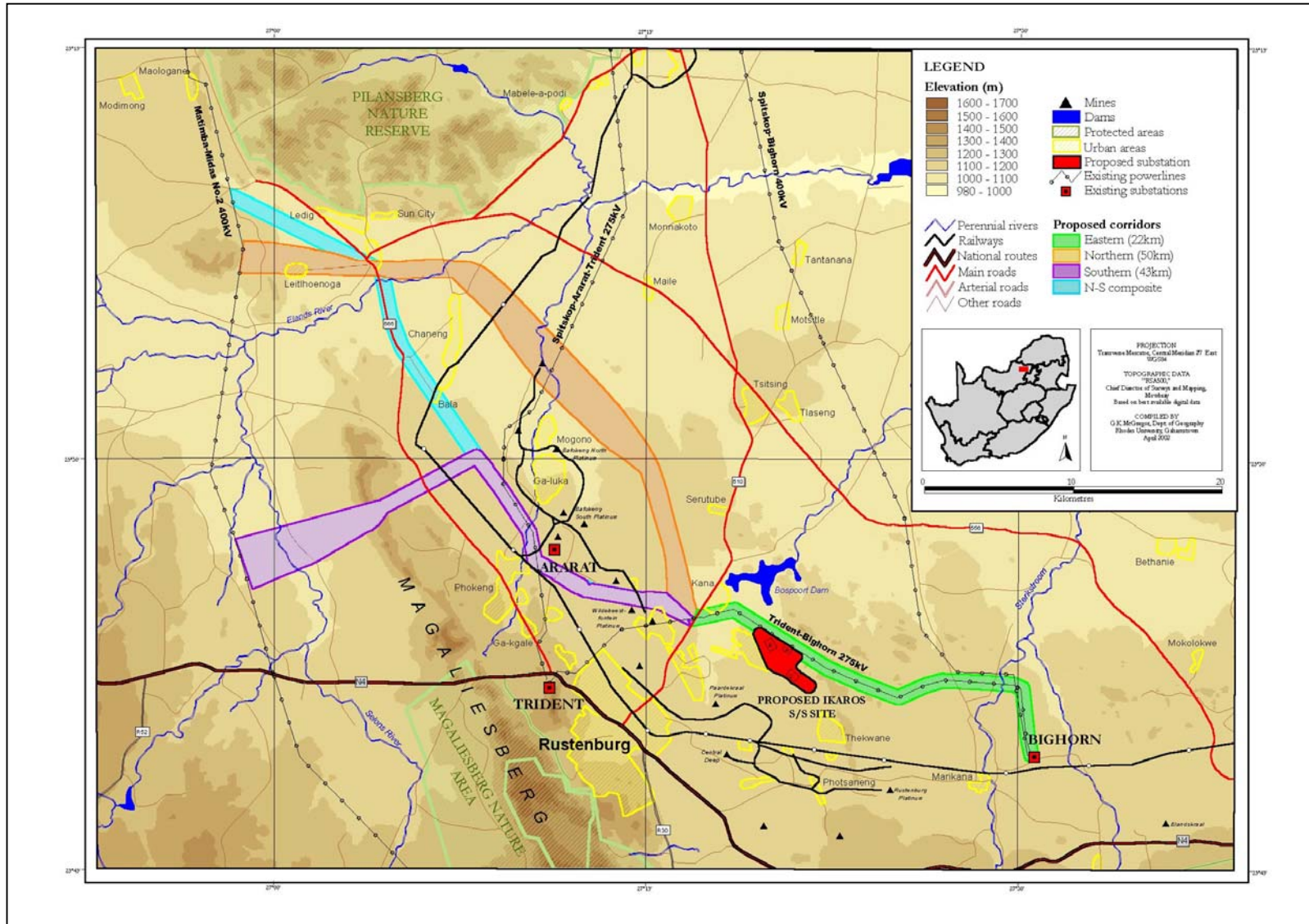


Figure 1: Basemap showing identified feasible corridors and substation sites

2. PROJECT REQUIREMENTS

Three potential sites for the location of the Ikaros Substation were identified within a broader area (approx. 5 km x 5 km in size). The site is approximately 4 km south of the Bospoort Dam, straddling the farms Elandsheuwel 282 JQ, Klipgat 281 JQ and Turffontein 302 JQ. The total size required for the establishment of the substation is approximately 600 m x 600 m (i.e. 36 ha).

