ENVIRONMENTAL IMPACT ASSESSMENT FOR THE PROPOSED VRYHEID GRID STRENGTHENING

PROJECT:

FAUNA & FLORA SPECIALIST SCOPING REPORT

PRODUCED FOR NSOVO

ON BEHALF OF ESKOM DISTRIBUTION

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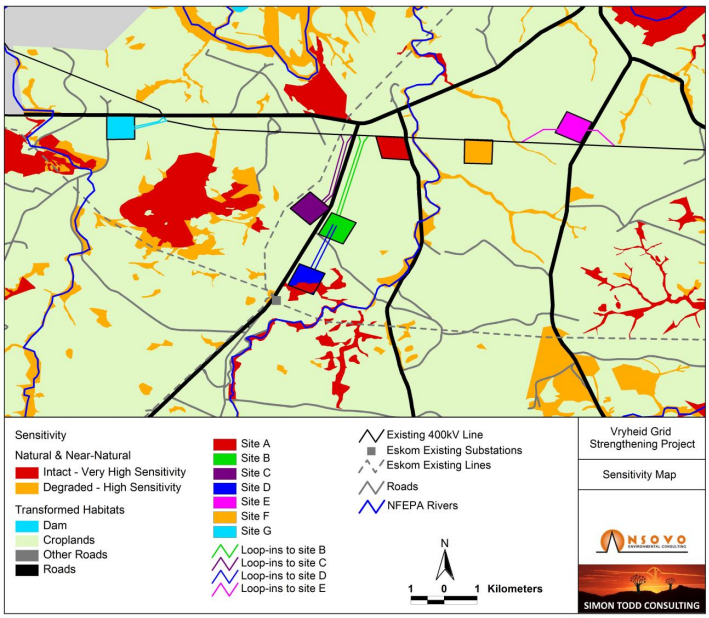
EXECUTIVE SUMMARY

Eskom Distribution proposes the upgrading of the Vryheid substation near Swellendam in order to strengthen the capacity and reliability of the distribution grid in the area in order to meet growing demand in the area. The upgrade requires a new distribution substation and loop-in loop-out line from the existing 400 kV. A full EIA process is required for the development and Nsovo Environmental Consultants has appointed Simon Todd Consulting to contribute the terrestrial biodiversity component of the EIA, which is currently in the Scoping Phase. The purpose of the Ecological Scoping Report is to describe and detail the ecological features of the proposed site; provide a preliminary assessment of the ecological sensitivity of the site and identify the likely impacts that may be associated with the development. Furthermore, the study outlines a plan of study for the EIA which will follow the Scoping Study.



A desktop review of the available ecological information for the area was used to identify and characterize the ecological features of the site and identify potential sensitivities. A draft ecological sensitivity map for the site was developed, which is depicted below. All of the seven proposed sites are within transformed habitat considered to be low sensitivity, except for Site D which contains some intact remnants of Ruens Silcrete Renosterveld which is Critically Endangered and considered Very High sensitivity. Due to the high conservation status of this vegetation type, this is considered a fatal flaw with this site and it should be scrapped or relocated to a less sensitive area.

Overall, provided that the intact vegetation remnants at the site can be avoided, there do not appear to be any highly significant impacts that would be associated with the development.

In terms of the different options apart from Site D, there is little to differentiate the remaining sites in terms of sensitivity or potential impact. The proximity to the existing 400kV line and the slope of the site are considered deciding factors at this point and as such, the ecological preference of a site for the development would be as follows, in descending order of preference: Site A, Site F, Site G, Site E, Site B, Site C and Site D is not considered viable.

1 INTRODUCTION

Eskom Distribution proposes the upgrading of the Vryheid substation near Swellendam in order to strengthen the capacity and reliability of the distribution grid in the area in order to meet growing demand in the area. The upgrade requires a new distribution substation and loop-in loop-out line from the existing 400 kV. A full EIA process is required for the development and Nsovo Environmental Consultants has appointed Simon Todd Consulting to contribute the terrestrial biodiversity component of the EIA, which is currently in the Scoping Phase.

The purpose of the Ecological Scoping Report is to describe and detail the ecological features of the proposed site; provide a preliminary assessment of the ecological sensitivity of the site and identify the likely impacts that may be associated with the development. A desktop review of the available ecological information for the area is conducted in order to identify and characterize the ecological features of the site. This information is used to derive a draft ecological sensitivity map that presents the presumed ecological constraints and opportunities for development at the site, which can then be verified and refined during the EIA. The information and sensitivity map presented here provides an ecological baseline that can be used in the planning phase of the development to ensure that the potential negative ecological impacts associated with the development can be minimized. Furthermore, the study defines the terms of reference for the EIA phase of the project and outlines a plan of study for the EIA which will follow the Scoping Study.

1.1 SCOPE OF STUDY

The scope of the study includes the following activities

- a description of the environment that may be affected by the activity and the manner in which the environment may be affected by the proposed project;
- a description and evaluation of potential environmental issues and potential impacts (including direct, indirect and cumulative impacts) that have been identified;
- Direct, indirect and cumulative impacts of the identified issues are evaluated within the Scoping Report in terms of the following criteria:
    - the nature, which includes a description of what causes the effect, what will be affected and how it will be affected;
    - the extent, wherein it is indicated whether the impact will be local (limited to the immediate area or site of development), regional, national or international;
- a statement regarding the potential significance of the identified issues based on the evaluation of the issue/impacts;

- Identification of potentially significant impacts to be assessed within the EIA phase and the details of the methodology to be adopted in assessing these impacts. This should be detailed enough to include within the Plan of Study for EIA and include a description of the proposed method of assessing the potential environmental impacts associated with the project

1.2 ASSESSMENT APPROACH & PHILOSOPHY

The assessment will be conducted according to the EIA Regulations, published by the Department of Environmental Affairs and Tourism (April 1998) in terms of the Environmental Conservation Act No. 73 of 1989 as well as within the best-practice guidelines and principles for biodiversity assessment as outlined by Brownlie (2005) and De Villiers et al. (2005).

This includes adherence to the following broad principles:

- That a precautionary and risk-averse approach be adopted towards projects which may result in substantial detrimental impacts on biodiversity and ecosystems, especially the irreversible loss of habitat and ecological functioning in threatened ecosystems or designated sensitive areas: i.e. Critical Biodiversity Areas (as identified by systematic conservation plans, Biodiversity Sector Plans or Bioregional Plans) and Freshwater Ecosystem Priority Areas.

