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ESTABLISHMENT OF THE 132KV GRID CONNECTION INFRASTRUCTURE, ASSOCIATED ACCESS TRACKS & WATER COURSE CROSSINGS ASSOCIATED WITH THE AUTHORISED EMOYENI WIND ENERGY FACILITIES, NEAR MURRAYSBURG, BEAUFORT WEST AND UBUNTU LOCAL MUNICIPALITIES AND CENTRAL KAROO AND PIXELY KA SEME DISTRICT MUNICIPALITIES, WESTERN CAPE, AND NORTHERN CAPE PROVINCES.

OCTOBER 2022
DRAFT BASIC ASSESSMENT REPORT
(DFFE REF: 14/12/16/3/3/1/2626)

DOCUMENT DETAILS

Applicant	:	Eskom Holdings SOC Limited
Title	:	Proposed New 132kV Grid Connection and Associated Infrastructure for the Authorised Emoyeni Wind Energy Facilities, Near Murraysburg, Beaufort West & Ubuntu Local Municipalities and Central Karoo & Pixely Ka Seme District Municipalities, Western Cape and Northern Cape Provinces.
Author/EAP	:	Nala Environmental (Pty) Ltd Arlene Singh Norman Chetsanga Justin Jacobs
Purpose of Report	:	Public Participation Process & Commenting
Date	:	October 2022

RELEASE OF THE BASIC ASSESSMENT REPORT AND INVITATION TO COMMENT

Nala Environmental (Pty) Ltd has been appointed by Eskom Holdings SOC Limited as the independent environmental consultant to undertake the Basic Assessment (BA) for the proposed 132kV Grid Connection Infrastructure, Associated Access Tracks & Water Course Crossings within a 400m wide development corridor associated with the authorised Khangela Emoyeni Wind Energy Facility (DFFE Ref:.14/12/16/3/3/2/687), Umsinde Emoyeni Wind Energy Facility (DFFE Ref:. 14/12/16/3/3/2/686) and Ishwati Emoyeni Wind Energy Facility (DFFE Ref.: 12/12/20/2351) located near Murraysburg, Beaufort West and Ubuntu Local Municipalities and Central Karoo And Pixely Ka Seme District Municipalities, Western Cape and Northern Cape Provinces. A Basic Assessment process is being undertaken in accordance with the requirements of the 2014 EIA Regulations promulgated in terms of the National Environmental Management Act (NEMA; Act No. 107 of 1998) and compiled in accordance with Appendix 1 of the EIA Regulations, 2014 (as amended).

This BA Report describes and assesses this proposed project and consists of the following sections:

- **Section 1** - Introduction and project background
- **Section 2** – Project description
- **Section 3 -** Alternatives proposed
- **Section 4 -** Need & desirability of the project explained along with the strategic regulatory context for energy planning and the approach to undertaking the Basic Assessment process
- **Section 5 -** Description of the receiving environment
- **Section 6 -** Assessment of the impacts associated and recommendations for the mitigation of impacts
- **Section 7 -** Assessment of the cumulative impacts
- **Section 8 -** Conclusions and recommendations based on the findings of the BA Report.
- **Section 9 –** References

It must be noted that a Basic Assessment report for the above-mentioned development was previously distributed to interested and affected parties for review and comment on 16 September 2022. However, the Department of Forestry, Fisheries and the Environment subsequently instructed the Applicant to resubmit the application together with confirmation as to the applicability of GNR 2313[1]. In terms of Section 6.1 of GNR 2313, the Standard and the exclusions do not apply for the proposed Emoyeni Grid infrastructure. In this regard the Application for Environmental Authorisation and Basic Assessment report have been revised to take into consideration GNR 2313 including the provision of confirmation to the Competent Authority (DFFE) in terms of Section 6.1 of GNR 2313 where the Standards and exclusions are not applicable to the development. In this regard, a new Application for Environmental Authorisation has been submitted to the Competent Authority (CA). Following an acknowledgment of receipt of the Application and confirmation of the applicability of Section 6.1., the CA has indicated that a new public participation process may commence. The revised basic assessment report and specialist studies are accordingly available for review and comment as follows:

This BA report has been made available for review from the 13 October 2022 to the 14 November 2022 (both days inclusive) at the https://nalaenvironmental.co.za/projects/basic-assessment-process-for-the-132kv-grid-connection-infrastructure-associated-with-the-authorised-emoyeni-wind-energy-facilities-northern-and-western-cape-provinces/ and at the Ubuntu Local Municipality (Victoria West, Northern Cape Province) and Beaufort West Public Library (Western Cape Province) . Comments received during the initial public participation (which commenced on 16 September) have been addressed within this DBAR. All comments received during this 30-day review period will be addressed and responded to in the final Basic Assessment Report (refer to Appendix C7 and Appendix C8) for consideration by the National Department of Forestry, Fisheries and Environment, (DFFE).

[1] The "*Standard for the development and expansion of powerlines and substations within identified geographical areas and the exclusion of this infrastructure from the requirement to obtain an environmental authorization*" as published in Government Notice 2313 on 27 July 2022.

SYNOPSIS OF THE PROJECT

The applicant, Eskom Holdings SOC Limited is proposing establishment of the 132kV Grid Connection Infrastructure, associated Access Tracks & Water Course crossings within a 400m wide development corridor associated with the authorised Umsinde, Khangela and Ishwati Emoyeni Wind Energy Facilities located in the Beaufort West & Ubuntu Local Municipalities, and Central Karoo And Pixely Ka Seme District Municipalities, Northern and Western Cape Provinces. The proposed grid connection infrastructure will extend from the authorised wind farms, to the Eskom Gamma Main Transmission Substation. The following Environmental Authorisations were issued for the for the wind energy facilities and associated infrastructure in the vicinity of the proposed grid connection infrastructure sites:

Umsinde Emoyeni Wind Energy Facility	DFFE Ref: 14/12/16/3/3/2/686	on 06 September 2018
132kV Grid connection Infrastructure associated with the Umsinde Emoyeni WEF	DFFE Ref: 14/12/16/3/3/2/684	on 06 September 2018
Khangela Emoyeni Wind Energy Facility	DFFE REF:. 14/12/16/3/3/2/687	on 06 September 2018
132kV Grid connection Infrastructure associated with the Khangela Emoyeni WEF	DFFE REF:. 14/12/16/3/3/2/685	on 06 September 2018
Ishwati Emoyeni Wind Energy Facility	DFFE Ref: 12/12/20/2351	on 02 July 2015
Transmission grid connection infrastructure (Eskom Gamma Main Transmission Substation)	DFFE Ref: 14/12/16/3/3/2/410	on 02 July 2015
Distribution grid connection infrastructure	DFFE Ref: 14/12/16/3/3/2/411	on 02 July 2015

Following receipt of the relevant Environmental Authorisations for the grid connection infrastructure for the Umsinde and Khangela Emoyeni Wind Energy Facilities, it was noted that several listed activities that were relevant to the grid infrastructure had not been considered, therefore new a Basic Assessment process will be undertaken that will now consider all the applicable listed activities as per the EIA Regulations. In addition, due to alterations in the wind farm layouts, and based on further technical analysis and liaison with Eskom's technical and grid access units, it was determined that the previously authorised powerline routings (DFFE REF:. 14/12/16/3/3/2/685 and DFFE Ref: 14/12/16/3/3/2/684) intended to evacuate electricity generated from these authorised wind energy facilities to the National Grid via the Gamma Substation are no longer suitable/ optimal and will need to be revised to cater for the final wind farm layouts, and Eskom's connection requirements. A new Basic Assessment will therefore be undertaken to assess the revised (re-optimised) grid connection layout as well as all applicable listed activities, including the listed activities omitted from the original BA process. The proposed 400m wide development corridor that has been identified for the development of the grid connection infrastructure required to evacuate power generated from the authorised Emoyeni WEFs, is informed by the most feasible grid connection point into the national grid from a technical, economic and environmental perspective.

The authorised Khangela and Umsinde Emoyeni Wind Energy Facilities have been selected as preferred bidder projects via private off take (i.e. private power purchase) procurement processes, and construction is expected to commence in 2023. The Umsinde Emoyeni Wind Energy Facility also has been registered as a Strategic Integrated Project (SIP 20c) status **(Appendix N)** and thus corresponding authority decision making timelines (57 days) are anticipated. Following onto the SIP status, this application also seeks to request that the development corridor layout and EMPrs be considered as the final layout and EMPrs for approval. The proposed grid connection infrastructure is essential to enable these preferred bidder projects to connect to the national Eskom electricity grid. The grid connection infrastructure is also required to enable the future connection of the authorised Ishwati Emoyeni WEF, once this wind farm has secured a power purchase agreement with an electricity offtaker.

In order to evacuate electricity generated from the authorised Emoyeni Wind Energy Facilities to the National Grid the following infrastructure is proposed and has been assessed within this Basic Assessment report:

- The establishment of a 132kV collector substation (switching station) within the authorised Umsinde Emoyeni WEF site (adjacent to the authorised WEF facility substation) with a footprint of approximately 100m X 80m (~0.8ha) to be located within an assessment footprint that encompasses a 300m radius.

- The establishment of a 132kV collector substation (switching station) within the authorised Khangela Emoyeni WEF site (adjacent to the authorised WEF facility substation) with a footprint of approximately 100m X 80m (~0.8ha) to be located within an assessment footprint that encompasses a 300m radius.
- The establishment of a 132kV collector substation (switching station) within the authorised Ishwati Emoyeni WEF site (adjacent to the authorised WEF facility substation) with a footprint of approximately 120m X 100m (~1.2 ha) with an assessment footprint that encompasses a 300m radius.
- The establishment of a 132kV powerline within a 400m wide corridor that will extend from the Khangela switching station to the Ishwati switching station (~36km), and then onward for ~25km to the Eskom Gamma Substation. In addition, a further length of 132kV powerline (within a 400m wide corridor) will extend from the Umsinde switching station to the Khangela switching station for ~8km OR it may connect directly into the Khangela-Ishwati powerline at the Khangela switching station. An extended powerline development corridor of approximately 1.91 km^2 has been assessed in the vicinity of the Gamma Substation, that will enable the 132kV powerline to connect to either the south face of the Gamma Substation yard or approach from the east, depending on the available connection point at the time of connection. The 132kV Powerline from Umsinde to Khangela, and from Khangela to Ishwati and onward to Gamma Substation will be a single- or double-circuit overhead powerline, with a single set of pylons structures with a maximum height of 35m. Access/service tracks (jeep track) up to 7m wide and associated watercourse crossings will be associated with the powerline and will be located within the assessed powerline corridor.
- The upgrade/establishment of a new access road approximately 14km long from the existing public road from Richmond to the Ishwati switching station site. The proposed new access road will be unsealed and up to 12m wide during construction but will be reduced to a maximum of 6 m width during operation. The access road will largely follow an existing farm road (to be upgraded) but will also entail development of a new length of road.

The following alternatives are proposed for the powerline access tracks and watercourse crossing.

Table 1: 132kV Powerline within a 400m wide development corridor and gravel access track approximately 7m wide (Centre Line Co-ordinates)

	Preferred Alternative		**Alternative 1**		**Alternative 2**	
	Latitude	**Longitude**	**Latitude**		**Longitude**	
Start (on-site substation at Umsinde Emoyeni WEF site)	31°51'13.38"S	24° 1'25.58"E	31°51'13.38"S	24° 1'25.58"E	31°51'13.38"S	24° 1'25.58"E
Point 2	31°50'14.37"S	24° 0'50.32"E	31°50'14.37"S	24° 0'50.32"E	31°50'14.37"S	24° 0'50.32"E
Point 3	31°48'43.59"S	23°57'55.92"E	31°48'43.59"S	23°57'55.92"E	31°48'43.59"S	23°57'55.92"E
Start (on-site substation at Khangela Emoyeni WEF site)	31°48'43.05"S	23°57'42.71"E	31°48'43.05"S	23°57'42.71"E	31°48'43.05"S	23°57'42.71"E
Point 4	31°50'14.63"S	23°55'28.86"E	31°50'14.63"S	23°55'28.86"E	31°50'14.63"S	23°55'28.86"E
Point 5	31°49'13.74"S	23°53'33.39"E	31°49'13.74"S	23°53'33.39"E	31°49'13.74"S	23°53'33.39"E
Point 6	31°49'7.26"S	23°52'39.52"E	31°49'7.26"S	23°52'39.52"E	31°49'7.26"S	23°52'39.52"E
Point 7	31°47'31.74"S	23°49'11.72"E	31°47'31.74"S	23°49'11.72"E	31°47'31.74"S	23°49'11.72"E
Point 8	31°45'32.28"S	23°45'29.58"E	31°45'32.28"S	23°45'29.58"E	31°45'32.28"S	23°45'29.58"E
Point 9	31°43'29.18"S	23°45'1.23"E	31°44'1.56"S	23°42'34.93"E	31°44'1.56"S	23°42'34.93"E
Point 10	31°42'48.88"S	23°40'11.59"E	31°43'6.86"S	23°42'18.16"E	31°42'48.88"S	23°40'11.59"E
			31°42'48.88"S	23°40'11.59"E		
Point 11 (Ishwati Collector Sub)	31°42'24.42"S	23°39'30.33"E	31°42'24.42"S	23°39'30.33"E	31°42'24.42"S	23°39'30.33"E

Point 12	31°42'34.31"S	23°38'58.91"E	31°42'34.31"S	23°38'58.91"E	31°42'34.31"S	23°38'58.91"E
Point 13	31°43'9.01"S	23°38'11.49"E	31°43'9.01"S	23°38'11.49"E	31°43'9.01"S	23°38'11.49"E
Point 14	31°43'54.78"S	23°35'20.23"E	31°43'54.78"S	23°35'20.23"E	31°43'54.78"S	23°35'20.23"E
Point 15	31°40'58.19"S	23°25'27.11"E	31°40'58.19"S	23°25'27.11"E	31°40'58.19"S	23°25'27.11"E
End (Extended 1,91km^2 development corridor to (Gamma Substation) Preferred Alternative from the east	31°40'46.22"S	23°24'46.55"E	31°40'46.22"S	23°24'46.55"E	31°40'46.22"S	23°24'46.55"E
End (Extended 1,91km^2 development corridor to Gamma Substation) Preferred Alternative from the south	31°40'56.04"S	23°24'40.11"E	31°40'56.04"S	23°24'40.11"E	31°40'56.04"S	23°24'40.11"E

Table 2. Water Crossing Points along the 132kV Powerline within the 400m wide development corridor (Preferred Alternative):

Gamma Substation to Ishwati Switching Station					
Watercourse Crossing	GPS Coordinates		Watercourse Crossing	GPS Coordinates	
	Latitude	Longitude		Latitude	Longitude
1	31° 40.895'S	23° 25.233'E	16	31° 43.839'S	23° 35.129'E
2	31° 41.036'S	23° 25.743'E	17	31° 43.889'S	23° 35.303'E
3	31° 41.303'S	23° 26.688'E	18	31° 43.853'S	23° 35.487'E
4	31° 41.551'S	23° 27.579'E	19	31° 43.738'S	23° 35.826'E
5	31° 41.647'S	23° 27.969'E	20	31° 43.660'S	23° 36.141'E
6	31° 41.776'S	23° 28.327'E	21	31° 43.518'S	23° 36.634'E
7	31° 41.815'S	23° 28.474'E	22	31° 43.458'S	23° 36.905'E
8	31° 42.067'S	23° 29.346'E	23	31° 43.453'S	23° 36.987'E
9	31° 42.354'S	23° 30.316'E	24	31° 43.389'S	23° 37.208'E
10	31° 42.405'S	23° 30.479'E	25	31° 43.261'S	23° 37.699'E
11	31° 42.538'S	23° 30.925'E	26	31° 43.238'S	23° 37.813'E
12	31° 42.772'S	23° 31.654'E	27	31° 43.229'S	23° 37.905'E
13	31° 43.233'S	23° 33.111'E	28	31° 43.178'S	23° 38.061'E
14	31° 43.362'S	23° 33.570'E	29	31° 43.082'S	23° 38.300'E
15	31° 43.536'S	23° 34.080'E	30	31° 42.930'S	23° 38.518'E

Ishwati Switching Station to Khangela Switching Station					
Watercourse Crossing	GPS Coordinates		Watercourse Crossing	GPS Coordinates	
	Latitude	Longitude		Latitude	Longitude
31	31° 42.866'S	23° 40.290'E	58	31° 47.823'S	23° 49.804'E
32	31° 43.284'S	23° 41.134'E	59	31° 47.901'S	23° 49.951'E
33	31° 43.688'S	23° 41.937'E	60	31° 48.006'S	23° 50.198'E

34	31° 42.898'S	23° 41.616'E	**61**	31° 48.066'S	23° 50.364'E
35	31° 43.027'S	23° 42.364'E	**62**	31° 48.259'S	23° 50.708'E
36	31° 44.009'S	23° 42.534'E	**63**	31° 48.621'S	23° 51.486'E
37	31° 43.178'S	23° 43.374'E	**64**	31° 48.904'S	23° 52.183'E
38	31° 43.261'S	23° 44.255'E	**65**	31° 49.041'S	23° 52.498'E
39	31° 43.293'S	23° 44.328'E	**66**	31° 49.190'S	23° 52.867'E
40	31° 44.504'S	23° 43.539'E	**67**	31° 49.215'S	23° 53.392'E
41	31° 44.270'S	23° 45.237'E	**68**	31° 49.404'S	23° 53.891'E
42	31° 44.826'S	23° 44.149'E	**69**	31° 49.442'S	23° 53.813'E
43	31° 45.124'S	23° 44.700'E	**70**	31° 49.598'S	23° 54.228'E
44	31° 44.812'S	23° 45.526'E	**71**	31° 49.640'S	23° 54.290'E
45	31° 45.537'S	23° 45.494'E	**72**	31° 49.691'S	23° 54.376'E
46	31° 45.845'S	23° 46.109'E	**73**	31° 49.860'S	23° 54.672'E
47	31° 45.739'S	23° 45.958'E	**74**	31° 50.021'S	23° 54.889'E
48	31° 45.629'S	23° 45.691'E	**75**	31° 50.088'S	23° 55.079'E
49	31° 46.235'S	23° 46.853'E	**76**	31° 50.152'S	23° 55.217'E
50	31° 46.547'S	23° 47.440'E	**77**	31° 49.854'S	23° 56.055'E
51	31° 46.717'S	23° 47.775'E	**78**	31° 49.748'S	23° 56.220'E
52	31° 46.785'S	23° 47.899'E	**79**	31° 49.677'S	23° 56.303'E
53	31° 47.088'S	23° 48.482'E	**80**	31° 49.532'S	23° 56.461'E
54	31° 47.290'S	23° 48.698'E	**81**	31° 49.124'S	23° 56.975'E
55	31° 47.414'S	23° 48.959'E	**82**	31° 48.830'S	23° 57.425'E
56	31° 47.492'S	23° 49.051'E	**83**	31° 48.558'S	23° 57.715'E
57	31° 47.708'S	23° 49.547'E	**84**	31° 48.759'S	23° 57.831'E