Potential corridors for the proposed Transmission lines were identified. Due to the lines being required to link back to the Matimba-Midas line, two servitudes, each 55 m in width, will be required (i.e. a total servitude of 110 m). The total length of the line between the Matimba-Midas line and Bighorn Substation will be approximately 70 km.

Extensions to Bighorn substation are proposed to include an additional 400 kV line bay for the new Transmission line, and can be established adjacent to the existing site.

3. ENVIRONMENTAL STUDIES AND PUBLIC PARTICIPATION

An Environmental Impact Assessment (EIA) for the proposed Ikaros Substation and associated 400 kV Transmission line infrastructure has been undertaken in accordance with the Environmental Impact Assessment (EIA) Regulations published in Government Notice R1182 to R1184 of 5 September 1997 in terms of Section 21 of the Environment Conservation Act (No 73 of 1989), as well as the National Environmental Management Act (NEMA; No 107 of 1998). This EIA was undertaken in order to identify and assess potential environmental impacts (biophysical and social) associated with the proposed project, and nominate a preferred substation site and Transmission line corridor.

Specialist studies undertaken within the EIA included the assessment of potential impacts on:

- avifauna (bird life);
- vegetation;
- terrestrial fauna;
- agricultural potential;
- archaeological, cultural and historical sites;
- aesthetics and visual quality;
- land use; and
- the social environment.

To ensure effective public participation throughout the environmental studies for this project, an on-going public participation process was implemented. The aim of the public participation process was to establish efficient communication channels which would provide all I&APs with the opportunity to participate meaningfully in the process. More than 370 individuals and organisations throughout the broader study area representing a broad range of sectors of society were consulted telephonically, through individual meetings/interviews, through documentation distributed via mail, a key stakeholder workshop, a public meeting and via the printed media throughout the EIA process. Special attention was paid to consultation with potentially directly affected landowners (e.g. within the demarcated corridors).

The EIA process identified and recorded landowners' details within the study area, as well as issues and concerns raised. Issues and concerns raised during the feedback meetings and the EIA Phase of the public participation process were compiled into an Issues Trail. This information, together with issues captured during the Environmental Scoping Study, is incorporated as the core of the scoping of social issues within this Environmental Impact Assessment Report.

The Draft Environmental Impact Assessment Report has been made available for public review. Comments received from the public will be captured within a final Environmental Impact Assessment Report, which is to be presented to the National and North West Departments of Environment Affairs for comment and approval.

4. SUMMARY OF SPECIALIST STUDY FINDINGS

Each corridor and substation site were ranked from most preferred to least preferred, and these findings were workshopped by all the specialists in order to provide a considered and consolidated preferred nominations. In addition to the environmental specialist evaluations, the technical feasibility and associated costs are required to be considered by Eskom Transmission.

4.1. Summary of Specialist Study Findings

The following summaries the preferences per specialist discipline per component of the project.

4.1.1. Ikaros Substation Site

Surface Watercourses

Sites A and C are in close proximity to watercourses. Site C, however, is the only site at potential risk of flooding (with a portion of the site below the 1:50 year floodline). Site B is the preferred site as this is the only site of the three which is not influenced by a watercourse.

Geology and Soils

Sites B and A are preferred due to their typical topography and geotechnical properties. Considering all geotechnical factors Site B is recommended as the preferred option, as possibility exists that Site A would require larger quantities of over-excavation of the expansive soils. In addition, this site may not be available for development due to the potential future expansion of the mines in the area.

Agricultural Potential

The soils present on all sites are black, swelling clay soils, with little variation. The small areas of surface rock outcrops (ArR unit) are isolated and easily observed. There is little difference between the sites in terms of soils or agricultural potential. Therefore, no one site is nominated as a preferred site.

Flora and Terrestrial Fauna

There is little difference between the sites in terms of flora or habitats present. Therefore, no one site is nominated as a preferred site.

Avifauna

Permanent impacts from human activity are evident in the broader area proposed for the establishment of the substation. There is little difference between the sites in terms of habitats present for avifauna. Therefore, no one site is nominated as a preferred site.