- Demonstrate how the proponent intends complying with the principles contained in section 2 of the National Environmental Management Act, 1998 (Act No. 107 of 1998), as amended (NEMA), which, amongst other things, indicates that environmental management should.

    - In order of priority aim to: avoid, minimise or remedy disturbance of ecosystems and loss of biodiversity;
    - Avoid degradation of the environment;
    - Avoid jeopardising ecosystem integrity;
    - Pursue the best practicable environmental option by means of integrated environmental management;
    - Protect the environment as the people's common heritage;
    - Control and minimise environmental damage; and
    - Pay specific attention to management and planning procedures pertaining to sensitive, vulnerable, highly dynamic or stressed ecosystems.

These principles serve as guidelines for all decision-making concerning matters that may affect the environment. As such, it is incumbent upon the proponent to show how proposed

activities would comply with these principles and thereby contribute towards the achievement of sustainable development as defined by the NEMA.

In order to adhere to the above principles and best-practice guidelines, the following approach forms the basis for the study approach and assessment philosophy:

The study will include data searches, desktop studies, site walkovers / field survey of the property and baseline data collection, describing:

- A description of the broad ecological characteristics of the site and its surrounds in terms of any mapped spatial components of ecological processes and/or patchiness, patch size, relative isolation of patches, connectivity, corridors, disturbance regimes, ecotones, buffering, viability, etc.

In terms of **pattern**, the following will be identified or described:

Community and ecosystem level

- The main vegetation type, its aerial extent and interaction with neighbouring types, soils or topography;
- Threatened or vulnerable ecosystems (*cf. new SA vegetation map/National Spatial Biodiversity Assessment1, fine-scale systematic conservation plans, etc*).

Species level

- Red Data Book (RDB) species (giving location if possible using GPS)
- The viability of an estimated population size of the RDB species that are present (include the degree of confidence in prediction based on availability of information and specialist knowledge, i.e. High=70-100% confident, Medium 40-70% confident, low 0-40% confident)
- The likelihood of other RDB species, or species of conservation concern, occurring in the vicinity (include degree of confidence).

Fauna

- Describe and assess the terrestrial fauna present in the area that will be affected by the proposed development.
- Conduct a faunal assessment that can be integrated into the ecological study.
- Describe the existing impacts of current land use as they affect the fauna.
- Clarify species of special concern (SSC) and that are known to be:
- endemic to the region;
- that are considered to be of conservational concern;
- that are in commercial trade (CITES listed species);
- or, are of cultural significance.

- Provide monitoring requirements as input into the Environmental Management Plan (EMP) for faunal related issues.

Other pattern issues

- Any significant landscape features or rare or important vegetation associations such as seasonal wetlands, alluvium, seeps, quartz patches or salt marshes in the vicinity.
- The extent of alien plant cover of the site, and whether the infestation is the result of prior soil disturbance such as ploughing or quarrying (alien cover resulting from disturbance is generally more difficult to restore than infestation of undisturbed sites).
- The condition of the site in terms of current or previous land uses.

In terms of **process**, the following will be identified or described:

- The key ecological "drivers" of ecosystems on the site and in the vicinity, such as fire.
- Any mapped spatial component of an ecological process that may occur at the site or in its vicinity (i.e. *corridors* such as watercourses, upland-lowland gradients, migration routes, coastal linkages or inland-trending dunes, and *vegetation boundaries* such as edaphic interfaces, upland-lowland interfaces or biome boundaries)
- Any possible changes in key processes e.g. increased fire frequency or drainage/artificial recharge of aquatic systems.
- Furthermore, any further studies that may be required during or after the EIA process will be outlined.
- All relevant legislation, permits and standards that would apply to the development will be identified.
- The opportunities and constraints for development will be described and shown graphically on an aerial photograph, satellite image or map delineated at an appropriate level of spatial accuracy.

1.3 RELEVANT ASPECTS OF THE DEVELOPMENT

The development would consist of the following elements:

- A new substation, which would occupy an area of up 600x600m or 36ha. Seven different location alternatives have been identified, up to 3.5km from the existing 400 kV line.
- A loop-in, loop-out line from the 400kV line, up to 3.5km long.

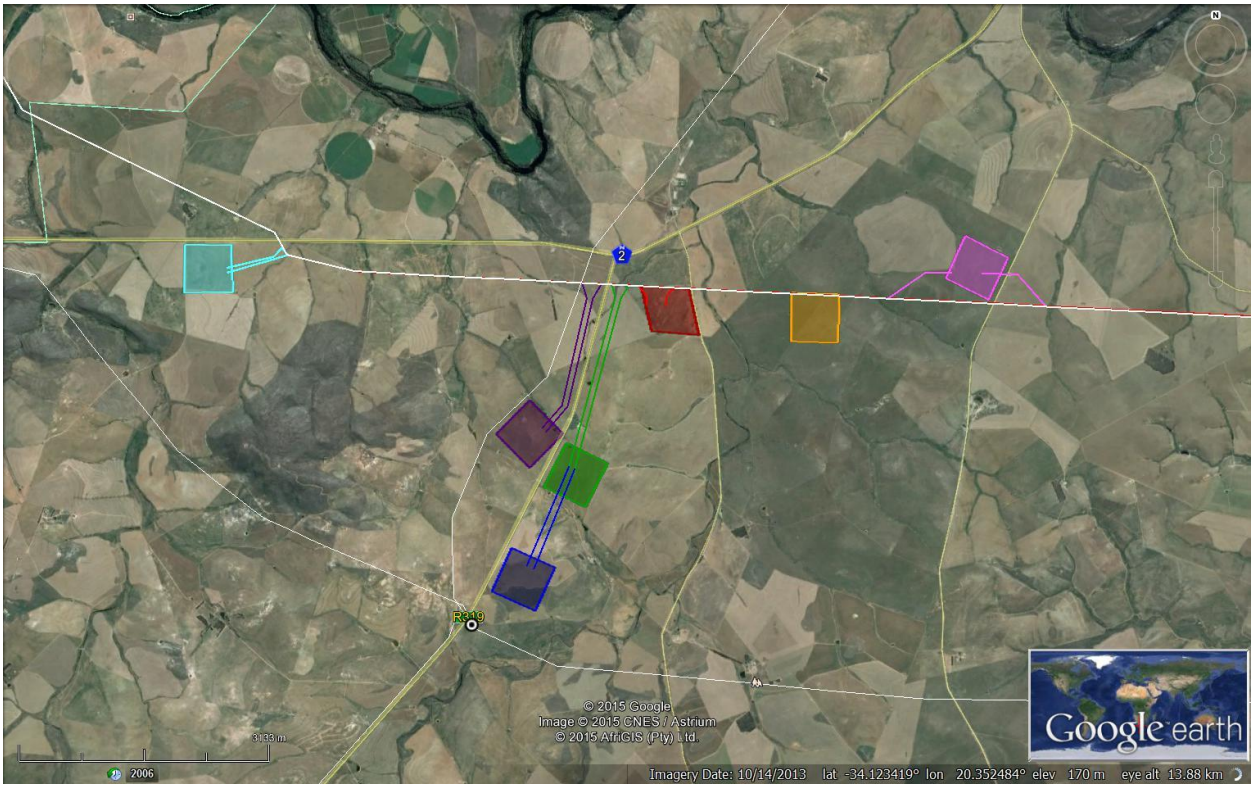


Figure 1. Satellite image of the Vryheid study area, showing the seven substation alternatives with their loop-in loop-out lines from the existing 400kV line.

