



DIGBY WELLS
ENVIRONMENTAL



Environmental Impact Assessment for Eskom's Northern KwaZulu-Natal Strengthening Project

Fauna and Flora Screening Assessment

Project Number:

ILI3864

DEA Reference:

14/12/16/3/3/2/1036 – Normandie-Iphiva 400 kV Powerline

14/12/16/3/3/2/1037 – Iphiva Substation

14/12/16/3/3/2/1038 – Iphiva-Duma 400 kV Powerline

Prepared for:

NAKO ILISO

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Project Name:	Environmental Impact Assessment for Eskom's Northern KwaZulu-Natal Strengthening Project
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EXECUTIVE SUMMARY

ILISO Consulting (Pty) Ltd, trading as NAKO ILISO, appointed Digby Wells Environmental (hereinafter Digby Wells) in respect of the Eskom Holdings SOC Ltd (hereinafter Eskom) Northern KwaZulu-Natal (KZN) Strengthening Project. The Project will entail four separate applications for Environmental Authorisation (EA) comprising:

- A new Iphiva Substation;
- Establishment of 132 kV Distribution lines;
- The Iphiva – Duma 400 kV Powerline; and
- The Normandie – Iphiva 400 kV Powerline.

The Terms of Reference (ToR) of this fauna and flora screening and comparative specialist study was to evaluate the presence of sensitive species and landscapes/habitat present that could be affected by the various options available for the project infrastructure. Thereafter to determine the preliminary impacts on these natural resources and recommend mitigation measures to alleviate negative impacts.

The consideration of alternative for the project infrastructure, from a biodiversity perspective, centred on the ecological sensitivity present in each alternative, this approach is discussed below.

In terms of ecological sensitivity, the following features are assessed to determine how sensitive the habitats identified within the alternatives are:

- Presence or absence of Red Data or protected plant and animal species;
- Presence or absence of exceptional species diversity;
- Extent of intact habitat in good ecological condition in the absence of disturbance; and
- Presence or absence of important ecosystems such as Protected Areas, areas demarcated for future protected area status (NPAES) and wetlands.

The results of the comparison of alternatives demonstrated the following preferred options from a fauna and flora perspective:

1. Iphiva 6 Substation;
2. West routing alternative for the Iphiva-Makhathini / Iphiva-Mbazwane distribution line;
3. All above ground design options for the 132 kV distribution line along the P234 corridor;
4. Iphiva – Duma West 1, with no issues being identified with regards to the deviation; and
5. Normandie – Iphiva 2 400 kV alternative, with no issues being identified with regards to the deviation.

Based on Digby Wells' understanding of the Project and the results of this assessment, the following recommendations/mitigations were suggested:

- A walk through of the selected alignment as well as tower positions should be conducted by a suitable qualified botanist as well as zoologist in order to ascertain for the presence of any threatened, protected, endemic or plant or animal species of special concern within or in close proximity to the construction areas (tower supports) for the presence of any animal burrows (including spiders and scorpions), rocky outcrops, logs, stumps and other debris and relocate any affected animals to appropriate habitat away from the servitude or tower.
- Protected trees within the servitude will necessitate that appropriate permits are applied for before these trees are damaged or removed.
- General mitigation measures would include the avoidance of any physical damage to natural vegetation on the periphery of the proposed servitude and is of particular importance in all riparian areas and areas of steep slopes.
- Water Use Licences/Registrations must be obtained for any construction in a regulated area (below 1:00 floodline or 100 m from water course and 500 m from a wetland).
- No hunting permitted by Eskom employees or contractors.
- All construction areas should be demarcated prior to construction to ensure that the footprint of impacts are limited.
- All alien invasive species on site should be removed and follow up monitoring and removal programmes should be initiated once construction is completed.
- Adhere to the Eskom vegetation management guideline.
- The ECO should identify any sensitive species or habitats along the servitude, particularly in relation to large terrestrial species and notify the faunal specialist of these so that he can advise on how best to handle these.
- The construction of new access roads should be limited.
- All vehicle and pedestrian movement should be restricted to the actual construction site and servitude.
- Removal of plants should be restricted to only those trees that pose a risk to the power line.
- Sensitive alluvial vegetation should be avoided and construction restricted within 50m from the edge of an endangered habitat.

DECLARATION

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I, Rudi Greffrath as duly authorised representative of Digby Wells and Associates (South Africa) (Pty) Ltd., hereby confirm my independence (as well as that of Digby Wells and Associates (South Africa) (Pty) Ltd.) and declare that neither I nor Digby Wells and Associates (South Africa) (Pty) Ltd. have any interest, be it business, financial, personal or other, in any proposed activity, application or appeal in respect of Eskom SOC Ltd, other than fair remuneration for work performed, specifically in connection with the Fauna and Flora management process proposed for the Eskom Northern KwaZulu-Natal Strengthening Project, located in KwaZulu-Natal Province.



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Experience (Years):	12
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Compliance with Appendix 6 of GN 326 of 7 April 2017

Regulatory Requirements	Section of Report
(a) The person who prepared the report; and the expertise of that person to carry out the specialist study or specialised process.	Appendix A
(b) a declaration that the person is independent	Page iii
(c) an indication of the scope of, and the purpose for which, the report was prepared	Section 5.1
(cA) an indication of the quality and age of base data used for the specialist report	Section 5
(cB) a description of existing impacts on the site, cumulative impacts of the proposed development and levels of acceptable change	Section 6
(d) the duration, date and season of the site investigation and the relevance of the season to the outcome of the assessment	Section 5.3
(e) a description of the methodology adopted in preparing the report or carrying out the specialised process inclusive of equipment and modelling used	Section 4
(f) details of an assessment of the specific identified sensitivity of the site related to the proposed activity or activities and its associated structures and infrastructure, inclusive of a site plan identifying site alternatives	Section 5.2 and 5.4, Section 7
(g) an identification of any areas to be avoided, including buffers	Section 5
(h) a map superimposing the activity including the associated structures and infrastructure on the environmental sensitivities of the site including areas to be avoided, including buffers	Section 7
(i) a description of any assumptions made and any uncertainties or gaps in knowledge	Section 3
(j) a description of the findings and potential implications of such findings on the impact of the proposed activity or activities	Section 9
(k) any mitigation measures for inclusion in the EMPr	Section 9
(l) any conditions for inclusion in the environmental authorisation	Section 9
(m) any monitoring requirements for inclusion in the EMPr or environmental authorisation	Section 6, 9



Regulatory Requirements	Section of Report
(n) a reasoned opinion— (i) whether the proposed activity, activities or portions thereof should be authorised; (iA) regarding the acceptability of the proposed activity or activities; and (ii) if the opinion is that the proposed activity, activities or portions thereof should be authorised, any avoidance, management and mitigation measures that should be included in the EMPr, and where applicable, the closure plan	
(o) a description of any consultation process that was undertaken during the course of preparing the specialist report	Section 8
(p) a summary and copies of any comments received during any consultation process and where applicable all responses thereto	Section 8
(q) any other information requested by the competent authority	

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1 Introduction

ILISO Consulting (Pty) Ltd, trading as NAKO ILISO, appointed Digby Wells Environmental (hereinafter Digby Wells) in respect of the Eskom Holdings SOC Ltd (hereinafter Eskom) Northern KwaZulu-Natal (KZN) Strengthening Project.

This fauna and flora report forms part of the EIA process and aims to comply with National and Provincial legislation with regards to biodiversity conservation. Furthermore, it will identify rate and provide mitigation measures for impacts that arise from the project activities as they are outlined in this document.

1.1 Project Background

Transmission powerlines transport electricity generated at power stations to predetermined locations. Over extended distances, transmission substations are required. At present, the Normandie and Impala Main Transmission Substations, approximately 80 km north-west of Pongola and 180 km south of Makhatini Flats respectively, supply northern KZN network. With an increase in electricity demand in this region of KZN, voltages are approaching unacceptable low levels. Furthermore, the network is experiencing high voltage drops and thermal loading of the remaining network due to the contingencies on the main 132 kilovolt (kV) supplies.

Eskom recognises these constraints to the current network, and have proposed the implementation of the Northern KZN Strengthening Project (*“the Project”*), as described in Section **Error! Reference source not found.** For this Project to be realised, Eskom is required to undertake an Environmental Authorisation (EA) process in terms of Section 24 of the National Environmental Management Act, 1998 (Act No. 107 of 1998) (NEMA).

1.2 Project Description

The intent of the Project is to “de-load” the primary sub-transmission network and improve voltage regulation to alleviate existing and future network constraints in northern KZN.

To achieve this strategic objective, Eskom plans to construct the new Iphiva 400/132 kV Substation near the town of Mkuze, which will be integrated into the 400 kV network by two 400 kV lines. These will comprise the following:

- The 120 km Normandie – Iphiva 400 kV powerline; and
- The 130 km Iphiva - Duma 400 kV powerline.

To accommodate the towers and overhead lines of the 400 kV Transmission powerlines, a 55 m servitude (27.5 m on either side of the centre line) is required. The servitude is required to ensure safe construction, maintenance and operation of the line and Eskom will be entitled to unrestricted access. Where 400 kV power lines are constructed in parallel, a minimum separation distance of 55 m between centre points is required.



In addition to the two 400 kV lines, 165 km of 132 kV Distribution power lines will also link into the Iphiva Substation.

The various components of this Project are presented separately below.

1.2.1 Iphiva Substation (Ref. No. 14/12/16/3/3/2/1037)

A substation must be situated within proximity to an existing network, in this instance the existing 132 kV KZN network. It is envisaged that a total footprint of 400 x 400 m (i.e. 16 ha) will be required for the development footprint, within a site-specific study area of 1 x 1 km. The 16 ha development footprint area includes provisions for an 80 m high microwave radio communication mast, oil and fuel storage facilities, and an oil bund to contain any accidental transformer oil spills.

The proposed substation will comprise standard electrical equipment, including but not limited to:

- Transformers;
- Reactors;
- Busbars; and
- Isolators.

In respect of this Project, two (2) alternate locations were considered. These comprised Iphiva 3A and 6 respectively. The substation will accommodate three (2) 400 kV and seven (7) 132 kV powerlines entering / leaving the site in various directions¹. Construction of the substation will include:

- Vegetation clearing;
- Surface clearing, levelling and terracing;
- Laying of concrete foundations and other applicable works such as storm water drainage pipes, slabs, bund walls, control room and storage facilities;
- Erection of steelworks;
- Delivery and installations of transformers; and
- Upgrade of access roads, and where applicable, water crossings.

Based on the proposed activities, the Listed Activities as presented in **Error! Reference source not found.** will be triggered.

¹ The routing of the 400 and 132 kV lines will be determined based on the authorisation of the final siting of the Iphiva Substation at either the proposed Iphiva 3 or Iphiva 6 alternatives.


Table 1-1: Applicable Listed Activities relative to the Iphiva Substation

Listing Notice	Activity	Description
GN R 983 (as amended by GN R 327)	11	<p>The development of facilities or infrastructure for the transmission and distribution of electricity – (i) outside urban areas or industrial complexes with a capacity of more than 33 but less than 275 kV or (ii) inside urban areas or industrial complexes with a capacity of 275 kV or more excluding the development of bypass infrastructure for the transmission and distribution of electricity where such bypass infrastructure is –</p> <ul style="list-style-type: none"> (a) temporarily required to allow for maintenance of existing infrastructure; (b) 2 kilometres or shorter in length; (c) within an existing transmission line servitude; and (d) will be removed within 18 months of the commencement of development.
	14	Development and related operation facilities or infrastructure, for the storage, or for the storage and handling, of a dangerous good, where such storage occurs in containers with a combined capacity of 80 cubic metres or more but not exceeding 500 cubic metres.
	24	The development of a road (ii) with a reserve wider than 13.5 metres, or where no reserve exists where the road is wider than 8 metres.
	28	Institutional developments wherever such land was used for agriculture, game farming, equestrian purposes or afforestation after 1 April 1998, outside an urban area where the total land is bigger than 1 hectare.
GN R 984 (as amended by GN R 325)	9	<p>The development of facilities or infrastructure for the transmission and distribution of electricity with a capacity of 275 kV or more, outside an urban area or industrial complex excluding the development of bypass infrastructure for the transmission and distribution of electricity where such bypass infrastructure is –</p> <ul style="list-style-type: none"> (a) temporarily required to allow for maintenance of existing infrastructure; (b) 2 kilometres or shorter in length; (c) within an existing transmission line servitude; and (d) will be removed within 18 months of the commencement of development.



Listing Notice	Activity	Description
GN R 985 (As amended by GN R 324)	3	<p>The development of masts or towers of any type used for telecommunication broadcasting or radio transmission purposes where the mast or tower- (a) is to be placed on a site not previously used for this purpose; and (b) will exceed 15 meters in height – but excluding attachments to existing buildings and masts on rooftops. (d) In KwaZulu-Natal (ii) Community Conservation Areas; (iii) Biodiversity Stewardship Programme Biodiversity Agreement areas; (iv) A protected area identified in terms of NEMPAA, excluding conservancies; (vi) Sites or areas identified in terms of an International Convention; (vii) Critical Biodiversity areas as identified in systemic biodiversity plans adopted by the competent authority or bioregional plans; (viii) Core areas in Biosphere Reserves; (ix) Areas designated for conservation use in Spatial Development Frameworks adopted by competent authority or zoned for conservation purpose; (xi) Sensitive areas as identified in an environmental management framework as contemplated in Chapter 5 of the Act and as adopted by the competent authority; (xii) Outside urban areas (bb) Areas within 10 kilometres from national parks or world heritage sites or 5 kilometres from any terrestrial protected area identified in terms of NEMPAA or from the core areas of a biosphere reserve.</p>
	4	<p>Development of a road wider than 4 m with a reserve less than 13,5 metres. (d) In KwaZulu-Natal (iii) Community Conservation Areas; (v) Biodiversity Stewardship Programme Biodiversity Agreement areas; (vi) A protected area identified in terms of NEMPAA, excluding conservancies; (vii) Sites or areas identified in terms of an International Convention; (viii) Critical Biodiversity areas as identified in systemic biodiversity plans adopted by the competent authority or bioregional plans; (ix) Core areas in Biosphere Reserves; (x) Areas designated for conservation use in Spatial Development Frameworks adopted by competent authority or zoned for conservation purpose; (xi) Sensitive areas as identified in an environmental management framework as contemplated in Chapter 5 of the Act and as adopted by the competent authority; (xii) Outside urban areas (i) Areas within 10 kilometres from national parks or world heritage sites or 5 kilometres from any other protected area identified in terms of NEMPAA or from the core areas of a biosphere reserve.</p>
	12	<p>Clearance of an area of 300 m² or more of indigenous vegetation except where such clearance of indigenous vegetation is required for maintenance purposes undertaken in accordance with a maintenance plan. In (d) KwaZulu-Natal: (ii) community conservation areas; (iv) within any critically endangered or endangered ecosystem listed in terms of section 52 of the NEMBA or prior to the publication of such a list, within an areas that has been identified as critically endangered in</p>



Listing Notice	Activity	Description
		<p>the National Spatial Biodiversity Assessment 2004; (v) Critical biodiversity areas as identified is systemic biodiversity plans adopted by the competent authority or in bioregional plans; (vii) On land, where, at the time of the coming into effect of this Notice or thereafter such land was zoned open space, conservation or had an equivalent zoning; (viii) A protected area identified in terms of NEMPAA, excluding conservancies; (xi) Areas designated for conservation use in Spatial Development Frameworks adopted by competent authority or zoned for a conservation purpose; (xii) Sensitive areas as identified in an environmental management framework as contemplated in chapter 5 of the Act and as adopted by the competent authority.</p>



1.2.2 132 kV Distribution line alternatives

Eskom will at a later stage, submit an application for environmental authorisation for the establishment of 132 kV Distribution powerlines as part of the greater Project. Therefore, these are being considered in this report to provide a holistic assessment of the potential fauna and flora impacts to be considered as a condition of authorisation.

Eskom are considering six (6) 132 kV Distribution powerlines. These will comprise the following routings:

- Iphiva – Pongola (1) 132 kV powerline to tie in with the existing powerline, double circuit with Iphiva / Hluhluwe;
- Iphiva – Pongola (2) 132 kV powerline;
- Iphiva / Makhathini 132 kV powerline double circuit with Iphiva / Mbazwane;
- 132 kV powerline loop-in to Candover Switching Station from the existing Impala / Normandie Line²

Eskom will apply for the environmental authorisation of 500 m corridors within which the 132 kV Distribution powerlines will occupy a 36 m wide servitude. The associated towers will be placed between roughly 250 – 400 m apart, ranging in heights between 25 – 40 m.

Construction of the 132 kV Distribution powerlines will include:

- Establishment of a contractor site along the route alignments;
- Access road negotiation and construction;
- Survey and pegging of the tower positions;
- Fencing and gate installation;
- Vegetation clearing;
- Foundation excavation and installation;
- Tower assembly and erection;
- Conductor stringing and tensioning; and
- Servitude clean-up and rehabilitation.

Based on the proposed activities, the Listed Activities as presented in **Error! Reference source not found.** will be triggered.

² This line is temporary and will be removed once the Iphiva Substation and new Iphiva / Normandie Line are commissioned.


Table 1-2: Applicable Listed Activities relating to the 132 kV Distribution Lines

Listing Notice	Activity	Description	
GN R 983 (as amended by GN R 327)	11	<p>The development of facilities or infrastructure for the transmission and distribution of electricity – (i) outside urban areas or industrial complexes with a capacity of more than 33 but less than 275 kV or (ii) inside urban areas or industrial complexes with a capacity of 275 kV or more excluding the development of bypass infrastructure for the transmission and distribution of electricity where such bypass infrastructure is –</p> <ul style="list-style-type: none"> (a) temporarily required to allow for maintenance of existing infrastructure; (b) 2 kilometres or shorter in length; (c) within an existing transmission line servitude; and (d) will be removed within 18 months of the commencement of development. 	
	19	The infilling or depositing of any material of more than 10 cubic meters into, or the dredging, excavation, removal or moving of soil, sand, shells, shell grit, pebbles or rock of more than 10 cubic metres from – (i) a watercourse.	
	28	Institutional developments wherever such land was used for agriculture, game farming, equestrian purposes or afforestation after 1 April 1998, outside an urban area where the total land is bigger than 1 hectare.	
	56	The widening of a road by more than 6 meters, or the lengthening of a road by more than 1 kilometre- (i) where the existing road reserve is 13,5 meters; or (ii) where no reserve exists, where the existing road is wider than 8 meters; excluding where widening or lengthening occur inside and urban area.	
GN R 985 (As amended by GN R 324)	4	Development of a road wider than 4 m with a reserve less than 13,5 metres. (d) In KwaZulu-Natal (iii) Community Conservation Areas; (v) Biodiversity Stewardship Programme Biodiversity Agreement areas; (vi) A protected area identified in terms of NEMPAA, excluding conservancies; (vii) Sites or areas identified in terms of an International Convention; (viii) Critical Biodiversity areas as identified in systemic biodiversity plans adopted by the competent authority or bioregional plans; (ix) Core areas in	



Listing Notice	Activity	Description	
		Biosphere Reserves; (x) Areas designated for conservation use in Spatial Development Frameworks adopted by competent authority or zoned for conservation purpose; (xi) Sensitive areas as identified in an environmental management framework as contemplated in Chapter 5 of the Act and as adopted by the competent authority; (xii) Outside urban areas (i) Areas within 10 kilometres from national parks or world heritage sites or 5 kilometres from any other protected area identified in terms of NEMPAA or from the core areas of a biosphere reserve.	

1.2.3 Iphiva-Duma 400 kV (Ref. No. 14/12/16/3/3/2/1038)

The Iphiva – Duma 400 kV powerline will extend over a 130 km routing in the southern portion of the overall study area. Three technically feasible alternative routing options were considered in this assessment, namely the eastern, west 1 and west 2 corridors. The overhead powerline will be supported by towers positioned within a 55 m servitude³. Possible tower types⁴ that may be considered for this Project include:

- Cross rope;
- Self-supporting; and
- Guyed vee.

Construction of the powerline will include:

- Establishment of a contractor site along the route alignment;
- Access road negotiation and construction;
- Survey and pegging of the tower positions;
- Fencing and gate installation;
- Vegetation clearing;
- Foundation excavation and installation;

³ The servitude will allow for clearance of 27.5 m on either side of the centre line of the powerline. Where constructed in parallel, a minimum distance of 55 m between the centre points is required. The minimum vertical clearance distance between the ground and powerline conductor is 8.1 m.

⁴ Eskom will determine the tower type after establishing the final routing alignment and associated profiling with the necessary environmental authorisations. Please refer to the Scoping Report and EIA for detailed descriptions of the various tower types.

- Tower assembly and erection;
- Conductor stringing and tensioning; and
- Servitude clean-up and rehabilitation.

Eskom will require contractors' construction camps along the routing of the powerline during construction activities. The proponent will determine and negotiate the exact position of these with the relevant landowners after issuing of environmental authorisation of the final alignment. As far as possible, contractors will use the existing road network. Where the national regulatory framework requires additional authorisations for the construction of new roads, these will be included within the Environmental Management Programme (EMPr) as a condition of authorisation and obtained during the implementation phase prior to construction of the relevant Project component. Eskom will negotiate the various access points and road alignments the relevant landowners after issuing of environmental authorisation of the final alignment.

The individual towers will be placed on foundations. The type of foundation required however, is dependent on the geo-technical conditions of the final siting and the type of tower used. The foundations may be drilled, mechanically excavated or dug by hand, and filled with concrete. Any incomplete excavations will be protected to prevent injury of both animals and individuals, but will ultimately be back-filled and stabilised through compaction and capped with concrete.

The contractors will assemble the towers on site and lift it into place using cranes, or where required, helicopters. The conductors are then strung between the towers by lacing cable drums at 5 km intervals and passing the cables via guide wire through the desired position in 2.5 km intervals in each direction.

During operation, Eskom will undertake ongoing monitoring and maintenance in accordance with their "Life Cycle Management Plan for Transmission Overhead Lines" (*Ref: TBP41-367*).

Based on the proposed activities, the Listed Activities as presented in **Error! Reference source not found.** will be triggered.


Table 1-3: Applicable Listed Activities relative to the Iphiva – Duma 400 kV

Listing Notice	Activity	Description
GN R 983 (as amended by GN R 327)	19	The infilling or depositing of any material of more than 10 cubic meters into, or the dredging, excavation, removal or moving of soil, sand, shells, shell grit, pebbles or rock of more than 10 cubic metres from – (i) a watercourse.
	24	The development of a road for which an environmental authorisation was obtained for the route determination in terms of activity 5 in Government Notice 387 of 2006 or activity 18 in Government Notice 545 of 2010; or with a reserve wider than 13,5 meters, or where no reserve exists where the road is wider than 8 metres; but excluding a road which is identified and included in activity 27 in Listing Notice 2 of 2014; where the entire road falls within an urban area; or which is 1 kilometre or shorter.
	28	Institutional developments wherever such land was used for agriculture, game farming, equestrian purposes or afforestation after 1 April 1998, outside an urban area where the total land is bigger than 1 ha.
	56	The widening of a road by more than 6 meters, or the lengthening of a road by more than 1 kilometre- (i) where the existing road reserve is 13,5 meters; or (ii) where no reserve exists, where the existing road is wider than 8 meters; excluding where widening or lengthening occur inside and urban area.
GN R 984 (as amended by GN R 325)	9	The development of facilities or infrastructure for the transmission and distribution of electricity with a capacity of 275 kV or more, outside an urban area or industrial complex excluding the development of bypass infrastructure for the transmission and distribution of electricity where such bypass infrastructure is – (a) temporarily required to allow for maintenance of existing infrastructure; (b) 2 kilometres or shorter in length; (c) within an existing transmission line servitude; and (d) will be removed within 18 months of the commencement of development.
GN R 985 (As amended by GN R 324)	4	Development of a road wider than 4 m with a reserve less than 13,5 metres. (d) In KwaZulu-Natal (iii) Community Conservation Areas; (v) Biodiversity Stewardship Programme Biodiversity Agreement areas; (vi) A protected area identified in terms of NEMPAA, excluding



Listing Notice	Activity	Description
		<p>conservancies; (vii) Sites or areas identified in terms of an International Convention; (viii) Critical Biodiversity areas as identified in systemic biodiversity plans adopted by the competent authority or bioregional plans; (ix) Core areas in Biosphere Reserves; (x) Areas designated for conservation use in Spatial Development Frameworks adopted by competent authority or zoned for conservation purpose; (xi) Sensitive areas as identified in an environmental management framework as contemplated in Chapter 5 of the Act and as adopted by the competent authority; (xii) Outside urban areas (i) Areas within 10 kilometres from national parks or world heritage sites or 5 kilometres from any other protected area identified in terms of NEMPAA or from the core areas of a biosphere reserve.</p>
	12	<p>Clearance of an area of 300 m² or more of indigenous vegetation except where such clearance of indigenous vegetation is required for maintenance purposes undertaken in accordance with a maintenance plan. In (d) KwaZulu-Natal: (ii) community conservation areas; (iv) within any critically endangered or endangered ecosystem listed in terms of section 52 of the NEMBA or prior to the publication of such a list, within an areas that has been identified as critically endangered in the National Spatial Biodiversity Assessment 2004; (v) Critical biodiversity areas as identified is systemic biodiversity plans adopted by the competent authority or in bioregional plans; (vii) On land, where, at the time of the coming into effect of this Notice or thereafter such land was zoned open space, conservation or had an equivalent zoning; (viii) A protected area identified in terms of NEMPAA, excluding conservancies; (xi) Areas designated for conservation use in Spatial Development Frameworks adopted by competent authority or zoned for a conservation purpose; (xii) Sensitive areas as identified in an environmental management framework as contemplated in chapter 5 of the Act and as adopted by the competent authority.</p>



1.2.4 Normandie-Iphiva 400 kV (Ref. No. 14/12/16/3/3/2/1036)

The Normandie – Iphiva 400 kV powerline will extend over an approximate 150 km routing in the northern portion of the overall study area. Eskom considered the results of the scoping assessment, discarding routing options with significant sensitivities. The remaining N-I 2 and N-I 3 alternative routing options were considered in this assessment. The construction and operational activities, as presented in Section 1.2.3 above, are applicable to this component of the Project. These are not repeated here for the sake of brevity.

Please refer to **Error! Reference source not found.** for applicable listed activities for the ormandie-Iphiva 400 kV powerline EA application.

1.3 Project Location

The proposed project is located predominately in KZN with a small portion of the project in Mpumalanga. The Umkhanyakude, Zululand and Gert Sibande District Municipalities are affected by the project with Pongola and Mkuze being the main towns in the study area. Land use varies across the study area with dispersed rural settlements, sugar cane farming, areas formally protected for conservation, private game farms and linear peri-urban development adjacent to the National Route 2 (N2). The Pongola River divides the area north and south and one of the lines will have to cross it (**Error! Reference source not found.**). Also indicated on this map are the names used to refer to different route options, these different options form the basis for the sensitivity assessment.