Khangela Switching Station to Umsinde Switching Station		
Watercourse Crossing	**GPS Coordinates**	
	Latitude	**Longitude**
83	31° 48.558'S	23° 57.715'E
84	31° 48.759'S	23° 57.831'E
85	31° 48.886'S	23° 58.233'E
86	31° 49.101'S	23° 58.643'E
87	31° 49.438'S	23° 59.251'E
88	31° 49.489'S	23° 59.362'E
89	31° 49.750'S	23° 59.910'E
90	31° 50.062'S	24° 00.493'E
91	31° 50.317'S	24° 00.890'E

Proposed access road to the Ishwati WEF Switching Station Co-ordinates:

	Latitude	Longitude
Start (off the existing unnamed gravel road)	31° 44.203'S	23° 46.714'E
Middle	31° 42.906'S	23° 42.942'E
End (Authorised Ishwati Substation site)	31° 42.407'S	23° 39.506'E

The authorised Umsinde, Ishwati and Khangela Emoyeni Wind Energy Facilities (WEFs) are located approximately 18km north of the town of Murraysburg and are located in the Beaufort West and Ubuntu local Municipalities, Western and Northern Cape Provinces. The following properties have been identified for the development of the grid connection infrastructure , including overhead powerlines and substations, with associated access tracks and Water Course crossings:

Property Details	**SG Codes**
➢ Portion 1 of farm Klein Driefontein No. 152	C05200000000015200001
➢ Remainder of Farm De Hoop No. 30;	C05200000000003000000
➢ Portion 2 of Farm De Hoop No. 30	C05200000000003000002
➢ Remainder of Farm Swavel Kranse No. 28	C05200000000002800000
➢ Portion 2 of Farm Swavel Kranse No. 28	C05200000000002800002
➢ Portion 4 (portion of portion 1) of Farm Driefontein 26	C05200000000002600004
➢ Portion 6 of Farm Klipplaat No. 109	C06300000000010900006
➢ Portion 4 (portion of portion 2) of Farm Klipplaat No. 109	C06300000000010900004
➢ Portion 1 of the Farm Klipplaat No. 109	C06300000000010900001
➢ Remainder Klipplaat No. 109	C06300000000010900000
➢ Portion 1 of the Farm Uitvlugtfontein No. 265	C08000000000026500001
➢ The Farm Rietpoort No. 9	C05200000000009000000
➢ Remainder of Farm Driefontein No. 8	C05200000000008000000
➢ Portion 3 of Farm Badfontein No. 10 (powerline alternative 1 route)	C05200000000001000003
➢ Remainder of Farm Leeuwenfontein No. 6	C05200000000006000000
➢ Portion 2 of Farm Leeuwenfontein No. 6	C05200000000006000002
➢ Portion 4 (a portion of portion 1) of Farm Allemansfontein No.7	C05200000000007000004
➢ Portion 2 (a portion of portion 1) of Farm Allemansfontein No.7	C05200000000007000002
➢ The Farm Klein Los Kop No.5	C05200000000005000000
➢ Remainder of the Farm Schietkuil No.3	C05200000000003000000

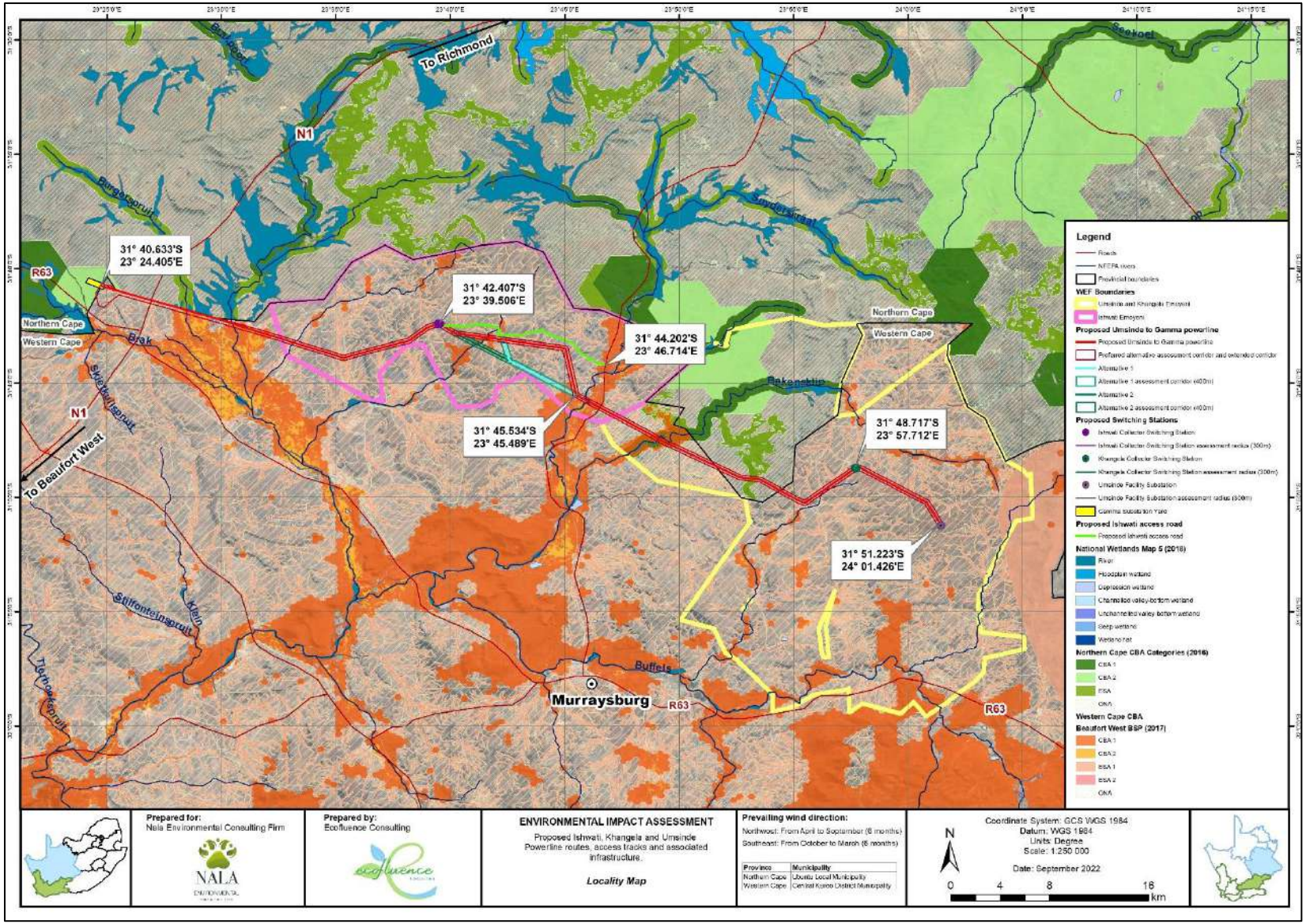

Figure 1.1: Locality map showing the location of the proposed Grid Connection and associated infrastructure

The potential environmental impacts associated with the proposed establishment of the 132kV Grid Connection Infrastructure, associated Access Tracks & Watercourse crossings associated with the authorised Emoyeni Wind Energy Facilities identified and assessed through the BA process i.e. :

Ecological Impacts (Terrestrial Biodiversity) – The impacts of the proposed establishment of 132kV Grid Connection , Associated Access Tracks & Water Course Crossings within a 400m wide development corridor and access road to the Ishwati switching station as a result of loss and fragmentation of habitats, ecosystems and vegetation, introduction of alien species, destruction of plant species and displacement of faunal communities, direct mortalities and poaching, are considered to be medium to high significance prior to the implementation of mitigation measures and of medium-low significance with the implementation of mitigation measures. The ecosystems on site were still natural to largely natural based on the diversity of species recorded, and the habitat physiognomy. The current natural ecosystems provide important ecosystem services including water regulation and pollination. However, certain areas are degraded due to overgrazing and erosion were still nevertheless functional. Areas of rocky outcrops delineated as assigned a Site Ecological Importance (SEI) of "Very High" sensitivity are considered no go areas and may be used for construction only if no other alternative is possible and construction in these areas is unavoidable. Where possible these areas should be spanned by overheard powerlines. Where it is not feasible or practicable to span the Very High SEI areas completely, then the minimum possible number of pylons with the smallest possible footprint must be utilised and the disturbance footprint must be strictly controlled. A service track (jeep track) is permissible in Very High SEI areas only to the extent required to establish and maintain the powerline, and only if no other access options are available in areas of lower sensitivity.. Personnel are not to use these areas for any other reason (to prevent additional erosion, loss of fauna and flora etc. The option with the least impacts is the preferred alternative, or alternative 2, although only marginally as they traverse slightly less high SEI areas than alternative 1. As many of the Very High SEI areas should be avoided as possible. The preferred alternative is therefore considered the most acceptable option. Placement of infrastructure anywhere within the assessed corridors is considered acceptable, subject to the mitigation measures specified in this report and subject to the minimisation of the disturbance within high SEI areas as far as possible. Additionally, it is also recommended that the substation access road should avoid crossing the EN river and riparian zone as far as possible. It would be preferable to construct the access road follow the already existing section of farm road that already crosses the river, to minimise further habitat fragmentation. Considering the above-mentioned information, the proposed development will result in the in the destruction of some functional habitats. It is the opinion of the specialist that the proposed activities can go ahead provided areas of high to very high SEI are avoided as far as practicable, and control of introduced alien invasive plants, as well as erosion mitigation is implemented.

Avifauna Impacts – Displacement of avifauna , habitat loss, along with collisions and electrocutions are regarded as the greatest impact associated with the proposed grid connection infrastructure for the Emoyeni Wind Energy Facilities. The significance of impacts was determined to be of medium to high significance pre- mitigation and of high-low significance post mitigation. During the field assessment 99 bird species were recorded of these eight of the species recorded were SCCs on a national or international scale. Blue Crane (*Grus paradisea*), Karoo Korhaan (*Eupodotis vigorsii*), Kori Bustard (*Ardeotis kori*), Ludwigs Bustard (*Neotis ludwigii*), Martial Eagle (*Polemaetus bellicosus*), Secretary bird (Sagittarius serpentarius), Verreauxs Eagle (*Aquila verreauxii*), and Lanner Falcon (*Falco biarmicus*) were the SCCs recorded. One nest of a Verreauxs Eagle was found close to the Gamma substation in an existing 400kV powerline, while an additional two nests' locations were provided by local farmers).

The high number of SCCs present increases the overall sensitivity of the area and is the reason for the powerline corridor mainly being made up of Very-High and High sensitivity areas. The straight approach of the powerline at the Gamma station (from the east) is the preferred option, the southern approach is acceptable should all the mitigations be implemented depending on the available connection point at the time of the connection. The principle impacts of the operational phase are electrocution and collisions due to the powerlines. The impact of electrocutions were rated as High pre-mitigations and Low post- mitigations, while the collisions were rated as High pre-mitigations but were still high even after the implementation of mitigations. Mitigations in this instance would be the installation of bird diverters. The reason for the High post mitigation rating is because of the high number and density of SCCs recorded in the area. The development falls in a previously authorised WEF project area of Influence (assessment area) along with previously authorised powerlines. Therefore, even though the project has some areas of very high sensitivity it is not regarded as a fatal flaw based on the previous assessments and their findings and recommendations, and subject to the implementation of the recommended mitigation measures. Considering the above-mentioned information, the proposed development will result in the in the destruction of some functional habitats. It

is the opinion of the specialist that the proposed activities can go ahead provided areas of high to very high SEI are avoided as far as practicable and all recommendations as specified by the specialist report are implemented for the project.

Aquatic Impacts – A variety of risks have been identified for the proposed project for both the construction and operational phase. These include small scale drainage patterns change; isolated removal of embankment vegetation areas for select roads; operation of equipment and machinery outside riparian areas; soil and building material stockpile management; domestic and industrial waste; storage of chemicals, mixes and fuel and final landscaping and post-construction rehabilitation for the construction phase of the project as well as alteration of surface drainage and runoff; storm water management; operation of transmission line and substation; establishment of alien plants on disturbed areas and conducting maintenance for the operational phase of the project. The impacts however are largely mitigated by the transmission line only crossing the watercourses by means of multiple pylon structures (towers)with towers, substations and laydown yards outside of delineated riparian areas and associated buffers. As a result, all identified risks for both the construction phase and the operational phase are considered low.

It is the opinion of the specialists that after a consideration of the current sensitivity of the assessed systems, which was calculated at "High' according to the site ecological importance as well as the potential risks which may result from the powerline routes, that the 400 m corridor along with the 1.91 km^2 extended corridor be approved as the development of the grid connection infrastructure within the assessed corridors are acceptable regardless of whether the 132kV powerline connects to the south face or eastern face of the Gamma Substation yard, provided all delineated no-go areas are avoided, with the exception of the watercourse crossing points for the access tracks (including Ishwati SS access road) and the recommended mitigations are applied. Therefore, the project poses no fatal flaws and the project qualifies for authorisation under the provisions of the General Authorisation and Environmental Impact Assessment Regulations provided that the mitigation measures held within are adhered to. No additional walk throughs for the aquatic specialist assessment are required along the proposed corridor.

Impacts on Soil and Agricultural Potential _ The most sensitive soil forms identified within the assessment area is the Oakleaf and Quaggafontein soil forms. The land capability sensitivities (DAFF, 2017) indicate land capabilities with "Low" and "Moderate" sensitivities. The assessment area is not associated with any arable soils, due to the type of soil as well as the climate, which in itself limits crop production significantly. The harsh climatic conditions are associated with low annual rainfall and high evapotranspiration potential demands of the area. The land capabilities associated with the regulated area are only suitable for grazing and wildlife farming. It is the specialist's opinion that the proposed grid connection and associated infrastructure will have no impacts on the agricultural production ability of the land. Additionally, the proposed activities will not result in the segregation of any high production agricultural land. The development within the 400 m assessment corridor beyond the required 50 m recommended assessment buffer for soils also has no effects on the agricultural potential of the land. Some of the field crop boundaries between the Khangela to Ishwati substations were identified as "high sensitivity", and these areas should be treated as no-go areas for substations, pylons and access/service tracks (unless agreed otherwise with the landowner). The powerline may however span these crop fields. The assessment area associated with the access road to the Ishwati switching station is not associated with any arable soils, due to the type of soil as well as the climate, which in itself limits crop production significantly. It is the specialist's opinion that the proposed grid connection and associated infrastructure will have no impacts on the agricultural production ability of the land. The assessment area does not consist of high clay content soils, it is mainly dominated by very shallow soils with restrictive hard rock layers. Therefore, there will not be any results of segregation of any high production agricultural land. The assessed corridors including the 400 m development corridor and the 1.91 km2 extended corridor, 300m substation assessment areas and access road will not have any impact on the agricultural potential of the land. Therefore, the proposed development may be favourably considered.

Impacts on Heritage Resources (archaeology and palaeontology)– An overall medium palaeontological sensitivity is allocated to the development footprint. Three powerline alternatives (i.e., Preferred Alternative, Alternative 1 and Alternative 2) as well as an extended development corridor enabling the 132kV powerline to connect either to the south face of the Gamma substation yard or approach from the east) is considered for the development. From a Palaeontological view there is no preference between these alternatives. The development will thus not lead to detrimental impacts on the palaeontological reserves of the area (if mitigations measures are followed) and construction of the development may be authorised to its whole extent.

The pre-construction and construction phase of the proposed development will entail extensive surface clearance as well as excavations into the superficial sediment cover and underlying bedrock (e.g., for powerlines, new access roads, on-site substations). The possible pre-construction impacts calculated on the tangible cultural heritage resources is overall MODERATE NEGATIVE rating but with the implementation of the recommended buffers and management guidelines will be reduced to a LOW impact. Owing to the location of the historical farmstead (PL_06) within the proposed 400m grid corridor, the "Preferred" and "Alternative 1" powerline routes are less preferred. If possible, "Alternative 2" should be considered from a heritage perspective. However, all three alternatives are acceptable subject to the recommended mitigation. Therefore, the proposed development can be placed anywhere within the assessed corridors, provided that the delineated no-go areas are avoided, and the recommended mitigations are applied. Considering the overall assessment, the impact of the proposed development would be acceptably Low or could be totally mitigated. As such it is the specialist's opinion that the project should be approved from a heritage perspective.

Impacts of Visual Aspects - The proposed infrastructure will be visible within an area that is generally characterised by low growing shrubland and wide-open undeveloped spaces. The infrastructure would thus be highly visible and impossible to hide within an area that incorporates potentially various sensitive visual receptors that may consider visual exposure to this type of infrastructure to be intrusive. The low occurrence of such sensitive visual receptors within this environment, specifically in close proximity to the proposed infrastructure as well as the presence of existing high voltage overhead powerlines, is of relevance however, and has affected the significance rating of the anticipated visual impacts. Overall, the post mitigation significance of the visual impacts for all the alternatives is predominately moderate to low. A high significance rating is anticipated for users travelling along the secondary roads and residents of dwellings within 0.5 km from the proposed infrastructure. However, due to the low number/ density of homesteads/dwellings within the study area and the fact that observers travelling along the secondary road will only experience a visual intrusion for a short period of time, this impact is anticipated to be greatly reduced. The visual impacts are not considered to be fatal flaws for a development of this nature particularly due to the remote location of the study area and very low density of visual receptors. While all three (3) of the alternatives have been found to have a similar impact and therefore considered acceptable, it is recommended that the Preferred Alternative for the proposed development of 132 kV overhead powerlines, three (3) 132 kV on-site substations (switching stations), new access tracks and watercourse crossing points associated with the authorized Emoyeni Wind Energy Facilities, as per the assessed layout (i.e. placement anywhere within the 400 m corridor) be supported from a visual perspective, subject to the implementation of the suggested best practice mitigation measures provided in the report.

Cumulative Impacts – The grid infrastructure establishment is located within the footprint of the authorised Umsinde, Ishwati and Khangela Emoyeni Wind Energy Facilities. The Eskom Gamma Main Transmission Station and several existing 765kV and 400kV overhead powerlines are located in the western portion of the proposed development corridor.

Based on the specialist cumulative assessments and findings regarding the development of the proposed grid connection infrastructure, and associated access tracks and watercourse crossings, for the Emoyeni Wind Energy Facilities (refer to **Section 7** and specialist reports contained within **Appendix D - H**) and its contribution to the overall impact within the surrounding area, it can be concluded that there are no cumulative impacts or risks identified as unacceptable with the development of the grid connection and associated infrastructure within the surrounding area. Considering all aspects, cumulative impacts associated with the infrastructure establishment have been assessed to be acceptable, with no unacceptable loss or risk expected.