2 METHODOLOGY

2.1 DATA SOURCING AND REVIEW

Data sources from the literature consulted and used where necessary in the study includes the following:

Vegetation:

- Vegetation types and their conservation status were extracted from the South African National Vegetation Map (Mucina and Rutherford 2006) as well as the National List of Threatened Ecosystems (2011), where relevant.
- Critical Biodiversity Areas for the site and surroundings were extracted from the Namakwa District Biodiversity Sector Plan (Desmet & Marsh 2008.)
- Information on plant and animal species recorded for the Quarter Degree Square (QDS) 3420AB was extracted from the SABIF/SIBIS database hosted by SANBI. This is a considerably larger area than the study area, but this is necessary to ensure a conservative approach as well as counter the fact that the site itself has probably not been well sampled in the past.

- The IUCN conservation status (Table 1) of the species in the list was also extracted from the database and is based on the Threatened Species Programme, Red List of South African Plants (2013).
- Freshwater and wetland information was extracted from the National Freshwater Ecosystem Priority Areas assessment, NFEPA (Nel et al. 2011). This includes rivers, wetlands and catchments defined under the study.
- Important catchments and protected areas expansion areas were extracted from the National Protected Areas Expansion Strategy 2008 (NPAES).

Fauna

- Lists of mammals, reptiles and amphibians which are likely to occur at the site were derived based on distribution records from the literature and the ADU databases http://vmus.adu.org.za.
- Literature consulted includes Branch (1988) and Alexander and Marais (2007) for reptiles, Du Preez and Carruthers (2009) for amphibians, Friedmann and Daly (2004) and Skinner and Chimimba (2005) for mammals.
- The faunal species lists provided are based on species which are known to occur in the broad geographical area, as well as a preliminary assessment of the availability and quality of suitable habitat at the site.
- The conservation status of each species is also listed, based on the IUCN Red List Categories and Criteria 2014 (See Figure 1) and where species have not been assessed under these criteria, the CITES status is reported where possible. These lists are adequate for mammals and amphibians, the majority of which have been assessed, however the majority of reptiles have not been assessed and therefore, it is not adequate to assess the potential impact of the development on reptiles, based on those with a listed conservation status alone. In order to address this shortcoming, the distribution of reptiles was also taken into account such that any narrow endemics or species with highly specialized habitat requirements occurring at the site were noted.

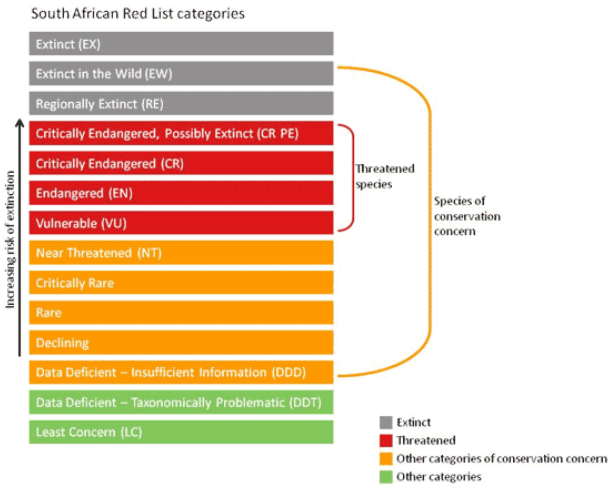


Figure 1. Schematic representation of the South African Red List categories. Taken from http://redlist.sanbi.org/redcat.php

2.2 SENSITIVITY MAPPING & ASSESSMENT

A draft ecological sensitivity map of the site was produced by integrating the available ecological and biodiversity information available in the literature and various spatial databases as described above. As a starting point, mapped sensitive features such as wetlands, drainage lines and water bodies were collated and buffered where appropriate to comply with legislative requirements or ecological considerations. Additional sensitive areas where then identified from the satellite imagery of the site and delineated. All the different layers created were then merged to create a single coverage. Features that were specifically captured in the sensitivity map include drainage features, wetlands and dams, as well as rocky outcrops and steep slopes. The ecological sensitivity of the different units identified in the mapping procedure was rated according to the following scale:

- **Low** – Units with a low sensitivity where there is likely to be a negligible impact on ecological processes and terrestrial biodiversity. This category is reserved specifically for areas where the natural vegetation has already been transformed, usually for agricultural purposes. These areas represent opportunities for development since they have low biodiversity value and the impact of development within these areas will generally be low.
- **Medium**- Areas of natural or previously transformed land where the impacts are likely to be largely local and the risk of secondary impact such as erosion low. These can be developed with relatively low ecological impact provided that suitable mitigation and amelioration measures are taken.
- **High** – Areas of natural or transformed land where a high impact is anticipated due to the high biodiversity value, sensitivity or important ecological role of the area. Development within these areas is undesirable and should proceed extremely cautiously. Extensive mitigation measures may be necessary to reduce the ecological impact of development within these areas to an acceptable level.
- **Very High** – Critical and unique habitats that serve as habitat for rare/endangered species or perform critical ecological roles. These are essentially no-go areas from a development perspective and any direct or indirect impacts to these areas should be avoided as much as possible.