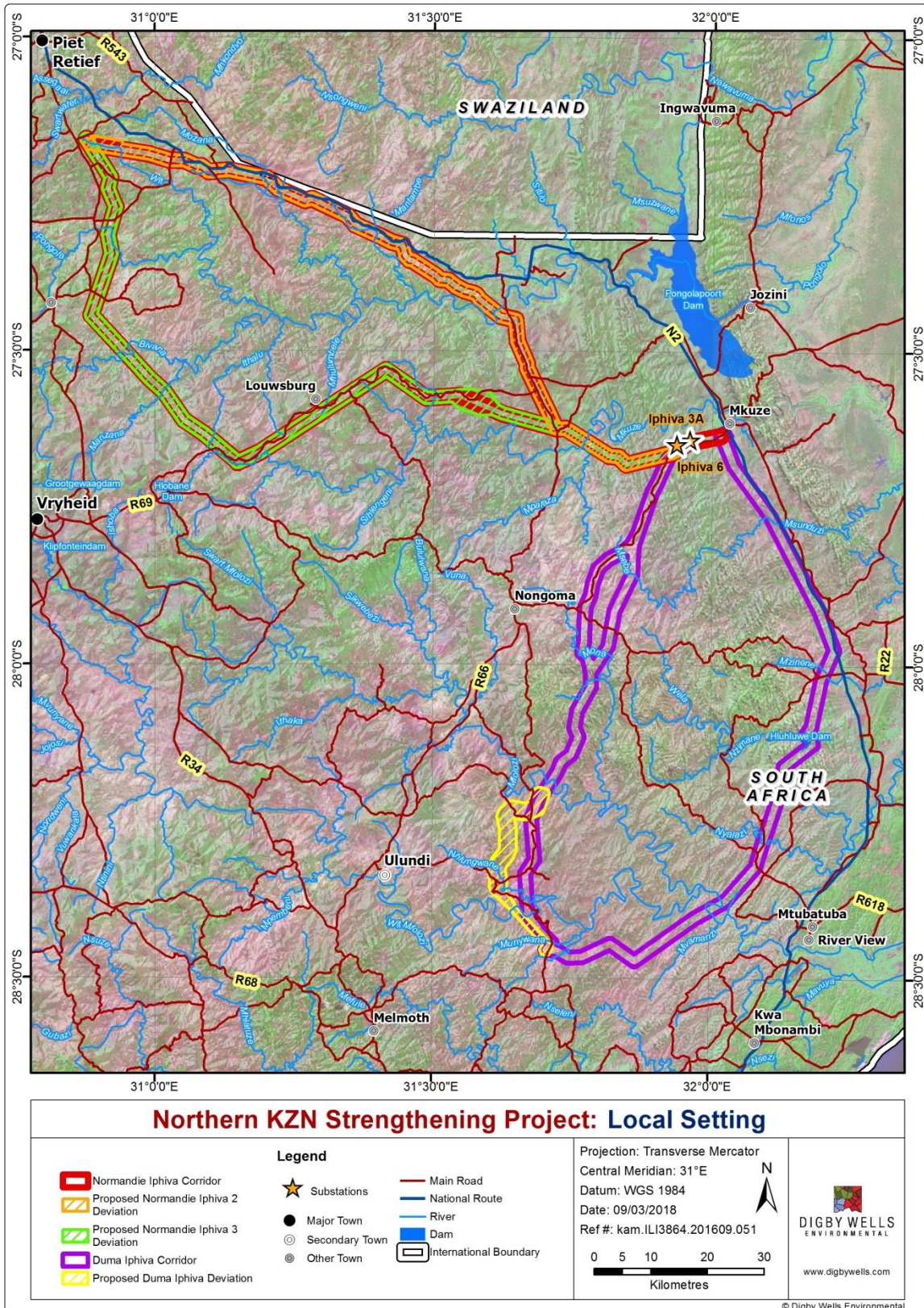


Figure 1-1: Project Location



1.4 Terms of Reference

The Terms of Reference of this fauna and flora screening and comparative specialist study was to evaluate the presence of sensitive species and landscapes/habitat present that could be affected by the various options available for the project infrastructure. Thereafter to determine the preliminary impacts on these natural resources and recommend mitigation measures to alleviate negative impacts.

1.5 Scope of Work

The fauna and flora specialist study and comparative screening assessment was completed through the following activities:

- Completion of a Desktop Assessment to determine the baseline of the fauna and flora species present in the study area;
- Identification of likely impacts on the natural species and landscape through project activities proposed;
- Present the results of consultation with Interested and Affected Parties (I&APs) and/or stakeholders;
- Recommend feasible management or mitigation measures to avoid and/or reduce negative impacts and enhance positive ones.

1.6 Expertise of Specialist

Rudi Greffrath (Pr.Sci.Nat.) is Digby Well's Biodiversity Manager and has a National diploma and B-tech in Nature Conservation from Nelson Mandela Metropolitan University's George Campus and is affiliated to the South African Council for Natural Scientific Professions as a *Professional Natural Scientist* in the field of practice *Conservation Science*, registration # 400018/17. He has eleven years' experience in the environmental consulting field specifically in the terrestrial ecology within the Highveld/KZN grasslands and Savanna regions of Southern and Central Africa and the forest regions of central and West Africa. He specialises in fauna and flora surveys, biodiversity surveys, environmental management plans, environmental monitoring and rehabilitation for projects in accordance with the International Finance Corporation (IFC) and World Bank. Rudi has gained experience working throughout Africa specifically DRC, Sierra Leone, Ghana, Mali, Botswana, Namibia and Cote D'Ivoire

2 Legislative and Policy Framework

The surveys and reporting for Eskom's Northern KZN strengthening project was completed in accordance with the following legislation and guideline documents:

- Section 24 of the Constitution – Environment, 1996 (Act No. 108 of 1996);



- Section 5 of the National Environmental Management Act, 1998 (Act No. 108 of 1998);
- National Environmental Management Biodiversity Act, 2004 (NEMBA, Act No. 10 of 2004); and
- Guidelines for Biodiversity Impact Assessments in KZN, 2003 (February 2013, Ezemvelo KZN Wildlife).
- International Union for the Conservation of Nature (IUCN) Red List (IUCNRedList.org 2016-2);
- The National Forests Act, 1998 (Act No. 84 of 1998) Protected Trees, and
- The National Environmental Biodiversity Act, 2004 (Act 10 of 2004), Threatened and Protected Species.
- The National Environmental Biodiversity Act, 2004 (Act 10 of 2004): Alien Invasive Regulations (2014)
- The National Environmental Biodiversity Act, 2004 (Act 10 of 2004): Alien and Invasive Species Lists (2016).

3 Limitations

The fauna and flora study was completed during the rainy season of KwaZulu-Natal, and as such during 3 of the 7 days on site field work was hampered by rain, flooded river crossings and low visibility.

- The assessment constitutes a high-level screening to identify the potential impacts to the natural biological resources (plants, flora, mammals, amphibians, reptiles and invertebrates) that may occur within the approved corridors and development footprints. This report is not a reflection of the fauna and flora currently present in the development footprints as can be reported upon thorough detailed infield investigations;
- The development footprint of the various infrastructures will be finalised upon selection and authorisation of the preferred options. To this effect, a detailed impact assessment could not be completed in this report, and will be required as a condition of authorisation;
- Considering the nature of the Project, the extent of the routing options, and scope of work, the field survey was predominantly undertaken as a vehicular survey, except with regards to the substations and distribution line alternatives;
- While every effort was made to cover the extent of the various routing options, access to portions of various routing options was restricted by topography and landowners; and



- Whilst every attempt to obtain the latest available information was made, the reviewed literature does not represent an exhaustive list of information sources for the various study areas.

4 Methodology

The field screenings completed, aimed to identify the preferred corridor in which the proposed powerline will be situated. The fauna and flora survey evaluated both of the substation sites and 132 kV distribution lines in detail, however, with regards to the 400 kV powerline corridors field work was limited to selected areas of concern, with the remaining based on desktop information.

This specialist study will aim for authorisation of corridors (approximately 2km wide) within which a servitude (55 m) for the power lines can be acquired. The approach of this study is to avoid environmental impacts by identifying a corridor for each power line within which the power line can be constructed that will have the least impacts on the biophysical environment. The acquisition of the servitudes and identification of the power line positions will only be undertaken after Environmental Authorisation (EA) has been received. The EA will therefore be obtained without doing detailed ground surveys of the full corridors. Further studies will be required during implementation phase in the form of a detailed walk down.

4.1 Vegetation Survey

The floristic survey was completed in two stages and was designed to firstly evaluate the 400 kV Transmission Power Line options from a screening and sensitive landscape criteria. The second stage consisted of the two proposed sub-station project areas and the associated distribution lines emanating from the preferred substation.

The floristic screening survey was conducted during the growing season (the rainy season when most plants are in flower or seeding (December 2016) to determine the species composition of selected areas within the greater project area. Possible areas of concern were evaluated along the 400kV power lines.

The field work screening survey gave an indication of the actual species present within the distribution lines and sub-stations project site, these are discussed in context of plant communities present within the ecosystems of the area.

The expected and recorded protected, endemic, exotic, alien invasive and culturally significant species are discussed as separate issues and related back to relevant legal requirements.

Furthermore the identification of red data and protected species as listed according to the IUCN List, NEMBA and Ezemvelo KZN Wildlife Provincial legislation was completed. Forest vegetation when present was included in the survey that was completed during the summer months in addition, the forest edge and ecotone was also be included, where relevant

Depending on the vegetation and terrain, present during phase 2 the Braun-Blanquet sampling method, belt or line transect methods will be used during vegetation assessments.



However should dominant vegetation types require other methods be used, then these shall be motivated. The Braun-Blanquet method allows for the following to be compiled:

- Vegetation classification regarding plant communities within the pre-determined survey points along the final route alignment project area and sub communities and variations of these;
- Species list for each plant community, including diagnostic and dominant species.
- Invasive species (if present) for each plant community;
- Exotic species (if present) for each plant community;
- Protected and/or endemic species for each plant community; and
- Culturally significant plant species within each community.

4.2 Faunal Survey

Field surveys was conducted concurrently with vegetation surveys and all animals observed in the project area during phase 1 and 2 were noted, trapping was performed during phase 2. Detailed fauna lists were generated through desktop and field assessment, and related back to the floristic component of the Transmission Power Line route alignment options, distribution lines and substation options. The probability of occurrence for species not observed during field surveys was completed in project areas where sampling took place. Protected and endemic, range restricted red and rare species were the focus the surveys. Diurnal and nocturnal surveys were completed during phase 2 of the assessment.

The current status of the faunal environment was determined and an evaluation of the extent of site-related effects in terms of certain ecological indicators, as well as identification of specific important ecological attributes such as rare and endangered species, protected species, sensitive species and endemic species were made.

4.2.1.1 Mammals

A list of all potential mammals was compiled by means of desktop study and all potential red data species were highlighted with short habitat descriptions.

The presence of mammals were recorded using tracks, dung, ecological indicators, camera traps, non-fatal traps (Sherman traps) and visual sightings of the animals themselves, sample sites covered all habitat available for mammals' species within the phase 2 study area.

The survey will aim to determine the species richness of the phase 2 project area. The following was recorded during the mammal survey:

- All mammals encountered or noted during the surveys was recorded;
- Tracks and dung of mammals encountered during the survey were, where possible, identified and recorded (if possible);



- A list of the most prominent mammal species was compiled;
- A list of rare and endangered species encountered during the survey, as well as species listed according to the results of a desktop study but which were not recorded during the survey, will be compiled;
- A list of protected species that could occur in the study area but not recorded during the site visits or surveys; and
- A list of exotic or introduced vertebrate species occurring in the study area.

4.2.1.2 Amphibians and Reptiles

Reptiles and Amphibians were sampled using both active and passive sampling techniques. Active searching was completed and as many as possible individuals caught, identified and photographed using the rubber band technique. Sample sites were concentrated in areas where habitat that could support reptile and amphibian species can be found. Passive sampling included drift fence arrays and pitfall traps where possible. Amphibians were sampled using active methods such as netting during their hours of activity (night). Burrowing species were surveyed after rains, where possible. Passive sampling methods included pitfall traps and sound recordings where possible:

- All frogs, snakes, lizards and tortoises encountered or noted during the surveys were recorded;
- A list of the most prominent amphibian and reptile species was compiled;
- A list of rare and endangered species encountered during the survey, as well as species listed according to the results of a desktop study but which were not recorded during the survey, were compiled; and
- A list of protected species that occur on the potential list but not recorded during the site visits or surveys.

4.2.1.3 Invertebrates

Indicator invertebrates groups were sampled using appropriate methodology, such as sweep netting. For each sample plot the insects are identified to at least family level and where possible to genus and species level. Groups including ants, ground living beetles (Tenebrionidae and Carabidae), termites, leafhoppers, spiders and scorpions were included where present.

4.3 Sensitive Areas

All sensitive areas, as described by the provincial and national legislation, were identified. The locality and extent, as well as species composition of sensitive areas such as the wetlands or pans, streams, rivers and rocky outcrops were conducted in order to identify and map all such sensitive areas present in the phase 2 study area. Threatened ecosystems as listed by NEMBA (2004) and ratified by the minister in December 2011, were identified.



4.4 Consideration of alternatives

The use of multi-criteria decision analysis (MCDA) has proven to be a quantifiable and defensible method when assessing the suitability of various alternative decision options. The matrix used in this instance adopts a specific variant of MCDA, the Simple Linear Additive Evaluation Model (SLAEM). This model yields a single, overall value for each decision option that reflects the rating on each of the decision criteria under consideration. The SLAEM has a well-established record of providing robust and effective support to decision makers when considering the suitability of various decision options.

Digby Wells developed specific evaluation criteria that assess decision options suitability from the perspective of specialist disciplines. These criteria denote characteristics that would influence the selection through the severity of identified potential impacts relevant to the specialist disciplines or project-related risks. A clear understanding of the baseline conditions, therefore, is critical to identifying criteria that are relevant to the evaluation.

Digby Wells assessed the various alternative options in terms of the defined evaluation criteria to assign a rating. Rating options range from 5 (most suitable) to 1 (unsuitable). This method employed a "rounded average" of the criteria value to allow for comparison between various specialist disciplines regardless of the number of criteria used. In this way, an overall ranking of between 1 and 5 can be obtained.

5 Baseline Description

5.1 Regional Vegetation

The KZN Vegetation Type map has undergone several changes since the publication of the Mucina and Rutherford (2006) national Vegetation Types. Ezemvelo KZN Wildlife (Ezemvelo) has, in collaboration with various government departments, NGOs, Working Groups and Forums e.g. KZN Wetland Forum, IAIA (members of the International Association for Impact Assessment), municipalities and parastatals, refined the KZN Vegetation Types to develop an accurate representation of the pre-transformation extent of the vegetation types present. As a result of the finer scale mapping and classification, KZN vegetation types map has in some cases identified new vegetation types and or subtypes within the vegetation types identified at national level. The sub types in some instances have different red data statuses from the main vegetation type, and are indicated as such. During the field survey phase of the project the high conservation status vegetation types will be focussed on.


Table 5-1: Vegetation Types Descriptions

Vegetation Type Status (Scott-Shaw & Escott, 2011)	Conservation Status Mucina & Rutherford Vegetation (2012)	Description (Scott-Shaw & Escott, 2011)
(SVI 4) Delagoa Lowveld	CR	Dense tree or tall shrub layer dominated by <i>Acacia welwitschia</i> , often forming thickets. Herb layer has in addition to grass species a wide variety of forbs. Areas are often heavily grazed which sometimes drastically reduces the grass cover.
(SVI 3) Granite Lowveld	EN	Tall shrubland with few trees to moderately dense low woodland on the deep sandy uplands with <i>Terminalia sericea</i> , <i>Combretum zeyheri</i> and <i>C. apiculatum</i> and ground layer including <i>Pogonarthria squarrose</i> , <i>Tricholaena monachne</i> and <i>Eragrostis rigidior</i> . Dense thicket top open savanna in the bottomlands with <i>Acacia nigrescens</i> , <i>Dichrostachys cinerea</i> , <i>Grewia bicolour</i> in the woody layer. The dense herbaceous layer contains the dominant <i>Digitaria eriantha</i> , <i>Panicum maximum</i> and <i>Aristida congesta</i> on fine-textured soils, while brackish bottomlands support <i>Sporobolus nitens</i> , <i>Urochloa masambicensis</i> and <i>Chloris virgata</i> . At seep lines, where convex topography changes to concave, a dense fringe of <i>Terminalia sericea</i> occurs, with <i>Eragrostis gummiflua</i> in the undergrowth.
(Gs2) Ithala Quartzite Sourveld		Low mountain ranges and undulating hills with rocky lowlands. The general pattern is a mosaic of woody shrubs and small trees in rocky areas, interspersed in the grass layer. Vegetation structure varies according to altitude and rockiness, but the basal density of the grass sward is relatively low. This unit occurs in the zone between Grassland and Savanna where the dominant grassland gives way to woodland as elevation decreases. The grasslands are species-rich covering a variety of altitudes but sharing a common species unique to the dystrophic quartzite geology.
(Gm 16) KaNgwane Montane Grassland (VU)	EN	Largely comprised of undulating hills and plains that occur on the eastern edge of the Escarpment. This unit is transitional between the Highveld and Escarpment



Vegetation Type Status (Scott-Shaw & Escott, 2011)	Conservation Status Mucina & Rutherford Vegetation (2012)	Description (Scott-Shaw & Escott, 2011)
		that contains elements of both. The vegetation structure is comprised of a short closed grassland layer with many forbs, and a few scattered shrubs on the rocky outcrops.
(Gs6) KwaZulu-Natal Highland Thornveld		Hilly, undulating landscapes and broad valleys supporting tall tussock grassland usually dominated by <i>Hyparrhenia hirta</i> , with occasional savannoid woodlands with scattered <i>Acacia sieberiana</i> var <i>woodii</i> and in small pockets with <i>A. karroo</i> and <i>A. nilotica</i> .
(SVI 17) Lebombo Summit Sourveld (VU)	EN	Ridge plateaus and adjacent slightly sloping flanks covered with open, tall, sour, wiry grasslands, often dotted with low bushes and solitary savanna trees.
(FOa 1) Lowveld Riverine Forest (VU)	CR	Tall forests fringing larger rivers (gallery forests) and water pans. When dominated by <i>Ficus sycomorus</i> or <i>Diospyros mespiliformis</i> (alluvial sediments along major rivers), these forests are dense and tall, structured into several tree layers and with a well-developed dense shrub layer.
(SVI 21) Makatini Clay Thicket		Comprises a mixed, but mainly simple-leaved short bushland and thicket with emergent trees up to 10 m and generally dense dominant shrub layer 1 – 4m tall. It occurs on the lower slopes and bottomland areas of gently undulating terrain. Small clay-bottom, endorheic pans occur commonly at low points in the terrain.
(Gs1) Northern Zululand Mistbelt Grassland	VU	Gentle to steep upper slopes of mountains formed by hard dolerite dykes dominated by relatively forb-rich, tall sour <i>Themeda triandra</i> grasslands.
(SVI 22) Northern Zululand Sourveld		The dominant structural vegetation type is wooded grassland, in places pure sour grasslands and rarely also dense bushveld thickets. Terrain is mainly low, undulating mountains, sometimes highly dissected, and also some moderately undulating plains and hills.
(Gm 15) Paulpietersburg	VU	Mainly undulating with moderately steep slopes, but valley basins are wide and flat and mountainous areas



Vegetation Type Status (Scott-Shaw & Escott, 2011)	Conservation Status Mucina & Rutherford Vegetation (2012)	Description (Scott-Shaw & Escott, 2011)
Moist Grassland (VU)		occur mostly along the northern and eastern boundary. Tall closed grassland rich in forbs and dominated by <i>Tristachya leucothrix</i> , <i>Themeda triandra</i> and <i>Hyparrhelia hirta</i> . Evergreen woody vegetation is characteristic on rocky outcrops.
(FOz 8) Sand Forest		Dense thickets of 5-6 m ('short forest' of Matthews <i>et al.</i> (2001)) up to tall forests with the canopy reaching 15 m ('tall forest' of Matthews <i>et al.</i> (2001)), with well-developed shrub layer and very poorly developed ground layer. The dominant trees are <i>Cleistanthus schlechteri</i> , <i>Dialium schlechteri</i> and emergent <i>Newtonia hildebrandtii</i> in Maputaland, whereas <i>Baphia massaiensis</i> subsp. <i>obovata</i> , <i>Cleistanthus schlechteri</i> and <i>Guibourtia conjugata</i> are most conspicuous in the tree layer in the Nwanbyia and Pumbe regions. The shrub layer is dominated by <i>Croton pseudopulchellus</i> , <i>Cola greenwayi</i> , <i>Pteleopsis myrtifolia</i> , <i>Psydrax locuples</i> , <i>Drypetes arguta</i> and the woody climber <i>Uvaria lucida</i> . The most conspicuous graminoid in the herb layer is <i>Eragrostis moggii</i> . Epiphytic orchids and lichens festoon the tall trees.
(FOz 5) Scarp Forest Eastern Scarp Forests: Ngome-Nkandla Scarp Forest (CR)		Tall (15 – 25 m), species-rich and structurally diverse, multi-layered forests, with well-developed canopy and understory tree layers, but a poorly developed herb layer. Buttressed stems are common in the Scarp Forest. The most conspicuous trees are <i>Buxus macowanii</i> , <i>B. natalensis</i> , <i>Drypetes gerrardii</i> , <i>Englerophytum natalense</i> , <i>Harpephyllum caffrum</i> , <i>Heywoodia lucens</i> , <i>Memecylon natalense</i> , <i>Millettia grandis</i> , <i>Oricia bachmannii</i> , <i>Philenoptera sutherlandii</i> , <i>Rinorea angustifolia</i> , <i>Rothmannia globosa</i> and <i>Umtiza listeriana</i> .
(SVI 16) Southern Lebombo Bushveld		Open Bushveld with dominant <i>Acacia</i> and <i>Combretum</i> species. <i>Themeda triandra</i> is the dominant grass on undisturbed sites. On very shallow soils (e.g. slopes of deep gorges or exposed ridges) with <i>Aloe marlothii</i> , <i>Euphorbia confinalis</i> and thickets of <i>Olea europea</i>



Vegetation Type Status (Scott-Shaw & Escott, 2011)	Conservation Status Mucina & Rutherford Vegetation (2012)	Description (Scott-Shaw & Escott, 2011)
		subsp. <i>Africana</i> and <i>Combretum woodii</i> . <i>Combretum woodii</i> . Dry slopes may be dominated by <i>Androstachys johnsonii</i> in the northern parts.
<p>(AZa7) Subtropical Alluvial Vegetation</p> <p>Can be subdivided into:</p> <p>Alluvial Wetlands: Subtropical</p> <p>Alluvial Vegetation (EN)</p> <p>Alluvial Wetlands: Subtropical</p> <p>Alluvial Vegetation: Lowveld</p> <p>Floodplain Grasslands (CR)</p> <p>Alluvial Wetlands: Subtropical</p> <p>Alluvial Vegetation: Lowveld</p> <p>Floodplain Grasslands: Tall Reed</p> <p>Wetlands (VU)</p> <p>Alluvial Wetlands: Subtropical</p> <p>Alluvial Vegetation: Lowveld</p> <p>Floodplain Grasslands: Short</p> <p>Grass/ SedgeWetland</p>		<p>Flat alluvial riverine terraces supporting an intricate complex of macrophytic vegetation (channel of flowing rivers and river-fed pans), marginal reed belts (in sheltered ox-bows and along very slow-flowing water courses) as well as extensive flooded grasslands, ephemeral herblands and riverine thickets.</p>



Vegetation Type Status (Scott-Shaw & Escott, 2011)	Conservation Status Mucina & Rutherford Vegetation (2012)	Description (Scott-Shaw & Escott, 2011)
(EN)		
Subtropical Freshwater Wetlands (AZf 6) Divided into: FreshwaterWetlands: Subtropical Freshwater Wetlands (VU) FreshwaterWetlands: Subtropical FreshwaterWetlands: Short Grass/ SedgeWetlands: Dune Slack (VU)		Flat topography supporting low beds dominated by reeds, sedges and rushes, water logged meadows dominated by grasses. Found typically along edges of often seasonal pools in Aeolian depressions as well as fringing alluvial backwater pans or artificial dams.
(SVI 14) Swaziland Sour Bushveld		Open to closed, medium to tall tree layer with closed well-developed grass layer. Very hilly with moderate to steep slopes, positioned at higher altitudes than the adjacent SVI 3 Granite Lowveld to the east.
(SVI 20) Western Maputaland Clay Bushveld	VU	Comprises a mixed but mainly compound leaved short (5 – 10 m) woodlands and wooded grasslands. It occurs on the crests, upper and mid-slopes of gently undulating terrain. This vegetation unit is dissected by two large alluvial floodplains associated with the Mkuze and Phongolo Rivers. FOa 1 Lowveld Riverine Forest and woodland dominate these alluvial soils and numerous small floodplains associated with smaller streams.
(SVI 19) Western Maputaland Sandy Bushveld		Comprised of mixed, but mainly simple-leaved, short (5 – 10 m) bushlands, woodlands and wooded grasslands. Occurring on the mid- and lower midslopes of ancient coastal dune cordons on gently undulating terrain.



Vegetation Type Status (Scott-Shaw & Escott, 2011)	Conservation Status Mucina & Rutherford Vegetation (2012)	Description (Scott-Shaw & Escott, 2011)
		Extreme variations include open canopy <i>Terminalia sericea</i> sandvelds on deeper yellow to orange sands, through to <i>Combretum molle</i> - dominated woodlands on the deep red mesotrophic sands.
(SVI 23) Zululand Lowveld	VU	Extensive flat or only slightly undulating landscapes supporting complex of various bushveld units ranging from dense thickets of <i>Dichrostachys cinerea</i> and <i>Acacia</i> species, through parklike savanna with flat-topped <i>A. tortilis</i> to tree dominated woodland with broadleaved open bushveld with <i>Sclerocarya birrea</i> subsp. <i>caffra</i> and <i>A. nigrescens</i> . Tall grassveld types with sparsely scattered solitary trees and shrubs form a mosaic with the typical savanna thornveld, bushveld and thicket patches.

VU = Vulnerable. EN = Endangered. CR=Critically Endangered.