Land Use

It is proposed that the Ikaros Substation be developed in the central or eastern portion of the broader site (i.e. in the vicinity of Site A or B), close to the existing Trident-Bighorn Transmission line. A buffer zone of open land is recommended between the proposed substation and the existing township of Boitekong. The south eastern section of the proposed substation site is located in close proximity to Thekwane and, therefore, Site C is not favoured for the positioning of the substation infrastructure.

All of the proposed substation sites will impact on land that is currently used for cattle grazing purposes by residents of the Boitekong area.

Site A may have a conflicting land use, with Anglo Platinum suggesting the use of the site for an additional mining shaft. Therefore, Site B is nominated as the preferred site.

Archaeology

Open pottery sites were recorded within the broader area identified for the establishment of the substation. These sites will not require further recording unless burnt daga structures are also found to be present. Due to the relative uniformity of the site in terms of the types of archaeological sites present, no one site is nominated as a preferred site.

Visual/Aesthetic Quality

The visual impact associated with the proposed Ikaros Substation is anticipated to be localised and similar for all sites. Therefore, no one site is nominated as a preferred site, although it is recommended that a buffer zone and/or visual screen is considered when in close proximity to township developments.

Social

It is recommended that the substation be developed in the central or eastern portion of the proposed site (Sites A or B), in the vicinity of the existing Trident-Bighorn Transmission line. This will effectively create a buffer zone of open land between the existing township of Boitekong and the proposed substation. The south-eastern section of the proposed substation site (Site C) is located in close proximity to Thekwane. Site A is nominated as the preferred option, with Sites B and C requiring buffer zone considerations due to the proximity of township developments.

Conclusions and Recommendations:

Considering the findings of all the detailed studies undertaken, the order of preference for the Ikaros Substation site is rated as follows:

- Site B is recommended as the first option, provided that a buffer zone with Boitekong is allowed for.
- Site A is recommended the second option, although this site may not be available due to the potential future expansion of the mines in the area.

- Site C is the least preferred option.

4.1.2. Proposed 400 kV Transmission Lines between the Matimba-Midas No 2 400 kV Transmission Line and the Ikaros Substation

Geology and Soils

The nature of the soils and geology is fairly uniform across the study area. The potential impact associated with geology and soils will be similar for all three proposed corridors. Erosion risk is present throughout the study area, and considered high on steep slopes. The southern corridor crosses relief areas, and therefore the least preferred option.

Agricultural Potential

The new Transmission lines can be constructed in any of the identified corridors as the potential impacts on agricultural potential will be localised and restricted to the tower footprint area. However, construction of the proposed Transmission line within the N-S composite corridor will have the lowest impact on high potential soils, and therefore this option is favoured.

Flora and Terrestrial Fauna

The N-S composite corridor is nominated as the preferred option, as this corridor is considered to be largely disturbed with little natural vegetation and habitats. The northern corridor is the second option, as the condition of the vegetation within this corridor is considered to be low. The southern corridor is the least preferred option, as the condition of the vegetation within this corridor (particularly the section of the corridor over the Magaliesberg ridge) is considered to be moderate to high (where protected species have been identified).

Avifauna

The N-S composite corridor is nominated as the preferred option, as this corridor is heavily impacted on by human activity, and therefore most of the collisions sensitive species have most likely already disappeared in and adjacent to the corridor, or occur sporadically in very low numbers. The northern corridor is the second option, as this corridor is largely disturbed due to mining activities, thus decreasing the potential for sensitive bird species to occur. The southern corridor is the least preferred option, largely due to the potential sensitivity of the area surrounding the Magaliesberg ridge.

Land Use

All three corridors potentially impact on the land use associated with township developments, as a number are skirted by the proposed corridors. This is required to be addressed in the final routing of the line with any of the alternatives chosen. The N-S composite corridor is nominated as the preferred option, although impacts on Bala township are required to be addressed in the final alignment of the Transmission line. The southern corridor is the second option, although land use issues have been identified in the Boschhoek area where tourist developments are planned. The northern corridor is the least preferred option, largely due to the planned expansions of mining activities within the area surrounding this corridor and the potential land use conflicts associated with the Transmission lines and the mining expansions.

Archaeology

The N-S composite corridor is nominated as the preferred option, as the proposed Transmission line follows existing linear infrastructure, which could potentially have had a historic impact on sites in the area. The northern corridor is the second option, as this corridor is largely disturbed due to mining activities, thus decreasing the potential for the occurrence of significant sites. The southern corridor is the least preferred option, largely due to the potential significance of sites identified within this corridor, particularly in the relief areas.