2.3 LIMITATIONS & ASSUMPTIONS

The current study is a desktop study and as such this imposes some limitations on the study. The study relies on existing information as available in the various spatial databases and coverages. In many cases, these databases are not intended for fine-scale use and the reliability and adequacy of these data sources relies heavily on the extent to which the area has been sampled in the past. Many rural areas have not been well sampled with the result that the species lists obtained for the site do not always adequately reflect the actual fauna and flora present at the site. Furthermore, the condition of the vegetation and the impact

of land use on the site cannot always be adequately judged from satellite imagery or aerial photography. Such influences can have a large impact on the sensitivity and composition of the fauna and flora present. In order to counter the likelihood that the area has not been well sampled in the past and in order ensure a conservative approach, the species lists derived for the site were obtained from an area significantly larger (quarter degree squares 3420AA, 3420AB, 3420BA) than the study area and are likely to include a much wider array of species than actually occur at the site. This is a cautious and conservative approach which takes the study limitations into account.

3 DESCRIPTION OF THE AFFECTED ENVIRONMENT

3.1 BROAD-SCALE VEGETATION PATTERNS

According to the national vegetation map, only two vegetation types would be impacted by the development (Figure 2); the majority of the site falls within the Eastern Ruens Shale Renosterveld vegetation type, with a small extent of Ruens Silcrete Renosterveld within Alternative D. At this stage, the most pertinent feature of these vegetation types is their conservation status, as both are classified as Critically Endangered. As such any further loss of these vegetation types is high undesirable and would constitute a high impact. As there is some remnant vegetation within the footprint of Site D, this is considered to be a fatal flaw associated with this site Alternative and on this basis, it must be eliminated as a viable alternative for the development, in its current location. There is no remnant vegetation within any of the other alternatives. Although the listed ecosystems layer shows some occasional pixels of intact vegetation, this is pioneer vegetation and invader shrubs along road verges or along fences and is not intact renosterveld. There is a large amount of transformed habitat in the area and as a result, there is no need for the substation to impact intact vegetation and there is ample space available in the area to ensure that it generates a low impact on the receiving environment.

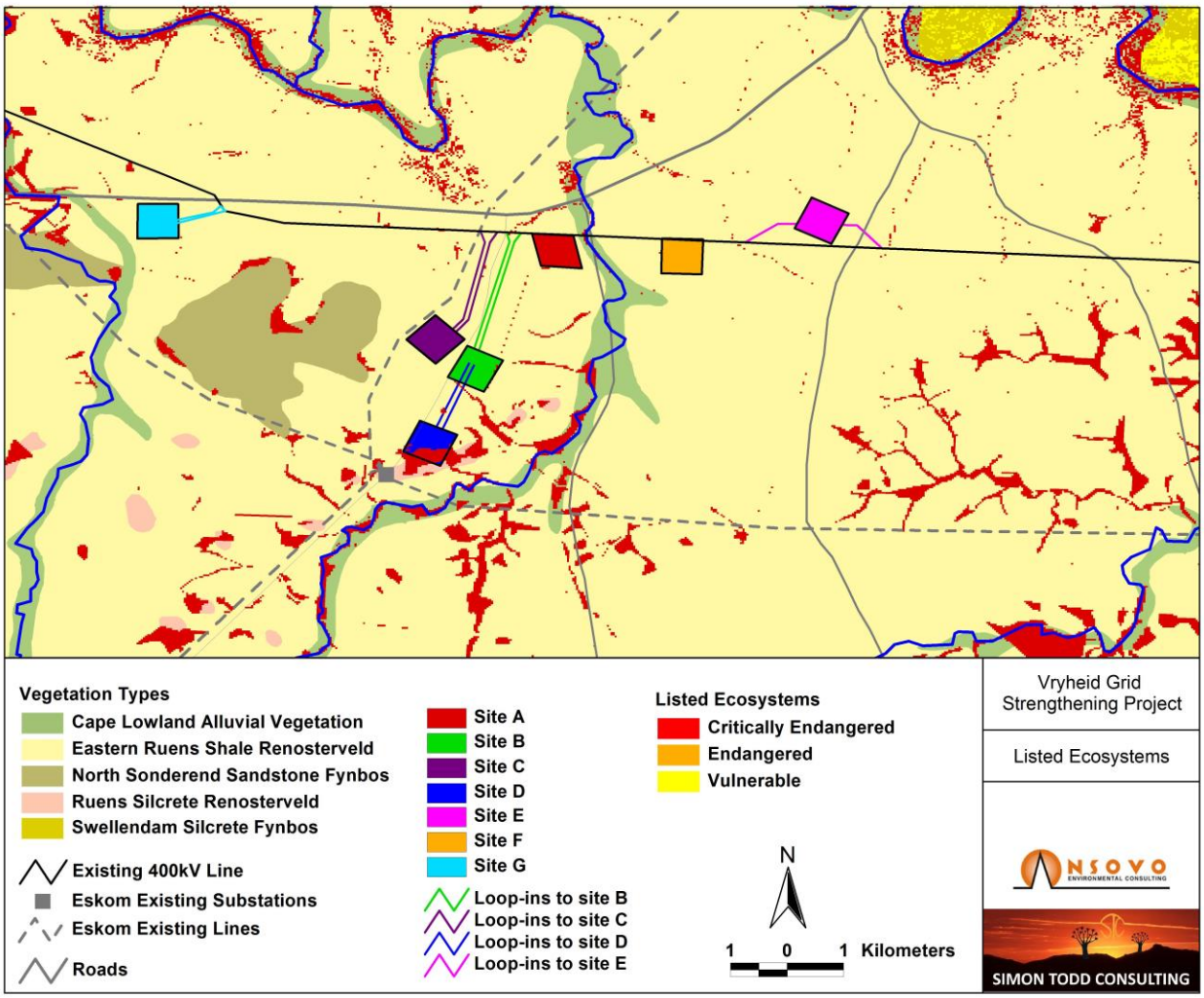


Figure 2. Vegetation map (Mucina and Rutherford 2006) of the Vryheid study area, showing the remaining extent of listed ecosystems as well. Only Site D has some intact vegetation remaining and this is considered to be fatal flaw associated with this alternative.

3.2 Listed & Protected Plant Species

According to the SANBI SIBIS database, more than 1000 indigenous species have been recorded from the quarter degree square containing the site. This includes 71 species of high conservation concern, illustrating the high diversity of the area as well as the high treat status faced by many species in the area. This results from the high level of transformation the area has experienced and the small population sizes and localized distributions that many species have been reduced to. As such, any additional impact to the intact remnants in the area are likely to impact listed species and any further loss of intact vegetation in the area is highly undesirable.

Table 1. Numbers of the species within the different conservation status categories as indicated below, data derived from the SANBI SIBIS database.