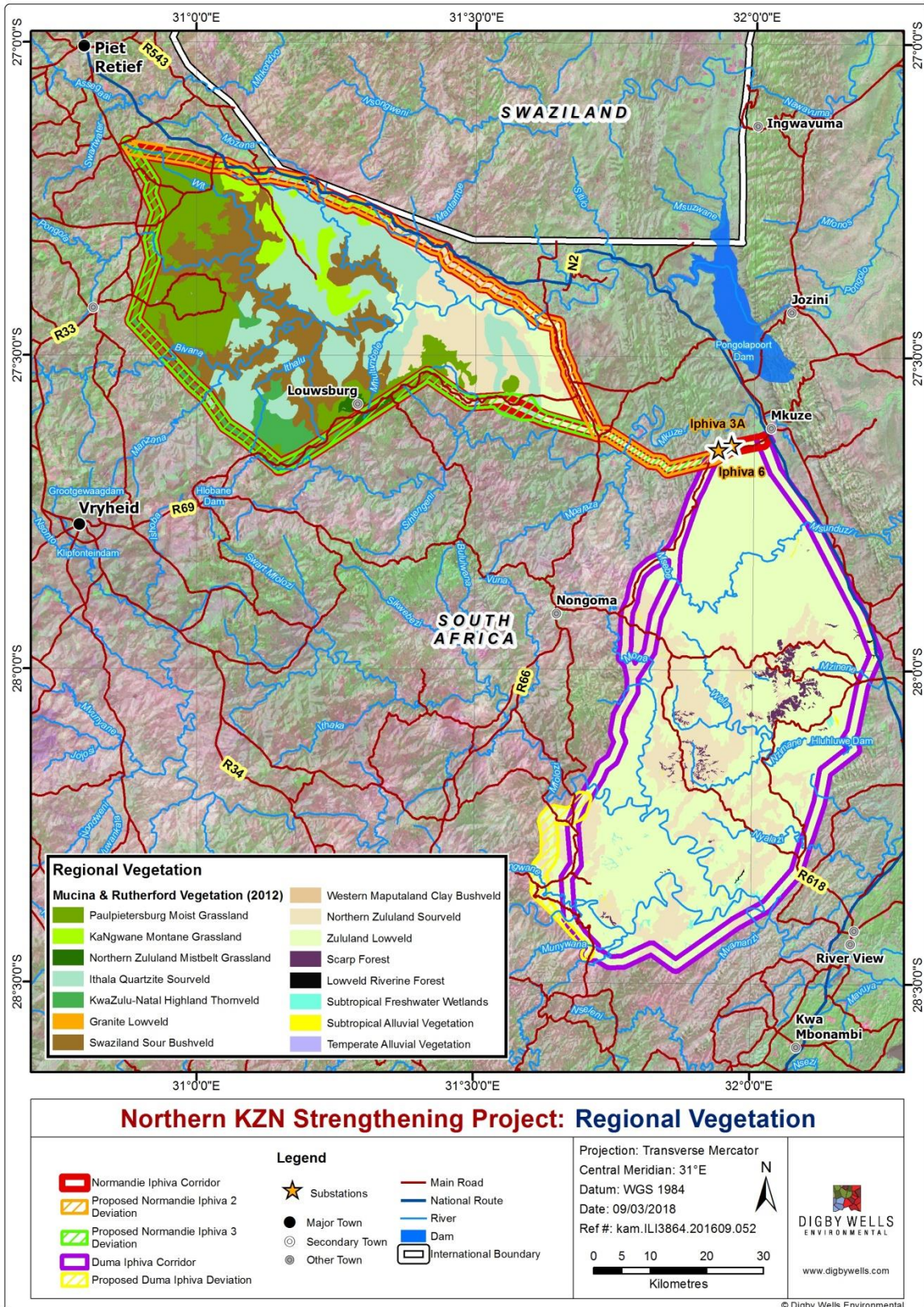


Figure 5-1: Regional Vegetation Types (Mucina and Rutherford 2012)



5.2 Flora

5.2.1 Species of Special Concern

The Red Data listed species that have been recorded previously in relevant 26 Quarter Degree Square Grid (QDS grids) are listed in Table 5-2 (POSA). This list is supplemented with data received from Ezemvelo KZN Wildlife in January 2017.

Within this list three species is designated as Critically Endangered, 15 species as Declining, ten species as Endangered, 13 species as Near Threatened, five species as Rare, one species as Threatened and 21 species as Vulnerable. Of this list multiple species occur in more than one QDS grids and is therefore listed in both in the table below. No champion trees occur within the route alignments. (DAFF 2012) The table is arranged so that species within a QDS grid is grouped together to illustrate that QDS grids relative abundance of protected species. Detailed habitat analysis will be conducted during the EIA phase and the presence of such species along the routes will be thoroughly investigated and mapped to avoid/minimize and impacts on such species, where possible these must be avoided.

Table 5-2: Plant SSC According to POSA

Scientific Name	English Name	SA Red Data Book
<i>Brachystelma ngomense</i>		Endangered
<i>Encephalartos aemulans</i>	Cycad; Wolkop cycad	Critically Endangered
<i>Warburgia salutaris</i>	Pepper-bark Tree	Endangered
<i>Albizia suluensis</i>	Zulu albizia	Endangered
<i>Dracosciadium italaie</i>		Vulnerable
<i>Helichrysum ingomense</i>		Endangered
<i>Melanospermum italaie</i>		Vulnerable
<i>Schizoglossum ingomense</i>		Threatened
<i>Dierama erectum</i>		Endangered
<i>Senecio villifructus</i>		Endangered
<i>Encephalartos lebomboensis</i>	Lebombo cycad	Endangered
<i>Curtisia dentata</i>	Assegai	Near Threatened
<i>Cyrtanthus brachysiphon</i>	Ngoje Fire Lily	Endangered
<i>Scilla natalensis</i>	Large blue scilla, blue hyacinth, Blue Squill	Vulnerable
<i>Strelitzia reginae</i>	Bird-of-paradise-flower, Crane Flower;	Vulnerable
<i>Protea comptonii</i>	Saddleback sugarbush	Near Threatened
<i>Streptocarpus species novum italaie</i>		Vulnerable
<i>Melhania polygama</i>		Rare
<i>Emplectanthus cordatus</i>		Rare
<i>Rapanea melanophloeos</i>	Cape Beech	Declining
<i>Senecio dregeanus</i>		Vulnerable
<i>Balanites maughamii</i>	Green Thorn, Torchwood	Declining
<i>Boophane disticha</i>		Declining
<i>Habenaria culveri</i>		Rare
<i>Erythrophleum lasianthum</i>		Near Threatened
<i>Ansellia africana</i>	Leopard Orchid, Tiger Orchid	Declining
<i>Wahlenbergia pinnata</i>		Near Threatened



<i>Nesaea wardii</i>		Vulnerable
<i>Peucedanum wilmsianum</i>		Vulnerable
<i>Gladiolus cruentus</i>	Blood-red Gladiolus;	Critically Endangered
<i>Gunnera perpensa</i>		Declining
<i>Sandersonia aurantiaca</i>	Christmas Bells;	Declining
<i>Prunus africana</i>	Red Stinkwood,Bitter Almond	Vulnerable
<i>Protea scorzonerifolia</i>		Vulnerable
<i>Stangeria eriopus</i>		Vulnerable
<i>Cyphia longiflora</i>		Near Threatened
<i>Clivia miniata</i> var. <i>miniata</i>	Clivia,Bush Lily,St John's Lily,	Vulnerable
<i>Cassipourea gummiflua</i> var. <i>verticillata</i>		Vulnerable
<i>Encephalartos ngoyanus</i>	Ngoye dwarf cycad	Vulnerable
<i>Lotononis amajubica</i>		Rare
<i>Rhus harveyi</i>	Itala Rhus	Near Threatened
<i>Dierama dubium</i>	Hairbell	Vulnerable
<i>Crinum moorei</i>	Moore's Crinum,Natal Lily,Ngome Lily	Vulnerable
<i>Adenia fruticosa fruticosa</i>		Near Threatened
<i>Encephalartos senticosus</i>	Lebombo cycad	Vulnerable
<i>Schizochilus gerrardii</i>		Endangered
<i>Pachycarpus lebomboensis</i>		Rare
<i>Eugenia simii</i>		Vulnerable
<i>Eucomis bicolor</i>	Forest Pineapple Flower	Near Threatened
<i>Protea roupelliae hamiltonii</i>		Critically Endangered
<i>Eulophia speciosa</i>	Wild Orchid	Declining
<i>Aloe cooperi cooperi</i>	Cooper's Aloe	Declining
<i>Ceropegia cimiciodora</i>	Bedbug ceropegia	Vulnerable
<i>Atalaya natalensis</i>	Natal wing-nut	Near Threatened
<i>Newtonia hildebrandtii</i> var. <i>hildebrandtii</i>	Lebombo wattle	Declining
<i>Haemanthus paucifolius</i>		Rare
<i>Euryops brevilobus</i>		Rare
<i>Crinum acaule</i>	Maputaland Grass Crinum	Near Threatened
<i>Clivia gardenii</i>	Major Garden's Clivia, Natal Drooping Clivia	Vulnerable
<i>Mystacidium alicae</i>		Vulnerable
<i>Encephalartos natalensis</i>	Natal giant cycad	Near Threatened
<i>Dierama sp nov 28 Gerstner 4697</i>		Endangered
<i>Eucomis autumnalis</i>		Declining
<i>Moraea graminicola graminicola</i>		Near Threatened
<i>Elaeodendron transvaalense</i>	Bushveld saffron	Near Threatened
<i>Acridocarpus natalitius</i>		Declining



5.3 Site Screening Findings

The following site descriptions are made with field data acquired during field work, in which the representation of the current vegetation type with regards to the expected vegetation type is the main concern, coupled with that the degree of disturbance was also seen as a deciding factor in the disturbed nature of the sites.

5.3.1 Sub Stations

The site specific field work carried out during the screening survey that concentrated on the sub-station options and the distribution lines. Option 3 was found to be undisturbed and was characterised by *Ximenia caffra*, *Dovyalis rhamnoides*, *Carissa microcarpa*, *Vachelia nilotica*. Whereas site 6 was found to have undergone transformation due to anthropogenic activities, such as building of roads, housing and open areas with little vegetation cover.

5.3.2 Distribution Lines

5.3.2.1 Eastern Alternative

The eastern alternative was characterised by species such as *Euphorbia ingens*, *Vachelia nilotica*, *Celtis Africana*, *Combretum apiculatum*, *Ximenia caffra*, *Gardenia spp.*, *Sclerocaria birrea* and *Euphorbia cooperii*, which constituted a good description of the expected vegetation type. The western alternative was found to be dominated by sugar cane farming, and as such was not a good representation of the natural vegetation type expected here.

5.4 Fauna

5.4.1 Mammals

A database search for mammal species that have been recorded in the 26 QDS grids, on the virtual museum of the Animal Demography Unit (<http://www.adu.org.za>) was performed. This database forms part of the Department of Biological Science at the University of Cape Town Mammal species that have been recorded in the Kwa-Zulu Natal province, and could possibly occur in the area of interest are discussed below.

Mammal species expected to occur in the area of interest include eight Vulnerable species, two Near Threatened, one Critically Endangered species and two Endangered, as indicated in Table 5-3 **Error! Reference source not found.**, as per ADU database searches. The variety of vegetation types occurring in the area of interest ensures an ecologically diverse assemblage of plant species which in turn could support a variety of mammal species, therefore the current expected species list could be more extensive than is currently.


Table 5-3: Protected Mammal species of the Kwa-Zulu Natal Province

Scientific Name	Common Name	KZN	NEMBA TOPS	IUCN
<i>Acinonyx jubatus</i>	Cheetah		VU	VU
<i>Alcelaphus buselaphus</i>	Hartebeest	Protected	-	-
<i>Aonyx capensis</i>	Clawless Otter		Protected	-
<i>Cephalophus natalensis</i>	Red duiker	Protected	Rare	LC
<i>Ceratotherium simum</i>	White Rhino	Protected	Protected	NT
<i>Chrysospalax villosus</i>	Rough-haired Golden Mole		-	VU
<i>Civettictis civetta</i>	Civet		Rare	-
<i>Damaliscus lunatis</i>	Tsessebe	Specially Protected	EN	-
<i>Diceros bicornis</i>	Black Rhino	Protected	EN	CR
<i>Eidolon helvum</i>	Strawcoloured Fruit Bat		-	NT
<i>Equus zebra zebra</i>	Cape Mountain Zebra		VU	-
<i>Felis nigripes</i>	Small Spotted Cat		-	VU
<i>Felis serval</i>	Serval	Protected	Rare	-
<i>Giraffidae - Giraffa camelopardalis</i>	Giraffe	Protected	-	-
<i>Hippopotamus amphibius</i>	Hippopotamus	Protected	Rare	-
<i>Hippotragus equinus</i>	Roan Antelope	Protected	EN	-
<i>Hippotragus niger</i>	Sable Antelope	Protected	VU	-
<i>Hyaena brunnea</i>	Brown Hyaena		Rare	-
<i>Kobus ellipsiprymnus</i>	Waterbuck	Protected	-	-
<i>Loxodonta africana</i>	Elephant	Protected	Protected	VU
<i>Lutra maculicollis</i>	Spottednecked Otter		-	NT
<i>Lycaon pictus</i>	African Wild Dog	Protected	EN	EN
<i>Manis temminckii</i>	Pangolin	Protected	VU	VU
<i>Mellivora capensis</i>	Honey Badger	Protected	-	LC
<i>Mystromys albicaudatus</i>	Whitetailed Mouse		-	EN
<i>Neotragus moschatus</i>	Suni	Protected	Protected	-
<i>Oreotragus oreotragus</i>	Klipspringer	Protected	-	-
<i>Ourebia ourebi</i>	Oribi	Protected	EN	LC
<i>Panthera leo</i>	Lion		VU	VU
<i>Panthera pardus</i>	Leopard		-	VU
<i>Pelea capreolus</i>	Grey Rhebuck	Protected	-	-
<i>Philantomba monticola</i>	Blue Duiker	Protected	VU	-
<i>Raphicercus campestris-</i>	Steenbok	Protected	-	-
<i>Redunca arundinum</i>	Reedbuck	Protected	-	-
<i>Tragelaphus strepsiceros</i>	Kudu	Protected	-	-



<i>Vulpes chama</i>	Cape Fox	Protected	
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Information from the EWT concerning Wild Dog (*Lycaon pictus*) sightings is included below, from this map it is evident that

Figure 5-2: Wild Dog Sightings in relation to the project infrastructure

The bat species of special concern are listed below in Table 5-4, from this we can see that 21 bat species of conservation concern can possibly be present in the area of interest.

Table 5-4: Protected Bat Species

Common Name	Scientific Name	NEMBA	IUCN	Habitat preference
Sundevall's roundleaf bat	<i>Hipposideros caffer</i>	DD	LC	-
Anchieta's pipistrelle	<i>Hypsugo anchietae</i>	NT	LC	Afromontane forest, coastal forest or bushveld
Damara woolly bat	<i>Kerivoula argentata</i>	EN	LC	Moist savanna habitats (including bushveld) (Taylor 2000). Roosting sites include deserted weaver bird nests, among clusters of leaves, on the bark of trees, and on traditional houses (rondavels).
Lesser woolly bat	<i>Kerivoula lanosa</i>	NT	LC	Variety of habitats, ranging from lowland tropical moist forest, to dry woodland, and both dry and moist savanna. Animals have often been encountered roosting in abandoned bird nests
Botswana long-eared bat (Near Endemic)	<i>Laephotis botswanae</i>	V	LC	Dry and moist savanna, and heathland habitats. It is often found in the vicinity of rivers. This species is prefers habitats at higher elevations (Happold and Happold 1997). It is reported to occur under the bark of trees, usually in pairs
De Winton's long-eared	<i>Laephotis wintoni</i>	V	LC	Dry savanna, mediterranean like shrubby vegetation, and high altitude grassland, and



bat				bushveld
Lesser long-fingered bat (Endemic)	<i>Miniopterus fraterculus</i>	NT	LC	Distribution in KwaZulu-Natal indicates a wide range of habitats from drier Valley bushveld and Lowveld to moister Mistbelt (including forest habitats), where suitable cover is present in the form of caves, overhangs, and unused mine and railway tunnels. Roosts in caves, overhangs, disused mines, railway tunnels and similar habitats (Skinner and Chimimba 2005). In KwaZulu-Natal it has been found in damp sandstone caves, a solution cave of poorly consolidated glacio-fluvial boulder clay, a rocky overhang over a forest stream, a rock fissure, a railway tunnel as well as from unused mine adits.
Greater long-fingered bat	<i>Miniopterus natalensis</i>	NT	NT	Dry and moist savanna, and Mediterranean-type shrubby vegetation. It is generally a cave roosting species also found in similar habitats such as disused mines.
Rufous mouse-eared bat	<i>Myotis bocagii</i>	DD	LC	-
Temminck's hairy bat	<i>Myotis tricolor</i>	NT	LC	Dry and moist savanna, and Mediterranean-type shrubby vegetation. The species roosts in caves and abandoned mines. It appears to prefer larger caves that are relatively undisturbed, usually ones that contain large pools of water
	<i>Myotis welwitschii</i>	NT	LC	Tropical dry forest, montane tropical moist forest, both dry and moist savanna, shrublands, and high altitude grassland. Animals have been encountered roosting in buildings, caves and dense vegetation (including rolled banana leaves).
-	<i>Neoromicia nana</i>	LC	LC	-



Cape serotine bat	<i>Neoromicia capensis</i>	LC	LC	
Rendall's serotine bat	<i>Neoromicia rendalli</i>	CR	LC	Natural habitats are dry savanna, moist savanna, subtropical or tropical dry shrubland, and subtropical or tropical moist shrubland
Hairy slit-faced bat	<i>Nycteris hispida</i>	NT	LC	Moist savanna, dry savanna, papyrus swamps and marsh. Colonies roost in hollow trees, dense bushes, caves, holes in termite colonies and similar habitats. Colonies range in size from individual and pairs of animals to up to 20 bats
Large-eared free-tailed bat	<i>Otomops martiensseni</i>	V	NT	Moist forest to semi-arid environments, and in some instances have been found to be common in urban and suburban areas, foraging in areas of intensive agricultural operations, roost in caves, disused tunnels, trees, hollows and on vegetation.
Blasius's horseshoe bat	<i>Rhinolophus blasii</i>	V	NT	Summer roosts are situated in natural and artificial underground sites, with attics also being used in the northern part of the range. In winter, it hibernates in underground sites. This species is considered to be sedentary (Hutterer et al. 2005).
Geoffroy's horseshoe bat	<i>Rhinolophus clivosus</i>	NT	LC	Savanna woodland, Mediterranean-type shrubland, dry (and possibly moist) savanna, open grasslands and semi-desert to even more arid environments. Roosting has been recorded in caves, rock crevices, disused mines, and various rural and urban buildings
Darling's horseshoe bat	<i>Rhinolophus darlingi</i>	NT	LC	Savanna and savanna-woodland type habitats. It is dependant on caves, mines, broken rocky areas, buildings and similar structures as roost sites
Swinny's horseshoe bat	<i>Rhinolophus swinnyi</i>	EN	NT	Moist montane rainforest, and dry and moist savanna. Populations are dependent on caves, mines and similar habitats for roosting.



				It appears to be sparsely distributed in parts of its range
Light-winged lesser house bat	<i>Scotoecus albofuscus</i>	V	DD	Occurs in dry savanna habitats

5.4.2 Reptiles

Reptiles are ectothermic (cold-blooded) meaning they are organisms that control body temperature through external means. As a result reptiles are dependent on environmental heat sources. Due to this many reptiles regulate their body temperature by basking in the sun, or in warmer areas. Substrate is an important factor determining which habitats are suitable for which species of reptile.

According to the Animal demography unit's virtual museum a total of 60 species have been recorded in the relevant QDS grids in the past (<http://sarca.adu.org.za/>). Only three protected species are expected to occur within the Transmission Power Line corridors and sub-stations (Table 5-5).

Table 5-5: Kwa-Zulu Natal Province Expected Reptile Species

Scientific	Common	KZN	NEMBA TOPS	IUCN
<i>Acanthocercus atricollis atricollis</i>	Southern Tree Agama			Not Listed
<i>Acontias plumbeus</i>	Giant Legless Skink			LC
<i>Afroedura marleyi</i>	Marley's Flat Gecko			Not Listed
<i>Afrotyphlops bibronii</i>	Bibron's Blind Snake			Not Listed
<i>Afrotyphlops schlegelii</i>	Schlegel's Beaked Blind Snake			Not Listed
<i>Agama aculeata distanti</i>	Distant's Ground Agama			Not Listed
<i>Aparallactus capensis</i>	Black-headed Centipede-eater			LC
<i>Atractaspis bibronii</i>	Bibron's Stiletto Snake			Not Listed
<i>Bitis arietans arietans</i>	Puff Adder			Not Listed
<i>Bitis gabonica</i>	Gaboon Adder		Protected	Not Listed
<i>Boaedon capensis</i>	Brown House Snake			Not Listed



<i>Bradypodion setaroi</i>	Setaro's Dwarf Chameleon			LC
<i>Causus defilippii</i>	Snouted Night Adder			Not Listed
<i>Causus rhombeatus</i>	Rhombic Night Adder			Not Listed
<i>Chamaeleo dilepis dilepis</i>	Common Flap-neck Chameleon			Not Listed
<i>Chondrodactylus turneri</i>	Turner's Gecko			Not Listed
<i>Cordylus vittifer</i>	Common Girdled Lizard			Not Listed
<i>Crocodylus niloticus</i>	Nile Crocodile		VU	Lower Risk/least concern
<i>Dasypeltis scabra</i>	Rhombic Egg-eater			LC
<i>Dispholidus typus typus</i>	Boomslang			Not Listed
<i>Dispholidus typus viridis</i>	Northern Boomslang			Not Listed
<i>Gerrhosaurus flavigularis</i>	Yellow-throated Plated Lizard			Not Listed
<i>Hemidactylus mabouia</i>	Common Tropical House Gecko			Not Listed
<i>Homopholis wahlbergii</i>	Wahlberg's Velvet Gecko			Not Listed
<i>Kinixys zombensis</i>	Eastern Hinged Tortoise			Not Listed
<i>Lamprophis guttatus</i>	Spotted House Snake			Not Listed
<i>Lycophidion capense capense</i>	Cape Wolf Snake			Not Listed
<i>Lygodactylus capensis capensis</i>	Common Dwarf Gecko			Not Listed
<i>Matobosaurus validus</i>	Common Giant Plated Lizard			Not Listed
<i>Naja melanoleuca</i>	Forest Cobra			Not Listed
<i>Naja mossambica</i>	Mozambique Spitting Cobra			Not Listed
<i>Nucras intertexta</i>	Spotted Sandveld Lizard			Not Listed
<i>Nucras ornata</i>	Ornate Sandveld Lizard			Not Listed
<i>Pachydactylus maculatus</i>	Spotted Gecko			LC
<i>Pachydactylus vansoni</i>	Van Son's Gecko			LC
<i>Panaspis wahlbergi</i>	Wahlberg's Snake-eyed Skink			Not Listed



<i>Pelomedusa galeata</i>	South African Marsh Terrapin			Not Listed
<i>Pelusios castanoides</i>	Yellow-bellied Terrapin	Hinged		Lower Risk/least concern
<i>Pelusios sinuatus</i>	Serrated Hinged Terrapin			Not Listed
<i>Philothamnus hoplogaster</i>	South Eastern Green Snake			Not Listed
<i>Philothamnus natalensis occidentalis</i>	Western Natal Green Snake			Not Listed
<i>Platysaurus intermedius natalensis</i>	Natal Flat Lizard			Not Listed
<i>Prosymna stuhlmannii</i>	East African Shovel-snout			Not Listed
<i>Psammophis brevirostris</i>	Short-snouted Snake	Grass		Not Listed
<i>Pseudocordylus melanotus melanotus</i>	Common Crag Lizard			Not Listed
<i>Python natalensis</i>	Southern African Python		Protected	Not Listed
<i>Rhoptropus boultoni boultoni</i>	Boulton's Gecko	Namib Day		Not Listed
<i>Scelotes mirus</i>	Montane Dwarf Skink	Burrowing		Not Listed
<i>Smaug barbertonensis</i>	Baberton Girdled Lizard			Not Listed
<i>Smaug warreni</i>	Warren's Girdled Lizard			Not Listed
<i>Telescopus semiannulatus</i>	Eastern Tiger Snake			Not Listed
<i>Tetradactylus africanus</i>	Eastern Long-tailed Seps			LC
<i>Thelotornis capensis capensis</i>	Southern Twig Snake			Not Listed
<i>Trachylepis margaritifera</i>	Rainbow Skink			Not Listed
<i>Trachylepis punctatissima</i>	Speckled Rock Skink			LC
<i>Trachylepis striata</i>	Striped Skink			Not Listed
<i>Trachylepis varia</i>	Variable Skink			Not Listed
<i>Varanus albigularis albigularis</i>	Rock Monitor			Not Listed
<i>Varanus niloticus</i>	Water Monitor			Not Listed



<i>Zygaspis vandami arenicol</i>	Maputoland Dwarf Worm Lizard		Not Listed
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5.4.3 Amphibians

Amphibians are viewed be good indicators of changes to the whole ecosystem because they are sensitive to changes in the aquatic and terrestrial environments (Waddle, 2006). Most species of amphibians are dependent on the aquatic environment for reproduction (Duellman and Trueb 1986). Additionally, amphibians are sensitive to water quality and ultra violet radiation because of their permeable skin (Gerlanc and Kaufman 2005). Activities such as feeding and dispersal are spent in terrestrial environments (Waddle, 2006). According to Carruthers (2009), a number of factors influence the distribution of amphibians, but because amphibians have porous skin they generally prosper in warm and damp habitats. The presence of suitable habitat within the study area should provide a number of different species of amphibians.

According to Carruthers (2009), frogs occur throughout southern Africa. A number of factors influence their distribution, and they are generally restricted to the habitat type they prefer, especially in their choice of breeding site. The choices available of these habitats coincide with different biomes, these biomes in turn, are distinguished by means of biotic and abiotic features prevalent within them. Therefore a collection of amphibians associated with the Grassland and Bushveld biome will all choose to breed under the prevailing biotic and abiotic features present. Further niche differentiation is encountered by means of geographic location within the biome, this differentiation includes, banks of pans, open water, inundated grasses, reed beds, trees, rivers and open ground, all of which are present within the area of interest. Amphibians expected to occur on site are listed in the Table 5-6 below (<http://sarca.adu.org.za/>). No protected amphibian species are expected to occur on site as per this information, no NEMBA protected species are expected to occur.