No environmental fatal flaws were Identified In the detailed specialist studies conducted for the grid infrastructure establishment. All impacts associated with the project establishment within the development footprint can be mitigated to acceptable levels or enhanced through the implementation of the recommended mitigation or enhancement measures. Considering the findings of the independent specialist studies, the impacts identified, the development of the proposed grid connection infrastructure (within the assessed corridor), and associated access tracks and watercourse crossings, for the Emoyeni Wind Energy Facilities the proponent, has the potential to further minimise the impacts to acceptable levels through mitigation, it is the reasoned opinion of the Environmental Assessment Practitioner (EAP) that the development of the grid connection infrastructure for the already authorised Emoyeni WEFs sites is acceptable within the landscape and that the 400m development corridor, extended

corridor and associated infrastructure can reasonably be authorised. Any further micrositing of the infrastructure within the corridor will be based on detail design, but will however be outside of all prescribed and identified no-go areas.

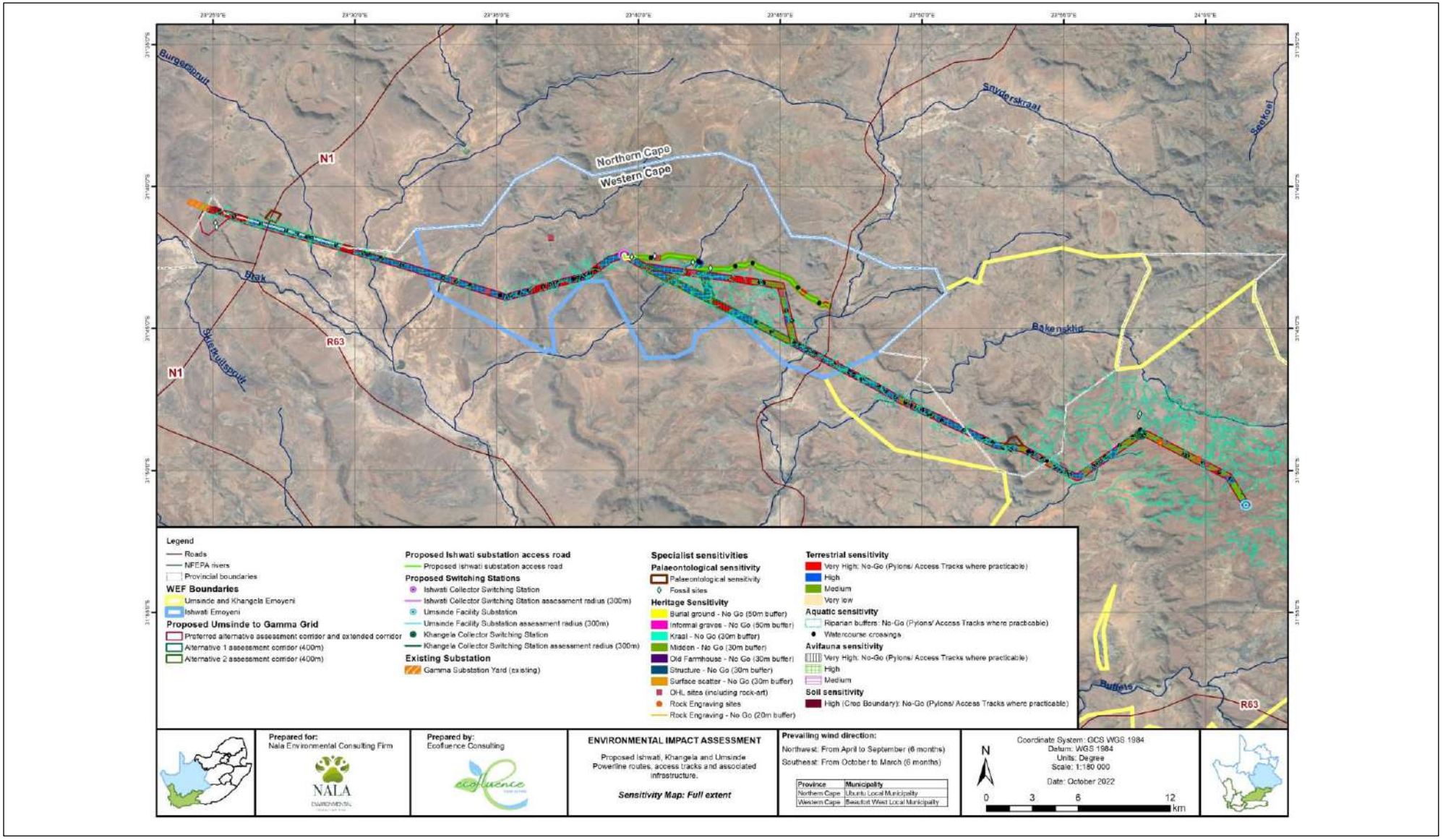

Figure 1.2. Environmental sensitivity map of the 132kV Grid Connection Infrastructure, associated access Tracks & Water Course crossings assessed as part of the BA process (refer to Appendix B – Maps) for more detailed sensitivity maps related to sections of the powerline and associated infrastructure.

DEFINITIONS

Activity (Development) – an action either planned or existing that may result in environmental impacts through pollution or resource use.

Alien vegetation - Alien vegetation is defined as undesirable plant growth (usually of foreign origin) which includes, but is not limited to all declared category 1 and 2 listed invader species as set out in the 1983 Conservation of Agricultural Resources Act (CARA) regulations. Other vegetation deemed to be alien are those plant species that show the potential to occupy in number any area within the defined construction area and which are declared undesirable.

Alternatives: – a possible course of action, in place of another, of achieving the same desired goal of the proposed project. Alternatives can refer to any of the following but are not limited to: site alternatives, site layout alternatives, design or technology alternatives, process alternatives or a no-go alternative. All reasonable alternatives must be rigorously explored and objectively evaluated.

Applicant – the project proponent or developer responsible for submitting an environmental application to the relevant environmental authority for environmental authorisation.

Biodiversity – the diversity of animals, plants and other organisms found within and between ecosystems, habitats, and the ecological complexes.

Commencement – The start of any physical activity, including site preparation and any other activity on site furtherance of a listed activity or specified activity, but does not include any activity required for the purposes of an investigation or feasibility study as long as such investigation or feasibility study does not constitute a listed activity or specified activity.

Construction – means the building, erection or establishment of a facility, structure or infrastructure that is necessary for the undertaking of a listed or specified activity but excludes any modification, alteration or expansion of such a facility, structure or infrastructure and excluding the reconstruction of the same facility in the same location, with the same capacity and footprint.

Cumulative impacts – impacts that result from the incremental impact of the proposed activity on a common resource when added to the impacts of other past, present or reasonably foreseeable future activities to produce a greater impact or different impacts.

Decommissioning – To take out of active service permanently or dismantle partly or wholly, or closure of a facility to the extent that it cannot be readily re-commissioned. This usually occurs at the end of the life of a facility.

Direct impacts – impacts that are caused directly by the activity and generally occur at the same time and at the same place of the activity. These impacts are usually associated with the construction, operation or maintenance of an activity and are generally quantifiable.

'Do nothing' alternative – The 'do nothing' alternative is the option of not undertaking the proposed activity or any of alternatives. The 'do nothing' alternative also provides the baseline against which the impacts of other alternatives should be compared.

Endangered species – Taxa in danger of extinction and whose survival is unlikely if the causal factors continue operating. Included here are taxa whose numbers of individuals have been reduced to a critical level or whose habitats have been so drastically reduced that they are deemed to be in immediate danger of extinction.

Emergency – An undesired/ unplanned event that results in a significant environmental impact and requires the notification of the relevant statutory body, such as a local authority.

Emissions – The release or discharge of a substance into the environment which generally refers to the release of gases or particulates into the air.

Environment – In terms of the National Environmental Management Act (NEMA) (Act No 107 of 1998) (as amended), "Environment" means the surroundings within which humans exist and that are made up of:
a) the land, water and atmosphere of the earth;
b) micro-organisms, plants and animal life;
c) any part or combination of (i) of (ii) and the interrelationships among and between them; and
d) the physical, chemical, aesthetic and cultural properties and conditions of the foregoing that influence human health and wellbeing.

Environmental Assessment – the generic term for all forms of environmental assessment for projects, plans, programmes or policies and includes methodologies or tools such as environmental impact assessments, strategic environmental assessments and risk assessments.

Environmental Authorisation – an authorisation issued by the competent authority in respect of a listed activity, or an activity which takes place within a sensitive environment.

Environmental Assessment Practitioner (EAP) – the individual responsible for planning, management and coordination of environmental impact assessments, strategic environmental assessments, environmental management programmes or any other appropriate environmental instrument introduced through the EIA Regulations.

Environmental impact – a change to the environment (biophysical, social and/ or economic), whether adverse or beneficial, wholly or partially, resulting from an organisation's activities, products or services.

Environmental management - ensuring that environmental concerns are included in all stages of development, so that development is sustainable and does not exceed the carrying capacity of the environment.

Environmental management programme – A detailed plan of action prepared to ensure that recommendations for enhancing or ensuring positive impacts and limiting or preventing negative environmental impacts are implemented during the life cycle of a project. The EMPr focuses on the construction phase, operation (maintenance) phase and decommissioning phase of the proposed project.

Fatal Flaw – issue or conflict (real or perceived) that could result in developments being rejected or stopped.

General Waste – household water, construction rubble, garden waste and certain dry industrial and commercial waste which does not pose an immediate threat to man or the environment.

Hazardous Waste – waste that may cause ill health or increase mortality in humans, flora and fauna.

Heritage – That which is inherited and forms part of the National Estate (Historical places, objects, fossils as defined by the National Heritage Resources Act of 2000).

Incident - An undesired event which may result in a significant environmental Impact but can be managed through internal response.

Indigenous – All biological organisms that occurred naturally within the study area prior to 1800.

Indirect impacts – indirect or induced changes that may occur as a result of the activity. These types if impacts includes all of the potential impacts that do not manifest immediately when the activity is undertaken or which occur at a different place as a result of the activity.

Method statement – A written submission to the ECO and the site manager (or engineer) by the EPC Contractor in collaboration with his/her EO.

Mitigate – the implementation of practical measures designed to avoid, reduce or remedy adverse impacts or enhance beneficial impacts of an action.

No-Go Option – in this instance the proposed activity would not take place, and the resulting environmental effects from taking no action are compared with the effects of permitting the proposed activity to go forward.

Open Space – environmentally sensitive areas which are not suitable for development and consist of watercourses, buffers, floodplains, steep slopes, sensitive biodiversity and/or areas of cultural or heritage significance.

Pollution – A change in the environment caused by substances (radio-active or other waves, noise, odours, dust or heat emitted from any activity, including the storage or treatment or waste or substances.

Pre-construction – The period prior to the commencement of construction, this may include activities which do not require Environmental Authorisation (e.g. geotechnical surveys).

Rare species: – Taxa with small world populations that are not at present Endangered or Vulnerable, but are at risk as some unexpected threat could easily cause a critical decline. These taxa are usually localised within restricted geographical areas or habitats or are thinly scattered over a more extensive range. This category was termed Critically Rare by Hall and Veldhuis (1985) to distinguish it from the more generally used word "rare."

Red data species – Species listed in terms of the International Union for Conservation of Nature and Natural Resources (IUCN) Red List of Threatened Species, and/or in terms of the South African Red Data list. In terms of the South African Red Data list, species are classified as being extinct, endangered, vulnerable, rare, indeterminate, insufficiently known or not threatened (see other definitions within this glossary).

Registered Interested and Affected Party – an interested and affected party whose name is recorded in the register opened for that application

Rehabilitation – a measure aimed at reinstating an ecosystem to its original function and state (or as close as possible to its original function and state) following activities that have disrupted those functions.

Significance – significance can be differentiated into impact magnitude and impact significance. Impact magnitude is the measurable change (i.e. magnitude, intensity, duration and likelihood). Impact significance is the value placed on the change by different affected parties (i.e. level of significance and acceptability). It is an anthropocentric concept, which makes use of value judgements and science-based criteria (i.e. biophysical, social and economic).

Stakeholder engagement – the process of engagement between stakeholders (the proponent, authorities and I&APs) during the planning, assessment, implementation and/or management of proposals or activities.

Watercourse – means:
a) a river or spring;
b) a natural channel or depression in which water flows regularly or intermittently;
c) a wetland, lake or dam into which, or from which, water flows; and

d) any collection of water which the Minister may, by notice in the Gazette, declare to be a watercourse
as defined in the National Water Act, 1998 (Act No. 36 of 1998) and a reference to a watercourse includes, where relevant, its bed and banks.

Wetland – means land which is transitional between terrestrial and aquatic systems where the water table is usually at or near the surface, or the land is periodically covered with shallow water, and which land in normal circumstances supports or would support vegetation typically adapted to life in saturated soil.

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SECTION 1: INTRODUCTION AND PROJECT BACKGROUND

The applicant, Eskom Holdings SOC Limited is proposing the establishment of the 132kV grid connection infrastructure (overhead powerline and x3 on-site switching stations), associated access tracks & watercourse crossings associated with the authorised Emoyeni Wind Energy Facilities located in the Beaufort West & Ubuntu Local Municipalities, Northern and Western Cape Provinces.

The following Environmental Authorisations for various grid connection infrastructure and wind energy facilities related to the Emoyeni Wind Energy Facilities and their authorised grid connection infrastructure were previously obtained:

Umsinde Emoyeni Wind Energy Facility	DFFE Ref: 14/12/16/3/3/2/686 on 06 September 2018
132kV Grid connection Infrastructure associated with the Umsinde Emoyeni WEF	DFFE Ref: 14/12/16/3/3/2/684 on 06 September 2018
Khangela Emoyeni Wind Energy Facility	DFFE REF:. 14/12/16/3/3/2/687 on 06 September 2018
132kV Grid connection Infrastructure associated with the Khangela Emoyeni WEF	DFFE REF:. 14/12/16/3/3/2/685 on 06 September 2018
Ishwati Emoyeni Wind Energy Facility	DFFE Ref: 12/12/20/2351 on 2 July 2015
Transmission grid connection infrastructure (Eskom Gamma Main Transmission Substation)	DFFE Ref: 14/12/16/3/3/2/410 on 02 July 2015
Distribution grid connection infrastructure (Eskom distribution grid connection infrastructure consisting of 132kV power lines and on-site switching station located within the authorised Ishwati Emoyeni Wind Energy Facility)	DFFE Ref: 14/12/16/3/3/2/411 on 02 July 2015

Following receipt of the relevant Environmental Authorisations for the grid connection infrastructure for the Umsinde and Khangela Emoyeni Wind Energy Facilities (DFFE Ref:14/12/16/3/3/2/684 and DFFE Ref:.14/12/16/3/3/2/685) , it was noted that several listed activities that were relevant to the grid infrastructure had not been considered[2], therefore new a Basic Assessment process will be undertaken that will now consider all the applicable listed activities as per the EIA Regulations. In addition, due to alterations in the wind farm layouts, and based on further technical analysis and liaison with Eskom's technical and grid access units it was determined that the previously authorised powerline routings intended to evacuate electricity generated from these authorised wind energy facilities to the National Grid via the Gamma Substation are no longer suitable/ optimal and will need to be revised to cater for final wind farm layouts, and Eskom's connection requirements. A new Basic Assessment will therefore be undertaken to assess the revised (re-optimised) grid connection layout as well all applicable listed activities, including the listed activities omitted from the original BA process. The proposed 400m wide development corridor that has been identified for the development of the grid connection infrastructure required to evacuate power generated from the authorised Emoyeni WEFs, is informed by the most feasible grid connection point into the national grid from a technical, economic and environmental perspective.

[2] Specifically, Listed Activities 12, 19 as per GNR. 327 and Listed Activities 4 and 14 as per GNR. 324 were omitted from the previous Basic Assessment process and EA

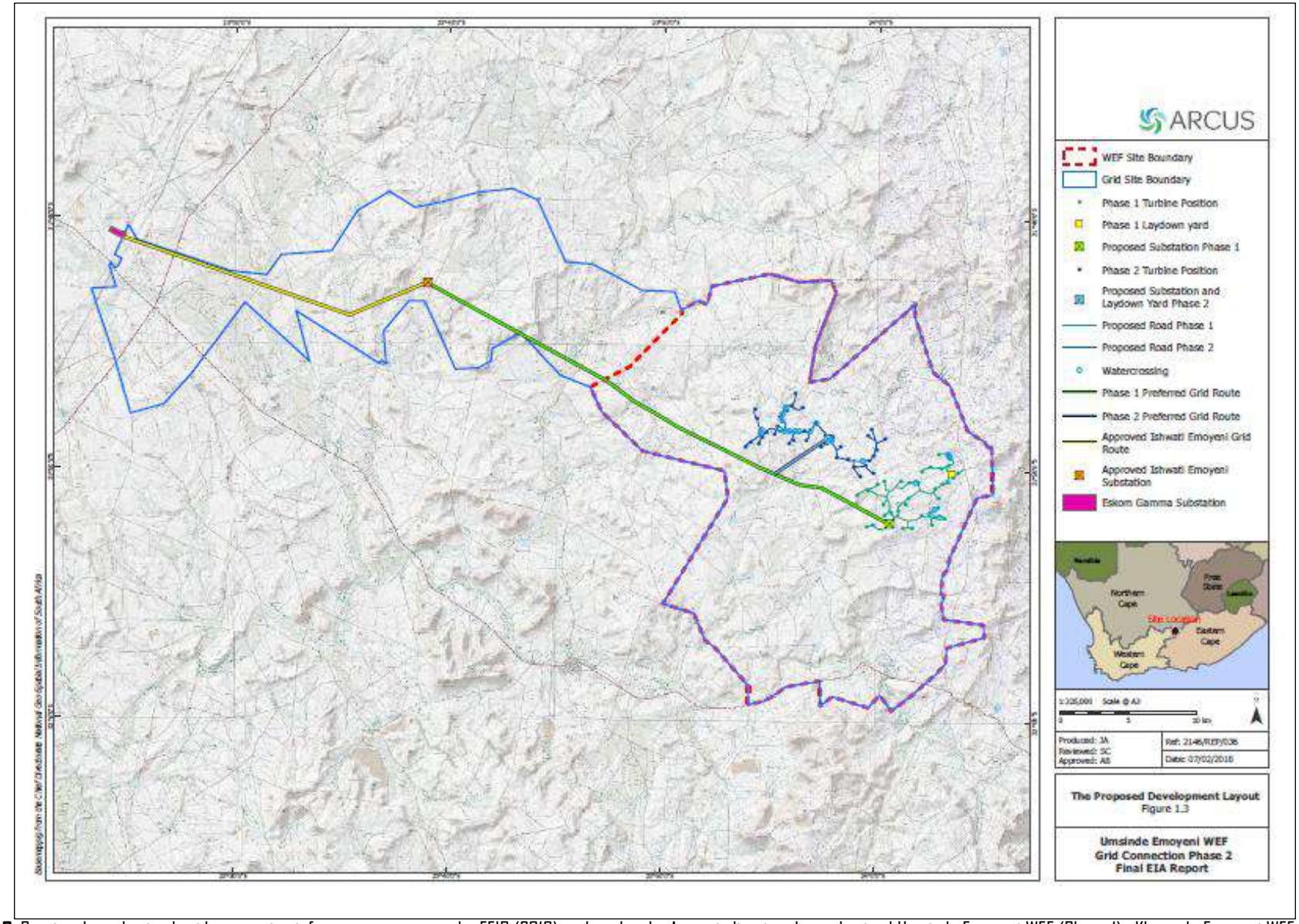


Figure 1.3. Previously authorised grid connection infrastructure as per the FEIR (2018) undertaken by Arcus indicating the authorised Umsinde Emoyeni WEF (Phase I) , Khangela Emoyeni WEF (Phase 2) and grid infrastructure.