Status/ IUCN Red List Category	No. Species
Critically Endangered (CR)	**5**
Endangered (EN)	**31**
Vulnerable (VU)	**35**
Near Threatened (NT)	**27**
Rare	**9**
Declining	**6**
Data Deficient - Insufficient Information (DDD)	**2**
Data Deficient - Taxonomically Problematic (DDT)	**11**
Least Concern	**1006**
Total	**1131**

3.3 Critical Biodiversity Areas & Broad Scale Ecological Processes

The CBA map for the general area surrounding the site is depicted below in Figure 3. The CBA map corresponds closely with the remaining vegetation in the area and all remnant fragments have been classified as CBAs on account of the very high threat status of the remaining vegetation and the high biodiversity value of these areas. Only Site D contains and CBA and this site should either be scrapped or relocated outside of the intact vegetation and CBA. Provided that the substation is constructed on transformed habitat, then it is highly unlikely that the development would impact broad-scale ecological processes or the connectivity of the landscape. The majority of the landscape has already been highly impacted and the drainage lines represent the most important corridors remaining in the landscape, but would not be impacted by the current development.

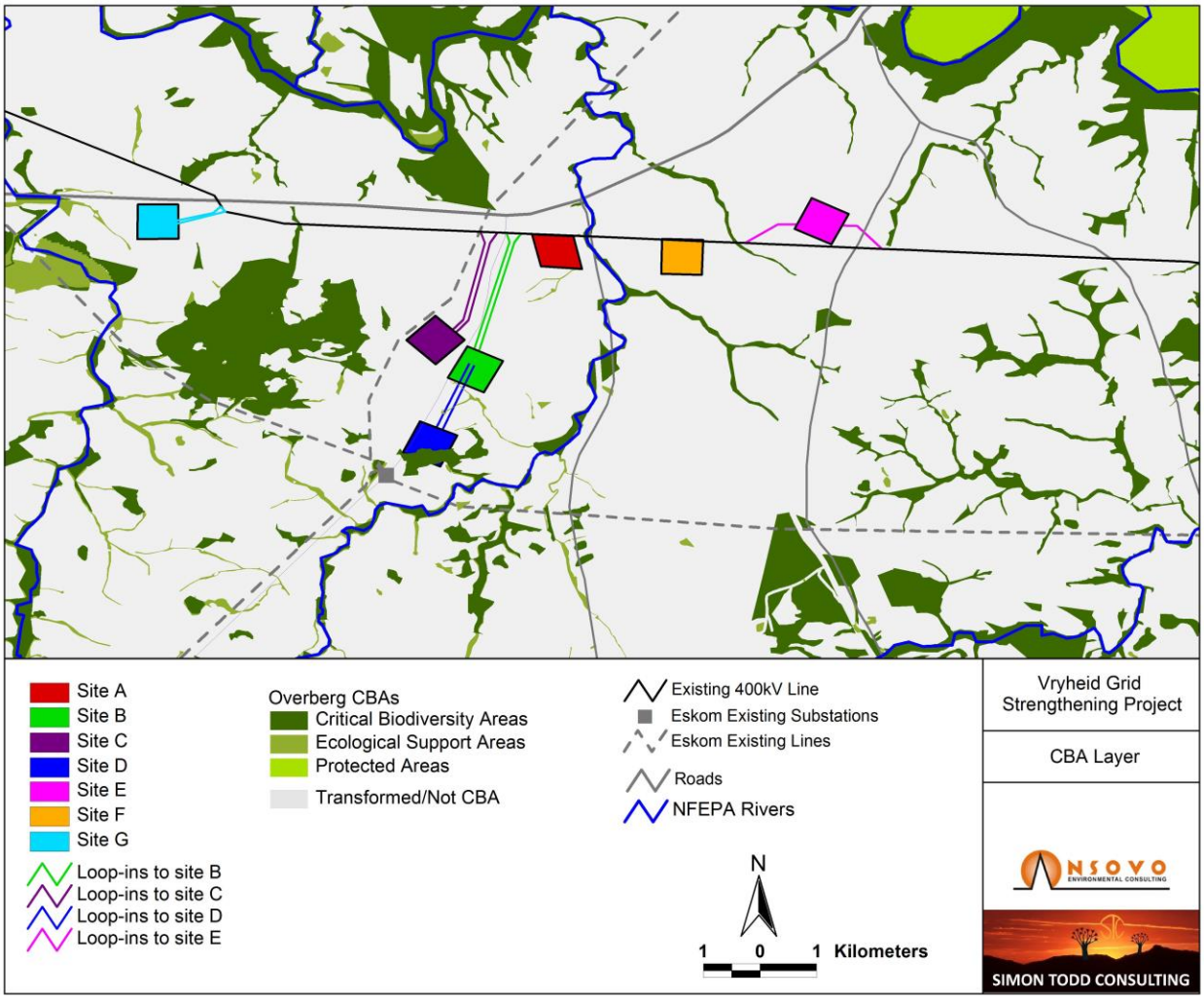


Figure 3. Critical Biodiversity Areas map of the area sound the Vryheid study site.

3.4 FAUNAL COMMUNITIES

Mammals

According to the MammalMap database, only 35 mammals have been recorded from the area, including several conservation dependent species such as Cape Mountain Zebra and Bontebok which would not be encountered in the study area. Given the high level of transformation the area has experienced, this relatively low total is not surprising. Three species of conservation concern occur in the wider area, the White-tailed Mouse *Mystromys albicaudatus* (Endangered), Leopard *Panthera pardus* (Near Threatened) and the Honey Badger *Mellivora capensis* (SA RDB Endangered). Given the high level of transformation and intensive agriculture in the area, it is highly unlikely that the Leopard occurs at the site, but both the White-tailed Mouse and Honey Badger potentially occur in the area, but would

be unlikely to frequent the transformed areas much as prey is too low or disturbance too high in these areas.

In the wider area, as many 50 mammal species may occur, but as the affected area is highy transformed, few of these would actually be present within the affected areas. Larger mammals observed to be present at the local area include Grey Rhebok *Pelea capreolus*, Steenbok *Raphicerus campestris*, Common Duiker *Sylvicapra grimmia*, Porcupine *Hystrix africaeaustralis* and Aardvark *Orycteropus afer*. Smaller mammals observed include Namaqua Rock Mouse *Aethomys namaquensis*, Bush Vlei Rat *Otomys unisulcatus*, Scrub Hare *Lepus saxatilis*, Cape Gerbil *Gerbilliscus afra*, Cape Grey Mongoose *Herpestes pulverulentus* and Marsh Mongoose *Atilax paludinosus*. As the intact habitats would be most important for these species, the development would have a low impact on these species as the loss of intact habitat would be very negligible.