Table 5-6: Expected Amphibian Species

Scientific Name	Common Name	KZN	NEMBA	IUCN
<i>Afrivalus delicatus</i>	Delicate Leaf-folding Frog	-	-	LC
<i>Afrivalus fornasinii</i>	Greater Leaf-folding Fro	-	-	Not Listed
<i>Amietia queckettii</i>	Queckett's River Frog	-	-	Not Listed
<i>Arthroleptis wahlbergi</i>	Bush Squeaker	-	-	Not Listed
<i>Breviceps adspersus</i>	Bushveld Rain Frog	-	-	LC
<i>Breviceps sopranus</i>	Whistling Rain Frog	-	-	LC



<i>Cacosternum nanum</i>	Bronze Caco	-	-	LC
<i>Chiromantis xerampelina</i>	Southern Foam Nest Frog	-	-	LC
<i>Hemisus marmoratus</i>	Spotted Shovel-nosed Frog	-	-	LC
<i>Hyperolius argus</i>	Argus Reed Frog	-	-	LC
<i>Hyperolius marmoratus</i>	Painted Reed Frog	-	-	LC
<i>Hyperolius semidiscus</i>	Yellowstriped Reed Frog	-	-	LC
<i>Hyperolius tuberilinguis</i>	Tinker Reed Frog	-	-	LC
<i>Kassina maculata</i>	Redlegged Kassina	-	-	LC
<i>Kassina senegalensis</i>	Bubbling Kassina	-	-	LC
<i>Leptopelis mossambicus</i>	Brownbacked Tree Frog	-	-	LC
<i>Phrynobatrachus mababiensis</i>	Dwarf Puddle Frog	-	-	LC
<i>Phrynobatrachus natalensis</i>	Snoring Puddle Frog	-	-	LC
<i>Ptychadena anchietae</i>	Plain Grass Frog	-	-	LC
<i>Ptychadena mascareniensis</i>	Mascarene Grass Frog	-	-	LC
<i>Ptychadena mossambica</i>	Broadbanded Grass Frog	-	-	LC
<i>Ptychadena oxyrhynchus</i>	Sharpnosed Grass Frog	-	-	LC
<i>Pyxicephalus edulis</i>	African Bull Frog	-	-	LC, Decreasing
<i>Schismaderma carens</i>	Red Toad	-	-	LC
<i>Sclerophrys garmani</i>	Olive Toad	-	-	Not Listed
<i>Sclerophrys gutturalis</i>	Guttural Toad	-	-	Not Listed
<i>Sclerophrys maculata</i>	Flatbacked Toad	-	-	Not Listed
<i>Strongylopus wageri</i>	Plain Stream Frog	-	-	LC



<i>Tomopterna cryptotis</i>	Tremelo Sand Frog	-	-	LC
<i>Tomopterna natalensis</i>	Natal Sand Frog	-	-	LC
<i>Xenopus laevis</i>	Common Platanna	-	-	LC
<i>Xenopus muelleri</i>	Tropical Platanna	-	-	LC

5.4.4 Invertebrates

Butterflies are a good indication of the habitats available in a specific area (Woodhall 2005). Although many species are eurytopes (able to use a wide range of habitats) and are widespread and common, South Africa has many stenotrope (specific habitat requirements with populations concentrated in a small area) species which may be very specialised (Woodhall 2005). Butterflies are useful indicators as they are relatively easy to locate and catch, and to identify.

6 Preliminary Impact Assessment

6.1 Methodology

Details of the impact assessment methodology used to determine the significance of physical, bio-physical and socio-economic impacts are provided below.

The significance rating process follows the established impact/risk assessment formula:

$$\text{Significance} = \text{Consequence} \times \text{Probability} \times \text{Nature}$$

Where

$$\text{Consequence} = \text{Intensity} + \text{Extent} + \text{Duration}$$

And

$$\text{Probability} = \text{Likelihood of an impact occurring}$$

And

$$\text{Nature} = \text{Positive (+1) or negative (-1) impact}$$

Note: In the formula for calculating consequence, the type of impact is multiplied by +1 for positive impacts and -1 for negative impacts.



The matrix calculates the rating out of 147, whereby Intensity, Extent, Duration and Probability are each rated out of seven as indicated in Table 6-3. The weight assigned to the various parameters is then multiplied by +1 for positive and -1 for negative impacts.

Impacts are rated prior to mitigation and again after consideration of the mitigation measure proposed in this report. The significance of an impact is then determined and categorised into one of eight categories, as indicated in Table 6-2, which is extracted from Table 6-1. The description of the significance ratings is discussed in Table 6-3.

It is important to note that the pre-mitigation rating takes into consideration the activity as proposed, i.e. there may already be certain types of mitigation measures included in the design (for example due to legal requirements). If the potential impact is still considered too high, additional mitigation measures are proposed.

Table 6-1: Impact Assessment Parameter Ratings

Rating	Intensity/Replacability		Extent	Duration/Reversibility	Probability
	Negative Impacts (Nature = -1)	Positive Impacts (Nature = +1)			
7	Irreplaceable loss or damage to biological or physical resources or highly sensitive environments. Irreplaceable damage to highly sensitive cultural/social resources.	Noticeable, on-going natural and/or social benefits which have improved the overall conditions of the baseline.	<u>International</u> The effect will occur across international borders.	Permanent: The impact is irreversible, even with management, and will remain after the life of the project.	Definite: There are sound scientific reasons to expect that the impact will definitely occur. >80% probability.
6	Irreplaceable loss or damage to biological or physical resources or moderate to highly sensitive environments. Irreplaceable damage to cultural/social resources of moderate to highly sensitivity.	Great improvement to the overall conditions of a large percentage of the baseline.	<u>National</u> Will affect the entire country.	Beyond project life: The impact will remain for some time after the life of the project and is potentially irreversible even with management.	Almost certain/Highly probable: It is most likely that the impact will occur. <80% probability.

Rating	Intensity/Replacability		Extent	Duration/Reversibility	Probability
	Negative Impacts (Nature = -1)	Positive Impacts (Nature = +1)			
5	Serious loss and/or damage to physical or biological resources or highly sensitive environments, limiting ecosystem function. Very serious widespread social impacts. Irreparable damage to highly valued items.	On-going and widespread benefits to local communities and natural features of the landscape.	<u>Province/ Region</u> Will affect the entire province or region.	Project Life (>15 years): The impact will cease after the operational life span of the project and can be reversed with sufficient management.	Likely: The impact may occur. <65% probability.
4	Serious loss and/or damage to physical or biological resources or moderately sensitive environments, limiting ecosystem function. On-going serious social issues. Significant damage to structures/items of cultural significance.	Average to intense natural and/or social benefits to some elements of the baseline.	<u>Municipal Area</u> Will affect the whole municipal area.	Long term: 6-15 years and impact can be reversed with management.	Probable: Has occurred here or elsewhere and could therefore occur. <50% probability.



Rating	Intensity/Replacability		Extent	Duration/Reversibility	Probability
	Negative Impacts (Nature = -1)	Positive Impacts (Nature = +1)			
3	Moderate loss and/or damage to biological or physical resources of low to moderately sensitive environments and, limiting ecosystem function. On-going social issues. Damage to items of cultural significance.	Average, on-going positive benefits, not widespread but felt by some elements of the baseline.	<u>Local</u> Local extending only as far as the development site area.	Medium term: 1-5 years and impact can be reversed with minimal management.	Unlikely: Has not happened yet but could happen once in the lifetime of the project, therefore there is a possibility that the impact will occur. <25% probability.
2	Minor loss and/or effects to biological or physical resources or low sensitive environments, not affecting ecosystem functioning. Minor medium-term social impacts on local population. Mostly repairable. Cultural functions and processes not affected.	Low positive impacts experience by a small percentage of the baseline.	<u>Limited</u> Limited to the site and its immediate surroundings.	Short term: Less than 1 year and is reversible.	Rare/improbable: Conceivable, but only in extreme circumstances. The possibility of the impact materialising is very low as a result of design, historic experience or implementation of adequate mitigation measures. <10% probability.

Rating	Intensity/Replacability		Extent	Duration/Reversibility	Probability
	Negative Impacts (Nature = -1)	Positive Impacts (Nature = +1)			
1	Minimal to no loss and/or effect to biological or physical resources, not affecting ecosystem functioning. Minimal social impacts, low-level repairable damage to commonplace structures.	Some low-level natural and / or social benefits felt by a very small percentage of the baseline.	<u>Very limited/Isolated</u> Limited to specific isolated parts of the site.	Immediate: Less than 1 month and is completely reversible without management.	Highly unlikely/None: Expected never to happen. <1% probability.

Table 6-2: Probability/Consequence Matrix

		Significance																																					
Probability	7	-147	-140	-133	-126	-119	-112	-105	-98	-91	-84	-77	-70	-63	-56	-49	-42	-35	-28	-21	21	28	35	42	49	56	63	70	77	84	91	98	105	112	119	126	133	140	147
	6	-126	-120	-114	-108	-102	-96	-90	-84	-78	-72	-66	-60	-54	-48	-42	-36	-30	-24	-18	18	24	30	36	42	48	54	60	66	72	78	84	90	96	102	108	114	120	126
	5	-105	-100	-95	-90	-85	-80	-75	-70	-65	-60	-55	-50	-45	-40	-35	-30	-25	-20	-15	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100	105
	4	-84	-80	-76	-72	-68	-64	-60	-56	-52	-48	-44	-40	-36	-32	-28	-24	-20	-16	-12	12	16	20	24	28	32	36	40	44	48	52	56	60	64	68	72	76	80	84
	3	-63	-60	-57	-54	-51	-48	-45	-42	-39	-36	-33	-30	-27	-24	-21	-18	-15	-12	-9	9	12	15	18	21	24	27	30	33	36	39	42	45	48	51	54	57	60	63
	2	-42	-40	-38	-36	-34	-32	-30	-28	-26	-24	-22	-20	-18	-16	-14	-12	-10	-8	-6	6	8	10	12	14	16	18	20	22	24	26	28	30	32	34	36	38	40	42
	1	-21	-20	-19	-18	-17	-16	-15	-14	-13	-12	-11	-10	-9	-8	-7	-6	-5	-4	-3	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
		Consequence																																					


Table 6-3: Significance Rating Description

Score	Description	Rating
109 to 147	A very beneficial impact that may be sufficient by itself to justify implementation of the project. The impact may result in permanent positive change.	Major (positive) (+)
73 to 108	A beneficial impact which may help to justify the implementation of the project. These impacts would be considered by society as constituting a major and usually a long-term positive change to the (natural and/or social) environment.	Moderate (positive) (+)
36 to 72	A positive impact. These impacts will usually result in positive medium to long-term effect on the natural and/or social environment.	Minor (positive) (+)
3 to 35	A small positive impact. The impact will result in medium to short term effects on the natural and/or social environment.	Negligible (positive) (+)
-3 to -35	An acceptable negative impact for which mitigation is desirable. The impact by itself is insufficient even in combination with other low impacts to prevent the development being approved. These impacts will result in negative medium to short term effects on the natural and/or social environment.	Negligible (negative) (-)
-36 to -72	A minor negative impact requires mitigation. The impact is insufficient by itself to prevent the implementation of the project but which in conjunction with other impacts may prevent its implementation. These impacts will usually result in negative medium to long-term effect on the natural and/or social environment.	Minor (negative) (-)
-73 to -108	A moderate negative impact may prevent the implementation of the project. These impacts would be considered as constituting a major and usually a long-term change to the (natural and/or social) environment and result in severe changes.	Moderate (negative) (-)
-109 to -147	A major negative impact may be sufficient by itself to prevent implementation of the project. The impact may result in permanent change. Very often these impacts are immitigable and usually result in very severe effects. The impacts are likely to be irreversible and/or irreplaceable.	Major (negative) (-)



6.2 Iphiva Substation 3 or 6 (Ref. No. 14/12/16/3/3/2/1037)

6.2.1 Project activity: Construction of Surface Infrastructure

The construction of various surface infrastructure components will mean the removal, partial or complete of vegetation/habitat types present.

Table 6-4: Interactions and Impacts of Iphiva Substation 3 and 6 Infrastructure Considered

Interaction	Impact
Site clearing for infrastructure placement	Direct loss of floral species/vegetation types and biodiversity.
	Loss of species of special concern (protected species).
	Alien vegetation recruitment

6.2.1.1 Impact Description

The construction of surface infrastructure which will include access roads and the actual sub-station will affect the current habitat and vegetation types present. A 400 x 400 m (i.e. 16 ha) will be required for the development footprint, within a site-specific study area of 1 x 1 km. The 16 ha development footprint area includes provisions for an 80 m high microwave radio communication mast, oil and fuel storage facilities, and an oil bund to contain any accidental transformer oil spills.

With the clearing of vegetation, open areas will occur, here indigenous vegetation will be replaced by fast growing alien and weed vegetation. This impact can be greatly reduced with the correct implementation of alien vegetation management plan.

6.2.1.2 Management Objectives

Management objectives will be to prevent the loss of important/protected landscapes, species of plants and animals (such as those with Red Data Status, National and Provincial). This is achieved by avoiding destruction of areas where these species are located. In the case of plants, if this is not possible relocation permits are required.

The destruction of the vegetative cover must be limited, this can be achieved by restricting the removal and disturbance of vegetation to those areas absolutely essential for the infrastructure placements.

The ecosystem present must be preserved, this includes areas not directly affected by project activities, and can be achieved by limiting project activities to areas where they are essential. Rehabilitation plans must be initiated during construction to minimise disturbed



areas. Habitat/vegetation degradation must be prevented through the implementation of an alien invasive plant management strategy.

6.2.1.3 Management Actions and Targets

Red Data Status plants located in areas of development should be marked prior to construction of any infrastructure and the necessary permits for relocations of these protected species must be obtained from the relevant government department. The relocation strategy must be approved by relevant provincial authorities prior to relocation to a safe place to avoid destruction and stipulations made by the authorities must be followed. A nursery should be developed on site for this purpose. No protected plant species can be disturbed without authorisation.

Three basic rules of conservation apply to populations of Red List Plant Species, as set out hereunder, according to Red List Plant Guidelines (2012).

- All populations of Near Threatened and Threatened plant taxa must be conserved *in situ*.
- All populations of Near Threatened and Threatened plant taxa must be protected with a buffer zone in accordance with guidelines.
- An Ecological Management Plan must be compiled in respect of all actions that affect populations of Red List Plant Species, and such Ecological Management Plans must conform with the Guidelines set out for buffer zone widths.

An alien plant management strategy must be implemented to preserve natural habitat. Such a strategy will entail the identification of areas where such infestation occurs and what the extent of it is. Thereafter specific eradication measures can be prescribed for species present. The alien invasive plant strategy must reduce the number of these plant species that occur in the project area.

Illegal waste dumping, including building waste and rubble, should be prohibited. Such illegal dumping sites are prone to alien vegetation recruitment. The environmental manager must ensure that after the building site is rehabilitated, there are no rubble piles remaining.

Training should be given to onsite staff on which plants and animals have red data status and how they may be identified. Thereafter the Environmental Officer must initiate the red data management plan. The incidence of plant or animal red data removal or death must be quantified and records kept, this will ensure that management actions are adapted if they are not successful.

Destruction of vegetation should be limited to the areas essential for the development if construction is finalised the environmental officer must ensure the construction areas are rehabilitated. Areas of erosion must be marked and attended to before the following wet season starts.



Rehabilitation of disturbed areas should take place within a week of construction, all bare patches of soil should be vegetated, preferably with pioneer species which will colonise open and disturbed areas relatively quickly, and prevent erosion and alien vegetation establishing.

Community awareness should be implemented as part of the stakeholder engagement procedure to create awareness of biodiversity and preservation of natural habitats.

6.2.1.4 Impact Ratings

Table 6-5: Potential Impacts of Construction of the Iphiva 3 Substation Infrastructure

Activity and Interaction Construction of infrastructure require vegetation clearing			
Dimension	Rating	Motivation	Significance
Impact Description: Direct loss of floral species/vegetation types and biodiversity			
<i>Prior to mitigation/ management</i>			
Duration	Permanent (7)	Total loss of 16 ha of floral species/vegetation will occur.	Moderate (negative) – 91
Extent	Limited (2)	Species/habitat loss will only occur within and immediately around the project site.	
Intensity x type of impact	Serious (4)	The footprint of Iphiva 3 covers undisturbed grassland.	
Probability	Definite (7)	It is likely that total destruction of vegetation types will occur.	
Nature	Negative		
<i>Mitigation/ Management actions</i>			
<ul style="list-style-type: none"> ▪ Limit degradation and destruction of natural environment to designated project area by keeping the footprint of the disturbed areas to the minimum and within designated areas only, preferably cultivated land. Re-vegetate open areas to limit erosion, which will also aid in water infiltration and flood attenuation. ▪ Avoid sensitive landscapes such as riparian and wetland areas that were encountered on and east of the site. Water Use Licences/Registrations must be obtained for any construction in a regulated area (below 1:00 floodline or 100 m from water course and 500 m from a wetland). 			



Activity and Interaction Construction of infrastructure require vegetation clearing			
Dimension	Rating	Motivation	Significance
<ul style="list-style-type: none"> Manage nationally restricted alien invasive plant species by ensuring the removal of vegetation during construction and operation are controlled so that no open areas occur. 			
Post- mitigation			
Duration	Permanent (7)	No mitigation possible.	Moderate (negative) – 77
Extent	Limited (2)	If contractors adhere to mitigation such as to limit the footprint of disturbance to only essential areas.	
Intensity x type of impact	Moderate (-2)	Dependent on sensitivity of the specific site.	
Probability	Definite (7)	This impact will occur	
Nature	Negative		

Activity and Interaction Construction of infrastructure require vegetation clearing)			
Dimension	Rating	Motivation	Significance
Impact Description: Loss of species of special concern (protected species)			
Prior to mitigation/ management			
Duration	Project Life (5)	Loss floral species/vegetation will occur within the footprints of	Minor (negative) –



Activity and Interaction Construction of infrastructure require vegetation clearing)			
Dimension	Rating	Motivation	Significance
		infrastructure.	60
Extent	Limited (2)	Species/habitat loss will only occur within the project site.	
Intensity x type of impact	High (4)	Natural vegetation occur in this substation site.	
Probability	High (6)	It is likely that destruction of vegetation types will occur without management measures.	
Nature	Negative		
<i>Mitigation/ Management actions</i>			
<ul style="list-style-type: none"> ▪ Limit degradation and destruction of natural environment to designated project areas by keeping the footprint of the disturbed areas to the minimum and within designated areas only. Re-vegetate open areas to limit erosion, which will also aid in water infiltration and flood attenuation. ▪ Avoid known areas of faunal and floral SSC. ▪ Avoid sensitive landscapes such as riparian and ridge areas that were encountered on site, Water Use Licences/Registrations must be obtained for any construction in a regulated area (below 1:00 floodline or 100 m from water course and 500 m from a wetland. ▪ Applications for permits for removal of certain plants, where required by provincial authorities. If plant SSC are to be removed, they should be either translocated to a similar habitat to the donor site or relocated to a nursery. 			
<i>Post management</i>			
Duration	Medium term (3)	With vegetation management including rehabilitation, vegetation can recover in 1-5 years.	Negligible (negative) – 24
Extent	Limited (2)	If contractors adhere to mitigation such as to limit the footprint of	



Activity and Interaction Construction of infrastructure require vegetation clearing)			
Dimension	Rating	Motivation	Significance
		disturbance to only essential areas.	
Intensity x of type impact	Moderate negative (-3)	Dependent on sensitivity of the specific site.	
Probability	Unlikely (3)	It is unlikely that compaction will have an effect after rehabilitation	
Nature	Negative		

Activity and Interaction Construction of infrastructure require vegetation clearing			
Dimension	Rating	Motivation	Significance
Impact Description: Alien vegetation establishment			
<i>Prior to mitigation/ management</i>			
Duration	Long term (4)	Alien vegetation will colonise any area that is available (open areas).	Minor (negative) – 48
Extent	Municipal area (4)	Such an infestation can easily spread to the entire municipal area, and infest water sources.	
Intensity x of type impact	Moderate - (-4)	Serious loss of sensitive habitats due to alien vegetation colonisation.	
Probability	Probable (4)	It is unlikely that without mitigation measures, alien vegetation will establish	
Nature	Negative		
<i>Mitigation/ Management actions</i>			



Activity and Interaction Construction of infrastructure require vegetation clearing			
Dimension	Rating	Motivation	Significance
<ul style="list-style-type: none"> ▪ Manage nationally restricted alien invasive plant species by ensuring the removal of vegetation during construction and operation are controlled so that no open areas occur. ▪ If alien vegetation is encountered, remove these plants, in the correct way and timeously. Alien plants should be removed as seedlings before they reach seed-bearing age. Alien plants can establish on a site after removal for up to 2-7 years, therefore appropriate monitoring must take place. 			
<i>Post management</i>			
Duration	Medium term (3)	Alien vegetation colonisation will be eradicated asap.	Negligible (negative) – 21
Extent	Limited (2)	An infestation will not be allowed to spread.	
Intensity x type of impact	Minor (-2)	Only limited areas will experience this for a short duration.	
Probability	Unlikely (3)	It is unlikely that alien vegetation will establish, if mitigation is adhered to.	
Nature	Negative		


Table 6-6: Potential Impacts of Construction of the Iphiva 6 Substation Infrastructure

Activity and Interaction Construction of infrastructure require vegetation clearing			
Dimension	Rating	Motivation	Significance
Impact Description: Direct loss of floral species/vegetation types and biodiversity			
<i>Prior to mitigation/ management</i>			
Duration	Project Life (5)	Total loss of 16 ha of floral species/vegetation will occur.	Minor (negative) – 70
Extent	Limited (2)	Species/habitat loss will only occur within and immediately around the project site.	
Intensity x type of impact	Moderate(3)	The footprint of Iphiva 6 covers disturbed grassland and agricultural areas.	
Probability	Definite (7)	It is likely that total destruction of vegetation types will occur.	
Nature	Negative		
<i>Mitigation/ Management actions</i>			
<ul style="list-style-type: none"> ▪ Limit degradation and destruction of natural environment to designated project area by keeping the footprint of the disturbed areas to the minimum and within designated areas only, preferably cultivated land. Re-vegetate open areas to limit erosion, which will also aid in water infiltration and flood attenuation. ▪ Avoid sensitive landscapes such as riparian and wetland areas that were encountered on and east of the site, Water Use Licences/Registrations must be obtained for any construction in a regulated area (below 1:00 floodline or 100 m from water course and 500 m from a wetland. ▪ Manage nationally restricted alien invasive plant species by ensuring the removal of vegetation during construction and operation are controlled so that no open areas occur. 			
<i>Post- mitigation</i>			
Duration	Project Life (5)	Total loss of 16 ha of degraded floral	Minor (negative)



Activity and Interaction Construction of infrastructure require vegetation clearing			
Dimension	Rating	Motivation	Significance
		species/vegetation will occur.	- 69
Extent	Limited (2)	If contractors adhere to mitigation such as to limit the footprint of disturbance to only essential areas.	
Intensity x type of impact	Moderate(2)	Dependent on sensitivity of the specific site.	
Probability	Definite (7)	This impact will occur	
Nature	Negative		

Activity and Interaction Construction of infrastructure require vegetation clearing)			
Dimension	Rating	Motivation	Significance
Impact Description: Loss of species of special concern (protected species)			
<i>Prior to mitigation/ management</i>			
Duration	Project Life (5)	Loss floral species/vegetation will occur within the footprints of infrastructure.	Minor (negative) - 59
Extent	Limited (2)	Species/habitat loss will only occur within the project site.	
Intensity x type of impact	High (-2)	No Sensitive sites occur in this substation site.	
Probability	High (6)	It is likely that destruction of vegetation types will occur without management measures.	



Activity and Interaction Construction of infrastructure require vegetation clearing)			
Dimension	Rating	Motivation	Significance
Nature	Negative		
Mitigation/ Management actions			
<ul style="list-style-type: none"> ▪ Limit degradation and destruction of natural environment to designated project areas by keeping the footprint of the disturbed areas to the minimum and within designated areas only. Re-vegetate open areas to limit erosion, which will also aid in water infiltration and flood attenuation. ▪ Avoid known areas of faunal and floral SSC. ▪ Avoid sensitive landscapes such as riparian and ridge areas that were encountered on site, Water Use Licences/Registrations must be obtained for any construction in a regulated area (below 1:00 floodline or 100 m from water course and 500 m from a wetland. ▪ Applications for permits for removal of certain plants, where required by provincial authorities. If plant SSC are to be removed, they should be either translocated to a similar habitat to the donor site or relocated to a nursery. 			
Post management			
Duration	Medium term (3)	With vegetation management including rehabilitation, vegetation can recover in 1-5 years.	Negligible (negative) – 24
Extent	Limited (2)	If contractors adhere to mitigation such as to limit the footprint of disturbance to only essential areas.	
Intensity x of type impact	Moderate - negative (-3)	Dependent on sensitivity of the specific site.	
Probability	Unlikely (3)	It is unlikely that compaction will have an effect after rehabilitation	
Nature	Negative		



Activity and Interaction Construction of infrastructure require vegetation clearing			
Dimension	Rating	Motivation	Significance
Impact Description: Alien vegetation establishment			
<i>Prior to mitigation/ management</i>			
Duration	Long term (4)	Alien vegetation will colonise any area that is available, and is already present (open areas).	Minor (negative) – 48
Extent	Municipal area (4)	Such an infestation can easily spread to the entire municipal area, and infest water sources.	
Intensity x type of impact	Moderate - (-4)	Serious loss of sensitive habitats due to alien vegetation colonisation.	
Probability	Probable (4)	It is unlikely that without mitigation measures, alien vegetation will establish	
Nature	Negative		
<i>Mitigation/ Management actions</i>			
<ul style="list-style-type: none"> ▪ Manage nationally restricted alien invasive plant species by ensuring the removal of vegetation during construction and operation are controlled so that no open areas occur. ▪ If alien vegetation is encountered, remove these plants, in the correct way and timeously. Alien plants should be removed as seedlings before they reach seed-bearing age. Alien plants can establish on a site after removal for up to 2-7 years, therefore appropriate monitoring must take place. 			
<i>Post management</i>			
Duration	Medium term (3)	Alien vegetation colonisation will be eradicated asap.	Negligible (negative) – 21



Activity and Interaction Construction of infrastructure require vegetation clearing			
Dimension	Rating	Motivation	Significance
Extent	Limited (2)	An infestation will not be allowed to spread.	
Intensity x type of impact	Minor (-2)	Only limited areas will experience this for a short duration.	
Probability	Unlikely (3)	It is unlikely that alien vegetation will establish, if mitigation is adhered to.	
Nature	Negative		

6.3 132 kV Distribution Line Alternatives

6.3.1 Project activity: Construction of Surface Infrastructure

The construction of various surface infrastructure components will mean the removal, partial or complete of vegetation/habitat types present.

Table 6-7: Interactions and Impacts of 132 kV Infrastructure Considered

Interaction	Impact
Site clearing for infrastructure placement	Direct loss of floral species/vegetation types and biodiversity.
	Loss of species of special concern (protected species).
	Alien vegetation recruitment

6.3.1.1 Impact Description

Eskom are considering four (4) 132 kV Distribution powerlines. These will comprise the following routings:

- Iphiva – Pongola (1) 132 kV powerline to tie in with the existing powerline, double circuit with Iphiva / Hluhluwe;
- Iphiva – Pongola (2) 132 kV powerline;



- Iphiva / Makhathini 132 kV powerline double circuit with Iphiva / Mbazwane; and
- 132 kV powerline loop-in to Candover Switching Station from the existing Impala / Normandie Line.

Of the 132 kV distribution lines considered in this assessment, only the Iphiva-Makhathini / Iphiva-Mbazwane distribution line has a routing alternative.