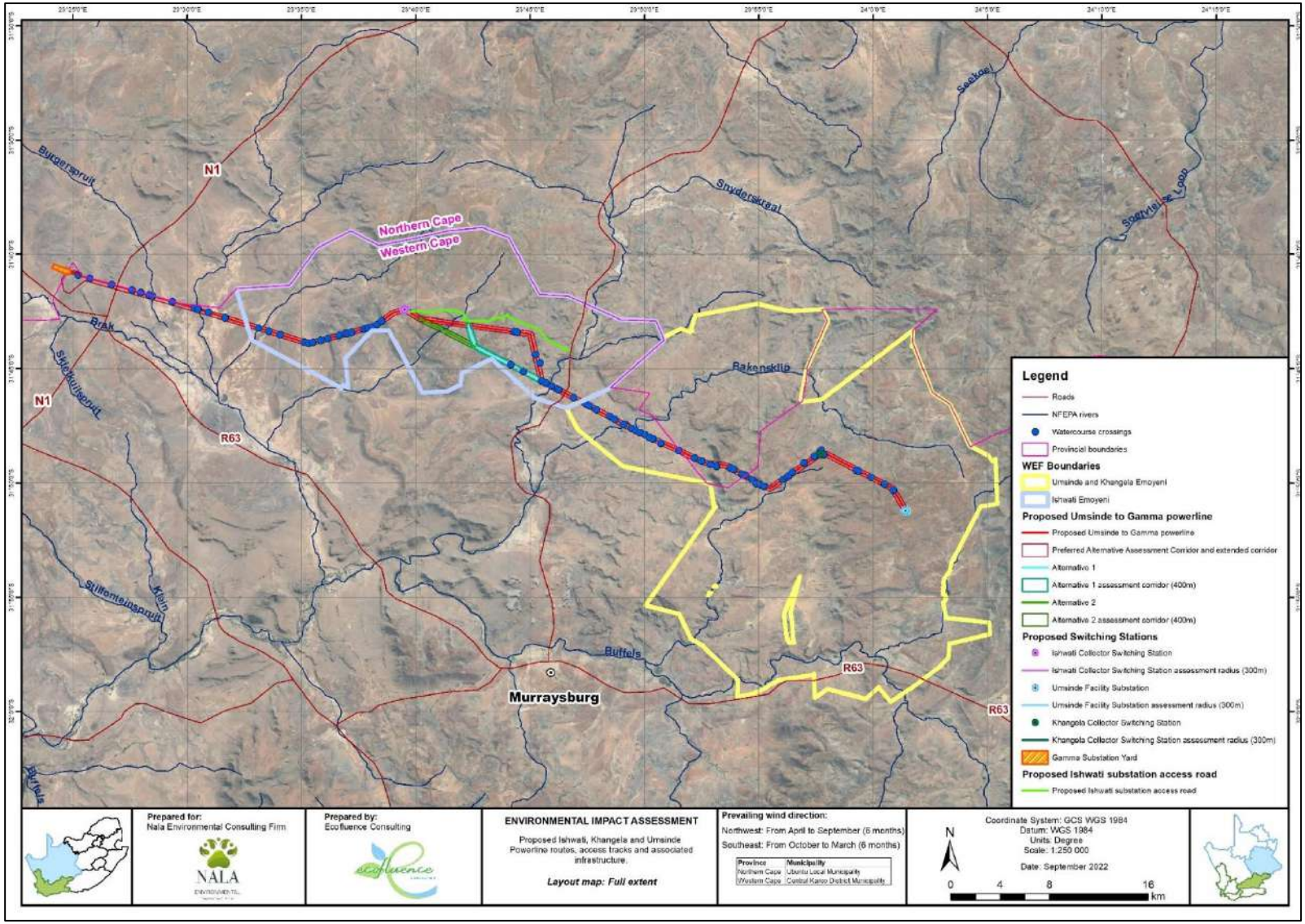


Figure 1.4. Proposed Layout map for the proposed development corridor and associated infrastructure related to the Emoyeni Wind Energy Facilities associated with the BA process (refer to Appendix B – Maps (A3) for detailed layouts of the powerline corridor and associated infrastructure in sections)

Since the Umsinde Emoyeni and Khangela Emoyeni Wind Energy Facilities have been selected as preferred bidder projects by private offtakers and based on further technical analysis and liaison with Eskom's technical and grid access units it was determined that the previously authorised powerline routings intended to evacuate electricity generated from these authorised wind energy facilities to the National Grid via the Gamma Substation are no longer suitable/ optimal and will need to be revised to cater for final wind farm layouts, and Eskom's connection requirements. Therefore, new grid connection infrastructure is proposed that is in line with Eskom's technical and feasibility requirements. This Basic Assessment seeks to assess the following infrastructure:

- The establishment of a 132kV collector substation (switching station) within the authorised Umsinde Emoyeni WEF site (adjacent to the WEF facility substation) with a footprint of approximately 100m X 80m (~0.8ha) to be located within an assessment footprint that encompasses a 300m radius.
- The establishment of a 132kV collector substation (switching station) within the authorised Khangela Emoyeni WEF site (adjacent to the WEF facility substation) with a footprint of approximately 100m X 80m (~0.8ha) to be located within an assessment footprint that encompasses a 300m radius.
- The establishment of a 132kV collector substation (switching station) within the authorised Ishwati Emoyeni WEF site (adjacent to the WEF facility substation) with a footprint of approximately 120m X 100m (~1.2 ha) with an assessment footprint that encompasses a 300m radius.
- The establishment of a 132kV powerline within a 400m wide corridor that will extend from the Khangela switching station to the Ishwati switching station (~36km), and then onward for ~25km to the Eskom Gamma Substation. In addition, a further length of 132kV powerline (within a 400m wide corridor) will extend from the Umsinde switching station to the Khangela switching station for ~8km OR it may connect directly into the Khangela-Ishwati powerline at the Khangela switching station. An extended powerline development corridor of approximately 1.91 km^2 has been assessed in the vicinity of the Gamma Substation, that will enable the 132kV powerline to connect to either the south face of the Gamma Substation yard or approach from the east, depending on the available connection point at the time of connection. The 132kV Powerline from Umsinde to Khangela, and from Khangela to Ishwati and onward to Gamma Substation will be a single- or double-circuit overhead powerline, with a single set of pylons structures with a maximum height of 35m Access/service tracks (jeep track) up to 7m wide and associated watercourse crossings will be associated with the powerline, and will be located within the assessed powerline corridor.
- The establishment of a new access road approximately 14km long from the existing public road from Richmond to the Ishwati switching station site. The proposed new access road will be unsealed and up to 12m wide during construction , but will be reduced to a maximum of 6 m width during operation. The access road will largely follow an existing farm road (to be upgraded), but will also entail development of a new length of road.

Please refer to the layout of the optimized 132kV Umsinde-Khangela-Ishwati Powerline routing including the associated switching stations infrastructure, access tracks and Water Course crossing points as Figure 1.4

The proposed grid infrastructure along with the access roads and water crossings are located within the authorised Umsinde, Khangela and Ishwati Wind Energy Facilities northeast of the town of Murraysburg. The authorised Umsinde Emoyeni WEF (DFFE REF: :.14/12/16/3/3/2/686), Khangela Emoyeni Wind Energy Facility (DEFFE REF:. 14/12/16/3/3/2/687) and the Ishwati Emoyeni Wind Energy Facility (DFFE Ref: 12/12/20/2351) sites are located within the Beaufort West Renewable Energy Development Zone (REDZ) and the majority of the new proposed grid connection infrastructure falls within the REDZ and the Central Corridor of the Strategic Transmission Corridors. (refer to Figure 2.1).

Table 1.1: Location of proposed new development corridor housing the 132kV grid connection infrastructure, access tracks and watercourse crossings:

Province	Northern and Western Cape Province
Local Municipality	Beaufort West and Ubuntu Local Municipality
District Municipality	Central Karoo and Pixley ka Seme District Municipality
Nearest Town	Murraysburg

Ward No.	Ward 1 (BWLM), Ward 3 (ULM)
Details of properties affected	• Portion 1 of farm Klein Driefontein No. 152 • Remainder of Farm De Hoop No. 30; • Portion 2 of Farm De Hoop No. 30 • Remainder of Farm Swavel Kranse No. 28 • Portion 2 of Farm Swavel Kranse No. 28 • Portion 4 (portion of portion 1) of Farm Driefontein 26 • Portion 6 of Farm Klipplaat No. 109 Portion 4 (portion of portion 2) of Farm Klipplaat No. 109 • Portion 1 of the Farm Klipplaat No. 109 • Remainder Klipplaat No. 109 • Portion 1 of the Farm Uitvlugtfontein No. 265 • The Farm Rietpoort No. 9 • Remainder of Farm Driefontein No. 8 • Portion 3 of Farm Badfontein No. 10 (powerline alternative 1 route) • Remainder of Farm Leeuwenfontein No. 6 • Portion 2 of Farm Leeuwenfontein No. 6 • Portion 4 (a portion of portion 1) of Farm Allemansfontein No.7 • Portion 2 (a portion of portion 1) of Farm Allemansfontein No.7 • The Farm Klein Los Kop No.5 • Remainder of the Farm Schietkuil No.3

Table 1.2. The centre line co-ordinates of the 400m wide development corridor* are presented below for the proposed corridor alternatives:

	Preferred Alternative		**Alternative 1**		**Alternative 2**	
	Latitude	**Longitude**	**Latitude**		**Longitude**	
Start (on-site substation at Umsinde Emoyeni WEF site)	31°51'13.38"S	24° 1'25.58"E	31°51'13.38"S	24° 1'25.58"E	31°51'13.38"S	24° 1'25.58"E
Point 2	31°50'14.37"S	24° 0'50.32"E	31°50'14.37"S	24° 0'50.32"E	31°50'14.37"S	24° 0'50.32"E
Point 3	31°48'43.59"S	23°57'55.92"E	31°48'43.59"S	23°57'55.92"E	31°48'43.59"S	23°57'55.92"E
Start (on-site substation at Khangela Emoyeni WEF site)	31°48'43.05"S	23°57'42.71"E	31°48'43.05"S	23°57'42.71"E	31°48'43.05"S	23°57'42.71"E
Point 4	31°50'14.63"S	23°55'28.86"E	31°50'14.63"S	23°55'28.86"E	31°50'14.63"S	23°55'28.86"E
Point 5	31°49'13.74"S	23°53'33.39"E	31°49'13.74"S	23°53'33.39"E	31°49'13.74"S	23°53'33.39"E
Point 6	31°49'7.26"S	23°52'39.52"E	31°49'7.26"S	23°52'39.52"E	31°49'7.26"S	23°52'39.52"E
Point 7	31°47'31.74"S	23°49'11.72"E	31°47'31.74"S	23°49'11.72"E	31°47'31.74"S	23°49'11.72"E
Point 8	31°45'32.28"S	23°45'29.58"E	31°45'32.28"S	23°45'29.58"E	31°45'32.28"S	23°45'29.58"E
Point 9	31°43'29.18"S	23°45'1.23"E	31°44'1.56"S	23°42'34.93"E	31°44'1.56"S	23°42'34.93"E

Point 10	31°42'48.88"S	23°40'11.59"E	31°43'6.86"S	23°42'18.16"E	31°42'48.88"S	23°40'11.59"E
			31°42'48.88"S	23°40'11.59"E		
Point 11 (Ishwati Collector Sub)	31°42'24.42"S	23°39'30.33"E	31°42'24.42"S	23°39'30.33"E	31°42'24.42"S	23°39'30.33"E
Point 12	31°42'34.31"S	23°38'58.91"E	31°42'34.31"S	23°38'58.91"E	31°42'34.31"S	23°38'58.91"E
Point 13	31°43'9.01"S	23°38'11.49"E	31°43'9.01"S	23°38'11.49"E	31°43'9.01"S	23°38'11.49"E
Point 14	31°43'54.78"S	23°35'20.23"E	31°43'54.78"S	23°35'20.23"E	31°43'54.78"S	23°35'20.23"E
Point 15	31°40'58.19"S	23°25'27.11"E	31°40'58.19"S	23°25'27.11"E	31°40'58.19"S	23°25'27.11"E
End (Extended 1.91 km^2 development corridor to (Gamma Substation) Preferred Alternative from the east	31°40'46.22"S	23°24'46.55"E	31°40'46.22"S	23°24'46.55"E	31°40'46.22"S	23°24'46.55"E
End (Extended 1.91 km^2 development corridor to Gamma Substation) Preferred Alternative from the south	31°40'56.04"S	23°24'40.11"E	31°40'56.04"S	23°24'40.11"E	31°40'56.04"S	23°24'40.11"E

*It must be noted that it is the intention in this BA report to assess the entire 400m-wide development corridor and 1,91 km^2 extended corridor in the vicinity of the Gamma Substation and for the corridor to be authorised to allow micro-siting of the infrastructure within the corridor that will avoid buffer zones and no-areas within the corridor as recommended by the various specialist assessment undertaken for the project. This approach will allow for the development corridor layout to be approved whilst considering all environmental sensitivities in the final design.

Table 1.3. Water Crossing Points along the 132kV Powerline within a 400m-wide corridor and gravel access track approximately 7m wide from the Umsinde Emoyeni switching station and extended 1.91 km^2 corridor to the Gamma Substation (Preferred Alternative):

Gamma Substation to Ishwati Switching Station					
Watercourse Crossing	GPS Coordinates		Watercourse Crossing	GPS Coordinates	
	Latitude	Longitude		Latitude	Longitude
1	31° 40.895'S	23° 25.233'E	16	31° 43.839'S	23° 35.129'E
2	31° 41.036'S	23° 25.743'E	17	31° 43.889'S	23° 35.303'E
3	31° 41.303'S	23° 26.688'E	18	31° 43.853'S	23° 35.487'E
4	31° 41.551'S	23° 27.579'E	19	31° 43.738'S	23° 35.826'E
5	31° 41.647'S	23° 27.969'E	20	31° 43.660'S	23° 36.141'E
6	31° 41.776'S	23° 28.327'E	21	31° 43.518'S	23° 36.634'E
7	31° 41.815'S	23° 28.474'E	22	31° 43.458'S	23° 36.905'E
8	31° 42.067'S	23° 29.346'E	23	31° 43.453'S	23° 36.987'E

9	31° 42.354'S	23° 30.316'E	**24**	31° 43.389'S	23° 37.208'E
10	31° 42.405'S	23° 30.479'E	**25**	31° 43.261'S	23° 37.699'E
11	31° 42.538'S	23° 30.925'E	**26**	31° 43.238'S	23° 37.813'E
12	31° 42.772'S	23° 31.654'E	**27**	31° 43.229'S	23° 37.905'E
13	31° 43.233'S	23° 33.111'E	**28**	31° 43.178'S	23° 38.061'E
14	31° 43.362'S	23° 33.570'E	**29**	31° 43.082'S	23° 38.300'E
15	31° 43.536'S	23° 34.080'E	**30**	31° 42.930'S	23° 38.518'E

Ishwati Switching Station to Khangela Switching Station					
Watercourse Crossing	**GPS Coordinates**		**Watercourse Crossing**	**GPS Coordinates**	
	Latitude	**Longitude**		**Latitude**	**Longitude**
31	31° 42.866'S	23° 40.290'E	**58**	31° 47.823'S	23° 49.804'E
32	31° 43.284'S	23° 41.134'E	**59**	31° 47.901'S	23° 49.951'E
33	31° 43.688'S	23° 41.937'E	**60**	31° 48.006'S	23° 50.198'E
34	31° 42.898'S	23° 41.616'E	**61**	31° 48.066'S	23° 50.364'E
35	31° 43.027'S	23° 42.364'E	**62**	31° 48.259'S	23° 50.708'E
36	31° 44.009'S	23° 42.534'E	**63**	31° 48.621'S	23° 51.486'E
37	31° 43.178'S	23° 43.374'E	**64**	31° 48.904'S	23° 52.183'E
38	31° 43.261'S	23° 44.255'E	**65**	31° 49.041'S	23° 52.498'E
39	31° 43.293'S	23° 44.328'E	**66**	31° 49.190'S	23° 52.867'E
40	31° 44.504'S	23° 43.539'E	**67**	31° 49.215'S	23° 53.392'E
41	31° 44.270'S	23° 45.237'E	**68**	31° 49.404'S	23° 53.891'E
42	31° 44.826'S	23° 44.149'E	**69**	31° 49.442'S	23° 53.813'E
43	31° 45.124'S	23° 44.700'E	**70**	31° 49.598'S	23° 54.228'E
44	31° 44.812'S	23° 45.526'E	**71**	31° 49.640'S	23° 54.290'E
45	31° 45.537'S	23° 45.494'E	**72**	31° 49.691'S	23° 54.376'E
46	31° 45.845'S	23° 46.109'E	**73**	31° 49.860'S	23° 54.672'E
47	31° 45.739'S	23° 45.958'E	**74**	31° 50.021'S	23° 54.889'E
48	31° 45.629'S	23° 45.691'E	**75**	31° 50.088'S	23° 55.079'E
49	31° 46.235'S	23° 46.853'E	**76**	31° 50.152'S	23° 55.217'E
50	31° 46.547'S	23° 47.440'E	**77**	31° 49.854'S	23° 56.055'E
51	31° 46.717'S	23° 47.775'E	**78**	31° 49.748'S	23° 56.220'E
52	31° 46.785'S	23° 47.899'E	**79**	31° 49.677'S	23° 56.303'E
53	31° 47.088'S	23° 48.482'E	**80**	31° 49.532'S	23° 56.461'E
54	31° 47.290'S	23° 48.698'E	**81**	31° 49.124'S	23° 56.975'E
55	31° 47.414'S	23° 48.959'E	**82**	31° 48.830'S	23° 57.425'E
56	31° 47.492'S	23° 49.051'E	**83**	31° 48.558'S	23° 57.715'E
57	31° 47.708'S	23° 49.547'E	**84**	31° 48.759'S	23° 57.831'E