Visual/Aesthetic Quality

The N-S composite corridor is nominated as the preferred option, as the proposed Transmission lines follow existing linear infrastructure, which has reduced the current visual quality of the local area, thus minimising the potential impact associated with the proposed new Transmission lines. The northern corridor is the second option, as this corridor is largely disturbed due to mining activities, which has also reduced the current visual quality of the local area. The southern corridor is the least preferred option, largely due to the potentially high visual quality of the Magaliesberg range and the associated tourism developments planned in this area.

Social

All three corridors skirt township developments, and due to the nature of the area, this cannot be avoided. The N-S composite corridor is nominated as the preferred option, as the proposed Transmission line follows existing linear infrastructure (such as roads, fence lines, etc), which current are part of the social environment of the local area. The northern corridor is the second option. This corridor would be the preferred corridor, as it impacts least on the local communities, but conflicts with planned expansions to mining activities. The southern

corridor is the least preferred option, largely due to the planned tourism facilities in the vicinity of the Magaliesberg ridge, the proposed township development, as well as the various existing townships which are potentially affected by this corridor.

All three corridors affect the informal Shazalaza township, and this is required to be addressed when negotiating a final alignment.

Conclusions and Recommendations:

Considering the findings of all the detailed studies undertaken, the order of preference for the corridor for the construction of the Transmission lines between the Matimba-Midas No 2 400 kV Transmission line and the Ikaros Substation is as follows:

- The N-S composite corridor is recommended as the first option.
- The northern corridor is the second option (based mainly on land use restrictions as a result of planned extensions to mining activities in this area).
- The southern corridor is the least preferred option.

4.1.3. Proposed 400 kV Transmission Lines between the Ikaros and Bighorn Substations, and Extension of Bighorn Substation

Geology and Soils

The nature of the soils and geology is fairly uniform across this section of the study area. The local geology and soils may present an erosion risk, but this is required to be considered within the EMP, particularly on steep slopes. The extension of the Bighorn Substation may potentially be restricted by the occurrence of rocky outcrops.

Agricultural Potential

This section of the study area has several properties which are cultivated. In order to limit the potential impacts on agricultural potential, it is recommended that the Transmission lines be constructed as close as possible south of the existing Trident-Bighorn 275 kV Transmission line.

No significant impacts are anticipated to be associated with the extension of Bighorn Substation.

Flora and Terrestrial Fauna

In order to minimise potential impacts on flora and fauna, it is recommended that the new 400 kV Transmission lines should, as far as possible, be constructed parallel to the existing Trident-Bighorn 275 kV line.

No significant impacts are anticipated to be associated with the extension of Bighorn Substation.

Avifauna

As far as possible, the proposed new Transmission lines should be constructed in parallel with the existing Trident-Bighorn 275 kV Transmission line. Following the existing line acts as a significant mitigation measure against bird collisions. This option will concentrate impacts along one corridor and will effectively not create a new impact. Most of the collisions sensitive species have, however, most likely already disappeared in and adjacent to the existing corridor or occur sporadically in very low numbers due to heavy human impacts (mines and settlements).

No significant impacts are anticipated to be associated with the extension of Bighorn Substation.

Land Use

It is recommended that the proposed Transmission lines be constructed as close as possible to the south of the existing Trident-Bighorn 275 kV Transmission line in order to consolidate the linear developments, and the impact and, therefore, minimise further impacts on land use.

No significant impacts are anticipated to be associated with the extension of Bighorn Substation.

Archaeology

In order to minimise the potential for impacts on archaeological, cultural and/or historical sites, it is recommended that, as far as possible, the proposed 400 kV Transmission lines should be constructed parallel to the existing Trident-Bighorn 275 kV line. It is also supported that the lines not be constructed on or at the immediate base of hills due to the likely occurrence of sites in such localities.

No significant impacts are anticipated to be associated with the extension of Bighorn Substation.

Visual/Aesthetic Quality

In order to minimise the potential visual impacts associated with the proposed 400 kV Transmission lines, it is recommended that, as far as possible, these new lines be constructed in parallel to the existing Trident-Bighorn 275 kV line. The existing line impacts on the current visual quality of the area, and through the consolidation of the linear developments, further impacts will be minimised. This will, however, result in three Transmission line servitudes running in parallel.