6.3.1.2 Management Objectives

Management objectives will be to prevent the loss of important/protected landscapes, species of plants and animals (such as those with Red Data Status, National and Provincial). This is achieved by avoiding destruction of areas where these species are located. In the case of plants, if this is not possible relocation permits are required.

The destruction of the vegetative cover must be limited, this can be achieved by restricting the removal and disturbance of vegetation to those areas absolutely essential for the infrastructure placements.

The ecosystem present must be preserved, this includes areas not directly affected by project activities, and can be achieved by limiting project activities to areas where they are essential. Rehabilitation plans must be initiated during construction to minimise disturbed areas. Habitat/vegetation degradation must be prevented through the implementation of an alien invasive plant management strategy.

6.3.1.3 Management Actions and Targets

Red Data Status plants located in areas of development should be marked prior to construction of any infrastructure and the necessary permits for relocations of these protected species must be obtained from the relevant government department. The relocation strategy must be approved by relevant provincial authorities prior to relocation to a safe place to avoid destruction and stipulations made by the authorities must be followed. A nursery should be developed on site for this purpose. No protected plant species can be disturbed without authorisation.

Three basic rules of conservation apply to populations of Red List Plant Species, as set out hereunder, according to Red List Plant Guidelines (2012):

- All populations of Near Threatened and Threatened plant taxa must be conserved *in situ*;
- All populations of Near Threatened and Threatened plant taxa must be protected with a buffer zone in accordance with guidelines; and
- An Ecological Management Plan must be compiled in respect of all actions that affect populations of Red List Plant Species, and such Ecological Management Plans must conform with the Guidelines set out for buffer zone widths.

An alien plant management strategy must be implemented to preserve natural habitat. Such a strategy will entail the identification of areas where such infestation occurs and what the



extent of it is. Thereafter specific eradication measures can be prescribed for species present. The alien invasive plant strategy must reduce the number of these plant species that occur in the project area.

Illegal waste dumping, including building waste and rubble, should be prohibited. Such illegal dumping sites are prone to alien vegetation recruitment. The environmental manager must ensure that after the building site is rehabilitated, there are no rubble piles remaining.

Training should be given to onsite staff on which plants and animals have red data status and how they may be identified. Thereafter the Environmental Officer must initiate the red data management plan. The incidence of plant or animal red data removal or death must be quantified and records kept, this will ensure that management actions are adapted if they are not successful.

Destruction of vegetation should be limited to the areas essential for the development if construction is finalised the environmental officer must ensure the construction areas are rehabilitated. Areas of erosion must be marked and attended to before the following wet season starts.

Rehabilitation of disturbed areas should take place within a week of construction, all bare patches of soil should be vegetated, preferably with pioneer species which will colonise open and disturbed areas relatively quickly, and prevent erosion and alien vegetation establishing.

Community awareness should be implemented as part of the stakeholder engagement procedure to create awareness of biodiversity and preservation of natural habitats.

6.3.1.4 Impact Ratings

Table 6-8: Potential Impacts of Construction of the 132kV Distribution Lines Infrastructure

Activity and Interaction Construction of infrastructure require vegetation clearing			
Dimension	Rating	Motivation	Significance
Impact Description: Direct loss of floral species/vegetation types and biodiversity			
<i>Prior to mitigation/ management</i>			
Duration	Permanent (7)	Total loss of floral species/vegetation will occur on selected footprint sites.	Moderate (negative) – 91
Extent	Limited (2)	Species/habitat loss will only occur within and immediately around the project site (pylon infrastructure).	
Intensity x	Serious (4)	The footprint of I-D covers multiple	



Activity and Interaction Construction of infrastructure require vegetation clearing			
Dimension	Rating	Motivation	Significance
type of impact		undisturbed vegetation types.	
Probability	Definite (7)	It is likely that total destruction of vegetation types will occur.	
Nature	Negative		
Mitigation/ Management actions			
<ul style="list-style-type: none"> ▪ Limit degradation and destruction of natural environment to designated project area by keeping the footprint of the disturbed areas to the minimum and within designated areas only, preferably cultivated land. Re-vegetate open areas to limit erosion, which will also aid in water infiltration and flood attenuation. ▪ Avoid sensitive landscapes such as riparian and wetland areas that were encountered on and east of the site. Water Use Licences/Registrations must be obtained for any construction in a regulated area (below 1:00 floodline or 100 m from water course and 500 m from a wetland. ▪ Manage nationally restricted alien invasive plant species by ensuring the removal of vegetation during construction and operation are controlled so that no open areas occur. 			
Post- mitigation			
Duration	Permanent (5)	Project life.	Moderate (negative) – 69
Extent	Limited (2)	If contractors adhere to mitigation such as to limit the footprint of disturbance to only essential areas.	
Intensity x type of impact	Moderate (-2)	Dependent on sensitivity of the specific site.	
Probability	Definite (7)	This impact will occur	
Nature	Negative		



Activity and Interaction Construction of infrastructure require vegetation clearing)			
Dimension	Rating	Motivation	Significance
Impact Description: Loss of species of special concern (protected species)			
<i>Prior to mitigation/ management</i>			
Duration	Project Life (5)	Loss floral species/vegetation will occur within the footprints of the pylons.	Moderate (negative) – 84
Extent	Provincial (5)	Species/habitat loss will only occur within the project site, and will be limited to the corridor but will extend across a very long corridor.	
Intensity x type of impact	High (4)	Natural vegetation occur in this substation site.	
Probability	High (6)	It is likely that destruction of vegetation types will occur without management measures.	
Nature	Negative		
<i>Mitigation/ Management actions</i>			
<ul style="list-style-type: none"> ▪ Limit degradation and destruction of natural environment to designated project areas by keeping the footprint of the disturbed areas to the minimum and within designated areas only. Re-vegetate open areas to limit erosion, which will also aid in water infiltration and flood attenuation. ▪ Avoid known areas of faunal and floral SSC. ▪ Avoid sensitive landscapes such as riparian and ridge areas that were encountered on site. Water Use Licences/Registrations must be obtained for any construction in a regulated area (below 1:00 floodline or 100 m from water course and 500 m from a wetland). 			



Activity and Interaction Construction of infrastructure require vegetation clearing)			
Dimension	Rating	Motivation	Significance
<ul style="list-style-type: none"> Applications for permits for removal of certain plants, where required by provincial authorities. If plant SSC are to be removed, they should be either translocated to a similar habitat to the donor site or relocated to a nursery. 			
Post management			
Duration	Medium term (3)	With vegetation management including rehabilitation, vegetation can recover in 1-5 years.	Minor (negative) – 55
Extent	Municipal area (4)	If contractors adhere to mitigation such as to limit the footprint of disturbance to only essential areas.	
Intensity x of type impact	Ongoing - negative (4)	Dependent on sensitivity of the specific site.	
Probability	Likely (5)	Rehabilitation with correct species and techniques are critical for success.	
Nature	Negative		

Activity and Interaction Construction of infrastructure require vegetation clearing			
Dimension	Rating	Motivation	Significance
Impact Description: Alien vegetation establishment			
Prior to mitigation/ management			
Duration	Long term (4)	Alien vegetation will colonise any area that is available (open areas).	Minor (negative) – 48
Extent	Municipal area (4)	Such an infestation can easily spread to the entire municipal area, and infest water sources.	



Activity and Interaction Construction of infrastructure require vegetation clearing			
Dimension	Rating	Motivation	Significance
Intensity x type of impact	Moderate - (-4)	Serious loss of sensitive habitats due to alien vegetation colonisation.	
Probability	Probable (4)	It is unlikely that without mitigation measures, alien vegetation will establish	
Nature	Negative		
Mitigation/ Management actions			
<ul style="list-style-type: none"> Manage nationally restricted alien invasive plant species by ensuring the removal of vegetation during construction and operation are controlled so that no open areas occur. If alien vegetation is encountered, remove these plants, in the correct way and timeously. Alien plants should be removed as seedlings before they reach seed-bearing age. Alien plants can establish on a site after removal for up to 2-7 years, therefore appropriate monitoring must take place. 			
Post management			
Duration	Medium term (3)	Alien vegetation colonisation will be eradicated asap.	Negligible (negative) – 21
Extent	Limited (2)	An infestation will not be allowed to spread.	
Intensity x type of impact	Minor (-2)	Only limited areas will experience this for a short duration.	
Probability	Unlikely (3)	It is unlikely that alien vegetation will establish, if mitigation is adhered to.	
Nature	Negative		



6.4 Iphiva-Duma 400 kV (Ref. No. 14/12/16/3/3/2/1038)

6.4.1 Project activity: Construction of Surface Infrastructure

The construction of various surface infrastructure components will mean the removal, partial or complete of vegetation/habitat types present.

Table 6-9: Interactions and Impacts of 400 kV Infrastructure Considered

Interaction	Impact
Site clearing for infrastructure placement	Direct loss of floral species/vegetation types and biodiversity.
	Loss of species of special concern (protected species).
	Alien vegetation recruitment

6.4.1.1 Impact Description

The Iphiva – Duma 400 kV powerline will extend over a 130 km routing in the southern portion of the overall study area. Three technically feasible alternative routing options were considered in this assessment, namely the eastern, west 1 and west 2 corridors. The overhead powerline will be supported by towers positioned within a 55 m servitude⁵. Possible tower types⁶ that may be considered for this Project include:

- Cross rope; and
- Self-supporting.
- Guyed vee

The construction of surface infrastructure which will include access roads and the actual tower footprints will affect the current habitat and vegetation types present.

With the clearing of vegetation, open areas will occur, here indigenous vegetation will be replaced by fast growing alien and weed vegetation. This impact can be greatly reduced with the correct implementation of alien vegetation management plan.

⁵ The servitude will allow for clearance of 27.5 m on either side of the centre line of the powerline. Where constructed in parallel, a minimum distance of 55 m between the centre points is required. The minimum vertical clearance distance between the ground and powerline conductor is 8.1 m.

⁶ Eskom will determine the tower type after establishing the final routing alignment and associated profiling with the necessary environmental authorisations. Please refer to the Scoping Report and EIA for detailed descriptions of the various tower types.



6.4.1.2 Management Objectives

Management objectives will be to prevent the loss of important/protected landscapes, species of plants and animals (such as those with Red Data Status, National and Provincial). This is achieved by avoiding destruction of areas where these species are located. In the case of plants, if this is not possible relocation permits are required.

The destruction of the vegetative cover must be limited, this can be achieved by restricting the removal and disturbance of vegetation to those areas absolutely essential for the infrastructure placements.

The ecosystem present must be preserved, this includes areas not directly affected by project activities, and can be achieved by limiting project activities to areas where they are essential. Rehabilitation plans must be initiated during construction to minimise disturbed areas. Habitat/vegetation degradation must be prevented through the implementation of an alien invasive plant management strategy.

6.4.1.3 Management Actions and Targets

Red Data Status plants located in areas of development should be marked prior to construction of any infrastructure and the necessary permits for relocations of these protected species must be obtained from the relevant government department. The relocation strategy must be approved by relevant provincial authorities prior to relocation to a safe place to avoid destruction and stipulations made by the authorities must be followed. A nursery should be developed on site for this purpose. No protected plant species can be disturbed without authorisation.

Three basic rules of conservation apply to populations of Red List Plant Species, as set out hereunder, according to Red List Plant Guidelines (2012):

- All populations of Near Threatened and Threatened plant taxa must be conserved *in situ*;
- All populations of Near Threatened and Threatened plant taxa must be protected with a buffer zone in accordance with guidelines; and
- An Ecological Management Plan must be compiled in respect of all actions that affect populations of Red List Plant Species, and such Ecological Management Plans must conform with the Guidelines set out for buffer zone widths.

An alien plant management strategy must be implemented to preserve natural habitat. Such a strategy will entail the identification of areas where such infestation occurs and what the extent of it is. Thereafter specific eradication measures can be prescribed for species present. The alien invasive plant strategy must reduce the number of these plant species that occur in the project area.

Illegal waste dumping, including building waste and rubble, should be prohibited. Such illegal dumping sites are prone to alien vegetation recruitment. The environmental manager must ensure that after the building site is rehabilitated, there are no rubble piles remaining.



Training should be given to onsite staff on which plants and animals have red data status and how they may be identified. Thereafter the Environmental Officer must initiate the red data management plan. The incidence of plant or animal red data removal or death must be quantified and records kept, this will ensure that management actions are adapted if they are not successful.

Destruction of vegetation should be limited to the areas essential for the development if construction is finalised the environmental officer must ensure the construction areas are rehabilitated. Areas of erosion must be marked and attended to before the following wet season starts.

Rehabilitation of disturbed areas should take place within a week of construction, all bare patches of soil should be vegetated, preferably with pioneer species which will colonise open and disturbed areas relatively quickly, and prevent erosion and alien vegetation establishing.

Community awareness should be implemented as part of the stakeholder engagement procedure to create awareness of biodiversity and preservation of natural habitats.

6.4.1.4 Impact Ratings

Table 6-10: Potential Impacts of Construction of the Iphiva-Duma 400kV Line Infrastructure

Activity and Interaction Construction of infrastructure require vegetation clearing			
Dimension	Rating	Motivation	Significance
Impact Description: Direct loss of floral species/vegetation types and biodiversity			
<i>Prior to mitigation/ management</i>			
Duration	Permanent (7)	Total loss of floral species/vegetation will occur on selected footprint sites.	Moderate (negative) – 91
Extent	Provincial (4)	Species/habitat loss will only occur within and immediately around the project site (pylon infrastructure).	
Intensity x type of impact	Serious (4)	The footprint of I-D covers multiple undisturbed vegetation types.	
Probability	Definite (7)	It is likely that total destruction of vegetation types will occur.	
Nature	Negative		



Activity and Interaction Construction of infrastructure require vegetation clearing			
Dimension	Rating	Motivation	Significance
Mitigation/ Management actions			
<ul style="list-style-type: none"> ▪ Limit degradation and destruction of natural environment to designated project area by keeping the footprint of the disturbed areas to the minimum and within designated areas only, preferably cultivated land. Re-vegetate open areas to limit erosion, which will also aid in water infiltration and flood attenuation. ▪ Avoid sensitive landscapes such as riparian and wetland areas that were encountered on and east of the site. Water Use Licences/Registrations must be obtained for any construction in a regulated area (below 1:00 floodline or 100 m from water course and 500 m from a wetland. ▪ Manage nationally restricted alien invasive plant species by ensuring the removal of vegetation during construction and operation are controlled so that no open areas occur. 			
Post- mitigation			
Duration	Permanent (5)	Project life.	Moderate (negative) – 69
Extent	Limited (2)	If contractors adhere to mitigation such as to limit the footprint of disturbance to only essential areas.	
Intensity x type of impact	Moderate (-2)	Dependent on sensitivity of the specific site.	
Probability	Definite (7)	This impact will occur	
Nature	Negative		



Activity and Interaction Construction of infrastructure require vegetation clearing)			
Dimension	Rating	Motivation	Significance
Impact Description: Loss of species of special concern (protected species)			
<i>Prior to mitigation/ management</i>			
Duration	Project Life (5)	Loss floral species/vegetation will occur within the footprints of the pylons.	Moderate (negative) – 84
Extent	Provincial (5)	Species/habitat loss will only occur within the project site, and will be limited to the corridor but will extend across a very long corridor.	
Intensity x type of impact	High (4)	Natural vegetation occur in this proposed corridor.	
Probability	High (6)	It is likely that destruction of vegetation types will occur without management measures.	
Nature	Negative		
<i>Mitigation/ Management actions</i>			
<ul style="list-style-type: none"> ▪ Limit degradation and destruction of natural environment to designated project areas by keeping the footprint of the disturbed areas to the minimum and within designated areas only. Re-vegetate open areas to limit erosion, which will also aid in water infiltration and flood attenuation. ▪ Avoid known areas of faunal and floral SSC. ▪ Avoid sensitive landscapes such as riparian and ridge areas that were encountered on site. Water Use Licences/Registrations must be obtained for any construction in a regulated area (below 1:00 floodline or 100 m from water course and 500 m from a 			



Activity and Interaction Construction of infrastructure require vegetation clearing)			
Dimension	Rating	Motivation	Significance
wetland. <ul style="list-style-type: none"> Applications for permits for removal of certain plants, where required by provincial authorities. If plant SSC are to be removed, they should be either translocated to a similar habitat to the donor site or relocated to a nursery. 			
Post management			
Duration	Medium term (3)	With vegetation management including rehabilitation, vegetation can recover in 1-5 years.	Minor (negative) – 55
Extent	Municipal area (4)	If contractors adhere to mitigation such as to limit the footprint of disturbance to only essential areas.	
Intensity x of type of impact	Ongoing - negative (4)	Dependent on sensitivity of the specific site.	
Probability	Likely (5)	Rehabilitation with correct species and techniques are critical for success.	
Nature	Negative		

Activity and Interaction Construction of infrastructure require vegetation clearing			
Dimension	Rating	Motivation	Significance
Impact Description: Alien vegetation establishment			
Prior to mitigation/ management			
Duration	Long term (4)	Alien vegetation will colonise any area that is available (open areas).	Minor (negative) – 48



Activity and Interaction Construction of infrastructure require vegetation clearing			
Dimension	Rating	Motivation	Significance
Extent	Municipal area (4)	Such an infestation can easily spread to the entire municipal area, and infest water sources.	
Intensity x type of impact	Moderate - (-4)	Serious loss of sensitive habitats due to alien vegetation colonisation.	
Probability	Probable (4)	It is unlikely that without mitigation measures, alien vegetation will establish	
Nature	Negative		
Mitigation/ Management actions			
<ul style="list-style-type: none"> Manage nationally restricted alien invasive plant species by ensuring the removal of vegetation during construction and operation are controlled so that no open areas occur. If alien vegetation is encountered, remove these plants, in the correct way and timeously. Alien plants should be removed as seedlings before they reach seed-bearing age. Alien plants can establish on a site after removal for up to 2-7 years, therefore appropriate monitoring must take place. 			
Post management			
Duration	Medium term (3)	Alien vegetation colonisation will be eradicated asap.	Negligible (negative) – 21
Extent	Limited (2)	An infestation will not be allowed to spread.	
Intensity x type of impact	Minor (-2)	Only limited areas will experience this for a short duration.	
Probability	Unlikely (3)	It is unlikely that alien vegetation will establish, if mitigation is adhered to.	



Activity and Interaction Construction of infrastructure require vegetation clearing			
Dimension	Rating	Motivation	Significance
Nature	Negative		

6.5 Normandie-Iphiva 400 kV (Ref. No. 14/12/16/3/3/2/1036)

6.5.1 Project activity: Construction of Surface Infrastructure

The construction of various surface infrastructure components will mean the removal, partial or complete of vegetation/habitat types present.

Table 6-11: Interactions and Impacts of the Normandie-Iphiva 400Kv Infrastructure Considered

Interaction	Impact
Site clearing for infrastructure placement	Direct loss of floral species/vegetation types and biodiversity.
	Loss of species of special concern (protected species).
	Alien vegetation recruitment

6.5.1.1 Impact Description

The Normandie – Iphiva 400 kV powerline will extend over an approximate 150 km routing in the northern portion of the overall study area. Eskom considered the results of the scoping assessment, discarding routing options with significant sensitivities. The remaining N-I 2 and N-I 3 alternative routing options were considered in this assessment

With the clearing of vegetation, open areas will occur, here indigenous vegetation will be replaced by fast growing alien and weed vegetation. This impact can be greatly reduced with the correct implementation of alien vegetation management plan.

6.5.1.2 Management Objectives

Management objectives will be to prevent the loss of important/protected landscapes, species of plants and animals (such as those with Red Data Status, National and Provincial). This is achieved by avoiding destruction of areas where these species are located. In the case of plants, if this is not possible relocation permits are required.



The destruction of the vegetative cover must be limited, this can be achieved by restricting the removal and disturbance of vegetation to those areas absolutely essential for the infrastructure placements.

The ecosystem present must be preserved, this includes areas not directly affected by project activities, and can be achieved by limiting project activities to areas where they are essential. Rehabilitation plans must be initiated during construction to minimise disturbed areas. Habitat/vegetation degradation must be prevented through the implementation of an alien invasive plant management strategy.

6.5.1.3 Management Actions and Targets

Red Data Status plants located in areas of development should be marked prior to construction of any infrastructure and the necessary permits for relocations of these protected species must be obtained from the relevant government department. The relocation strategy must be approved by relevant provincial authorities prior to relocation to a safe place to avoid destruction and stipulations made by the authorities must be followed. A nursery should be developed on site for this purpose. No protected plant species can be disturbed without authorisation.

Three basic rules of conservation apply to populations of Red List Plant Species, as set out hereunder, according to Red List Plant Guidelines (2012):

- All populations of Near Threatened and Threatened plant taxa must be conserved *in situ*;
- All populations of Near Threatened and Threatened plant taxa must be protected with a buffer zone in accordance with guidelines; and
- An Ecological Management Plan must be compiled in respect of all actions that affect populations of Red List Plant Species, and such Ecological Management Plans must conform with the Guidelines set out for buffer zone widths.

An alien plant management strategy must be implemented to preserve natural habitat. Such a strategy will entail the identification of areas where such infestation occurs and what the extent of it is. Thereafter specific eradication measures can be prescribed for species present. The alien invasive plant strategy must reduce the number of these plant species that occur in the project area.

Illegal waste dumping, including building waste and rubble, should be prohibited. Such illegal dumping sites are prone to alien vegetation recruitment. The environmental manager must ensure that after the building site is rehabilitated, there are no rubble piles remaining.

Training should be given to onsite staff on which plants and animals have red data status and how they may be identified. Thereafter the Environmental Officer must initiate the red data management plan. The incidence of plant or animal red data removal or death must be quantified and records kept, this will ensure that management actions are adapted if they are not successful.



Destruction of vegetation should be limited to the areas essential for the development if construction is finalised the environmental officer must ensure the construction areas are rehabilitated. Areas of erosion must be marked and attended to before the following wet season starts.

Rehabilitation of disturbed areas should take place within a week of construction, all bare patches of soil should be vegetated, preferably with pioneer species which will colonise open and disturbed areas relatively quickly, and prevent erosion and alien vegetation establishing.

Community awareness should be implemented as part of the stakeholder engagement procedure to create awareness of biodiversity and preservation of natural habitats.

6.5.1.4 Impact Ratings

Table 6-12: Potential Impacts of Construction of the Normandie-Iphiva 400kV Line Infrastructure

Activity and Interaction Construction of infrastructure require vegetation clearing			
Dimension	Rating	Motivation	Significance
Impact Description: Direct loss of floral species/vegetation types and biodiversity			
<i>Prior to mitigation/ management</i>			
Duration	Permanent (7)	Total loss of floral species/vegetation will occur on selected footprint sites.	Moderate (negative) – 91
Extent	Limited (2)	Species/habitat loss will only occur within and immediately around the project site (pylon infrastructure).	
Intensity x type of impact	Serious (4)	The footprint of N-I covers multiple undisturbed vegetation types.	
Probability	Definite (7)	It is likely that total destruction of vegetation types will occur.	
Nature	Negative		
<i>Mitigation/ Management actions</i>			
<ul style="list-style-type: none"> ▪ Limit degradation and destruction of natural environment to designated project area by keeping the footprint of the disturbed areas to the minimum and within designated areas only, preferably cultivated land. Re-vegetate open areas to limit erosion, which 			



Activity and Interaction Construction of infrastructure require vegetation clearing			
Dimension	Rating	Motivation	Significance
will also aid in water infiltration and flood attenuation.			
<ul style="list-style-type: none"> ▪ Avoid sensitive landscapes such as riparian and wetland areas that were encountered on and east of the site. Water Use Licences/Registrations must be obtained for any construction in a regulated area (below 1:00 floodline or 100 m from water course and 500 m from a wetland). ▪ Manage nationally restricted alien invasive plant species by ensuring the removal of vegetation during construction and operation are controlled so that no open areas occur. 			
Post- mitigation			
Duration	Permanent (5)	Project life.	Moderate (negative) – 69
Extent	Limited (2)	If contractors adhere to mitigation such as to limit the footprint of disturbance to only essential areas.	
Intensity x type of impact	Moderate (-2)	Dependent on sensitivity of the specific site.	
Probability	Definite (7)	This impact will occur	
Nature	Negative		

Activity and Interaction Construction of infrastructure require vegetation clearing)			
Dimension	Rating	Motivation	Significance
Impact Description: Loss of species of special concern (protected species)			
Prior to mitigation/ management			
Duration	Project Life (5)	Loss floral species/vegetation will occur within the footprints of the pylons.	Moderate (negative) – 84



Activity and Interaction Construction of infrastructure require vegetation clearing)			
Dimension	Rating	Motivation	Significance
Extent	Provincial (5)	Species/habitat loss will only occur within the project site, and will be limited to the corridor but will extend across a very long corridor.	
Intensity x type of impact	High (4)	Natural vegetation occur in this substation site.	
Probability	High (6)	It is likely that destruction of vegetation types will occur without management measures.	
Nature	Negative		
Mitigation/ Management actions			
<ul style="list-style-type: none"> ▪ Limit degradation and destruction of natural environment to designated project areas by keeping the footprint of the disturbed areas to the minimum and within designated areas only. Re-vegetate open areas to limit erosion, which will also aid in water infiltration and flood attenuation. ▪ Avoid known areas of faunal and floral SSC. ▪ Avoid sensitive landscapes such as riparian and ridge areas that were encountered on site. Water Use Licences/Registrations must be obtained for any construction in a regulated area (below 1:00 floodline or 100 m from water course and 500 m from a wetland. ▪ Applications for permits for removal of certain plants, where required by provincial authorities. If plant SSC are to be removed, they should be either translocated to a similar habitat to the donor site or relocated to a nursery. 			
Post management			
Duration	Medium term (3)	With vegetation management including rehabilitation, vegetation can recover in 1-5 years.	Minor (negative) – 55
Extent	Municipal area (4)	If contractors adhere to mitigation such as to limit the footprint of	



Activity and Interaction Construction of infrastructure require vegetation clearing)			
Dimension	Rating	Motivation	Significance
		disturbance to only essential areas.	
Intensity x type of impact	Ongoing negative (4)	- Dependent on sensitivity of the specific site.	
Probability	Likely (5)	Rehabilitation with correct species and techniques are critical for success.	
Nature	Negative		

Activity and Interaction Construction of infrastructure require vegetation clearing			
Dimension	Rating	Motivation	Significance
Impact Description: Alien vegetation establishment			
<i>Prior to mitigation/ management</i>			
Duration	Long term (4)	Alien vegetation will colonise any area that is available (open areas).	Minor (negative) – 48
Extent	Municipal area (4)	Such an infestation can easily spread to the entire municipal area, and infest water sources.	
Intensity x type of impact	Moderate - (-4)	Serious loss of sensitive habitats due to alien vegetation colonisation.	
Probability	Probable (4)	It is unlikely that without mitigation measures, alien vegetation will establish	
Nature	Negative		
<i>Mitigation/ Management actions</i>			



Activity and Interaction Construction of infrastructure require vegetation clearing			
Dimension	Rating	Motivation	Significance
<ul style="list-style-type: none"> ▪ Manage nationally restricted alien invasive plant species by ensuring the removal of vegetation during construction and operation are controlled so that no open areas occur. ▪ If alien vegetation is encountered, remove these plants, in the correct way and timeously. Alien plants should be removed as seedlings before they reach seed-bearing age. Alien plants can establish on a site after removal for up to 2-7 years, therefore appropriate monitoring must take place. 			
<i>Post management</i>			
Duration	Medium term (3)	Alien vegetation colonisation will be eradicated asap.	Negligible (negative) – 21
Extent	Limited (2)	An infestation will not be allowed to spread.	
Intensity x type of impact	Minor (-2)	Only limited areas will experience this for a short duration.	
Probability	Unlikely (3)	It is unlikely that alien vegetation will establish, if mitigation is adhered to.	
Nature	Negative		

7 Consideration of Alternatives

The consideration of alternative for the project infrastructure from a biodiversity perspective, centred on the ecological sensitivity present in each alternative, this approach is discussed below.