Khangela Switching Station to Umsinde Switching Station		
Watercourse Crossing	**GPS Coordinates**	
	Latitude	**Longitude**
83	31° 48.558'S	23° 57.715'E
84	31° 48.759'S	23° 57.831'E

85	31° 48.886'S	23° 58.233'E
86	31° 49.101'S	23° 58.643'E
87	31° 49.438'S	23° 59.251'E
88	31° 49.489'S	23° 59.362'E
89	31° 49.750'S	23° 59.910'E
90	31° 50.062'S	24° 00.493'E
91	31° 50.317'S	24° 00.890'E

Table 1.4. Proposed New Access Road Co-ordinates to the authorised Ishwati Substation site:

	Latitude	**Longitude**
Start (off the existing unnamed gravel road)	31° 44.203'S	23° 46.714'E
Middle	31° 42.906'S	23° 42.942'E
End (Authorised Ishwati Substation site)	31° 42.407'S	23° 39.506'E

Table 1.5 Legal Requirements as per the EIA Regulations, 2014 (as amended), for the undertaking of a Basic Assessment Report. Summary of where requirements of Appendix 1 of the 2014 NEMA EIA Regulations (as amended, GN R326) are provided in this BA Report

Appendix 1	**YES/NO**	**Applicable Section in BA Report**
Objective of the basic assessment process 2) The objective of the basic assessment process is to, through a consultative process a) determine the policy and legislative context within which the proposed activity is located and how the activity complies with and responds to the policy and legislative context; b) identify the alternatives considered, including the activity, location, and technology alternatives; c) describe the need and desirability of the proposed alternatives; d) through the undertaking of an impact and risk assessment process inclusive of cumulative impacts which focused on determining the geographical, physical, biological, social, economic, heritage, and cultural sensitivity of the sites and locations within sites and the risk of impact of the proposed activity and technology alternatives on these aspects to determine- (i) the nature, significance, consequence, extent, duration, and probability of the impacts occurring to; and (ii) the degree to which these impacts- (aa) can be reversed; (bb) may cause irreplaceable loss of resources; and (cc) can be avoided, managed or mitigated; and e) through a ranking of the site sensitivities and possible impacts the activity and technology alternatives will impose on the sites and location identified through the life of the activity	YES	Legislation and Policy – Section 4 (4.2.) Alternatives – Section 3 Need and Desirability – Section 4 Impact & Risk Assessment – Section 6

to- (i) identify and motivate a preferred site, activity and technology alternative; (ii) identify suitable measures to avoid, manage or mitigate identified impacts; and (iii) identify residual risks that need to be managed and monitored.		
Scope of assessment and content of basic assessment reports 3) (1) A basic assessment report must contain the information that is necessary for the competent authority to consider and come to a decision on the application, and must include: (a) details of: (i) the EAP who prepared the report; and (ii) the expertise of the EAP, including a curriculum vitae;	YES	Section 4.5.
(b) the location of the activity, including: (i) the 21 digit Surveyor General code of each cadastral land parcel; (ii) where available, the physical address and farm name; (iii) where the required information in items (i) and (ii) is not available, the coordinates of the boundary of the property or properties;	YES	SYNOPSIS OF THE PROJECT Section 2
(c) a plan which locates the proposed activity or activities applied for as well as associated structures and infrastructure at an appropriate scale; or, if it is- (i) a linear activity, a description and coordinates of the corridor in which the proposed activity or activities is to be undertaken; or (ii) on land where the property has not been defined, the coordinates within which the activity is to be undertaken;	YES	Section 2
(d) a description of the scope of the proposed activity, including all listed and specified activities triggered and being applied for; and a description of the activities to be undertaken including associated structures and infrastructure;	YES	Section 2 Section 4
(e) a description of the policy and legislative context within which the development is proposed including- (i) an identification of all legislation, policies, plans, guidelines, spatial tools, municipal development planning frameworks, and instruments that are applicable to this activity and have been considered in the preparation of the report; and (ii) how the proposed activity complies with and responds to the legislation and policy context, plans, guidelines, tools frameworks, and instruments;	YES	Section 4.2
f) a motivation for the need and desirability for the proposed development including the need and desirability of the activity in the context of the preferred location;	YES	Section 4
(g) a motivation for the preferred site, activity and technology alternative;	YES	Section 3
(h) A full description of the process followed to reach the proposed preferred alternative within the site, including - (i) details of all the alternatives considered;	YES	Section 3
(ii) details of the public participation process undertaken in terms of regulation 41 of the Regulations, including copies of the supporting documents and inputs;	YES	Section 4.7
(iii) a summary of the issues raised by interested and affected parties, and an indication of the manner in which the issues were incorporated, or the reasons for not including them;	YES	Section 4.7

(iv) the environmental attributes associated with the alternatives focusing on the geographical, physical, biological, social, economic, heritage and cultural aspects;	YES	Section 6
(v) the impacts and risks identified for each alternative, including the nature, significance, consequence, extent, duration and probability of the impacts, including the degree to which these impacts (aa) can be reversed; (bb) may cause irreplaceable loss of resources; and (cc) can be avoided, managed or mitigated;	YES	Section 6
vi) the methodology used in determining and ranking the nature, significance, consequences, extent, duration and probability of potential environmental impacts and risks associated with the alternatives;	YES	Section 4
(vii) positive and negative impacts that the proposed activity and alternatives will have on the environment and on the community that may be affected focusing on the geographical, physical, biological, social, economic, heritage and cultural aspects;	YES	Section 6
(viii) the possible mitigation measures that could be applied and level of residual risk;	YES	Section 6
(ix) the outcome of the site selection matrix;	YES	Section 6
(x) if no alternatives, including alternative locations for the activity were investigated, the motivation for not considering such; and	YES	Section 6
(xi) a concluding statement indicating the preferred alternatives, including preferred location of the activity.	YES	Section 6
(i) a full description of the process undertaken to identify, assess and rank the impacts the activity will impose on the preferred location through the life of the activity, including- (i) a description of all environmental issues and risks that were identified during the environmental impact assessment process; and (ii) an assessment of the significance of each issue and risk and an indication of the extent to which the issue and risk could be avoided or addressed by the adoption of mitigation measures;	YES	Section 6
(j) an assessment of each identified potentially significant impact and risk, including- (i) cumulative impacts; (ii) the nature, significance and consequences of the impact and risk; (iii) the extent and duration of the impact and risk; (iv) the probability of the impact and risk occurring; (v) the degree to which the impact and risk can be reversed; (vi) the degree to which the impact and risk may cause irreplaceable loss of resources; and (vii) the degree to which the impact and risk can be avoided, managed or mitigated;	YES	Section 7
(k) where applicable, a summary of the findings and impact management measures identified in any specialist report complying with Appendix 6 to these Regulations and an indication as to how these findings and recommendations have been included in the final report;	YES	Section 8
(l) an environmental impact statement which contains-		

(i) a summary of the key findings of the environmental impact assessment; (ii) a map at an appropriate scale which superimposes the proposed activity and its associated structures and infrastructure on the environmental sensitivities of the preferred site indicating any areas that should be avoided, including buffers; and (iii) a summary of the positive and negative impacts and risks of the proposed activity and identified alternatives;		
(m) based on the assessment, and where applicable, impact management measures from specialist reports, the recording of the proposed impact management outcomes for the development for inclusion in the EMPr;	YES	Section 6
(n) any aspects which were conditional to the findings of the assessment either by the EAP or specialist which are to be included as conditions of authorisation;	YES	Section 8
(o) a description of any assumptions, uncertainties, and gaps in knowledge which relate to the assessment and mitigation measures proposed;	YES	Section 4.4
(p) a reasoned opinion as to whether the proposed activity should or should not be authorised, and if the opinion is that it should be authorised, any conditions that should be made in respect of that authorisation;	YES	Section 8
(q) where the proposed activity does not include operational aspects, the period for which the environmental authorisation is required, the date on which the activity will be concluded, and the post construction monitoring requirements finalised;	N/A	
(r) an undertaking under oath or affirmation by the EAP in relation to - (i) the correctness of the information provided in the reports; (ii) the inclusion of comments and inputs from stakeholders and I&APs; (iii) the inclusion of inputs and recommendations from the specialist reports where relevant; and (iv) any information provided by the EAP to interested and affected parties and any responses by the EAP to comments or inputs made by interested and affected parties;	YES	Appendix N
(s) where applicable, details of any financial provisions for the rehabilitation, closure, and ongoing post decommissioning management of negative environmental impacts;	N/A	
(t) any specific information that may be required by the competent authority; and	N/A	
(u) any other matters required in terms of section 24(4)(a) and (b) of the Act.	N/A	
2) Where a government notice gazetted by the Minister provides for the basic assessment process to be followed, the requirements as indicated in such a notice will apply	YES	

SECTION 2: PROJECT DESCRIPTION

This section provides a description of the grid connection infrastructure and associated access tracks and watercourse crossings, to be developed within a ~400m wide development corridor and 1,91 km ^{2} extended corridor in the vicinity of the Gamma Substation .

2.1 Project Site Description

Eskom Holdings SOC Limited, is proposing the development of the 132kV Grid Connection Infrastructure (overhead 132kV power line and 132kV switching station infrastructure), associated access tracks & water course crossings associated with the authorised Emoyeni Wind Energy Facilities located in the Beaufort West & Ubuntu Local Municipalities, Northern And Western Cape Provinces.

The proposed 400m wide development corridor and associated grid connection infrastructure, access tracks & watercrossings is located within the Beaufort West REDZ and Central Power Corridor. (refer to **Figure 2.1**).

2.2 The infrastructure and key components considered as part of this Basic Assessment process includes:

- The establishment of a 132kV collector substation (switching station) within the authorised Umsinde Emoyeni WEF site (adjacent to the WEF facility substation) with a footprint of approximately 100m X 80m (~0.8ha) to be located within an assessment footprint that encompasses a 300m radius.
- The establishment of a 132kV collector substation (switching station) within the authorised Khangela Emoyeni WEF site (adjacent to the WEF facility substation) with a footprint of approximately 100m X 80m (~0.8ha) to be located within an assessment footprint that encompasses a 300m radius.
- The establishment of a 132kV collector substation (switching station) within the authorised Ishwati Emoyeni WEF site (adjacent to the WEF facility substation) with a footprint of approximately 120m X 100m (~1.2 ha) with an assessment footprint that encompasses a 300m radius.
- The establishment of a 132kV powerline within a 400m wide corridor that will extend from the Khangela switching station to the Ishwati switching station (~36km), and then onward for ~25km to the Eskom Gamma Substation. In addition, a further length of 132kV powerline (within a 400m wide corridor) will extend from the Umsinde switching station to the Khangela switching station for ~8km OR it may connect directly into the Khangela-Ishwati powerline at the Khangela switching station. An extended powerline development corridor of approximately 1.91 km^2 has been assessed in the vicinity of the Gamma Substation, that will enable the 132kV powerline to connect to either the south face of the Gamma Substation yard or approach from the east depending on the available connection point at the time of the connection. The 132kV Powerline from Umsinde to Khangela, and from Khangela to Ishwati and onward to Gamma Substation will be a single- or double-circuit overhead powerline, with a single set of pylons structures with a maximum height of 35m. Access/service tracks (jeep track) up to 7m wide and associated watercourse crossings will be associated with the powerline, and will be located within the assessed powerline corridor.
- The establishment of a new access road approximately 14km long from the existing public road from Richmond to the Ishwati switching station site. The proposed new access road will be unsealed and up to 12m wide during construction , but will be reduced to a maximum of 6 m width during operation.

Power Lines and Tower Structures

The proposed power lines are expected to have concrete foundations and steel tower structures (i.e. pylons). Self-supporting and/or stayed (guyed) Monopole pylon structures will be installed for the majority of the proposed power line, with lattice type structures utilised at specific bend- or strain-points. The 132kV powerline from the Umsinde Emoyeni WEF to the Khangela Emoyeni WEF, and from Khangela Emoyeni WEF to Ishwati Emoyeni WEF and onward to Gamma Substation will be a single- or double-circuit powerline with a single set of pylons structures with a maximum height of 35m.

Access Tracks and Watercourse Crossings

Access is required during both the construction and operational phases of the proposed grid connection infrastructure. The site proposed for development predominantly includes agriculture (grazing), and mountainous areas and already has gravel roads in some areas for the associated properties. Where possible, existing access roads/tracks/WEF internal access roads will be used to gain access to the grid connection development corridor and associated infrastructure. Where no access roads/tracks exist a single track/road will be created as close to the servitude/within the servitude as possible. These service tracks will be established during the construction phase and will be up to 7m wide. Access roads will enable the transportation of construction material as well as construction teams to the construction site and facilitate maintenance activities during the operational phase. Where possible access routes will be rehabilitated when no longer required. An access road approximately 14km long from the existing public road from Richmond to the authorised Ishwati On-site Substation site is proposed as part of the development. This access track will be unsealed and up to 12m wide during construction and will be reduced to a maximum width of 6m width during operation. Several new watercourse crossings are to be constructed along the 400m wide development corridor specifically along proposed access tracks for the 132kV powerline infrastructure and switching stations from the Umsinde Emoyeni WEF all the way to the Gamma Substation in the west .

Switching Station Infrastructure (x3 Switching Stations i.e. Umsinde Emoyeni Switching Station, Khangela Emoyeni Switching Station and the Ishwati Emoyeni Switching Station)

Energy generated by the Emoyeni Wind Energy Facilities will be fed via cabling to separate onsite 132kV collector substations (switching station) located within each of the authorised Emoyeni Wind Energy Facilities (Umsinde Emoyeni WEF, Khangela Emoyeni WEF and Ishwati Emoyeni WEF). The Umsinde and Khangela switching stations will have a footprint of approximately 100m X 80m (~0.8ha), while the Ishwati switching station will have a footprint of approximately 100m X 120m (1.2ha), all to be located within an assessment footprint that encompasses a 300m development radius. A map illustrating the location of each switching station is provided in the Layout Map (Figure 1.4). The final position of each of the switching stations will be located within the 300m development radii provided. The development radius enables the switching station infrastructure to be micro-sited within the assessed footprint to avoid environmental sensitivities, and to accommodate any micro-siting in the authorised WEF layouts.

Table 2.1 A summary of the details and dimensions of the proposed infrastructure associated with the project is provided below:

Infrastructure	Details
Double- and/or Single- circuit powerline	Proposed overhead 132kV powerline will extend from the Khangela Onsite switching station to the Ishwati switching station and then onwards to the connection point at the Eskom Gamma substation station yard. A further length of overhead 132kV powerline will extend from the Umsinde Emoyeni WEF onsite switching station to the Khangela switching station (or will connect to the Khangela-Ishwati powerline).
Power line voltage	132kV
Development corridor width	A 400m wide grid connection corridor along the 132kV routing; An extended 1.91km^2 corridor adjacent to the Gamma Substation to allow for connection of the 132kV powerline from the east or the south face within the extended corridor to the Gamma Substation yard, this is dependent on the available point of connection at the time.
132kV Powerline ~69km in length (Preferred Alternative)	The powerline will start at Umsinde onsite switching station located within the authorised Umsinde Emoyeni WEF within a 400m wide assessment corridor and traverses in a north westerly direction towards the Khangela on-site switching station, then onwards towards the Ishwati onsite switching station, and further westwards to the Gamma Substation
132kV Powerline 68km in length (Alternative 1)	The powerline will start at Umsinde onsite switching station located within the authorised Umsinde Emoyeni WEF within a 400m wide assessment corridor and

	traverse in a north westerly direction to Khangela on-site switching station, slightly turns towards a south westerly direction before turning north west towards the Ishwati onsite switching station to the Gamma Substation
132kV Powerline 67km in length (Alternative 2)	The powerline will start at Umsinde onsite switching station located within the authorised Umsinde Emoyeni WEF within a 400m wide assessment corridor and traverse in a north westerly direction to Khangela on-site switching station, straight towards the Ishwati onsite switching station to the Gamma Substation
Connection to the Eskom Gamma Substation	An extended powerline development corridor of approximately 1.91 km^2 has been assessed in the vicinity of the Gamma Substation, that will enable the 132kV powerline to connect to either the south face of the Gamma Substation yard or approach from the east, depending on the available connection bay available at the time of connection.
Umsinde Emoyeni switching station	132kV on site switching station with a footprint of approximately 100m x 80m (~0.8ha) with an assessment footprint that encompasses a 300m radius.
Khangela Emoyeni switching station	132kV on site switching station with a footprint of approximately 100m x 80m (~0.8ha) with an assessment footprint that encompasses a 300m radius.
Ishwati Emoyeni switching station	132kV on site switching station with a footprint of approximately 120m x 100m (~1.2ha) with an assessment footprint that encompasses a 300m radius.
Powerline servitude	up to 40m wide (or as per Eskom's requirements)
Tower Height	Up to 35m
Water crossings	Water crossings may require the construction of culverts or low water drifts in order to not impact on watercourses during the construction and operation of the powerline and access tracks.
Access Roads	• Access/service tracks (jeep track) up to 7m wide will be required along the length of the whole corridor of the 132kV powerline. • The establishment of a new access road approximately 14km long from the existing public road from Richmond to the Ishwati switching station site. The proposed new access road will be unsealed and up to 12m wide during construction , but will be reduced to a maximum of 6 m width during operation.

Example of a single culvert crossing.