Reptiles

According to the ReptileMap database, only 9 reptile species have been recorded from the quarter degree covering the site. Despite the high level of transformation in the area, this is an underestimate of the reptile richness of the area and according to the literature, as many as 35 reptile species may occur at the site. This is however still a comparatively low total suggesting that the site has a relatively depauperate reptile assemblage. Based on distribution maps and habitat requirements, the composition of the reptile fauna is likely to comprise 2 tortoises, 1 terrapin, 16 snakes, 14 lizards and skinks and 2 geckos. There are no listed species which are known to occur in the area. Species observed in the immediate area include the Cape Girdled Lizard *Cordylus cordylus* which is associated with rocky outcrops, the Angulate Tortoise *Chersina angulata*, Brown House Snake *Lamprophis capensis* and Cape Skink *Mabuya capensis* all of which occur within intact remnants. The most important habitats in the area for reptiles are likely to be rocky outcrops for lizards as well as the densely vegetated lowlands and areas around the drainage lines for snakes. As the development should be restricted to the transformed areas, the impact on reptiles would be low.

Amphibians

Fourteen frog species are known from the area, but this does not include any listed species and only a small proportion of these would be likely to occur within the affected area. The transformed areas are likely to be of very low important for frogs and frogs would only be impacted within intact areas through impact to their habitat through erosion or siltation and pollution due to runoff from the development during construction or operation.

3.5 SITE SENSITIVITY ASSESSMENT

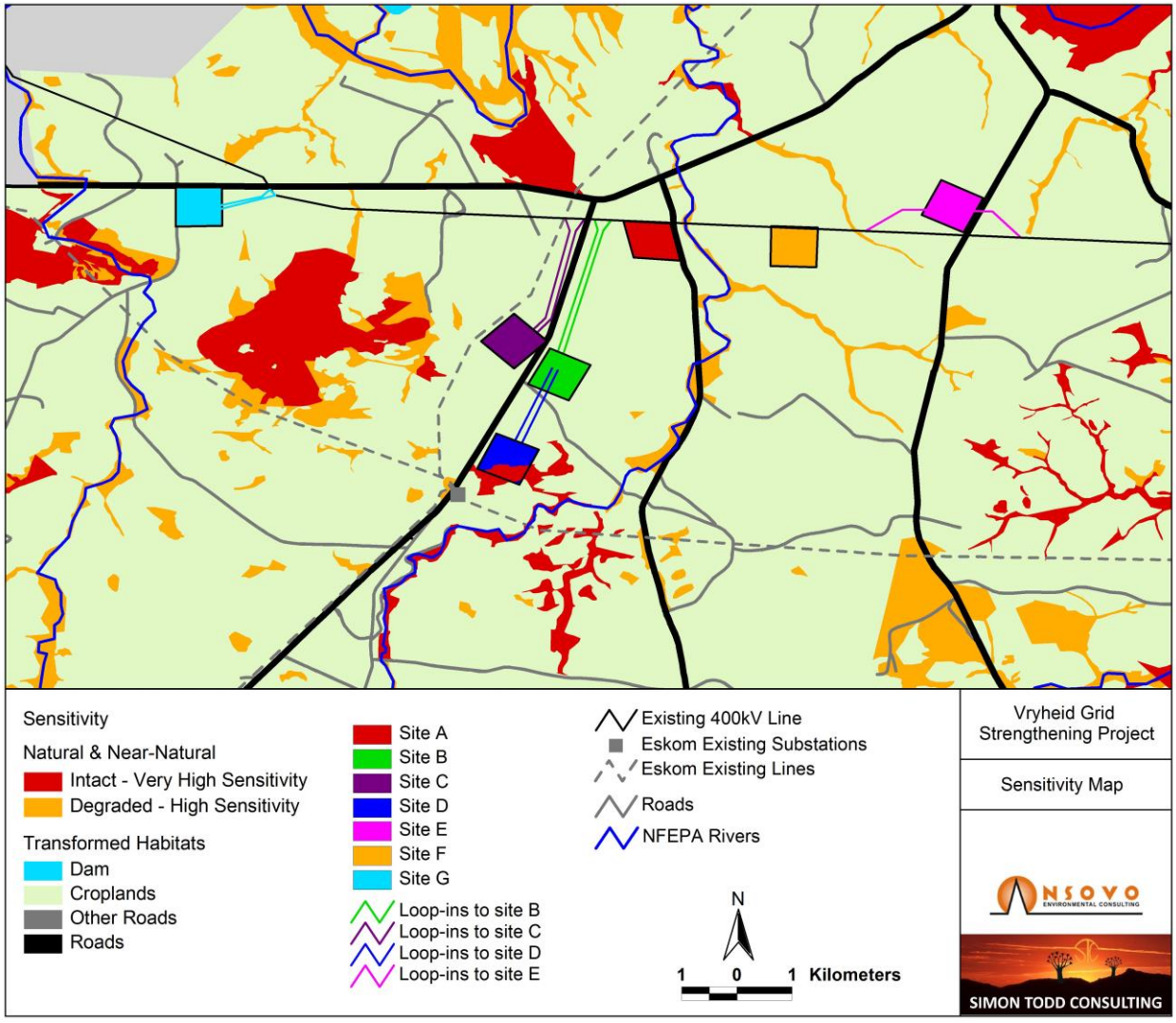


Figure 4. Ecological sensitivity map of the Vryheid study area, based on the transformation layer for the area.

The ecological sensitivity map of the site is depicted in Figure 4 above. All of the sites are within transformed habitat considered to be low sensitivity, except for Site D which contains some intact remnants of Ruens Silcrete Renosterveld which is Critically Endangered and considered Very High sensitivity. Due to the high conservation status of this vegetation type, this is considered a fatal flaw with this site and it should be scrapped or relocated to a less sensitive area. The remaining sites are all within transformed habitat and there is little to differentiate or distinguish them from one another in terms of their potential impact and the sensitivity of the affected area. As a result, those options close to the existing line or on

flat ground where the amount of disturbance required for construction would be low and erosion risk minimal are considered preferable.

4 IDENTIFICATION OF POTENTIAL IMPACTS AND ASSOCIATED ACTIVITIES

Potential ecological impacts resulting from the development of the Vryheid substation and grid strengthening would stem from a variety of different activities and risk factors associated with the preconstruction, construction and operational phases of the project potentially including the following:

Construction Phase

- Vegetation clearing for access roads, laydown areas and the substation site itself may impact intact vegetation.
- Increased erosion risk would occur due to the loss of plant cover and soil disturbance created during the construction phase. Some of the site options are steep and risk of erosion would be high. This may impact downstream riparian and wetland habitats if a lot of silt enters the drainage systems.
- Presence and operation of construction machinery on site. This will create a physical impact as well as generate noise, pollution and other forms of disturbance at the site.
- Increased human presence can lead to poaching, illegal plant harvesting and other forms of disturbance such as fire.