No significant impacts are anticipated to be associated with the extension of Bighorn Substation.

Social

It is recommended that the proposed Transmission lines be constructed as close as possible to the south of the existing Trident-Bighorn 275 kV Transmission line in order to consolidate the linear developments, and the impact and, therefore, minimise further impacts on the social environment. There are no major township developments along this corridor, which means low population densities in the vicinity of the corridor. This area is mainly inhabited by individual landowners, and they are predominantly farmers. Therefore, the impact of three Transmission lines in parallel, and the use of crop-spraying aircraft in area will be required to be addressed when negotiating a final alignment.

No significant impacts are anticipated to be associated with the extension of Bighorn Substation.

Conclusions and Recommendations

Considering the findings of all the detailed studies undertaken, it is recommended that the Transmission lines between the proposed Ikaros Substation and the existing Bighorn Substation be constructed as close as possible south of the existing Trident-Bighorn 275 kV Transmission line.

No significant impacts are anticipated as a result of the planned expansions to Bighorn Substation, due to the existing disturbance which exists in the area.

5. CONCLUSIONS AND RECOMMENDATIONS

5.1. Overall Conclusions

The findings of this Environmental Impact Assessment point to the following conclusions regarding preferred sites for substation establishment, and corridors for Transmission line construction:

5.1.1. Ikaros Substation

The nominated preferred site is Site B

5.1.2. Proposed 400 kV Transmission Lines between the Matimba-Midas No 2 400 kV Transmission Line and the Ikaros Substation

The nominated preferred corridor is the N-S Composite corridor.

There is sufficient scope within the corridor to allow for local deviation of the servitude to avoid sensitive areas identified in this study, and other sensitive sites that may be identified during the design phase.

5.1.3. Proposed 400 kV Transmission Lines between the Ikaros and Bighorn Substations, and Extension of Bighorn Substation

The nominated preferred corridor is parallel and to the south of the existing Trident-Bighorn 275 kV Transmission line.

There is sufficient scope within the corridor to allow for local deviation of the servitude to avoid sensitive areas identified in this study, and other sensitive sites that may be identified during the design phase.

The preferred site for the extension to the Bighorn Substation is to the western side of the Spitskop-Bighorn 400 kV line feeder.

These conclusions are pending the outcome of the public and authority comment on this draft EIA report.

These conclusions are the result of an intensive and comprehensive study. This has included the specialist assessments, based on issues identified within the Scoping Phase, as well as the parallel process of public participation. The public consultation exercise has been extensive and every effort has been made to include representative stakeholders in the study area.

It is considered that the study process has been successful and fully comprehensive.

5.2. Overall Recommendations

The recommendations arising from this study focus predominantly on the role and implementation of the Environmental Management Plan (EMP). The specialist studies identify areas and issues which are required to be addressed by this EMP, and the role of the EMP is seen to be vital to the successful implementation of the various mitigation measures which have been recommended at various points within this report. The application of the EMP for all life cycle phases of the new lines and substation, including design, construction, operation and decommissioning is considered to be key in achieving appropriate environmental management standards.

Specific to these developments, it is recommended that use of the specialists is actively planned as part of the design and construction phases:

- Specialist botanist to survey the preferred substation site and route to identify sensitive and endangered plants, particularly at the tower footings.
- Specialist archaeologist to survey the preferred substation site and route to assess the site specific impacts on sites on the route, particularly the tower footings.
- Bird specialist to review placement of ‘bird flight diverters’ and bird guards at key locations along the preferred route

It is also recommended that the process of communication and consultation with the community representatives is maintained after the award of environmental authorisation, but particularly during the construction phase.

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ACRONYMS AND ABBREVIATIONS

amsl	Above mean sea level
DEAT	National Department of Environmental Affairs and Tourism
EIA	Environmental Impact Assessment
ESS	Environmental Scoping Study
EMP	Environmental Management Plan
I&AP	Interested and affected party
I&APs	Interested and affected parties
IDP	Integrated Development Plan
kV	Kilovolt
LDO	Land Development Objective
NEMA	National Environmental Management Act (No 107 of 1998)
NW DACE	North West Department of Agriculture, Conservation and Environment

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