Source: https://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/nrcs142p2_018552.pdf (accessed 11/05/2022)

Table 2.2: The centre line co-ordinates of the 400m wide development corridor* are presented below for the proposed corridor alternatives:

	Preferred Alternative		**Alternative 1**		**Alternative 2**	
	Latitude	**Longitude**	**Latitude**		**Longitude**	
Start (on-site substation at Umsinde Emoyeni WEF site)	31°51'13.38"S	24° 1'25.58"E	31°51'13.38"S	24° 1'25.58"E	31°51'13.38"S	24° 1'25.58"E
Point 2	31°50'14.37"S	24° 0'50.32"E	31°50'14.37"S	24° 0'50.32"E	31°50'14.37"S	24° 0'50.32"E
Point 3	31°48'43.59"S	23°57'55.92"E	31°48'43.59"S	23°57'55.92"E	31°48'43.59"S	23°57'55.92"E
Start (on-site substation at Khangela Emoyeni WEF site)	31°48'43.05"S	23°57'42.71"E	31°48'43.05"S	23°57'42.71"E	31°48'43.05"S	23°57'42.71"E
Point 4	31°50'14.63"S	23°55'28.86"E	31°50'14.63"S	23°55'28.86"E	31°50'14.63"S	23°55'28.86"E
Point 5	31°49'13.74"S	23°53'33.39"E	31°49'13.74"S	23°53'33.39"E	31°49'13.74"S	23°53'33.39"E
Point 6	31°49'7.26"S	23°52'39.52"E	31°49'7.26"S	23°52'39.52"E	31°49'7.26"S	23°52'39.52"E
Point 7	31°47'31.74"S	23°49'11.72"E	31°47'31.74"S	23°49'11.72"E	31°47'31.74"S	23°49'11.72"E
Point 8	31°45'32.28"S	23°45'29.58"E	31°45'32.28"S	23°45'29.58"E	31°45'32.28"S	23°45'29.58"E
Point 9	31°43'29.18"S	23°45'1.23"E	31°44'1.56"S	23°42'34.93"E	31°44'1.56"S	23°42'34.93"E
Point 10	31°42'48.88"S	23°40'11.59"E	31°43'6.86"S	23°42'18.16"E	31°42'48.88"S	23°40'11.59"E
			31°42'48.88"S	23°40'11.59"E		

Point 11 (Ishwati Collector Sub)	31°42'24.42"S	23°39'30.33"E	31°42'24.42"S	23°39'30.33"E	31°42'24.42"S	23°39'30.33"E
Point 12	31°42'34.31"S	23°38'58.91"E	31°42'34.31"S	23°38'58.91"E	31°42'34.31"S	23°38'58.91"E
Point 13	31°43'9.01"S	23°38'11.49"E	31°43'9.01"S	23°38'11.49"E	31°43'9.01"S	23°38'11.49"E
Point 14	31°43'54.78"S	23°35'20.23"E	31°43'54.78"S	23°35'20.23"E	31°43'54.78"S	23°35'20.23"E
Point 15	31°40'58.19"S	23°25'27.11"E	31°40'58.19"S	23°25'27.11"E	31°40'58.19"S	23°25'27.11"E
End (Extended 1.91 km^2development corridor to (Gamma Substation) Preferred Alternative from the east	31°40'46.22"S	23°24'46.55"E	31°40'46.22"S	23°24'46.55"E	31°40'46.22"S	23°24'46.55"E
End (Extended 1.91 km^2 development corridor to Gamma Substation) Preferred Alternative from the south	31°40'56.04"S	23°24'40.11"E	31°40'56.04"S	23°24'40.11"E	31°40'56.04"S	23°24'40.11"E

*It must be noted that it is the intention in this BA report to assess the entire ~400m-wide development corridor and for the 400m wide corridor (and extended corridor) to be authorised to allow micro-siting of the infrastructure within the corridor that will avoid buffer zones and no-go areas within the corridor as recommended by the various specialist assessment undertaken for the project. This approach will allow for the development corridor layout to be approved whilst considering all environmental sensitivities in the final design.

Table 2.3. Water Crossing Points along the 132kV Powerline within a 400m wide corridor and gravel access track approximately 7m wide from the Umsinde Emoyeni switching station and extended 1.91 km^2 corridor to the Gamma Substation (Preferred Alternative):

Gamma Substation to Ishwati Switching Station					
Watercourse Crossing	**GPS Coordinates**		**Watercourse Crossing**	**GPS Coordinates**	
	Latitude	**Longitude**		**Latitude**	**Longitude**
1	31° 40.895'S	23° 25.233'E	**16**	31° 43.839'S	23° 35.129'E
2	31° 41.036'S	23° 25.743'E	**17**	31° 43.889'S	23° 35.303'E
3	31° 41.303'S	23° 26.688'E	**18**	31° 43.853'S	23° 35.487'E
4	31° 41.551'S	23° 27.579'E	**19**	31° 43.738'S	23° 35.826'E
5	31° 41.647'S	23° 27.969'E	**20**	31° 43.660'S	23° 36.141'E
6	31° 41.776'S	23° 28.327'E	**21**	31° 43.518'S	23° 36.634'E
7	31° 41.815'S	23° 28.474'E	**22**	31° 43.458'S	23° 36.905'E
8	31° 42.067'S	23° 29.346'E	**23**	31° 43.453'S	23° 36.987'E
9	31° 42.354'S	23° 30.316'E	**24**	31° 43.389'S	23° 37.208'E
10	31° 42.405'S	23° 30.479'E	**25**	31° 43.261'S	23° 37.699'E
11	31° 42.538'S	23° 30.925'E	**26**	31° 43.238'S	23° 37.813'E
12	31° 42.772'S	23° 31.654'E	**27**	31° 43.229'S	23° 37.905'E
13	31° 43.233'S	23° 33.111'E	**28**	31° 43.178'S	23° 38.061'E
14	31° 43.362'S	23° 33.570'E	**29**	31° 43.082'S	23° 38.300'E
15	31° 43.536'S	23° 34.080'E	**30**	31° 42.930'S	23° 38.518'E

Ishwati Switching Station to Khangela Switching Station					
Watercourse Crossing	GPS Coordinates		Watercourse Crossing	GPS Coordinates	
	Latitude	Longitude		Latitude	Longitude
31	31° 42.866'S	23° 40.290'E	58	31° 47.823'S	23° 49.804'E
32	31° 43.284'S	23° 41.134'E	59	31° 47.901'S	23° 49.951'E
33	31° 43.688'S	23° 41.937'E	60	31° 48.006'S	23° 50.198'E
34	31° 42.898'S	23° 41.616'E	61	31° 48.066'S	23° 50.364'E
35	31° 43.027'S	23° 42.364'E	62	31° 48.259'S	23° 50.708'E
36	31° 44.009'S	23° 42.534'E	63	31° 48.621'S	23° 51.486'E
37	31° 43.178'S	23° 43.374'E	64	31° 48.904'S	23° 52.183'E
38	31° 43.261'S	23° 44.255'E	65	31° 49.041'S	23° 52.498'E
39	31° 43.293'S	23° 44.328'E	66	31° 49.190'S	23° 52.867'E
40	31° 44.504'S	23° 43.539'E	67	31° 49.215'S	23° 53.392'E
41	31° 44.270'S	23° 45.237'E	68	31° 49.404'S	23° 53.891'E
42	31° 44.826'S	23° 44.149'E	69	31° 49.442'S	23° 53.813'E
43	31° 45.124'S	23° 44.700'E	70	31° 49.598'S	23° 54.228'E
44	31° 44.812'S	23° 45.526'E	71	31° 49.640'S	23° 54.290'E
45	31° 45.537'S	23° 45.494'E	72	31° 49.691'S	23° 54.376'E
46	31° 45.845'S	23° 46.109'E	73	31° 49.860'S	23° 54.672'E
47	31° 45.739'S	23° 45.958'E	74	31° 50.021'S	23° 54.889'E
48	31° 45.629'S	23° 45.691'E	75	31° 50.088'S	23° 55.079'E
49	31° 46.235'S	23° 46.853'E	76	31° 50.152'S	23° 55.217'E
50	31° 46.547'S	23° 47.440'E	77	31° 49.854'S	23° 56.055'E
51	31° 46.717'S	23° 47.775'E	78	31° 49.748'S	23° 56.220'E
52	31° 46.785'S	23° 47.899'E	79	31° 49.677'S	23° 56.303'E
53	31° 47.088'S	23° 48.482'E	80	31° 49.532'S	23° 56.461'E
54	31° 47.290'S	23° 48.698'E	81	31° 49.124'S	23° 56.975'E
55	31° 47.414'S	23° 48.959'E	82	31° 48.830'S	23° 57.425'E
56	31° 47.492'S	23° 49.051'E	83	31° 48.558'S	23° 57.715'E
57	31° 47.708'S	23° 49.547'E	84	31° 48.759'S	23° 57.831'E

Khangela Switching Station to Umsinde Switching Station		
Watercourse Crossing	GPS Coordinates	
	Latitude	Longitude
83	31° 48.558'S	23° 57.715'E
84	31° 48.759'S	23° 57.831'E
85	31° 48.886'S	23° 58.233'E
86	31° 49.101'S	23° 58.643'E
87	31° 49.438'S	23° 59.251'E
88	31° 49.489'S	23° 59.362'E
89	31° 49.750'S	23° 59.910'E
90	31° 50.062'S	24° 00.493'E
91	31° 50.317'S	24° 00.890'E

Table 2.4. Proposed New Access Road Co-ordinates to the authorised Ishwati Substation site:

	Latitude	**Longitude**
Start (off the existing unnamed gravel road)	31° 44.203'S	23° 46.714'E
Middle	31° 42.906'S	23° 42.942'E
End (Authorised Ishwati Substation site)	31° 42.407'S	23° 39.506'E

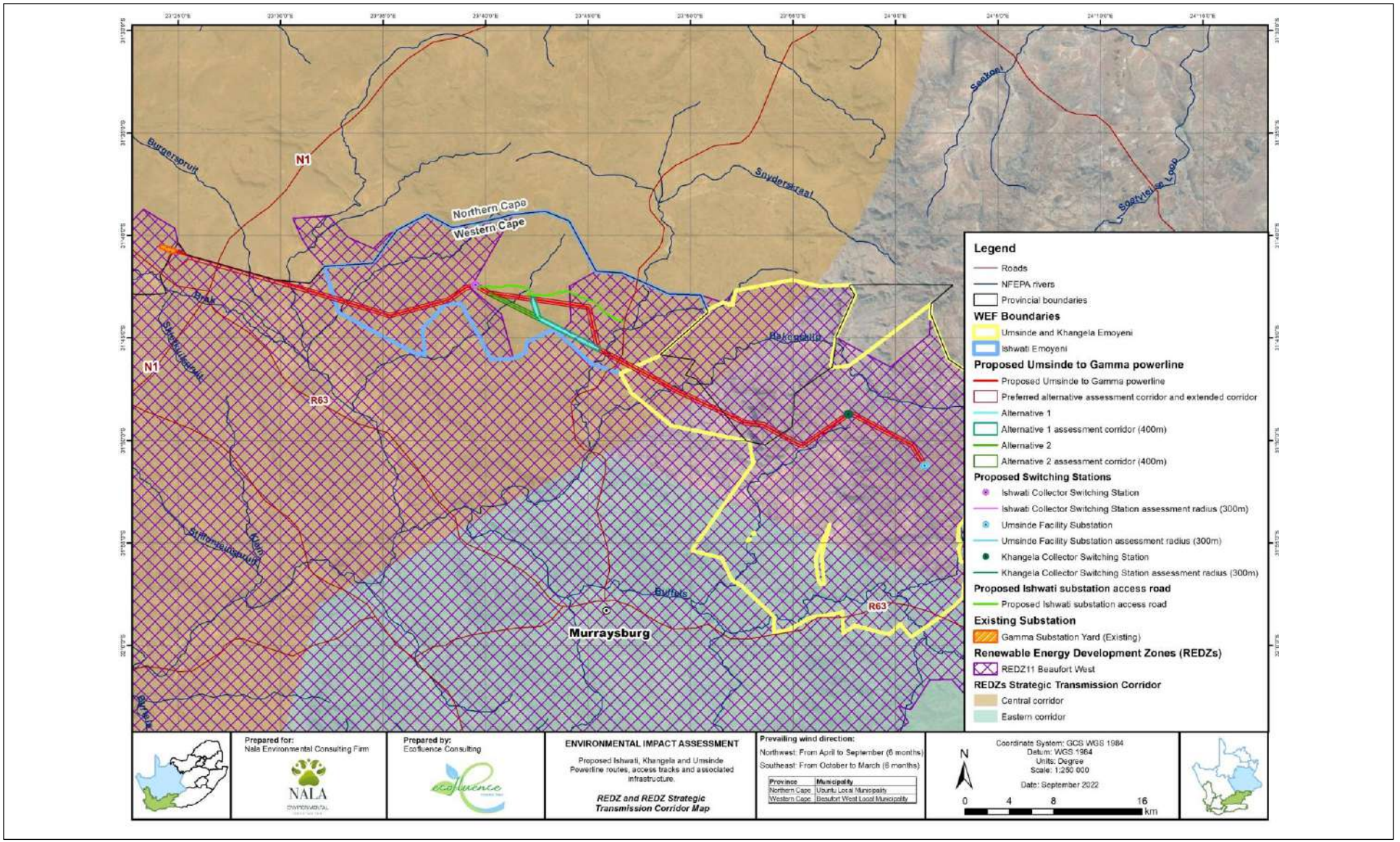


Figure 2.1. Location of the proposed new grid connection infrastructure within Renewable Energy Development Zone and Transmission Corridor

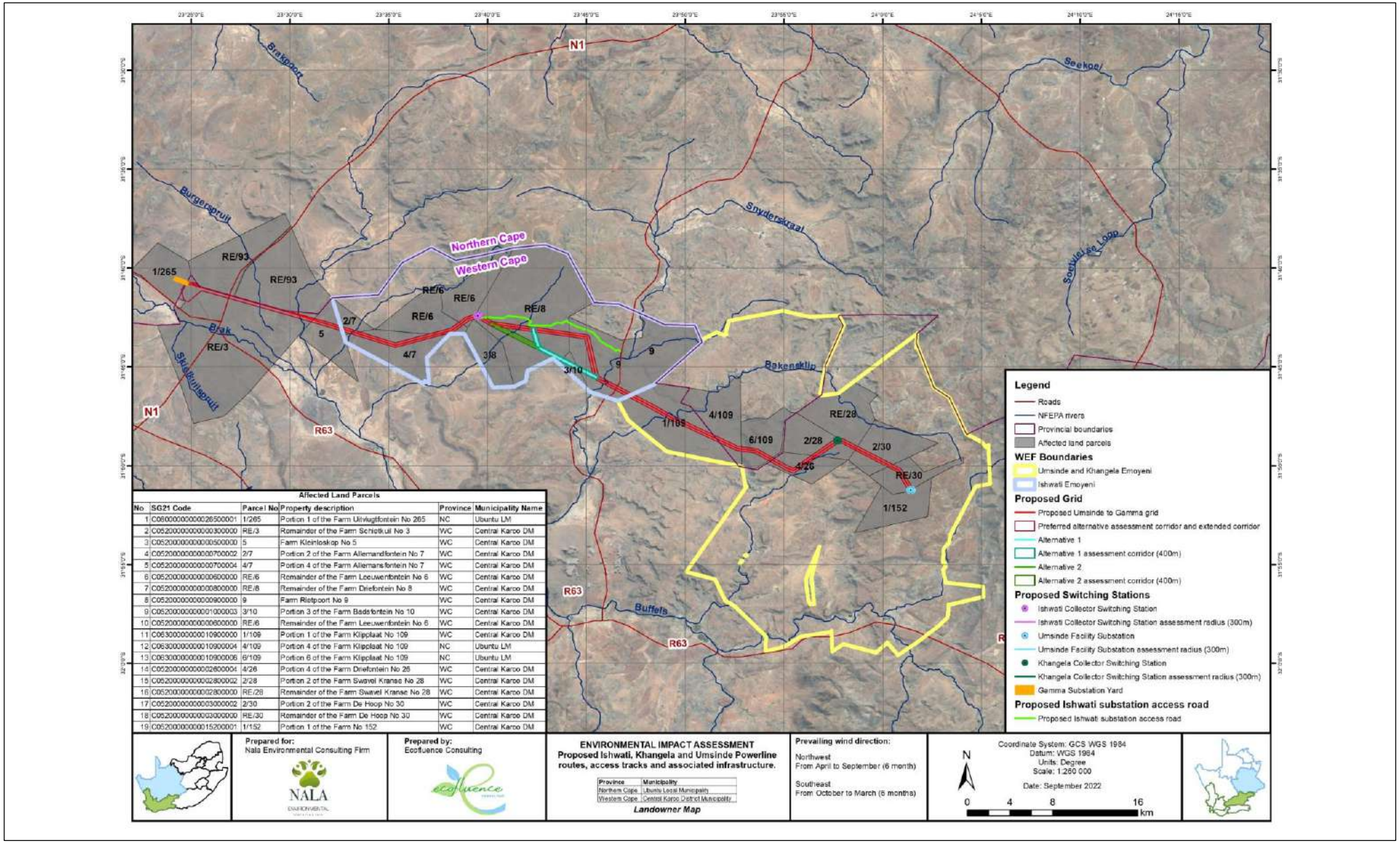


Figure 2.2. Landowners Map associated with the proposed grid connection corridor and associated infrastructure (Refer to Appendix B – Maps (A3))

SECTION 3: ALTERNATIVES

3.1 Feasible and Reasonable Project Alternatives

An EIA process must contain the consideration of alternatives, which can include site alternatives (i.e. development footprint), activity, technology and site access alternatives, as well as the "do-nothing" alternative as per the requirements of Appendix 3 of the 2014 EIA Regulations (GNR 326). Alternatives are to be assessed in terms of biophysical, economic, social and technical factors.

Applicable alternatives are discussed below and where no alternatives are found to be applicable, a motivation has been included.

3.2 Site Specific Alternatives

The proposed grid connection infrastructure, including associated access roads and water course crossings are associated with the authorised Umsinde, Khangela and Ishwati Emoyeni Wind Energy Facilities, and will connect the WEFs to the national electricity grid at the Eskom Gamma Main Transmission Substation (MTS). As such, the start-point (authorised WEF) and end-point (Gamma MTS) are fixed. As this grid connection infrastructure, associated access roads and water course crossings is required to evacuate electricity from the authorised Emoyeni WEFs to the National Grid , the location of the infrastructure is informed by the most direct and feasible grid connection routing between the authorised Emoyeni Wind Energy Facilities and the Eskom Gamma MTS.

The specific characteristics were considered in arriving at the proposed grid connection corridor, and the results thereof, are discussed in the sections below. The developer has considered several characteristics for the specific grid connection infrastructure, associated access roads and water course crossings (within a 400m wide development corridor), that have been selected, hence should the assessment outcomes indicate that the following characteristics not be favourable for the development of the grid connection infrastructure and associated infrastructure, some limitations and challenges may then be expected.

- Availability of Land- In order to develop the grid connection infrastructure associated with the Emoyeni WEFs, sufficient space and access to land outside of the wind farm projects' development sites (and along the 400m wide grid connection corridor) is required. The land use along the corridor includes the authorised Umsinde Emoyeni, Khangela Emoyeni and Ishwati Emoyeni Wind Energy development sites. The land use along the corridor mainly includes agricultural activities up to the existing Gamma Substation.

- Connection to the National Grid – The developer has liaised with the Eskom network planners to understand the future demand centres and the strategic plans to upgrade and strengthen the local networks in the area, hence this new application for the proposed powerline corridor and associated infrastructure to the existing Gamma Substation.

- Topographical considerations – The terrain traversed by the new grid connection corridor has been determined as acceptable for construction and maintenance in comparison to the previously authorised grid connection routings, providing good conditions for the power lines' and substation/switching stations' construction.

- Technical – the line routing has taken into account the need to reduce energy losses and ensure that the proposed 132kV powerline crosses existing infrastructure (exsiting and future planned 400kV powerlines and roads) with the appropriate clearance.