Operational Phase

- The operation of the facility will generate noise and disturbance which may impact some fauna.
- The presence of the facility may disrupt the connectivity of the landscape for some species which may impact their ability to disperse or maintain gene flow between subpopulations.
- The facility will require management and if this is not done appropriately, it could impact adjacent intact areas through impacts such as erosion, alien plant invasion and contamination from pollutants, herbicides or pesticides.

Cumulative Impacts

- The development would contribute to the cumulative fragmentation of the landscape and would potentially disrupt the connectivity of the landscape for fauna and flora and impair their ability to respond to environmental fluctuations.

4.1 IDENTIFICATION OF IMPACTS TO BE ASSESSED IN THE EIA PHASE

The likely impacts on the terrestrial ecology of the site resulting from the development of the Vryheid substation and loop in and loop out lines are identified and discussed below with reference to the characteristics and features of the site. The major risk factors and contributing activities associated with the development are identified and briefly outlined and summarized below before the impacts are assessed at the Scoping Level.

Potential Impact 1. *Impacts on vegetation and listed or protected plant species*

Only Site D contains any intact vegetation and this site is excluded from further consideration here, at the scoping phase as the presence of Critically Endangered vegetation within the footprint is seen as a fatal flaw. The remaining sites do not contain any intact vegetation and would not impact listed or protected plant species. As a result, this impact will not be assessed unless there is impact on intact vegetation.

Potential Impact 2. *Direct Faunal Impacts*

Increased levels of noise, pollution, disturbance and human presence during construction will be detrimental to fauna. Sensitive and shy fauna are likely to move away from the area during the construction phase as a result of the noise and human activities present, while some slow-moving species would not be able to avoid the construction activities and might be killed. Slower types such as tortoises, snakes and amphibians would be most susceptible and the impact would be largely concentrated to the construction phase when vehicle activity was high. Some mammals and reptiles would be vulnerable to illegal collection or poaching during the construction phase as a result of the large number of construction personnel that are likely to be present. Although faunal diversity within the transformed habitats would be low, some fauna are likely to be present and may be impacted. This impact will therefore be assessed for the development.

Potential Impact 3. *Increased Erosion Risk*

The large amount of disturbance created during construction would leave the site vulnerable to soil erosion, especially is any of the steeper sites are selected as the preferred alternative. The eroded material may enter streams and rivers at the site and may have significant impact on these systems through siltation of pools and changes in the chemistry and turbidity of the water. As this is a potential impact of the development, it will be assessed during the EIA phase.

Potential Cumulative Impact 1. *Cumulative impacts on broad-scale ecological processes*

The presence of the substation and daily activity at the site may deter certain species from the area, resulting in a loss in broad-scale landscape connectivity. The extent of this impact would depend on the location of the infrastructure in relation to intact vegetation or other

areas used for faunal movement. As this is a possible impact of the development, it will be assessed in the EIA

5 ASSESSMENT METHODOLOGY

The assessment methodology will be in accordance with the recent revised 2014 EIA regulations. The significance of environmental impacts is a function of the environmental aspects that are present and to be impacted on, the probability of an impact occurring and the consequence of such an impact occurring before and after implementation of proposed mitigation measures.

a) Extent (spatial scale):

Ranking criteria

L	M	H
Impact is localized within site boundary	Widespread impact beyond site boundary; Local	Impact widespread far beyond site boundary; Regional/national

b) Duration:

Ranking criteria

L	M	H
Quickly reversible, less than project life, short term (0-5 years)	Reversible over time; medium term to life of project (5-15 years)	Long term; beyond closure; permanent; irreplaceable or irretrievable commitment of resources

c) Intensity (severity):

Type of Criteria	Negative			Positive		
	H-	M-	L-	L+	M+	H+
Qualitative	Substantial deterioration, death, illness or injury, loss of habitat/diversity or resource, severe alteration or disturbance of important processes.	Moderate deterioration, discomfort, Partial loss of habitat/biodiversity/resource or slight or alteration	Minor deterioration, nuisance or irritation, minor change in species/habitat/ diversity or resource, no or very little quality deterioration.	Minor improvement, restoration, improved management	Moderate improvement, restoration, improved management, substitution	Substantial improvement, substitution
Quantitative	Measurable deterioration Recommended level will often be	Measurable deterioration Recommended level will	No measurable change; Recommended level will never	No measurable change; Within or	Measurable improvement	Measurable improvement

	violated (e.g. pollution)	occasionally be violated	be violated	better than recommended level.		

d) Probability of occurrence:

Ranking criteria

L	M	H
Unlikely; low likelihood; Seldom No known risk or vulnerability to natural or induced hazards.	Possible, distinct possibility, frequent Low to medium risk or vulnerability to natural or induced hazards.	Definite (regardless of prevention measures), highly likely, continuous High risk or vulnerability to natural or induced hazards.

e) Status of the impact:

Describe whether the impact is positive, negative or neutral for each parameter. The ranking criteria are described in negative terms. Where positive impacts are identified, use the opposite, positive descriptions for criteria.

Based on a synthesis of the information contained in (a) to (e) above, the specialist will be required to assess the significance of potential impacts in terms of the following criteria:

f) Significance: (Duration X Extent X Intensity)

Intensity = L				
Duration	**H**			
	M			Medium
	L	Low		
Intensity = M				
Duration	**H**			High
	M		Medium	
	L	Low		
Intensity = H				
Duration	**H**			
	M			High
	L	Medium		
		L	M	H
		Extent		

Positive impacts would be ranked in the same way as negative impacts, but result in high, medium or low positive consequence.

g) Degree of confidence in predictions:

State the degree of confidence in the predictions, based on the availability of information and specialist knowledge.

h) Significance Table Format:

Example of how significance tables should be formatted.

	Extent	Duration	Intensity	Status	Significance	Probability	Confidence
Without Mitigation							
With Mitigation							

6 SCOPING ASSESSMENT OF IMPACTS

A preliminary assessment of the likely extent and significance of each impact identified above is made below. It is however important to note that this a scoping assessment and represents the potential significance of impacts which may change substantially in the EIA depending on the mitigation and avoidance measures that are implemented by the developer in response to the sensitivity maps and site attributes reported here.