In terms of ecological sensitivity, the following features are assessed to determine how sensitive the habitats identified within the alternatives are:

- Presence or absence of Red Data or protected plant and animal species;
- Presence or absence of exceptional species diversity;
- Extent of intact habitat in good ecological condition in the absence of disturbance; and



- Presence or absence of important ecosystems such as Protected Areas, areas demarcated for future protected area status (NPAES) and wetlands.

There are several assessments for South Africa as a whole, as well as on provincial levels that allow for detailed conservation planning as well as meeting biodiversity targets for the country's variety of ecosystems. These guidelines are essential to consult for development projects, and will form an important part of the sensitivity analysis. Areas earmarked for conservation in the future, or that are essential to meet biodiversity and conservation targets should not be developed, and have a high sensitivity as they are necessary for overall functioning. In addition, site specific infield assessments and the utilization of the data captured during such infield assessments must be utilized during a more comprehensive sensitivity analysis in a much finer scale to confirm the accuracy of any guideline documents that normally utilize available desktop information on a broader scale. The information gathered needs to be analyzed in order to put site specific infield condition into a more localized context.

The following assessments were utilized to inform the sensitivity of the alternatives:

7.1.1 Kwa-Zulu Natal Conservation plan; Critical Biodiversity Areas, including centers of Endemism.

The purpose of the KZN C-Plan is to develop the spatial component of a bioregional plan (i.e. map of Critical Biodiversity Areas and associated land-use guidelines). Bioregional plans are one of a range of tools provided for in the National Environmental Management Biodiversity Act, 2004 (Act No. 10 of 2004) that can be used to facilitate biodiversity conservation in priority areas outside the protected area network. The purpose of a bioregional plan is to inform land-use planning, environmental assessment and authorizations, and natural resource management, by a range of sectors whose policies and decisions impact on biodiversity (**Error! Reference source not found.**).

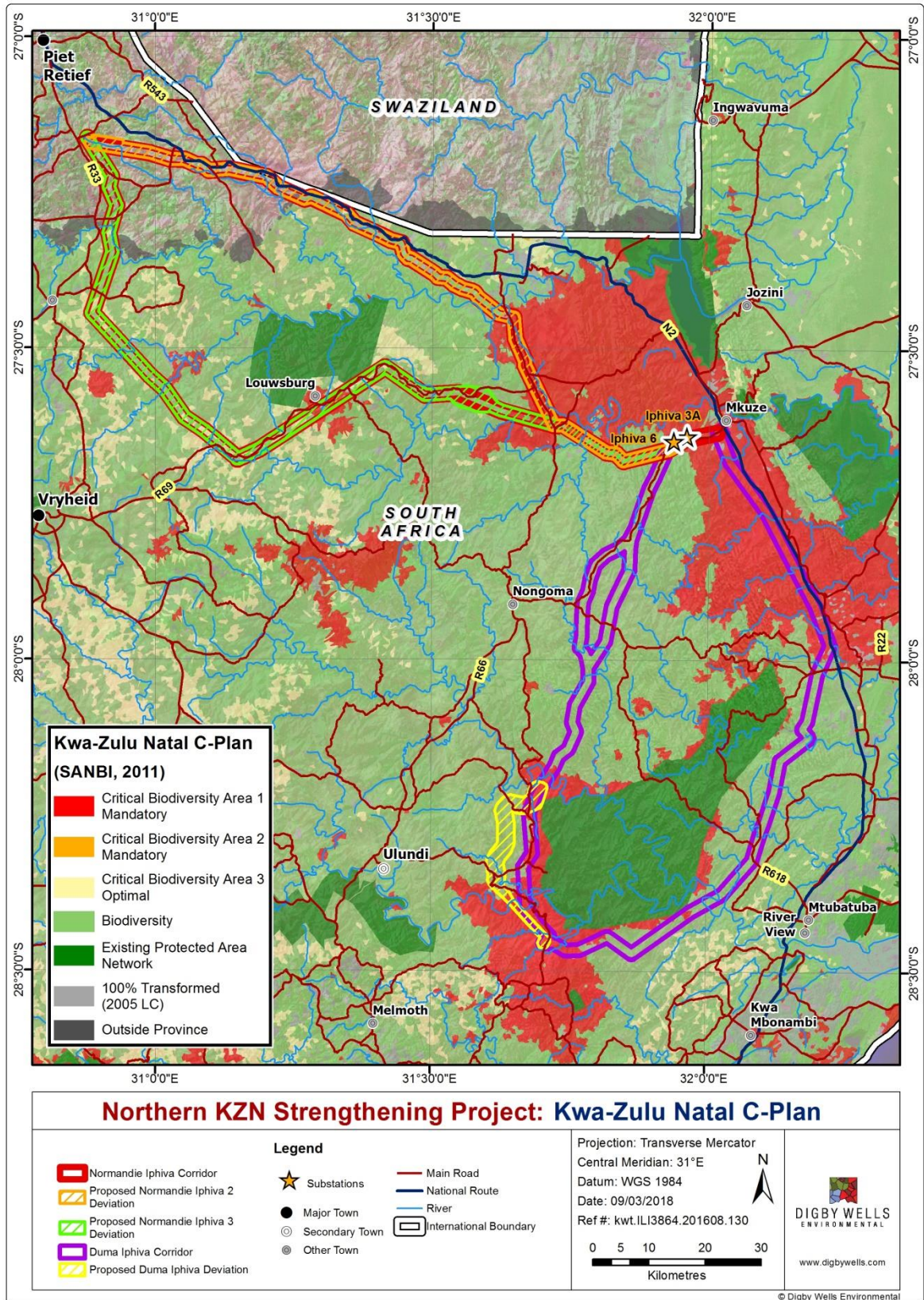


Figure 7-1: Kwa-Zulu Natal C-Plan



7.1.2 Protected areas

Officially protected areas, either Provincially or Nationally that occur close to any proposed project development site could have severe consequences from an environmental authorization point of view and/or from the associated impacts from such development on the surrounding environment (Figure 7-2).

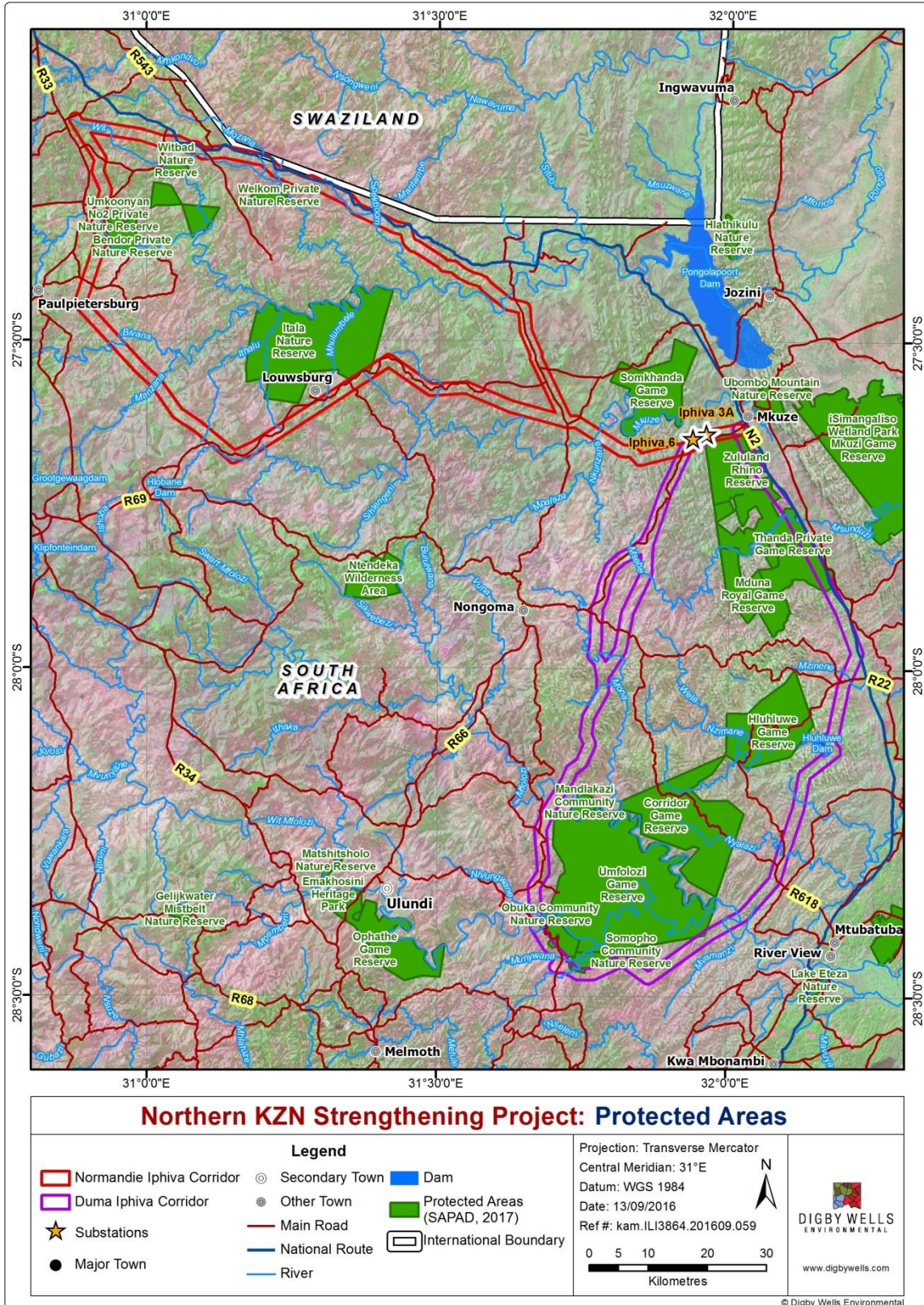


Figure 7-2: Protected Areas



7.1.3 Nationally Threatened Ecosystems

The Biodiversity Act (Act 10 of 2004) provides for listing of threatened or protected ecosystems, in one of four categories: critically endangered (CR), endangered (EN), vulnerable (VU) or protected. The purpose of listing threatened ecosystems is primarily to reduce the rate of ecosystem and species extinction. This includes preventing further degradation and loss of structure, function and composition of threatened ecosystems. The purpose of listing protected ecosystems is primarily to preserve witness sites of exceptionally high conservation value (Figure 7-3).

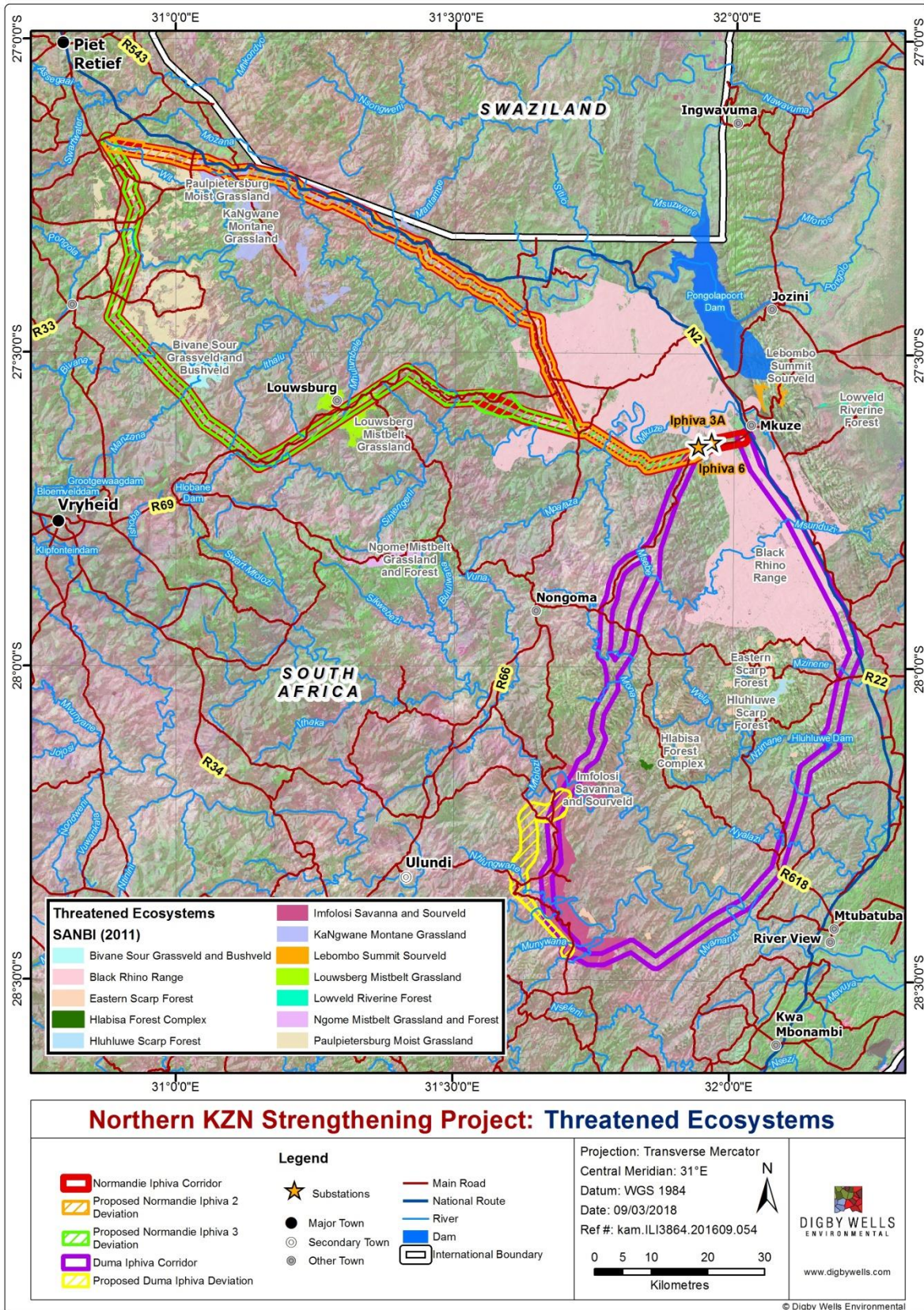


Figure 7-3: Nationally Threatened Ecosystems



7.1.4 Nationally Protected Areas Expansion strategy/Current Land Use

Protected areas are areas of land or sea that are protected by law and managed mainly for biodiversity conservation.

South Africa's protected area network currently falls far short of sustaining biodiversity and ecological processes. In this context, the goal of the National Protected Area Expansion Strategy is to achieve cost-effective protected area expansion for ecological sustainability and increased resilience to climate change (Figure 7-4).

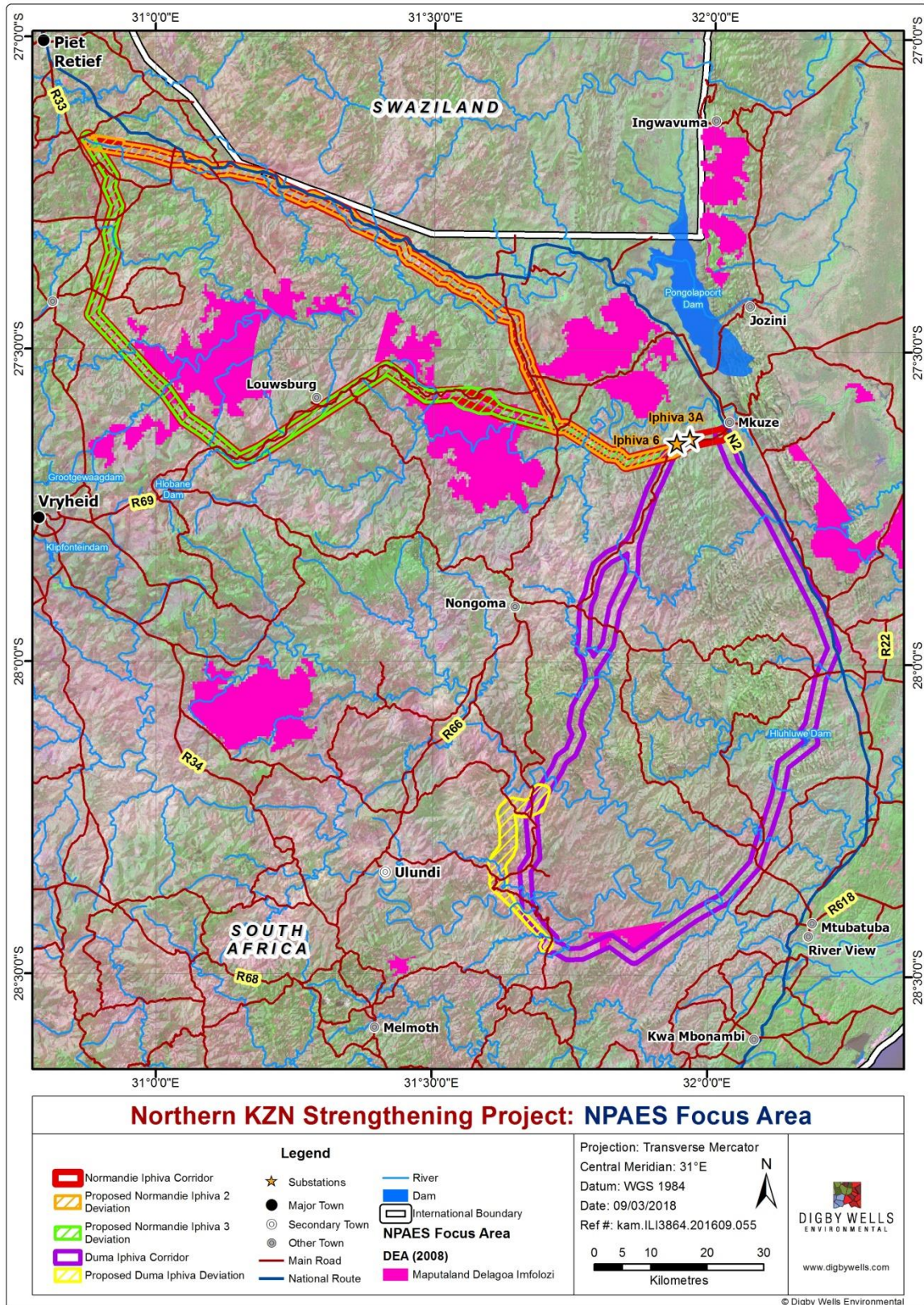


Figure 7-4: NPAES



Terrestrial conservation priorities highlighted in the Terrestrial Systematic Conservation Plan (CPLAN) for the Province (EKZNW, 2010) are shown in Figure 7-1. According to this plan, the majority of the project site and proposed corridors fall within areas known as Biodiversity areas, all the alternatives cross Critical Biodiversity areas 1 Mandatory, or Critical Biodiversity areas Optimal. The existing protected area network is not affected by the corridors or sub stations.

Biodiversity Priority Areas (BPAs) refer to natural areas that are viewed as necessary to ensure protection of biodiversity, environmental sustainability, and human well-being. The importance of the biodiversity features in Biodiversity Priority Areas and the associated ecosystem services is sufficiently high that, if their existence and condition are confirmed, the likelihood of a fatal flaw for new development projects is high (i.e. development projects are likely to be significantly constrained or may not receive necessary environmental authorizations).

Table 7-1: Multi-Criteria Decision Making Analysis

Corridor	Route option	C-Plan	Protected Areas	Threatened Ecosystems	NPAES
Normandie - Iphiva	Iphiva 2	High	Low	High	Low
	Iphiva 3	High	Moderate	High	Moderate
Duma - Iphiva	West 1	High	Moderate	High	Low
	West 2	High	Moderate	High	Low
	East	High	High	High	Low

A fifth criteria was also intruded, current land use, this criteria is more fine scaled and can be more accurate with regards to actual disturbances on the ground that could exclude criteria such as threatened ecosystems.

7.2 Iphiva Substation 6 (Ref. No. 14/12/16/3/3/2/1037)

The consideration of alternatives assessed the two Iphiva Substation site-specific study areas against the aforementioned criteria. The following table presents the designated ratings and consequent results:

Table 7-2: Consideration of Alternatives for the Iphiva Substations

Alternatives	Criteria 1	Criteria 2	Criteria 3	Criteria 4	Criteria 5	Total %	Rating	
Substation 3	1	2	2	5	1	40%	3.00	Negligible / insignificant
Substation 6	1	4	4	5	5	80%	4.00	Suitable

Detailed field work was carried out on the locations of the substation options. It was found that Substation 3 had a suitable and relatively undisturbed vegetation cover. Furthermore it was not disturbed by anthropogenic activities such as agricultural field, rural housing, bush



clearing or informal roads. The site was available for livestock to graze but this was not found to be a limiting factor.

Conversely Substation 6 was disturbed by rural housing, bush clearing or informal roads, with little natural habitat remaining. Scattered natural vegetation remained such as *Aloe marlothii* (Mountain Aloe) and various *Acacia* species.

Based on the amount of natural habitat that is relatively undisturbed that will be disturbed by the placement of the substation it is clear that Substation 6 is considered to be the more appropriate option.

7.3 132 kV Distribution Line Alternatives

Eskom are considering four (4) 132 kV Distribution powerlines. These will comprise the following routings:

- Iphiva – Pongola (1) 132 kV powerline to tie in with the existing powerline, double circuit with Iphiva / Hluhluwe;
- Iphiva – Pongola (2) 132 kV powerline;
- Iphiva / Makhathini 132 kV powerline double circuit with Iphiva / Mbazwane;
- 132 kV powerline loop-in to Candover Switching Station from the existing Impala / Normandie Line.

Of the 132 kV distribution lines considered in this assessment, only the Iphiva-Makhathini / Iphiva-Mbazwane distribution line has a routing alternative as per Figure 7-5.

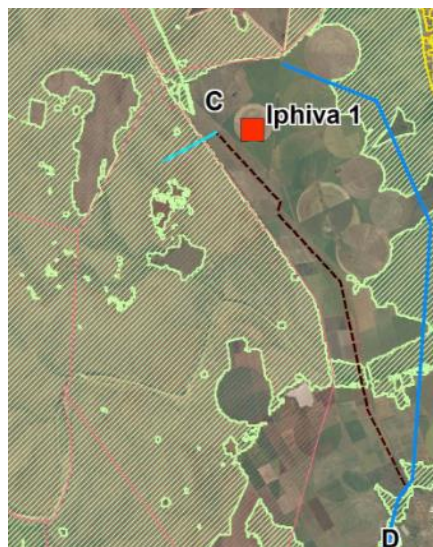


Figure 7-5: Iphiva-Makhathini / Iphiva-Mbazwane Routing Alternatives.

The following table presents the designated ratings and consequent results:


Table 7-3: Consideration of Iphiva-Makhathini / Iphiva-Mbazwane routing alternatives

Alternatives	Criteria 1	Criteria 2	Criteria 3	Criteria 4	Criteria 5	Total %	Rating	
East	1	3	3	3	2	40%	3.00	Negligible / insignificant
West	5	3	3	3	4	80%	4.00	Suitable

The east routing was found to be on the footslopes of the Ubombo Mountain range where the topography has made the majority of this alternative unsuitable to agriculture. The natural vegetation encountered here during the site visit was in pristine condition with no agricultural activities, rural housing, bush clearing or informal roads affecting the continuity of this vegetation type.

Further to the recognised routing alternative of the Iphiva-Makhathini / Iphiva-Mbazwane distribution line, Eskom are proposing alternatives in respect of design for a portion of the proposed routing along the P234 road. These will comprise varying combinations of above and below ground options as presented in Table 7-4.

Table 7-4: Design alternative for the 132 kV distribution lines and 400 kV powerline along the P234 road

Design Alternatives	Options	
	Iphiva-Duma West	Iphiva-Duma East
All above ground	1	2
4 x 132 kV powerline below ground 1 x 400 kV powerline above ground	3	4
All below ground	No 400 kV line occurs within P234 corridor in this configuration. Therefore, all 132 kV distribution lines will be below ground	5
4 x 132 kV powerline above ground on double circuit 1 x 400 kV powerline below ground	No 400 kV line occurs within P234 corridor in this configuration. Therefore, all 132 kV distribution lines will be above ground	6
1 x 400 kV and 2 x 132kV powerlines above ground on multi-circuit	N/A	7



1 x 132kV powerline below		
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The level of ground disturbance (and by default vegetation removal) that is required to either bury or erect above ground pylons is the major factor that is considered for the fauna and flora preferred alternative. As the burying of Transmission Power Lines will necessitate a larger footprint of vegetation or habitat to be disturbed, this option is not preferred. The maintenance of the buried lines will require disturbance to vegetation that has been restored, this will negatively affect the carrying capacity and species richness of the disturbed area.

The remainder of this section therefore considers the proposed distribution line routings in respect of above and below ground options against the following criteria:

- The level of disturbance needed to bury the powerlines will require vegetation/habitat removal; and
- The possible presence of protected and species of special concern, means that less disturbance to vegetation is preferred.

The following table presents the designated ratings and consequent results:

Table 7-5: Consideration of below and above ground alternatives

Alternatives	Criteria 1	Criteria 2	Total %	Rating	
Below ground	1	2	40%	2.00	Less suitable
Above ground	3	5	80%	4.00	Suitable

The earmarked footprint where the Transmission Power Lines could be buried was found to be adjacent to a dirt road, but with natural vegetation and habitat present on either side of the road. The vegetation was not disturbed by agricultural activities, predominantly because of the rocky nature of the terrain, furthermore, no informal settlements or bush clearing was recorded.

7.4 Iphiva-Duma 400 kV (Ref. No. 14/12/16/3/3/2/1038)

The consideration of alternatives assessed the three Iphiva-Duma 400 kV powerline site-specific study areas against the aforementioned criteria. The following table presents the designated ratings and consequent results.