- Consideration of environmental sensitivities – Through the assessment of a larger area within the authorised Emoyeni Wind Energy Facilities which have been previously assessed and authorised and the proposed 400m wide development corridor within which the proposed grid connection infrastructure, associated access roads and water course crossings are located, an opportunity has been created by the applicant for the avoidance of sensitive environmental features and areas. The consideration of the placement of the grid infrastructure and associated access tracks and water course crossings within a 400m wide development corridor enables the avoidance of environmental sensitivities, implementation of buffers and no-go areas within the corridor, thereby ensuring that the infrastructure can be appropriately placed without resulting in an unacceptable environmental impact or fatal flaws. This application of the mitigation strategy will allow for the avoidance, minimisation and mitigation of impacts will result in the identification of the most appropriate placement of the proposed powerline, switching stations and associated infrastructure associated with the authorised Emoyeni Wind Energy Facilities.

Therefore, considering the above, no location/site alternatives for the placement of the switching stations infrastructure have been identified, since these must be located directly adjacent to the authorised wind farm substations. Three alternatives have however been identified for the 400m wide grid development corridor comprising of the powerline routing, associated access roads and water course crossings. Only the 132kV powerline, x3 switching stations, associated access roads and water course crossings within the 400m wide development corridor will be assessed as part of this BA Report.

Assessment of a development corridor

A 400m wide powerline development corridor has been assessed to determine the environmental sensitivities along the proposed routing. A development buffer with a radius of 300m around each switching station location has been assessed and proposed for the placement of the three switching stations. An extended 1.91 km^2 extended corridor at the connection to the existing Eskom Gamma Substation has been assessed to the determine the environmental sensitivities related to the connection of the 132kV powerline to the Gamma Substation. The extended corridor at the western section of the proposed powerline will enable the powerline to connect to the Gamma Substation either from the east or from the south face, depending on the available connection bay at the time of connection. This is to cater for future grid capacity to the Gamma Substation. Both options (i.e connection from the east and the south face) are applicable to the development and are therefore not presented as alternatives

As the Umsinde and Khangela Emoyeni Wind Energy Facilities have been selected as preferred bidder projects via a private offtake and are set to commence with construction upon completion of the financial close activities in the latter half of 2022 or early 2023, it is the intention to assess the full extent of the development corridor at a fine-scale and determine the relevant high-sensitivity, no-go areas and buffer zones that the proposed grid infrastructure must take into consideration during the detailed design, construction and operational phases.

It is the intention to have the development corridor authorised to enable feasible connection to the Gamma Substation and enable the avoidance of environmental sensitivities, buffers and no-go zones along the proposed corridor routes. It will also enable micro-siting of the grid connection infrastructure in order to accommodate any micro-siting in the Emoyeni wind farm layouts.

Having the assessed development corridor approved will enable the placement of grid connection infrastructure (including powerline, switching station, access roads and watercourse crossings) within the corridor, while avoiding all delineated no-go areas and buffer zones, should the infrastructure need to be micro-sited within the corridor prior to commencement of construction.

3.3 Switching station Alternatives

No alternatives are being considered for the placement of the three 132kV switching stations within the authorised Umsinde, Khangela and Ishwati Emoyeni WEFs, as the switching stations must be located adjacent to the authorised WEF substations.

Umsinde Emoyeni Switching Station (Centre point of 300m assessment radii) **Latitude** 31°51'13.38"S **Longitude** 24° 1'25.58"E	Located within the authorised Umsinde Emoyeni WEF. A 132kV on site switching station with a development footprint of approximately 100m x 80m (~0.8ha) with an assessment footprint that encompasses a 300m development radius. This will enable the switching station to be micro-sited within the development radius prior to commencement of construction.
Khangela Emoyeni Switching Station Station (Centre point of 300m assessment radii) **Latitude** 31°48'43.05"S **Longitude** 23°57'42.71"E	Located within the authorised Khangela Emoyeni WEF. A 132kV on site switching station with a development footprint of approximately 100m x 80m (~0.8ha) with an assessment footprint that encompasses a 300m development radius. This will enable the switching station to be micro-sited within the development radius prior to commencement of construction.
Ishwati Emoyeni Switching station Station (Centre point of 300m assessment radii) **Latitude** 31°42'24.42"S **Longitude** 23°39'30.33"E	Located within the authorised Ishwati Emoyeni WEF. A 132kV on site switching station with a development footprint of approximately 120m x 100m (~1.2ha) with an assessment footprint that encompasses a 300m development radius. This will enable the switching station to be micro-sited within the development radius prior to commencement of construction.

3.4 Powerline Alternatives

The proposed 132kV powerline placement will also determine the placement of the access roads and water crossings within the 400m wide development corridor. Access roads will enable the transportation of construction material as well as construction teams to the construction site and facilitate maintenance activities during the operational phase. water course crossings will be required wherever such crossings are required along the access roads and any alternatives of such points will be determined by the powerline alternatives.

132kV Powerline (Preferred Alternative) within the 400m wide development corridor:

- The proposed 132kV powerline will start at Umsinde onsite switching station located within the authorised Umsinde Emoyeni WEF within a 400m wide development corridor and traverse in a north-westerly direction towards the proposed Khangela on-site switching station (located within the authorised Khangela Emoyeni WEF). The powerline then follows a south westerly direction before turning towards a generally northern western direction towards the proposed Ishwati onsite switching station (located within the proposed Ishwati Emoyeni WEF). (This preferred alternative route traverses towards the Ishwati onsite switching station with a pronounced bend in trajectory, to avoid challenging topography). From the Ishwati Emoyeni switching station the powerline traverses in the same general north-westerly direction to within an extended 1.91 km^2 corridor to enable the connection to the existing Eskom Gamma Substation either from the east or the south.

132kV Powerline (Alternative 1) within the 400m wide development corridor :

- The proposed 132kV powerline will start at Umsinde onsite switching station located within the authorised Umsinde Emoyeni WEF within a 400m wide assessment corridor and traverse in a north-westerly direction towards the proposed Khangela on-site switching station (located within the authorised Khangela Emoyeni WEF). The powerline then follows a south westerly direction before turning towards a generally north westerly direction towards the proposed Ishwati onsite switching station (located within the proposed Ishwati Emoyeni WEF). (This alternative 1 route traverses towards the Ishwati onsite switching station with a slightly bend in trajectory). From the Ishwati Emoyeni switching station the powerline traverses in the same general north-westerly direction to within an extended 1.91 km^2 corridor to enable the connection to the existing Eskom Gamma Substation either from the east or the south.

132kV Powerline (Alternative 2) within the 400m development corridor:

- The proposed 132kV powerline will start at Umsinde onsite switching station located within the authorised Umsinde Emoyeni WEF within a 400m wide assessment corridor and traverse in a north-westerly direction towards the proposed Khangela on-site switching station (located within the authorised Khangela Emoyeni WEF). The powerline then follows a south westerly direction before turning towards a generally northern western direction towards the proposed Ishwati onsite switching station (located within the proposed Ishwati Emoyeni WEF). (This alternative 2 route traverses straight north-westerly on to the Ishwati onsite switching station). From the Ishwati Emoyeni switching station the powerline traverses in the same general north-westerly direction to within an extended 1.91 km^2 corridor to enable the connection to the existing Eskom Gamma Substation either from the east or the south.

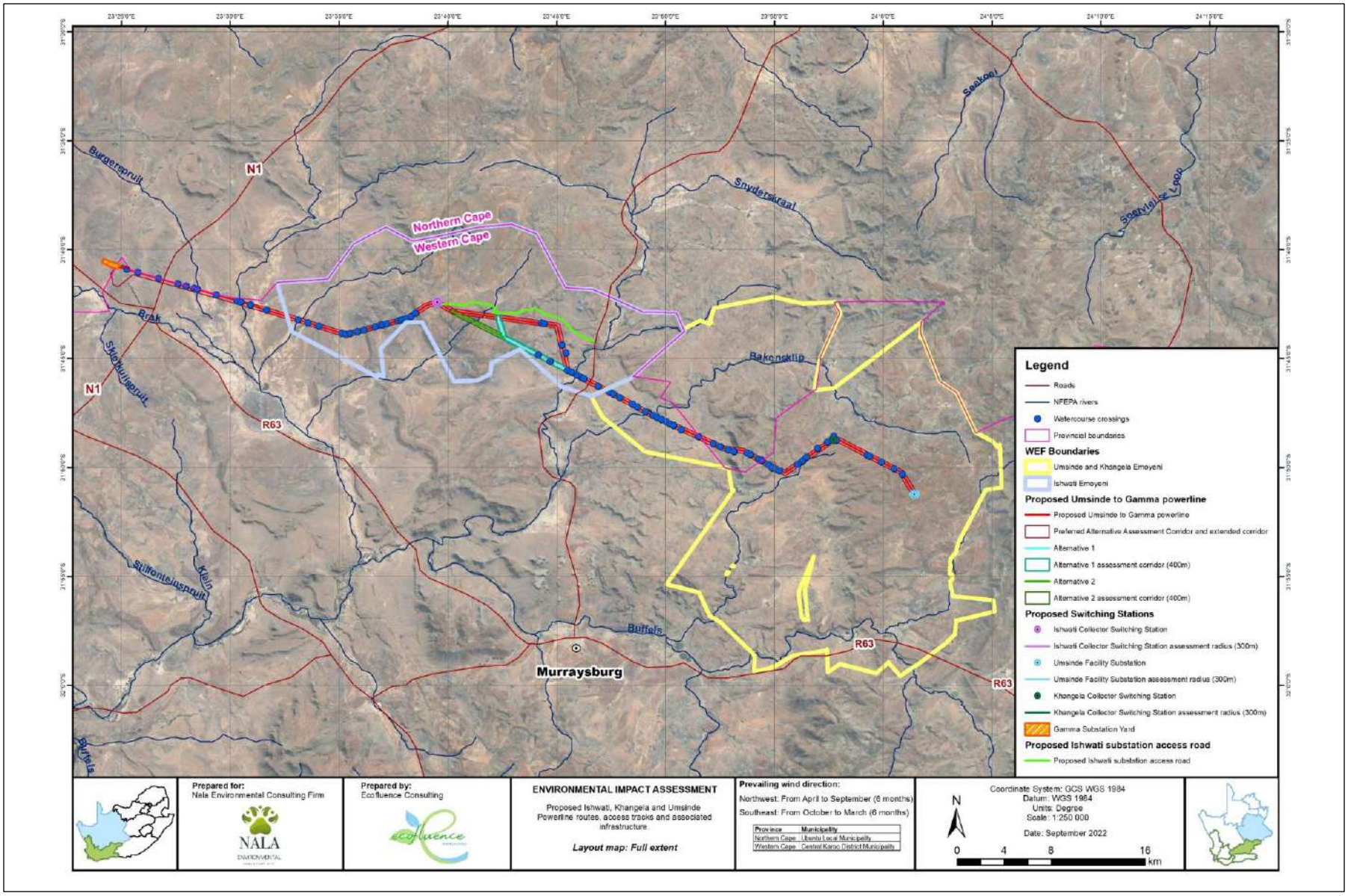


Figure 3.1. Layout map of the entire Powerline Corridor and Alternatives proposed (Refer to Appendix B – Maps (A3))

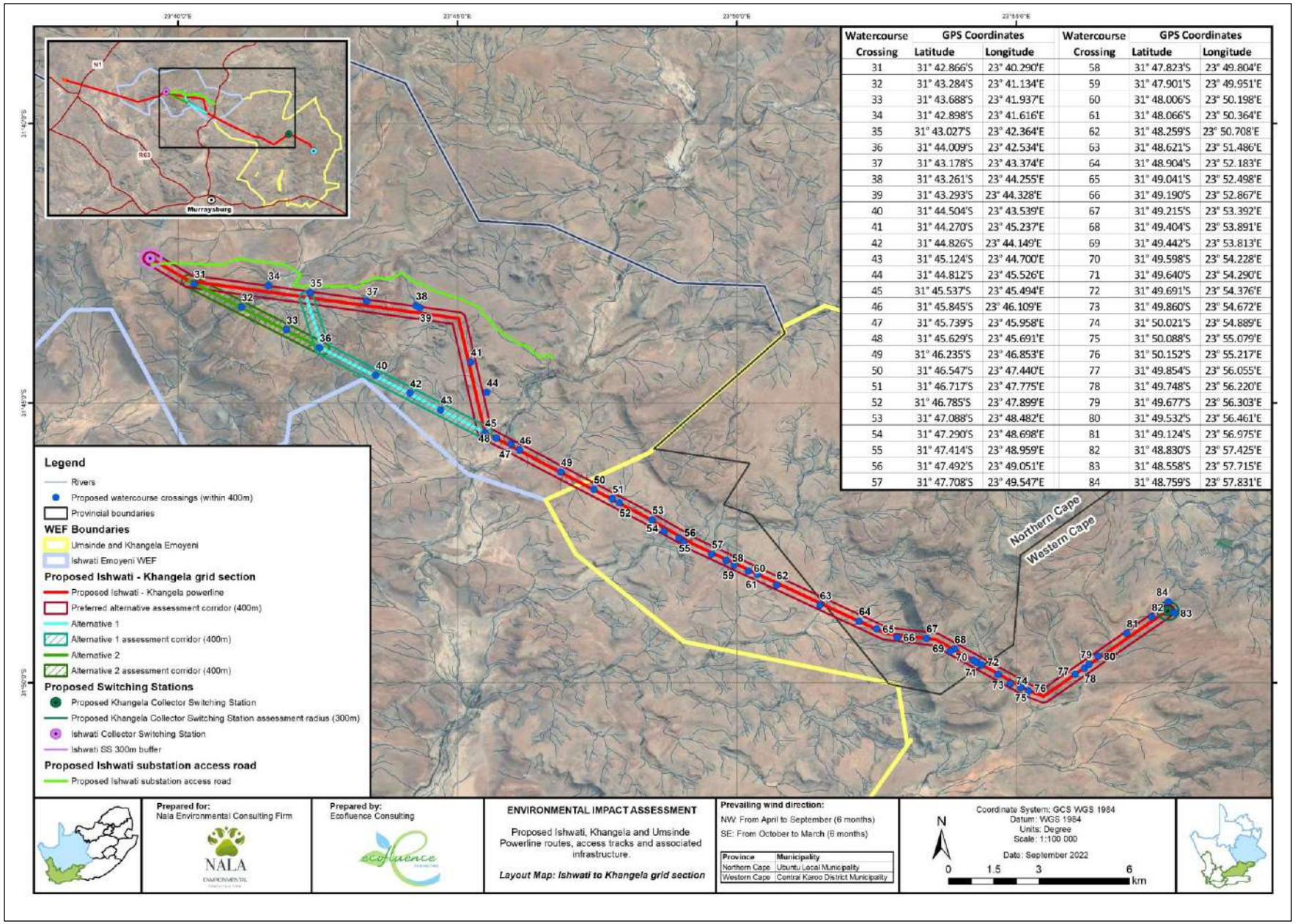


Figure 3.2. Inset map of the Powerline Corridor Alternatives proposed from the Khangela Collector Substation to the Ishwati Collector Substation (refer to Appendix B – Maps (A3)).

3.5 Technology Alternatives

No feasible technology alternatives exist for the powerline or switching station, as these will be developed in accordance with Eskom's technical requirements.

3.6 The 'Do-Nothing' Alternative

The 'do-nothing' alternative is the option of not constructing the proposed grid connection infrastructure, including three switching stations, 132kV power line infrastructure, associated access roads and water course crossings to support the authorised Emoyeni WEFs that have been selected as preferred bidder projects via a private offtake. This would result in no environment or social impacts (positive or negative) as a result of the development of the grid connection infrastructure, associated access roads and water course crossings or the wind energy facility.

The primary reasoning as to why the 'do-nothing' alternative is not considered as the preferred alternative in relation to the development of the 400m wide grid development corridor, associated power line infrastructure, associated access roads and water course crossings to support the authorised Emoyeni WEFs, is that these are considered as key infrastructure in order to enable the evacuation of the generated power from the authorised Emoyeni Wind Farms into the national grid. The activities associated with the development of the Umsinde, Ishwati and Khangela Emoyeni WEFs have already received Environmental Authorisation from the Department of Forestry, Fisheries and the Environment. The grid connection infrastructure previously authorised for the wind energy facilities is no longer considered viable following liaison within Eskom, topographical studies and updates to the wind farm layouts. Following receipt of the Environmental Authorisations for the previously authorised grid connection infrastructure for the Umsinde, Khangela and Ishwati Emoyeni Wind Energy Facilities it was determined that several applicable listed activities had not been included in the EIA process, therefore making the previously authorised grid connection infrastructure non-compliant in term of the EIA Regulations. Should the 'do-nothing' alternative be implemented for the new proposed grid connection infrastructure, it will result in the inability of the authorised wind energy facilities to connect to the national grid and therefore result in the wind energy facilities not being feasible for construction or operation.

This would result in the socio-economic benefits that would arise from the operation of the wind energy facilities not being realised due to its inability operate and feed electricity into the national grid. The inability of the wind energy facilities to operate would hinder socio-economic benefits at local, regional and national levels due to the additional electricity that would be fed into the country's national grid thereby limiting sales, production and losses within the GDP. The negative impacts of the 'do-nothing' alternative are considered to outweigh the positive impacts of this alternative.

The Umsinde and Khangela Emoyeni WEFs have been selected as preferred bidders with private energy offtakers. The Umsinde Emoyeni WEF has further been registered as a Strategic Integrated Project (SIP) and is thus of strategic importance to the Country's targets for the procurement of renewable energy. Should the proposed grid connection infrastructure not be implemented, these two projects will not be able to deliver on their commitments to deliver renewable energy to these private offtakers, and will not be able to support National Government's strategic targets to reduce the country's reliance on emission-intensive energy sources (such as coal energy).

The option of not developing the grid connection infrastructure, associated access roads and water course crossings solution required for the operation of the authorised Emoyeni WEFs is not preferred and is considered to restrict the development of the authorised wind energy facilities.

3.7 Activities during the Project Development Stages

The table below provides the details regarding the requirements and the activities to be undertaken during the 132kV grid connection infrastructure, associated access roads and water course crossings development phases (i.e. construction phase, operation phase and decommissioning phase).

Construction Phase:

The main activities associated with construction will be:

- Removal of vegetation for the proposed infrastructure;
- Excavations for pylon and substation foundations and associated infrastructure;
- Stockpiling of topsoil and cleared vegetation;
- Transportation of material and equipment to site, and personnel to and from site; and
- Construction of the 132kV grid connection infrastructure, associated access roads and water course crossings within the development corridor .