Impact 1. *Direct faunal impacts during Construction*

Impact Phase: Construction							
Impact Description: Direct faunal impacts due to construction phase noise and physical disturbance.							
	Extent	**Duration**	**Intensity**	**Status**	**Significance**	**Probability**	**Confidence**
Without Mitigation	**M**	**M**	**M**	**-'tve**	**Medium**	**H**	**High**
With Mitigation	**L**	**M**	**L**	**-'tve**	**Low**	**H**	**High**
Can the impact be reversed?		Construction phase disturbance will be transient and no long-term impacts are likely					
Will impact cause irreplaceable loss or resources?		No					
Can impact be avoided, managed or mitigated?		Some mitigation is possible, but noise and construction phase disturbance cannot be easily avoided.					
Mitigation measures to reduce residual risk or enhance opportunities: 1) Avoid sensitive faunal habitats such as drainage lines and wetlands. 2) A variety of avoidance and mitigation measures to reduce impact on fauna will need to be implemented during construction, including limiting impacts from construction staff and the							

operation of construction vehicles. 3)	
Impact to be addressed/ further investigated and assessed in Impact Assessment Phase?	Yes, the fauna present at the site will be characterized and any sensitive species or habitats in the study area identified.

Impact 2. *Direct faunal impacts during Operation*

Impact Phase: Operation							
Impact Description: Faunal impacts due to operational phase activities.							
	Extent	**Duration**	**Intensity**	**Status**	**Significance**	**Probability**	**Confidence**
Without Mitigation	**L**	**M**	**M**	**-'tve**	**Low**	**L**	**High**
With Mitigation	**L**	**M**	**L**	**-'tve**	**Low**	**L**	**High**
Can the impact be reversed?	The impact will persist for the lifespan of the facility.						
Will impact cause irreplaceable loss or resources?	No.						
Can impact be avoided, managed or mitigated?	Yes.						
Mitigation measures to reduce residual risk or enhance opportunities: 1) Ensure than management and maintenance activities are favourable for fauna. 2) 3)							
Impact to be addressed/ further investigated and assessed in Impact Assessment Phase?	Yes, the potential for long-term impact on fauna is possible and will need to be assessed during the EIA.						

Impact 3. *Soil Erosion Risk*

Impact Phase: Operation							
Impact Description: Following construction, the site will be highly vulnerable to soil erosion							
	Extent	**Duration**	**Intensity**	**Status**	**Significance**	**Probability**	**Confidence**
Without Mitigation	**M**	**M**	**M**	**-'tve**	**Medium**	**M**	**High**
With Mitigation	**L**	**L**	**L**	**-'tve**	**Low**	**L**	**High**
Can the impact be reversed?	With appropriate mitigation the impact can be ameliorated						
Will impact cause irreplaceable loss or resources?	The loss of large amounts to topsoil would potentially be an irreplaceable loss of resources.						
Can impact be avoided, managed or mitigated?	With appropriate control measures, erosion risk can be mitigated						
Mitigation measures to reduce residual risk or enhance opportunities: 1) Runoff management and erosion control should be integrated into the project design							

2) Development on steep slopes should be avoided as much as possible. 3)	
Impact to be addressed/ further investigated and assessed in Impact Assessment Phase?	Yes. As this a highly likely potential impact, it will be assessed in the EIA phase

Impact 4. *Impact on Broad-Scale Ecological Processes*

Impact Phase: Operation							
Impact Description: Cumulative impact on broad scale ecological processes							
	Extent	**Duration**	**Intensity**	**Status**	**Significance**	**Probability**	**Confidence**
Without Mitigation	**M**	**M**	**M**	**-'tve**	**Medium**	**M**	**High**
With Mitigation	**L**	**M**	**L**	**-'tve**	**Low**	**L**	**High**
Can the impact be reversed?		The impact would last for the lifetime of the development					
Will impact cause irreplaceable loss or resources?		No					
Can impact be avoided, managed or mitigated?		Yes					
Mitigation measures to reduce residual risk or enhance opportunities: 1) Minimise the development footprint and avoid any disturbance near to intact vegetation or drainage lines 2) 3)							
Impact to be addressed/ further investigated and assessed in Impact Assessment Phase?		Yes. The habitats at the site will need to be verified in the field the potential impact of the development considered in this light.					

7 PROPOSED ACTIVITIES FOR THE EIA PHASE

The current study is restricted largely to a desktop assessment and some additional fieldwork during the EIA phase will be required once the final site has been chosen. The EIA plan of study for the will include the following studies and activities:

- Ground-truth and refine the ecological sensitivity map of the site. Particular attention will be paid to the presence of any intact remnant vegetation at the site and any other areas of potential importance such as drainage lines.
- Verify that there are no listed or protected plant species within or near the development footprint. Any such features located will be mapped in the field.

- Assess whether there are any fauna in the area which would be particularly vulnerable to impact from the development and identify any appropriate mitigation and avoidance measures which would be applicable to such species.
- Evaluate, based on the site attributes, what the most applicable mitigation measures to reduce the impact of the development on the site would be and if there are any areas where specific precautions or mitigation measures should be implemented.
- Assess the impacts identified above in light of the site-specific findings and the final layout to be provided by the developer.
- At this stage the following impacts have been identified as being of potential significance and will be assessed in the EIA:
    - Faunal impacts during construction
    - Faunal impacts during operation
    - Soil erosion risk
    - Impact on broad-scale ecological processes.

8 CONCLUSIONS & RECOMMENDATIONS

The Vryheid study site contains some features of very high sensitivity including several Critically Endangered vegetation types. Further habitat loss within these ecosystems would be considered a fatal flaw and as such, Site D is considered not viable as the result of the presence of some intact Ruens Silcrete Renosterveld within the proposed footprint. This site should be eliminated as an option at the EIA stage or relocated to a less sensitive area. The remaining sites are however all within transformed areas, where the impacts on biodiversity area likely to be low. Due to the high levels of transformation the area has experienced, there is a lot of opportunity for development within transformed areas considered to be of low sensitivity and impact to sensitive features can be easily avoided. Overall, provided that the intact vegetation remnants at the site can be avoided, there do not appear to be any highly significant impacts that would be associated with the development.

In terms of the different options apart from Site D, there is little to differentiate the remaining sites in terms of sensitivity or potential impact. The proximity to the existing 400kV line and the slope of the site are considered deciding factors at this point and as such, the ecological preference of a site for the development would be as follows, in descending order of preference: Site A, Site F, Site G, Site E, Site B, Site C and Site D is not considered viable.

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