Table 7-6: Consideration of Iphiva-Duma 400 kV alternatives

Alternatives	C 1	C 2	C 3	C 4	C 5	Total %	Rating	
I-D West 1	1	2	4	5	3	60%	3.00	Negligible / insignificant
I-D West 2	1	4	3	3	3	60%	3.00	Negligible / insignificant
I-D East	1	1	1	4	1	40%	2.00	Less suitable
I-D West Deviation	1	1	1	3	4	40%	2.00	Less suitable

The Transmission Power Lines that are planned to be constructed between Iphiva and Duma travels in a southerly direction, four alternatives are considered, with the Iphiva Duma West Deviation option included specifically for mitigation of impacts as described in the Avifauna Specialist Study:

- Iphiva Duma East,
- Iphiva Duma West 1,
- Iphiva Duma West 2 and
- Iphiva Duma West Deviation (Figure 7-6).

Criteria 1 (KZN C-Plan) that was considered indicated that all four options traverse Critical Biodiversity areas 1 and Biodiversity areas, with the East option completely covered by Critical Biodiversity areas 1 and Biodiversity areas.

All four options are within the buffer zone of officially protected areas, more specifically the Hluhluwe–iMfolozi National Park is affected by all 3 western options and the Zululand Rhino Reserve, Thanda Private Game Reserve, Mduna Royal Game Reserve and Hluhluwe–iMfolozi National Park that affects the Eastern option.

This impact is exasperated by the possible impact the Iphiva-Duma East will have on the Black Rhino Range expansion (BREP) and the Ophathe-HiP-Fundimvelo link. Both of these initiatives are planned to be located east of the Duma substation and the Transmission Power Line will cross over these.

The uMfolozi Biodiversity Economy Node

South African Hunters and Game Conservation Association and Ezemvelo KZN Wildlife initiated a process to develop the Umfolozi Biodiversity Economy Node in 2014. It consists of the Hluhluwe iMfolozi protected areas and the eMhakosini-Ophathe Heritage Park as the core conservation areas. The proposed Iphiva-Duma East and West corridor options are within this economy node.

The Economy Node core conservation areas are linked with private protected areas, stewardships sites, private game farms and communal land in the southern reaches of Ulundi in KwaZulu Natal, the region has the potential to create a conservation area in excess of 150 000ha.

For Criteria 4 (Current land use) the eastern option affects a large portion of the Black Rhino range. Routing option west 1 and west 2 traverses the Imfolozi Savanna and Sourveld vegetation types, which are designated as threatened ecosystems.

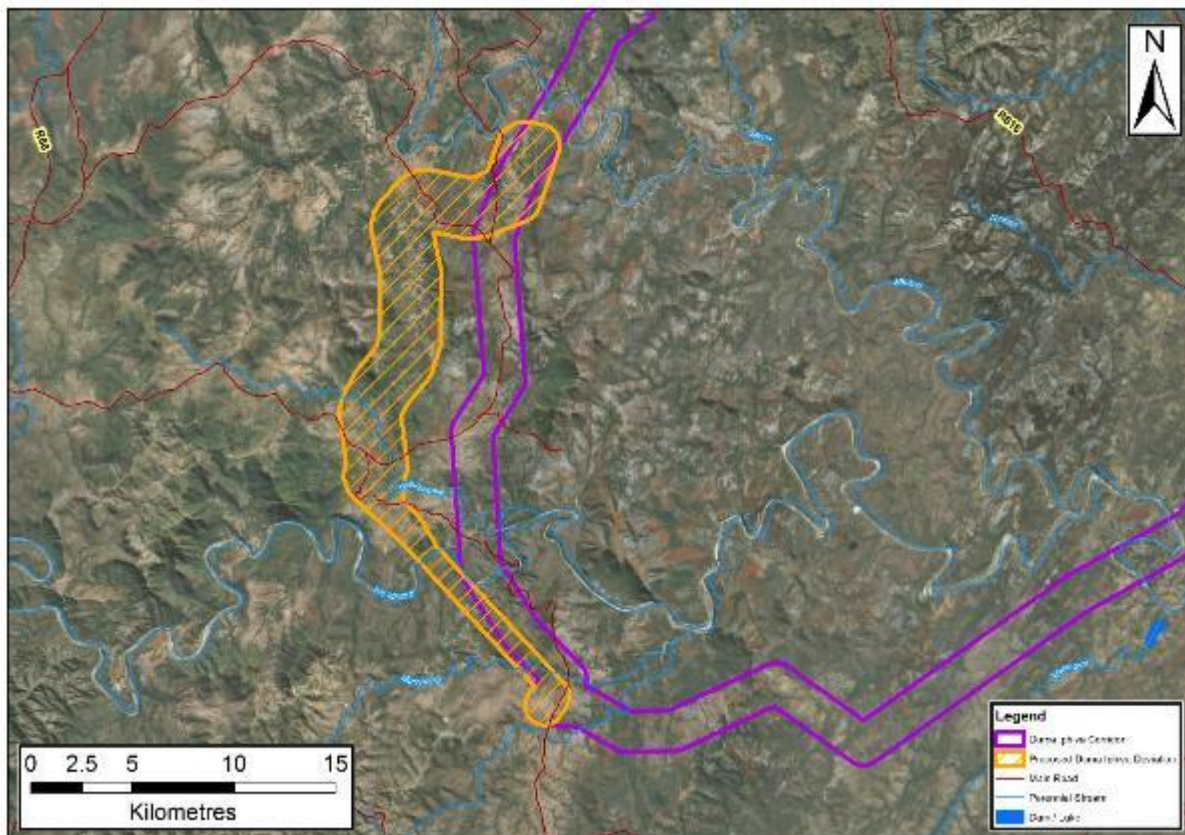


Figure 7-6: Proposed Iphiva-Duma West Deviation

7.5 Normandie-Iphiva 400 kV (Ref. No. 14/12/16/3/3/2/1036)

The consideration of alternatives assessed the three Normandie-Iphiva 400 kV powerline site-specific study areas against the aforementioned criteria. Based on the results of the scoping assessment, the width of the proposed Normandie-Iphiva 400 kV Powerline corridors were adjusted in two sections (Figure 7-7, Figure 7-8). The routings however, remain unchanged, and therefore the criteria and ratings of the alternatives are not affected. The following table presents the designated ratings and consequent results:

Table 7-7: Consideration of Normandie- Iphiva 400 kV alternatives

Alternatives	Criteria 1	Criteria 2	Criteria 3	Criteria 4	Criteria 5	Total %	Rating	
N-I 400kv 2	1	2	4	5	3	60%	3.00	Negligible / insignificant
N-I 400kv 3	1	4	3	3	3	60%	3.00	Negligible / insignificant

From the sensitivity analysis it was found that criteria 1 (KZN C-plan) Critical Biodiversity areas are affected by both alignments. Option 2 also covers Priority areas and Critical Biodiversity areas (Optimal).

For criteria 3 option 2 does not cross or come into close contact with protected areas, option 3 crosses the borders of the Itala Nature Reserve, and is therefore less suitable.

Where criteria 4 is concerned both options cross Paulpietersburg Moist Grassland, however option 2 also covers KanGwane Montane Grassland. Option 3 also crosses Louwsberg Mistbelt Grassland. Therefore the proximity of options 3 to all these protected ecosystems makes it a less desirable option.

Criteria 5 was the current land use for both options, here the hectares of each option was considered. Option 2 consisted of 65% or 18 144ha of undisturbed or Natural areas, with 27% being disturbed. Option 3 consisted of 70% open or undisturbed areas or 23 246 ha, with 28% or 9235ha of disturbed land. The difference for these 2 options were rated as Negligent/insignificant, but when wetlands are taken into consideration, option 2 is more suitable due to less wetlands being present, this is seen as an important consideration as to the biodiversity value of this option.

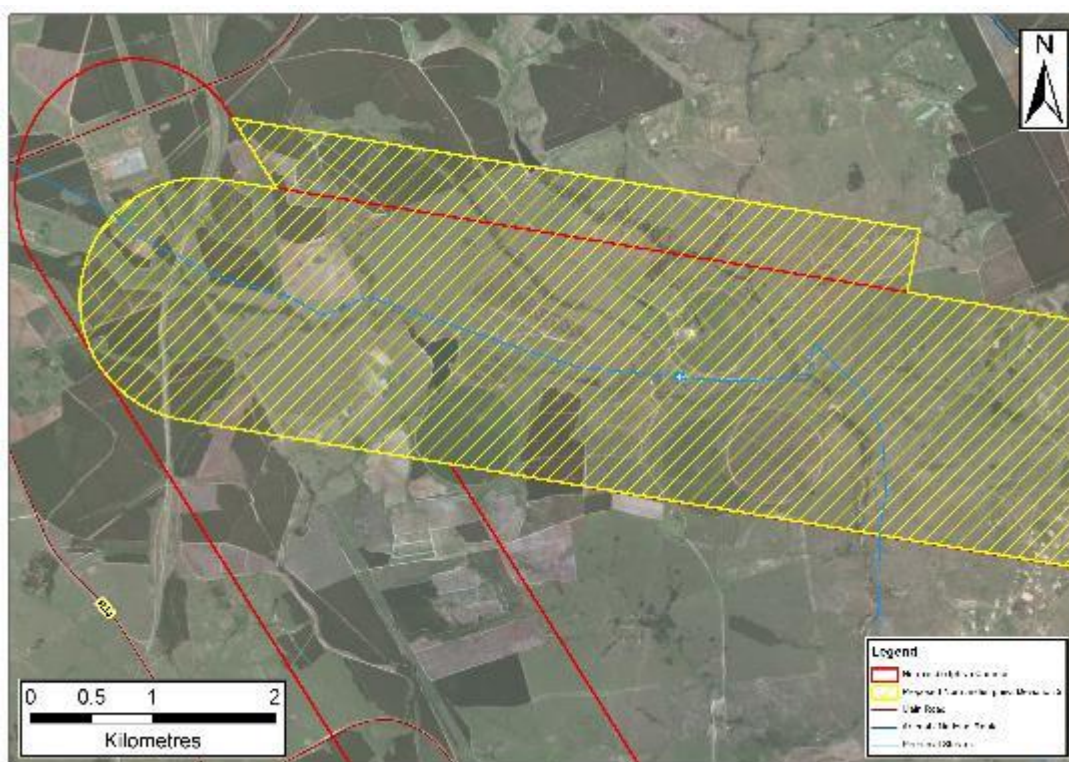


Figure 7-7: Normandi-Iphiva 2 corridor deviation

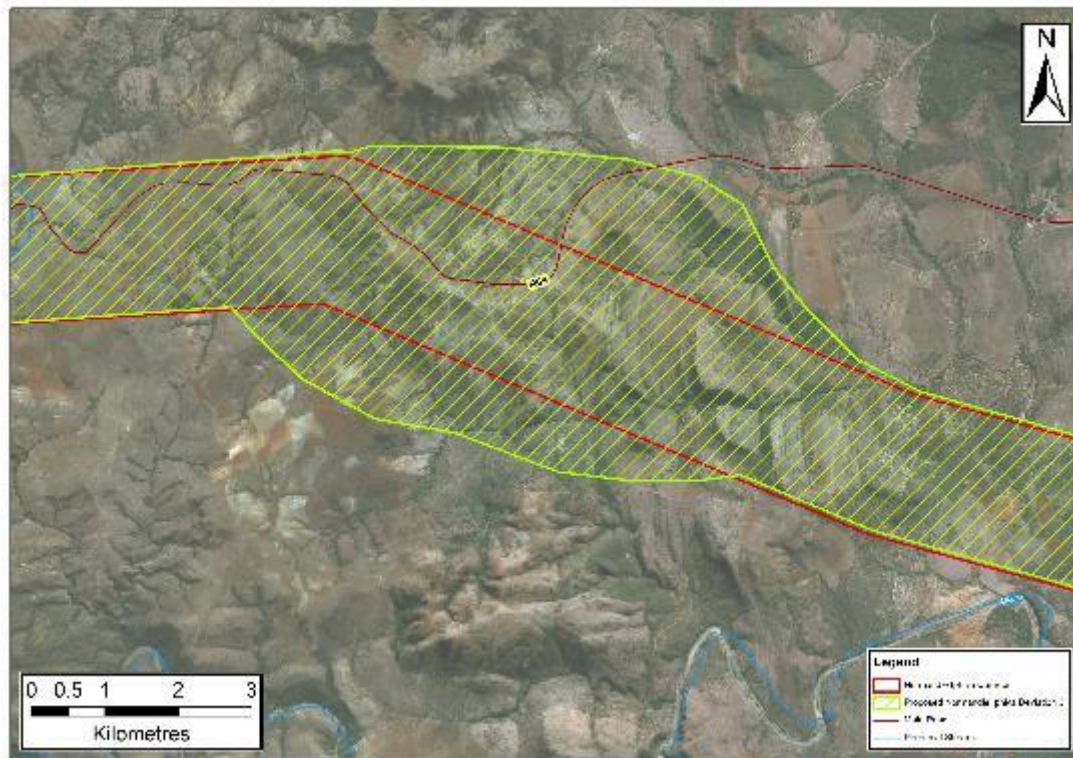


Figure 7-8: Normandi-Iphiva 3 corridor deviation.

8 Consultation

This section provides as summary of the consultation process as applicable to this assessment. Consultation for the Project adhered to the regulated Stakeholder Engagement Process (SEP). Table 8-1 **Error! Reference source not found.** summarises the select activities completed as part of this process.

Table 8-1: Summary of SEP undertaken during the Scoping Phase

Activity	Details
Identification of stakeholders	A stakeholder database was developed which includes I&APs from various sectors of society, including directly affected and adjacent landowners, in and around the proposed project area.
Distribution of announcement letter and BID	A BID, announcement letter was emailed and posted to stakeholders on 16 August 2016. Furthermore, project information leaflets were distributed to all post-boxes in the site specific study area between July and August 2016.



Activity	Details
Placing of newspaper advertisement	An English and Zulu advert was placed on 11 August 2016 in: <ul style="list-style-type: none"> ▪ Excelsior News; ▪ Isolezwe; and ▪ The Mercury.
Key Stakeholder and Authority Meetings	Meetings with key stakeholders and authorities were held as follows: <ul style="list-style-type: none"> ▪ Piet Retief, 5 September 2016; ▪ Pongola, 6 September 2016; ▪ Mkhuze, 7 September 2016; and ▪ Hluhluwe, 8 September 2016.
Focus Group Meeting	Focus Group Meetings were undertaken as follows: <ul style="list-style-type: none"> ▪ Pietermaritzburg, 9 September 2016; ▪ Mkhuze, 25 October 2016; ▪ Mkhuze, 29 March 2017.
Traditional Council Meetings	Traditional Council Meetings were held from 12 September 2016 through 28 October 2016. Please refer to the Comments and Response Report for details.
Obtained comments from stakeholders	Comments, issues of concern and suggestions received from stakeholders were captured in the Comments and Responses Report (CRR) dated 30 August 2017.

The following fauna and flora comments were recorded during the scoping phase of the Project:

Table 8-2: Fauna and flora specific comments and responses recorded during the Scoping Phase

Plants and Animals			
Comment	Date	Origin	Response
Impact on protected animals and birds' species currently within the	07 th September	Ms Karen Holmes	The Ecology Specialist Study will assess the potential



Plants and Animals			
reserve, such as wild dogs, and rhinos and vultures.	2016	Public Meeting, Mkhuze	impacts of the proposed project on protected animal and bird species.
A general ecologist specialist will be required in order to cover broad ecological issues.	9 th September 2016	Ms Dinesree Thambu FG meeting with EKZNW	Guidance from the Ezemvelo KZN Wildlife (EKZNW) is appreciated and will be incorporated into the Plan of Study for EIA in the Scoping Report.
There is a minimum requirements document that should be considered, and it will be made available to the project team, compliance to the requirements unless the specialist can substantiate the use of a different method.	9 th September 2016	Ms Dinesree Thambu FG meeting with EKZNW	Guidance from the EKZNW is appreciated and will be incorporated into the Plan of Study for EIA in the Scoping Report.
A portion of the study area is within the Pondoland-Albany biodiversity hotspot and has Red data and Endemic listed species.	9 th September 2016	Ms Dinesree Thambu FG meeting with EKZNW	Guidance from the EKZNW is appreciated and will be incorporated into the Plan of Study for EIA in the Scoping Report.
A concern regarding physical destruction of birds' nests.	25 th October 2016	Mr Charl Senekal Landowner Focus Group Meeting, Mkhuze	The impacts on birds will be assessed in the Avi-fauna specialist study.
A butterfly species was discovered in the Zululand Rhino Reserve and may perhaps occur in the neighbouring properties. An advice was given to the team to contact the Lepidoptera South Africa for records. A list of butterfly species will be forwarded to the team through email.	25 th October 2016	Mr Ivor van Rooyen Landowner Focus Group Meeting, Mkhuze	The information has been passed to the Fauna and Flora Specialist.
Furthermore, the Black Rhino population which is critically endangered species will also be impacted. She asked Eskom to circulate their vegetation control policy.	25 th October 2016	Ms Karen Holmes Landowner Focus Group Meeting, Mkhuze	This will be done in EIA.


Plants and Animals
Table 8-3: Comments submitted during Draft Scoping Report Review

Comments/ Questions	Date received	Origin	Responses
Referring to Critical Biodiversity Areas (CBAs), Mr Bengani asked if plants and animals have to be relocated in order to build a substation.	19 September 2017	Mr Thokozani Bengani Mkhuze Public Meeting	Ms Calmeyer said Irreplaceable and Optimal CBAs have been implemented on fairly broad level for the whole country. The CBAs are not considered as totally no-go areas, but ecological surveys and assessments of the actual sites must be undertaken to confirm the actual impact of the proposed project during the EIA process.
He asked if vegetation will be cleared within the 55 m servitude and what about maintenance after. Ms Odendaal said Eskom previously cleared vegetation once a year under other powerlines.	20 September 2017	Mr Nelis Moll Mkhuze Public Meeting	Some vegetation will be cleared, but not always the full 55 m. There are possibilities for not cutting all vegetation down to ground level under the power lines depending on the trees.
Please note that there are reserves on the eastern side of the reserve of N2.	20 September 2017	Ms Mariana Venter Mkhuze Public Meeting	This comment was noted, with thanks.
The Manyoni Private Game Reserve falls under protected areas. Why are you proposing powerlines over the protected	20 September 2017	Mr Dale Austin Mkhuze Public Meeting	Ms Calmeyer stated that there is no recommendation that goes over the protected area.



Comments/ Questions	Date received	Origin	Responses
area?			
He said the eastern side of the N2 consists of critical biodiversity areas which are irreplaceable, but are currently used for sugarcane and cattle farming.	20 September 2017	Mr Dale Austin Mkhuze Public Meeting	Ms Calmeyer explained that Critical Biodiversity Areas do not have the same status as protected areas as they are a high-level identification of land that should be further assessed on a site by site basis for potential conservation importance. These areas will be ground-truthed by the specialist studies.
<p>A submission from Manyoni Private Game Reserve titled “comments and objection to the eastern Iphiva – Duma corridor & substations” included the following documents:</p> <ul style="list-style-type: none"> • Manyoni Private Game Reserve (MPGR) Opposition to Eskom's Northern KwaZulu Natal KZN Strengthening Project (16 pages). • Appendix 1: Gazette – ZRR Proclamation Notice 65 (23 April 2009) • Appendix 2: Gazette – ZRR Proclamation Notice 1522 (10 October 2015) • Appendix 3 Lepidopterists' Society of Africa Letter • Appendix 4 MPGR Vulture Incidents • Appendix 5 – ZAP Wing Opposition Eskom Lines at Manyoni 	09 October 2017	Ms Karen Odendaal Manyoni Private Game Reserve	This receipt of this submission was acknowledged, with thanks. The information will be forwarded to relevant specialists as part of detailed investigations.



Comments/ Questions	Date received	Origin	Responses
<ul style="list-style-type: none"> Appendix 6 – Heligistix – Opposition Eskom Lines at Manyoni Appendix 8 Impact of Transmission Power Lines on the environment <p><i>NB: Due to the length of the submission, this has been included as a separate attachment under lengthy submissions (Annexure A1).</i></p>			
<p>As in IAP involved in the process since the first application we would like to point out the following issues noticed after inspecting the draft proposals.</p> <p>Without prejudice of our rights please find our comments regarding the Normandie iPhiva Draft Scoping Report:</p>	08 October 2017	Mr Charl Senekal Senekal Familie Boerdery	This receipt of this submission was acknowledged, with thanks. The information presented from a) to u) will be forwarded to relevant specialists as part of detailed investigations.
<p>a) Figure 2.1's placement of Iphiva 3 is factually incorrect. We have in the past pointed this out to Eskom and also refused EIA consultants entry to investigate this point as it was NEVER offered as a placement point for the substation. Senekal Familie Boerdery in good faith offered Eskom several viable options for substation placement that are along the preferred routes. Despite all this iPhiva 3 is still contained as an option in the report yet Eskom sent their EIA practitioners to the site for inspection.</p>	08 October 2017	Mr Charl Senekal Senekal Familie Boerdery	The location of Iphiva 3 on Figure 2.1 is correct. We acknowledge that there was some confusion between the naming of the alternative sites in the past. This has been resolved, and the presentation in the Scoping Report is correct. The site that you refused specialists access to is now referred to Iphiva 2. Iphiva 3 is not on property owned by the Senekal family. We assume that the statements in this point refer to Iphiva 2, which is not being recommended for further assessment. Opinions of yourselves and other I&APs contributed significantly to this



Comments/ Questions	Date received	Origin	Responses
<p>This only serves to disgruntle IAPs as despite all of our own time we spent in meetings are for naught if Eskom decides to publish factually incorrect maps which are the heart of the application and go as far as investigating sites which were never offered. This begs the question of whether Eskom is acting in bad faith regarding the application.</p>			<p>recommendation.</p>
<p>b) Figure 6.1 is factually incorrect. The boundaries of Zimanga are not nearly accurately portrayed, creating a false impression that the 400kva lines will be running through vacant land. We would like to place on record that the process of proclaiming Zimanga as a Protected Area will be completed soon, and that the decision to Proclaim Zimanga under the highest level of protection offered by the Protected Areas Act has already been approved by the EKZNW board.</p> <p>The management plan is currently being finalised for submission and the area will be proclaimed long before actual line construction commences. All land on Zimanga will therefore have to be treated as classified under the Protected Areas Act, which will be applicable before construction</p>	<p>08 October 2017</p>	<p>Mr Charl Senekal Senekal Familie Boerdery</p>	<p>Figure 6.1 is only the copy of a rough map that was used during field work to start identifying issues and risks. Decisions will be based on the official datasets from DEA, SANBI and the EKZNW. Our maps are based on current data and not future plans. Please let us know as soon as your proclamation has been finalized.</p>



Comments/ Questions	Date received	Origin	Responses
commences			
c) The corridor G-D is not indicated on any map despite it being the logical connection route. We have constantly pointed out this omission to Eskom yet they choose to ignore the fact. We have now reached application level and this has still not been corrected. This needs to be corrected as the text in Table 6.4 clearly indicates point D to be the end destination in all cases, yet all maps do not indicate the opposite?	08 October 2017	Mr Charl Senekal Senekal Familie Boerdery	Corridor G-D has been indicated on the Final Scoping Report Figures. This portion of the corridors has, however, not been recommended for further consideration as part of any of the alternatives. The Normandie-Iphiva 400 kV powerline will start at the Normandie Substation, and end at whichever Iphiva site is authorised. As explained in the Iphiva Substation Draft Scoping Report, 13 sites were identified as potentially viable alternatives. In the Scoping Phase, these have been narrowed down to 2 sites, namely Iphiva 3 and Iphiva 6.
d) Despite section C-G constantly being indicated in maps and meetings, and despite Mrs Bongji Shinga's direct comment to me that "adding C-G was a mistake", the route is still contained in the maps. The C-G section is not once discussed and analysed in the Ecological Sensitivity Rating despite forming part of the application. We therefore assume that it is not considered as an option as it ranks as the most ecologically damaging route to follow, containing nests of White Backed Vulture, Lappet Faced vulture, Mkuze-river riverine forest as well as a			G-C is not part of any of the alternatives recommended for further consideration.



Comments/ Questions	Date received	Origin	Responses
wetland of National Importance. This is not clearly indicated in this report and is still contained in maps in the final application. We deserve clarity on this line			
e) Section 6.2.11 mentions the presence of IBAs in the area. There is a new Zululand IBA that is to be proclaimed and through which the proposed routes will run.	08 October 2017	Mr Charl Senekal Senekal Familie Boerdery	The latest data sets of IBAs will be obtained from EKZNW. Planned future areas to be proclaimed will also be taken into account, if provided to use, but will not have the same status as proclaimed areas.
f) In paragraph 6.2.14 we concur with the fact that you state route NI-1 will have the highest rated ecological impact.	08 October 2017	Mr Charl Senekal Senekal Familie Boerdery	Support of the recommendations is noted.
g) We note in paragraph 6.3 that the mention of burying a portion of the line is mentioned. We are in full support of this alternative especially considering the impact these massive structures will have on the ecology, security, landscape, land use and economy of the area.	08 October 2017	Mr Charl Senekal Senekal Familie Boerdery	Support of the recommendations is noted.
h) Paragraph 8.1 indicates that the addition of powerlines not going through existing Protected areas will be possible. This needs to be changed in order to include areas in the process of proclamation. The addition of paperwork does not change the actual ecological	08 October 2017	Mr Charl Senekal Senekal Familie Boerdery	We hope to be able to avoid any powerlines in conservation areas protected by national and provincial legislation. This will have to be confirmed in the specialist studies. Future plans for protection of areas will be taken into account, but cannot have the same status as officially legally protected



Comments/ Questions	Date received	Origin	Responses
<p>processes on the ground, which are the reason for proclamation in the first place. By using any of the proposed routes the lines will run through protected areas/areas being proclaimed. Using route G-D only serves to limit this impact, as this is the shortest route through protected areas. As mentioned, Zimanga will be proclaimed before any construction commences with the Act regulating this type of construction on Protected areas.</p>			areas.
<p>i) Mention is made that the areas will be traversed in the summer months to assess avifaunal impact, but this is not ideal as different red data species nest across different timespans of the year. To do an assessment in summer will guarantee no presence of breeding white backed vultures, bateleurs and lappet faced vultures (to name but a few), as these breed along several proposed sections of the lines, but generally towards winter/late winter.</p>	08 October 2017	Mr Charl Senekal Senekal Familie Boerdery	
<p>j) There is an unnamed map around paragraph 8.3 that indicates site iPhiva 2 and 3 and which are not the sites offered in good faith by Senekal Farming on their land, yet are part of the application. This is incorrect information. The</p>			<p>The title to the Figure in Section 8.3 is in the legend (top right corner) and is the Landcover data set. The substation sites indicated on this map are the ones that were considered in the Scoping Phase. Iphiva 4 is the site that the Senekal family</p>



Comments/ Questions	Date received	Origin	Responses
simple addition of page numbers will make reference to these omissions easier.			proposed as the substation site.
k) Figure 9.2 does not indicate the G-D linkage which is described in the route assessments but rather focuses on G-C.	08 October 2017	Mr Charl Senekal Senekal Familie Boerdery	The data on Figure 9.2 covers the whole study area. It is not corridor specific and is meant to present back-ground information. This portion of the corridors has, however, not been recommended for further consideration as part of any of the alternatives.
l) The same can be said for Figure 9.3	08 October 2017	Mr Charl Senekal Senekal Familie Boerdery	The data on Figure 9.3 covers the whole study area. It is not corridor specific and is meant to present back-ground information. This portion of the corridors has, however, not been recommended for further consideration as part of any of the alternatives.
m) And figure 9.4	08 October 2017	Mr Charl Senekal Senekal Familie Boerdery	The data on Figure 9.4 covers the whole study area. It is not corridor specific and is meant to present back-ground information. This portion of the corridors has, however, not been recommended for further consideration as part of any of the alternatives.
n) Figure 9.7 too	08 October 2017	Mr Charl Senekal Senekal Familie Boerdery	The data on Figure 9.7 covers the whole study area. It is not corridor specific and is meant to present back-ground information. This portion of the corridors has, however, not



Comments/ Questions	Date received	Origin	Responses
			been recommended for further consideration as part of any of the alternatives.
o) Paragraph 9.8.6 and Table 9.5 makes mention of endangered species of birds but incorrectly classifies the White Backed Vulture as Endangered whilst the IUCN ranks it as Critically Endangered meaning one step away from being extinct in the wild. One would expect Eskom to be aware of this considering past dealings regarding the initial application	08 October 2017	Mr Charl Senekal Senekal Familie Boerdery	The Avi-fauna specialist will verify this information and will be updated as applicable in subsequent reports.
p) Figure 9.8 again indicates route C-G as an option despite in never being discussed with Senekal Farming, written off as a "mistake" and is never added in any ecological rating	08 October 2017	Mr Charl Senekal Senekal Familie Boerdery	The data on Figure 9.8 covers the whole study area. It is not corridor specific and is meant to present back-ground information. This portion of the corridors has, however, not been recommended for further consideration as part of any of the alternatives.
q) Figure 9.9, 9.10 and 9.11 same as above. Investigating every incorrect map is time consuming. Please take this as applicable to all maps and correct accordingly. It is of utmost importance to receive clarity on this issue.	08 October 2017	Mr Charl Senekal Senekal Familie Boerdery	The data on Figure 9.9, 9.10 and 9.11 covers the whole study area. It is not corridor specific and is meant to present back-ground information. This portion of the corridors has, however, not been recommended for further consideration as part of any of the alternatives.
r) These same comments are applicable to other reports, including the iPhiva	08 October 2017	Mr Charl Senekal Senekal Familie	



Comments/ Questions	Date received	Origin	Responses
<p>Substation placements in the iPhiva MTS Draft Scoping Report. Substation sites that are indicated on Senekal Familie Boerdery's land were never offered as such or are incorrectly indicated. With the documents reaching application status this urgently needs to be corrected lest it is placed on record as correct. Despite us pointing this out to Eskom several times it is being ignored, leading us to believe that Eskom is acting in bad faith with the application by writing off our comments as a mistake on their part, yet still including it in the applications. We deserve clarity on the issue.</p>		Boerdery	
<p>s) As far as the minutes document regarding the meeting at Ghost Mountain (29032017) in which Mrs Shinga clearly stated that the addition of line C-G was a mistake, this is not reflected in the minutes and therefore this document is also factually incorrect. I did ask for the C-G to be removed, to which Mrs Shinga responded that Eskom will comply to our request of removing their mistake, yet this was not minuted. The glaring omission of discussing option C-G in any report creates confusion as to why it is included on all maps, yet never discussed or ranked in</p>	08 October 2017	Mr Charl Senekal Senekal Familie Boerdery	



Comments/ Questions	Date received	Origin	Responses
<p>the Nako Iliso reports? Seeing that we are reaching application status this option needs to be clearly addressed as it influences every published report. It is clearly stated in the minutes that the connection between sites C and the existing line can be removed, thereby creating the impression by implication that corridor C-G is not viable seeing that other lines will be removed along this section, but never is the no-go option for C-G stated in any document. We would like to obtain clarity on this issue.</p>			
<p>t) The only report where we find reference to route C-G (albeit not clearly stated) was in the Digby Wells Fauna and Flora Baseline Input report, correctly classifying line C-G as a major impact with high sensitivity. This report, however, does not list the fact that Zimanga will be proclaimed as a Protected Area in the next few months, and rates its Protected Area impact sensitivity as low despite the EKZNW Board having taken the decision that the reserve be proclaimed as a nature reserve with the highest level of protection. The NPAES sensitivity table 2.11 does not take into account that Zimanga is the only remaining link between all other protected areas within this part of the</p>	08 October 2017	Mr Charl Senekal Senekal Familie Boerdery	



Comments/ Questions	Date received	Origin	Responses
<p>province, and incorrectly states the routes C-G as no interaction and low sensitivity, despite it being among the highest levels of sensitivity in the province. This needs to be addressed before final application. The NPAES of line C-B is rated as high, but despite proposed lines C-G and C-D occurring on the exact same game reserve with the exact same constraints that pertain to line B-C the impact of these routes are rated as low.</p> <p>The report therefore contradicts itself. We would like to place on record that this entire section C-G runs through the middle of Zimanga Private Game Reserve and will literally cut the reserve in half, together with associated habitat destruction, critically endangered species nest destruction, destroying a wetland registered as of National Importance and destroy the entire business and livelihoods of employees on the game reserve</p>			
<p>u) The only report where we find reference to route C-G (albeit not clearly stated) was in the Digby Wells Fauna and Flora Baseline Input report, correctly classifying line C-G as a major impact with high sensitivity. This report, however, does not list the fact that Zimanga will be</p>	08 October 2017	Mr Charl Senekal Senekal Familie Boerdery	



Comments/ Questions	Date received	Origin	Responses
<p>proclaimed as a Protected Area in the next few months, and rates its Protected Area impact sensitivity as low despite the EKZNW Board having taken the decision that the reserve be proclaimed as a nature reserve with the highest level of protection. The NPAES sensitivity table 2.11 does not take into account that Zimanga is the only remaining link between all other protected areas within this part of the province, and incorrectly states the routes C-G as no interaction and low sensitivity, despite it being among the highest levels of sensitivity in the province. This needs to be addressed before final application. The NPAES of line C-B is rated as high, but despite proposed lines C-G and C-D occurring on the exact same game reserve with the exact same constraints that pertain to line B-C the impact of these routes are rated as low.</p> <p>The report therefore contradicts itself. We would like to place on record that this entire section C-G runs through the middle of Zimanga Private Game Reserve and will literally cut the reserve in half, together with associated habitat destruction, critically endangered species nest destruction, destroying a</p>			



Comments/ Questions	Date received	Origin	Responses
<p>wetland registered as of National Importance and destroy the entire business and livelihoods of employees on the game reserve</p>			
<p>She submitted the following comments:</p> <ul style="list-style-type: none"> • She generally supports the specialist studies proposed. • The technical reason for discarding some of the Iphiva Substation sites is not clear in the report. I will edit this to provide clarity (i.e. if the substation is located too far from the area that is being supplied with electricity, then the losses of current to distributing the electricity from the substation to the end user is unacceptably large). • Besides the point above, her other comments do not require any changes to the Scoping Reports, but are rather for consideration in the specialist studies and impact assessment. • She would have preferred to see more alternatives being taken through to the specialist studies and Impact Assessment phase, but acknowledges the 2014 Regulations that imply only one site/corridor is “approved” in Scoping and accepts the two that we have. She suspects similar comments from other colleagues. We will address them as they arise. We 	<p>17 October 2017</p>	<p>Ms Dinesree Thambu Ezemvelo KZN Wildlife Telephonic Submission</p>	<p>These comments were acknowledged. At the time of submission of Final Scoping Report, the discussions and proposals for a meeting date with EKZNW was in progress.</p>



Comments/ Questions	Date received	Origin	Responses
<p>discussed the possibility of introducing additional totally new sites, but, as this would require re-doing or revising the Scoping Report, it was not pursued.</p> <ul style="list-style-type: none"> • She recommended that we meet with them again to discuss the Hluhluwe-Umfolozi Park and associated Biodiversity Economy Nodes that are being discussed in the Department. I welcomed this meeting, and we will agree on a mutually suitable date. Relevant specialists (ecology, avifauna, social, economic?) will be invited to attend this meeting. 			

Table 8-4: Comments submitted post Final Scoping Report Submission/Finalisation

Comments/ Questions	Date received	Origin/Name/Property Details	Responses
<p>1. The maps on the Environmental Impact Report must illustrate:</p> <ol style="list-style-type: none"> The environmental sensitivities identified superimposed onto the proposed corridor alignments; and Existing powerlines, existing powerline servitudes, existing pipelines and roads. The proposed powerline should be on existing disturbances as far as possible to reduce impacts. <p>2. The .shp files in decimal degrees or .kml files for the existing powerlines must be</p>	23 October 2017	Ms Dinesree Thambu Principal Planner Ezemvelo KZN Wildlife (EKZNW)	<p>These comments from EKZNW were acknowledged with thanks.</p> <p>1 (a) The request was noted for the Draft EIR compilation.</p> <p>1 (b) This comment was noted. The proposed infrastructure will follow areas which are already disturbed, where practically possible.</p> <p>1. The format of shapefiles was noted for future submissions, including Draft</p>



Comments/ Questions	Date received	Origin/Name/Property Details	Responses
<p>provided to Ezemvelo when the EIAR is ready for review.</p> <p>3. Contact be made with Bat Interest Group of KwaZulu-Natal, for local bat info: Kate Richardson ejrichardson@worldonline.co.za</p> <p>4. Local experts (for all ecological, fauna and flora specialist studies) be consulted, given that the specialists appointed to undertake the assessment are not from KwaZulu-Natal; and</p> <p>5. A meeting be held to discuss the Hluhluwe-Imfolozi Park and associated Biodiversity Economy nodes that is currently being discussed within our offices. This meeting should be attended by relevant specialists (e.g. ecology, avifauna, social, economic) so that appropriate questions can be raised and addressed, and that contacts can be made to source local information.</p>			<p>EIR.</p> <p>2. This information was provided to the Faunal Specialist.</p> <p>3. The suggestion was noted for forwarding to the relevant specialist.</p> <p>4. A meeting was held with EKZNW to discuss the Hluhluwe-Imfolozi Park and associated Biodiversity Economy nodes on 08 November 2017. A record of comments raised is also captured in this Comments and Responses Report.</p>
<p>Avifauna within the Iphiva-Duma proposed corridors appears to be a red flag. It needs the input of specialist studies.</p> <p>Ms Longmore advised that it would be preferable for the project to be implemented as far away from the Park as possible as there are also international obligations to be met in responsibly conserving the Park. There is also a 5km de facto buffer around the Park that automatically triggers an EIA, and the site for the Duma Substation</p>	08 November 2017	Ms Jenny Longmore EKZNW FGM	Ms Calmeyer indicated that an Avifaunal Specialist was appointed to conduct specialist studies for the proposed project. Mr Gounden further stated that noise and visual diverters are usually placed on the powerlines to deter the birds from flying into them.



Comments/ Questions	Date received	Origin/Name/Property Details	Responses
which already has environmental authorisation is well within the 5km buffer, and the western corridor of Iphiva-Duma is also within the 5km buffer.			
Ms Longmore asked if Iphiva-Duma east and west corridors were the only options for the powerlines to traverse without affecting HiP and its surroundings?	08 November 2017	Ms Jenny Longmore EKZNW FGM	Ms Calmeyer indicated that Eskom needs as short a route as possible to get the powerlines from Iphiva to Duma substation to minimize costs. Protected areas such as Manyoni Private Game Reserve and HiP were avoided at all costs although a compromise needs to be established because ultimately, a solution with the least impacts needs to be identified.
Ms Thambu indicated that EKZNW has noted that all the specialists appointed for the project are not from KZN, hence it is advised that the project specialists engage with EKZNW local specialists before finalizing their specialist reports.	08 November 2017	Ms Dinesree Thambu EKZNW FGM	Ms Calmeyer indicated that the project specialists are chasing a tight submission deadline as the project timeline generally has tight deadlines. Ms Longmore suggested that an extension can be requested from national DEA for submission so that the necessary studies are conducted thoroughly because the study area is quite extensive. Ms Calmeyer stated that national DEA denied providing an extension for the Scoping Phase



Comments/ Questions	Date received	Origin/Name/Property Details	Responses
			according to the 50-day clause. Hence, the final Scoping Report for the project has been submitted.
Ms Longmore indicated that there is a landing-strip within HiP and a helicopter pad that needs to be borne in mind when finalizing which corridor is best for the powerlines. She indicated that there is a safety issue with having powerlines where helicopters are used for monitoring black rhino poaching.	08 November 2017	Ms Jenny Longmore EKZNW FGM	Mr Bailey indicated that the shortest and straightest route is usually given preference, but it should avoid heritage sites, relocations, forestry, protected areas, and sugar canes which are often incompatible land uses for traversing powerlines. Areas of least impact are given preference.
Ms Thambu further stated that the same applies for private game farms who use helicopters and drones for anti-poaching activities. The potential impact of powerlines on drones used for anti-poaching activities needs to be assessed and added on the terms of reference for the specialist studies.	08 November 2017	Ms Dinesree Thambu EKZNW FGM	Comment noted with thanks. It was confirmed that areas of least impact are given preference.

9 Recommendations

The various options with regards to the Transmission Power Lines, sub-stations and distribution lines are discussed in detail in this report. It furthermore considers the possible impact that the preferred route alignments/corridors will have on fauna and flora assemblages with specific focus on portions of the development that impact on sensitive landscapes or species. Provincial biodiversity data was used to rate options of the Transmission Power Lines and field work was used to rate the distribution lines and sub stations. From this assessment it was found that none of the Transmission Power Line routes are free of interactions with protected areas or species that could be of concern. The distribution lines has only one variation available, here the line orientation over impacted areas was preferred. The sub-station preferred was dominated by disturbed vegetation/habitat, and was not a good representation of the natural vegetation type present in undisturbed areas.



The Iphiva-Duma 400kVa lines current alignment options are all within the buffer zone of the Hluhluwe-Imfolozi Game Reserve, as are the proposed Duma sub-station. The deviation that is proposed in the Iphiva –Duma West corridor will remove that portion of the line from the buffer zone, but will once more enter this buffer zone when reconnecting to the Duma substation. The impact of this on fauna and flora in this area was not investigated at ground level and a walk down of the preferred corridor will have to include this section for study.

The expansion strategy of the park is currently underway and is investigating options for expansion, the Transmission Power Line and Substation could affect these plans, however more detailed investigations are required to quantify such an impact.

Final alignment within the preferred corridors must be preceded by a detailed walk down of the Transmission Power Line route, and areas of interest such as, protected trees or plant species and protected fauna must be investigated. Sensitive landscapes (wetlands, ridges) must be noted and the most appropriate mitigation measures employed to avoid negative impacts.

The Eskom Biodiversity Implementation Plan which aims to mainstream biodiversity and legal compliance in projects through key strategic objectives.

The Environmental Implementation Plan highlights an important overarching biodiversity objective, viz to *“Minimise the impact of our activities on ecosystems and enhance ecosystem services through responsible land management practices”*. The Biodiversity Implementation Plan details the actions required to achieve the objective. This document must be consulted and adhered to through the entire process of this project, with its guidelines used in addition and to compliment the below mentioned mitigation measures.

The following mitigation measures are recommended:

- A walk through of the selected alignment as well as tower positions should be conducted by a suitable qualified botanist as well as zoologist in order to ascertain for the presence of any threatened, protected, endemic or plant or animal species of special concern within or in close proximity to the construction areas (tower supports) for the presence of any animal burrows (including spiders and scorpions), rocky outcrops, logs, stumps and other debris and relocate any affected animals to appropriate habitat away from the servitude or tower.
- Protected trees within the servitude will necessitate that appropriate permits are applied for before these trees are damaged or removed.
- General mitigation measures would include the avoidance of any physical damage to natural vegetation on the periphery of the proposed servitude and is of particular importance in all riparian areas and areas of steep slopes.
- No construction activity or disturbance to vegetation or habitat is to take place within 50m of a delineated wetland or riparian zone.
- No hunting permitted by Eskom employees or contractors.



- All construction areas should be demarcated prior to construction to ensure that the footprint of impacts are limited.
- All alien invasive species on site should be removed and follow up monitoring and removal programmes should be initiated once construction is completed.
- Adhere to the Eskom vegetation management guideline.
- The ECO should identify any sensitive species or habitats along the servitude, particularly in relation to large terrestrial species and notify the faunal specialist of these so that he can advise on how best to handle these.
- The construction of new access roads should be limited.
- All vehicle and pedestrian movement should be restricted to the actual construction site and servitude.
- Removal of plants should be restricted to only those trees that pose a risk to the power line.
- Sensitive alluvial vegetation should be avoided and construction restricted within 50m from the edge of an endangered habitat.

Please refer to Bulletin, 240-70172585, *Vegetation Management and Maintenance within Eskom Land, Servitudes and Rights of Way*, and Bulletin KZN13TGTI141, *Environmental Management of Trees and Plants in KZN* for specific vegetation management measures to be applied within servitudes.

9.1 Mitigation measures and management

Mitigation measures as discussed in the impact assessment section of this report must be central to all environmental management measures. Off sets are designed to mitigate the significant residual impact the project will have, in order for the project to achieve a Net Positive Impact on biodiversity.

The question of Off-Sets revolves around significant residual impact on threatened habitat/vegetation types, in this impact assessment it was demonstrated that a residual impact does exist, however this is not a significant residual impact. Furthermore, the possible residual impact that is demonstrated is with regards to Vultures and other large bodied birds, not threatened vegetation types, as described in this report. Because of this and the drive towards best practice, it is suggesting that collaboration with NGO's and KZN wildlife in conservation positive projects be pursued, to enhance conservation efforts.

The collaboration will address the residual impact and will lead towards achieving a Net Positive Impact on impacted species.



9.1.1 Avoidance

As no infrastructure placement or construction has taken place, this measure must be completed during the detailed walkdown to avoid any SSC and related habitat.

9.1.2 Minimisation

The loss of habitat or species as a direct result of the infrastructure placement is one of the largest impacts. The primary option for mitigating this impact is to define set-asides within the corridors area to be maintained as natural areas.

9.1.3 Rehabilitation

As much of the infrastructure is permanent, and cannot be rehabilitated, rehabilitation is not an option for meeting No Net Loss requirements for the study.

9.1.4 Offsets

As there are residual impacts remaining after following the mitigation hierarchy to this point, off sets must be investigated. An offsets study is required for this project to determine the best possible manner in which to ensure measurable No Net Loss/Gain for the project in terms of Biodiversity.

10 Conclusion

This report accepts the economic need of the Eskom expansion and is in support of this strategy. The aim of this report is to comply with Appendix 6 of GN 326 of 7 April 2017, and all Provincial and National environmental legislation with regards to biodiversity when describing the activity and the impact that will have on the natural environment. And doing so has demonstrated that certain areas of the proposed infrastructure have very high impacts on the fauna and flora in that area. A more detailed assessment is needed to quantify this impact further and to aid in making decisions and designing mitigation measures. Finally if all stakeholders are satisfied that all avenues of mitigation has been pursued, then this project should be allowed to continue.



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- Woodhall, S. 2005. Field Guide to Butterflies of South Africa. Struik Publishers.



Appendix A: CV

Mr. Rudolph Greffrath

Manager: Biodiversity

Senior Terrestrial Ecology specialist

Biophysical Department

Digby Wells Environmental

Tertiary Education

- 2005: B-tech Degree in Nature Conservation, Nelson Mandela Metropolitan University (NMMU).
- 2001- 2004: National Diploma in Nature Conservation, Nelson Mandela Metropolitan University (NMMU).

Professional Registration

- South African Council for Natural Scientific Professions, *Professional Natural Scientist* in the field of practice *Conservation Science*, registration number is 400018/17;
- IAIA, International Association for Impact assessments;
- Botanical Society of South Africa;
- The Land Rehabilitation Society of Southern Africa, LARSA (Membership No. 0085);
- Birdlife International;
- Endangered Wildlife Trust (EWT);
- Grassland Society of Southern Africa.

Employment

- 2006 – Present: Digby Wells Environmental, Johannesburg, South Africa.
- 2002 - 2003: Shamwari Game Reserve, Eastern Cape, South Africa.
- 2001: Kop-Kop Geotechnical instrumentation specialists, Johannesburg, South Africa.

Experience

Rudolph's current role is that of a terrestrial ecologist, with specific reference to fauna and flora. In this capacity he is responsible for the planning and completion of terrestrial ecological studies, in the context of standalone reports, EIA reports and ESIA reports used for environmental authorisations or are focused specialist studies which meet local and international standards.



Rudolph has extensive experience in the application and adherence to the International Finance Corporation Performance standards, specifically performance standard 6. In this field he has worked with mining companies across Africa to ensure their compliance to IFC PS6. In this regard he has gained experience in applying the No Net Loss and Net Positive Impact approaches for Biodiversity in a mining business context. He has experience in applying the Equator Principles and World Bank criteria, specifically Criteria 7.

In support of this, Rudolph is responsible for off set design after a mitigation hierarchy is applied, in this regard he compiles Biodiversity Land Management Programs where various specialist studies are collated into a working document for clients in order to aid in pre or post mining management and achieving the No Net Loss and Net Positive Impacts.

Further to this he is also involved in rehabilitation design studies which entail the planning, implementation and monitoring of vegetative rehabilitation in designated areas on mines. He is responsible for the planning of post mine land use and the various methods utilised to achieve this.

Rudolph also fulfils the role of project manager here he manages national and international projects across Africa, specifically west, central and southern Africa, managing a multi-disciplinary team of specialists.

Rudolph is also involved in the acquisition of regulatory permits for clients, this includes the planning of relocation strategies for protected and endangered plant species in areas where mines are to be established. This involves the planning and execution of data gathering surveys, thereafter he manages the process involving relevant provincial and National authorities in order to obtain the specific permit that allows for a development to continue.

Information pertaining to the technical expertise of Rudi includes the following:

- Environmental Impact Assessments (EIAs), Basic Assessments and Environmental Management Plans (EMPs) for environmental authorisations in terms of the South African National Environmental Management Act (NEMA), 1998 (Act 107 of 1998);
- Environmental pre-feasibility studies for gold tailings reclamation and iron ore mining projects;
- International Finance Corporation (IFC) related projects across Africa, applying performance standards and Equator Principles on the Environmental Health and Safety Guidelines set down by the IFC;
- Environmental and Social Impact Assessments (ESIA) for Environmental Authorisation;
- Biodiversity Assessments including Mammalia, Avifauna, Herpetofauna and Arthropoda;
- Impact Assessments based on the terrestrial environment;
- Biodiversity and Land Management Programs;
- Protected plant species management strategies planning and implementation;
- Monitoring of rehabilitation success through vegetation establishment;



- Rehabilitation planning;
- Environmental auditing of rehabilitated areas;
- Project management of ecological specialist studies;
- Planning and design of Rehabilitation off-set strategies.

Training

- Measurements of Biodiversity at the University of the Free State, led by Prof. M. T. Seaman. September 2008.
- IFC performance standards implementation training, Lee-Ann Joubert, January 2013.
- Bird Identification course led by Ettiene Marais November 2009.
- Introduction to VEGRAI and Eco-classification led by Dr. James Mackenzie December 2009.
- Dangerous snake handling and snake bite treatment with Mike Perry 2011.
- Rehabilitation of Mine impacted areas, with Fritz van Oudshoorn, Dr Wayne Truter and Gustav le Roux 2011.
- First aid Level 2, School of Emergency and Critical care, Netcare, 2013
- First aid Level 2, National First Aid Academy, 2017.

Projects

The following project list is indicative of Rudolph's experience, providing insight into the various projects, roles and locations he has worked in.

Project	Location	Client	Main project features	Positions held	Activities performed
Mmamabula Energy Project (MEP).	Botswana	CIC energy	Construction of a railway, opencast mine, wellfield, conveyors, addits, housing.	Technical Specialist Ecologist	IFC level specialist studies, Fauna and Flora surveys for the project features, including impact assessments, management plans. Alien eradication plans.
Orlight Solar PV Power Project	South Africa	Orlight SA	Environmental Impact Assessment (EIA) process for five proposed Solar Photovoltaic (PV) Power Plants	Technical Specialist Ecologist	EIA Terrestrial Biodiversity studies, IFC level specialist studies
Twenty Nine Capitol	South Africa	CSIR	Photovoltaic Power	Technical	EIA Terrestrial



			stations	Specialist Ecologist	Biodiversity studies, in support of the EIA report, IFC level specialist studies
Tongan Biodiversity Land Management Plan	Ivory Coast	Randgold	Design, compilation and implementation of the BLMP	Technical Specialist Ecologist, Project Manager	Fauna and Flora surveys for the BLMP, compilation of BLMP. Alien eradication plans. IFC level specialist studies
Kibali Gold mine	DRC Congo	Randgold	Gold mine infrastructure	Technical Specialist Ecologist	Technical specialist, fauna and flora, for the Kibali ESIA. IFC level specialist studies
Kibali Gold mine	DRC Congo	Randgold	ESIA Update	Technical Specialist Ecologist	Technical specialist, fauna and flora, for the Kibali ESIA. IFC level specialist studies
Nzoro Hydroelectric station	DRC Congo	Randgold	Hydroelectric plant	Technical Specialist Ecologist	Technical specialist, fauna and flora, for the Nzoro ESIA. IFC level specialist studies.
Loulo Biodiversity Land Management Plan	Mali	Randgold	Design, compilation and implementation of the BLMP	Technical Specialist Ecologist, Project Manager	Fauna and Flora surveys for the project features, compilation of BLMP.
Koidu Diamond Mine	Sierra Leone	Koidu Resources	Construction of new open pit	Technical Specialist Ecologist	Technical specialist, fauna and flora, for the Koidu ESIA. IFC level specialist studies, terrestrial ecology management plans



Resource Generation	South Africa	Temo Coal	Coal mine/Railway Line	Technical Specialist Ecologist	Fauna and Flora surveys, Protected plant species management plans, Permitting and Rehabilitation design.
Impunzi Rehabilitation monitoring	South Africa	Glencore	Monitoring of rehabilitation success and suggested management measures	Technical Specialist Flora specialist, Project manager	Vegetation surveys, rehabilitation monitoring. Alien eradication plan.

Publications

- Biodiversity Action Plans for faunal habitat maintenance and expansion in mining. Poster presented at the 48th Annual Grassland Society of Southern Africa (GSSA) conference.

Limpopo Province South Africa – the Biodiversity perspective Paper presentation, presented at the Limpopo Minerals Conference and Trade show, hosted by the fossil fuel foundation and LEDET, 2015/11/11



Appendix B: Comments and Responses



Appendix C:

Fauna and Flora Screening Assessment

Environmental Impact Assessment for Eskom's Northern KwaZulu-Natal Strengthening Project

ILI3864



DIGBY WELLS
ENVIRONMENTAL