Table 3.1: Construction phase activities

Duration	The construction phase will take place subsequent to the issuing of an EA from the DFFE. The construction phase for the proposed project is expected to take up to 24 months in total. Appropriate mitigation and management measures are included in the EMPr (**Appendices I-J** of the BA Report) with regard to traffic control.
Transportation	The construction phase will involve the transportation of personnel, construction material and equipment to the site, and personnel away from the site. (for the delivery of concrete, pylon components other construction materials) will be required.
Site Establishment	In terms of site establishment, a laydown area will be required at the outset of the construction phase, as well as dedicated access routes from the laydown area to the working areas.
Laydown area	Laydown areas will be temporary in nature (for the duration of the construction phase) and will include the establishment of the construction site camp (including site offices and other temporary facilities for the appointed contractors). This will be located within the authorised Umsinde, Ishwati and Khangela Emoyeni Wind Energy Facility sites, at the switching station locations. Smaller temporary laydown areas may be utilised along the powerline corridor, for the temporary placement of pylon components during construction.
Dust generation	During the construction phase, dust will be generated from the earthworks and excavation required for the construction of the proposed infrastructure, the removal of vegetation, the movement of vehicles and equipment accessing the site, and the infilling of excavations and levelling. Appropriate mitigation measures will be implemented during the construction phase to reduce the dust levels. Approved soil stabilizing agents may need to be used to minimise dust. Dust generation during the construction phase will be of a short-term duration and is predicted to be of low significance with the implementation of mitigation measures. Appropriate mitigation and management measures are included in the EMPr's (**Appendix I-J**) of the BA Report). The construction vehicles and equipment will also generate

	exhaust emissions. However, these emissions are also expected to be short-term in duration and of low significance with the implementation of mitigation measures.
Noise generation	In terms of noise generation, as part of the construction phase, noise will be generated by the construction activities, earthworks, personnel, equipment and vehicles on the site. The levels of noise are not expected to be excessive and will be in line with standard industry levels associated with the proposed activity. In addition, noise generation during the construction phase is considered to be localised and short-term, with a low to very low significance (with the implementation of mitigation measures). During the construction phase, the ambient noise is not expected to exceed 45 dB(A) during the day and 35 dB(A) at night for rural districts (as required by SANS 10103:2008). In addition, the proposed project will not generate any noise during the operational phase.

All efforts will be made to ensure that all construction work will be undertaken in compliance with local, provincial and national legislation, local and international best practice, as well as the EMPr, which is included in **Appendix I-J** of this BA Report. During the construction phase, it is estimated that approximately 300 employment opportunities will be created for the Emoyeni Wind Energy Facilities and associated grid connection infrastructure. The employment creation is also dependent on the final engineering design.

Operational Phase:

The following activities will occur during the operational phase:

- Electricity from the authorised wind energy facilities will be transmitted through the proposed grid connection infrastructure to the Eskom Gamma MTS.
- Maintenance of the 132kV grid connection infrastructure, associated access roads and water course crossings along the powerline corridor, and Ishwati substation access road
- During the life span of the grid connection infrastructure, associated access roads and water course crossings (approximately 20 years), on-going maintenance will be required on a scheduled basis. This maintenance work will be undertaken by contractors employed by the project applicant, and in compliance with the EMPr's.

Decommissioning Phase:

The main aim of decommissioning is to return the land to its original, pre-construction condition, or as close as possible thereto. Should the unlikely need for decommissioning arise (i.e. if the actual wind energy facilities are decommissioned or the land needs to be used for other purposes), the decommissioning procedures will be undertaken in line with the EMPr's and the site will be rehabilitated and returned to its pre-construction state. It is expected that the areas affected by the various infrastructure will revert back to the original land-use (i.e. primarily agricultural use) once the wind energy facilities have reached the end of its economic life and all infrastructure has been decommissioned.

SECTION 4: NEED FOR AND APPROACH TO UNDERTAKING THE BASIC ASSESSMENT PROCESS

The DFFE commissioned a Strategic Environmental Assessment (SEA) for Electrical Grid Infrastructure to assist Eskom with identifying priority corridors and to improve environmental regulatory processes inside the corridors in support of Strategic Integrated Project (SIP) 10. The final Power Corridors assessed as part of the 2016 Electricity Grid Infrastructure SEA were gazetted for implementation on 16 February 2018 in Government Gazette 41445, Government Notice 113. The proposed Electrical Grid Infrastructure project mostly falls within the Central Power Corridor included in the Electrical Grid Infrastructure SEA.

On 27 July 2022 the Minister of Environmental Affairs published GN.o 2313: *Standard for the development and expansion of powerlines and substation within Identified geographical areas and the exclusion of this infrastructure from the requirements to obtain Environmental Authorisation*. ("the Standard"). The Standard and the exclusions do not apply in the following instances: 6.1. Where any part of the infrastructure occurs on an area for which the environmental sensitivity for any environmental theme is identified as being very high or high by the national web based environmental screening tool and confirmed to be such through the application of the procedures set out in the Standard. As per Section 6 of GN R.2313 and the procedural requirements set out in the standard, screening tool reports were generated for the grid infrastructure indicating that portions of the powerline corridor falls within very high or high sensitivity environmental sensitivity for the various themes (refer to Table 4.4. for a summary and Appendix M for Screening Tool Reports). Therefore the application of GN R 2313 for the exclusion of the proposed infrastructure from the requirements to obtain Environmental Authorisation (i.e to undertake a registration process in line with the Standard) is not applicable for the project.

A Basic Assessment process will be undertaken and as the infrastructure is considered Electrical Grid Infrastructure however as the infrastructure is associated with projects that have been selected as preferred bidder projects via private offtake procurement programmes, one of which (Umsinde Emoyeni WEF) has been registered as a Strategic Integrated Project (SIP 20c: Embedded generation investment programme (EGIP)).

The majority of the proposed project falls within the Renewable Energy Zone (REDZ) 2 (i.e. Beaufort West REDZ) and Central Strategic Transmission Corridor. Eight REDZs were assessed as part of the 2015 Wind and Solar Phase 1 SEA were gazetted for implementation on 16 February 2018 in Government Gazette 41445, Government Notice 114 and Phase 2 Strategic Environmental Assessment for Wind and Solar Photovoltaic Energy in South Africa, 2019 identified 3 additional Renewable Energy Development Zones that are of strategic importance for large scale wind and solar photovoltaic energy development. These Renewable Energy Development Zones were published under Government Notice No. 786 Government Gazette No. 17 July of 2020.

In terms of the EIA Regulations of December 2014 (amended in April 2017) published in terms of the NEMA (Act No. 107 of 1998) as amended, the establishment of the grid connection infrastructure, and associated access tracks and water course crossings for the Umsinde, Khangela and Ishwati Emoyeni Wind Energy Facilities triggers listed activities requiring environmental authorisation. As the project triggers activities listed in Listing Notice 1 (GNR327) and Listing Notice 3 (GNR324), the application for environmental authorisation is required to be supported by a BA process, the decision-making timeframe on this application is 57 days in line with the SIP status of the project, and the project's location within a REDZ and EGI Corridor

This project relates to the development of Electricity Grid Infrastructure, and associated access tracks and crossings to support the authorised Emoyeni Wind energy facilities. Therefore, the development of Electricity Grid Infrastructure, and associated access tracks and water course crossings within a development corridor and the access track associated with Ishwati switching station serves as the subject of this Application for Environmental Authorisation. The proposed project is in line with national planning initiatives to support and promote sustainable development.

In accordance with Regulation 12 (1) of the 2014 NEMA EIA Regulations (as amended), the applicant has appointed Nala Environmental to undertake the BA Process in order to determine the biophysical, social and economic impacts associated with undertaking the proposed activity. The BA team also includes

various specialists that have been appointed to undertake specialist studies to contribute to the BA Process. These specialist studies are included in Appendix **D - H** of the BA Report.

4.1 Need & Desirability

The requirements of Appendix 1 of the EIA Regulations, 2014, as amended, is to motivate for "*the need and desirability for the proposed development, including the need and desirability of the activity in the context of the preferred location*".

The need and desirability for the proposed grid infrastructure, and associated access tracks and crossings for the project is directly linked to the need for the 147 MW Umsinde Emoyeni and 147MW Khangela Emoyeni which were authorised as (DFFE REF:. 14/12/16/3/3/2/686) on 06 September 2018, and (DFFE REF:. 14/12/16/3/3/2/687) respectively and the Ishwati Emoyeni Wind Energy Facility (DFFE Ref: 12/12/20/2351) authorised on 2 July 2015, as the main purpose of the proposed 132kV powerline and associated access tracks and water course crossings is to support the development of the wind energy facilities, specifically:

- The grid infrastructure is required to connect with infrastructure coming from the Umsinde Emoyeni WEF and transmitting this along via the Khangela and Ishwati switching station all the way up to the authorised Gamma substation which connects to the National Grid.
- In South Africa there is currently a disconnect between electricity supply and demand i.e. electricity is not always produced at the exact time that it is required resulting in periodic load shedding. There is a siginificant need for additional energy supply from renewable energy sources to supplement additional megawatts into the National Grid.

Considering the relationship, and the necessity of, the proposed grid infrastructure, associated access tracks and water course crossings for the authorised Emoyeni WEFs, the following need and desirability factors are applicable, and are aligned with national, regional, and local policies and plans (as detailed in section 4):

The National Development Plan (National Planning Commission, 2011, p.10) proposes to create 11 million jobs by 2030 by:

- "Realising an environment for sustainable employment and inclusive economic growth;
- Promoting employment in labour-absorbing industries;
- Raising exports and competitiveness;
- Strengthening government's capacity to give leadership to economic development; and
- Mobilising all sectors of society around a national vision".
- The need for the country to respond to the international commitments regarding climate change and reduction in carbon emissions.
- The need at a national level to diversify the power generation technology mix to include up to 14.4 GW of renewables by 2030, as defined in the Integrated Resource Plan (IRP), 2019.
- The need for sustainable development at a Provincial level, including the need to utilise its extensive resources for the benefits of the local area.

From an overall environmental sensitivity and planning perspective, the proposed infrastructure supports the broader strategic context of the relevant municipalities as it will be an integral part of the wind energy facilities which is considered an opportunity for economic development in the region as per the Beaufort West and Ubuntu Local Municipalities and the Central Karoo and Pixley ka Seme District Municipality's Integrated Development Plans. It is also in line with broader societal needs and the public interest as it is linked to a renewable energy facility (Emoyeni WEFs), for which there is national policy and support.

Approval of this BA project will enable and facilitate the construction of a larger suite of WEF projects proposed by the applicant, which will play a role in enhancing employment and economic growth objectives by creating employment opportunities and contributing to economic growth. The project will assist in reaching the objectives of the IDP to promote social and economic development for the Pixley ka Seme and Central Karoo district communities, through purposeful and quality service delivery and infrastructure, is achieved. The project will assist in supporting the local and national electricity supply through its contribution to the National Eskom Grid as the infrastructure is directly linked to the Emoyeni WEFs. The project will further assist in minor local job creation which will further aid in achieving IDP objectives and assist with local economic development. Large scale industrial private offtakers have selected the Umsinde and Khangela Emoyeni projects as preferred bidder projects. The proposed grid connection Infrastructure is required to enable these two wind farm projects to export their generated electricity into the national grid. The approval of this BA is essential to enable the development of the Emoyeni WEFs, and will facilitate a reduction of the offtakers emission footprint. This will also contribute to support the Government's commitments to reducing greenhouse gas emissions.

4.2 Relevant legislative permitting requirements

The National Environmental Management Act (Act No. 107 of 1998) and the Environmental Impact Assessment Regulations, 2014, as amended

An application for environmental authorisation is submitted to the National Department of Forestry, Fisheries and the Environment (DFFE). The DFFE requires a Basic Assessment for this project. The Basic Assessment will conform to the National Environmental Management Act 107 of 1998 (as amended). The Basic Assessment will provide information about the proposed 132kV powerline routing, and associated access tracks and watercourse crossings within a 400m wide development corridor and its scope is restricted to this component of the project. In terms of Section 24(1) of NEMA, the potential impact on the environment associated with listed activities must be considered, investigated, assessed and reported on to the competent authority (the decision-maker) charged by NEMA with granting of the relevant EA. As the proposed infrastructure is considered essential infrastructure for the authorised Emoyeni Wind Energy Facilities, which is a power generation activity, and therefore relates to the IRP 2010 – 2030, 2019, the National DFFE has been determined as the Competent Authority in terms of GNR 779 of 01 July 2016. The Provincial Northern Cape Department of Department of Agriculture, Environmental Affairs, Rural Development and Land Reform and the Western Cape Department of Environmental Affairs and Development Planning are the Commenting Authorities on the project.

The BA process being conducted for the proposed grid connection infrastructure associated access tracks and water course crossings within a 400m wide development corridor to support the Emoyeni WEFs is being undertaken in accordance with Section 24 (5) of the NEMA. Section 24 (5) of NEMA pertains to Environmental Authorisations (EAs), and requires that the potential consequences for, or impacts of, listed or specified activities on the environment be considered, investigated, assessed, and reported on to the competent authority. Listed Activities are activities identified in terms of Section 24 of the NEMA which are likely to have a detrimental effect on the environment, and which may not commence without an EA from the competent authority subject to the completion of an environmental assessment process (either a Basic Assessment (BA) or full Scoping and EIA).

As the proposed development triggers listed activities in Listing Notice 1 (GNR327) and Listing Notice 3 (GN324), and falls within the REDZ (i.e. Beaufort West) and the Central Power Corridor it would need to follow an expedited BA process in terms of the 2014 EIA Regulations, as amended.

Table 4.1: Listed activities as per the EIA regulations which are triggered by establishment of 132kV grid connection infrastructure, associated access road/tracks and Water Course crossings within a 400m wide development corridor associated with the authorised Emoyeni WEFs.

Activity No(s):	Provide the relevant **Basic Assessment Activity(ies)** as set out in **Listing Notice 1** of the EIA Regulations, 2014 as amended.	Describe the portion of the proposed project to which the applicable listed activity relates.

11	The development of facilities or infrastructure for the transmission and distribution of electricity— (i) outside urban areas or industrial complexes with a capacity of more than 33 but less than 275 kilovolts;	Three 33kV/132kV switching substations (collector stations) will be developed, adjacent to the authorised Umsinde-, Khangela- and Ishwati-Emoyeni WEF facility substations. The 132kV single or double circuit powerlines will be located within a 400m wide development corridor and will consist of the following: • The establishment of a 132kV powerline within a 400m wide corridor that will extend from the Khangela switching station to the Ishwati switching station (~36km), and then onward for ~25km to the Eskom Gamma Substation. • In addition, a further length of 132kV powerline (within a 400m wide corridor) will extend from the Umsinde switching station to the Khangela switching station for ~8km OR it may connect directly into the Khangela-Ishwati powerline at the Khangela switching station. • An extended powerline development corridor of approximately 1,91 km^2 wide has been assessed in the vicinity of the Gamma Substation that will enable the 132kV powerline to connect to either the south face of the Gamma Substation yard or approach from the east, depending on the available connection point at the time of the connection.
12(ii)(a)(c)	The development of (ii) infrastructure or structures with a physical footprint of 100 square meters or more; where such development occurs within (a) a watercourse and (c) within 32 meters of a watercourse, measured from the edge of a watercourse.	The double-circuit or single circuit overhead power lines, access tracks up to 7m wide, and water crossings will need to cross the several drainage lines in order to connect the Emoyeni Wind Energy Facilities to the Gamma Substation yard. The access road to the Ishwati switching station will be up to 12m wide during construction and reduces to 6m wide during operation will allow for access to the Ishwati switching station for construction and maintenance activities. This will result in infringement within the watercourse and/or within 32m of the watercourse with a physical footprint greater than 100 square metres.
19	The infilling or depositing of any material of more than 10 cubic meters into, or the dredging, excavation, removal, or moving of soil,	The development of the grid connection infrastructure and associated access tracks and water crossings will require

	sand, shells, shell grit, pebbles or rock of more than 10 cubic meters from a watercourse	the infilling or depositing of material and the extraction, removal or moving of soils of more than 10 cubic meters from watercourses during construction.
27	The clearance of an area of 1 hectare or more, but less than 20 hectares of indigenous vegetation, except where such clearance of indigenous vegetation is required for is required for- (i) The undertaking of a linear activity.	Clearance of vegetation will be required within the grid connection corridor during power line (pylon placement) and access tracks that will exceed 1ha but will be less than 20ha.
28	Residential, mixed, retail, commercial, industrial or institutional developments where such land was used for agriculture, game farming, equestrian purposes or afforestation on or after 01 April 1998 and where such development: (ii) will occur outside an urban area, where the total land to be developed is bigger than 1ha.	The proposed grid infrastructure that is intended to be developed will be greater than 1ha and is located outside of urban areas and will take place in areas used for agriculture.
Activity No(s):	Provide the relevant **Basic Assessment Activity(ies)** as set out in **Listing Notice 3** of the EIA Regulations, 2014 as amended.	Describe the portion of the proposed project to which the applicable listed activity relates.
4	The development of a road wider than 4 metres with a reserve less than 13,5 metres. **g. Northern Cape** ii. Outside urban areas: (ee) Critical biodiversity areas as identified in systematic biodiversity plans adopted by the competent authority or in bioregional plans; **i. Western Cape** ii. Area outside urban areas (aa) Area containing indigenous vegetation	Access tracks along the powerline routing will be developed to a width of up to 7m wide to allow for construction and maintenance activities. The development of the access track to the Ishwati switching station will be up to 12m wide during construction and reduced to 6m wide during operation. These access tracks are located within CBA and ESA areas and areas containing indigenous vegetation.
12.	The clearance of an area of 300 square metres or more of indigenous vegetation except where such clearance of indigenous vegetation is required for maintenance purposes undertaken in accordance with a maintenance management plan. g. **Northern Cape Province** iii. within critical biodiversity areas identified in in bioregional plans. **i. Western Cape Province** ii. Within critical biodiversity areas identified in bioregional plans	Clearance of vegetation will occur within the 400m grid connection corridor during power line, access track and watercourse crossing construction which is greater than 300 square metres and is located within CBA and ESA's.

	v. On land designated for protection or conservation purposes in an Environmental Management Framework adopted in the prescribed manner, or a Spatial Development Framework adopted by the MEC or Minister.	The powerline corridor in the Western Cape Province is located adjacent to the Mountain Zebra Camdeboo Protected Environment and within its 500m buffer.
14	The development of – (xii) infrastructure or structures with a physical footprint of 10 square metres or more Where such development occurs (a) Within a watercourse (c) if no setback has been adopted, within 32 metres of a watercourse, measured from the edge of a watercourse; Excluding the development of infrastructure or structures within existing ports or harbours that will not increase the development footprint of the port or harbour. **g. Northern Cape** ii. Outside urban areas : (ff) Critical biodiversity areas or ecosystem service areas as identified in systematic biodiversity plans adopted by the competent authority or in bioregional plans; **i. Western Cape** i. Outside urban areas (aa) A protected area identified in terms of NEMPAA, excluding conservancies. (ff) Critical biodiversity areas or ecosystem service areas as identified in systematic biodiversity plans adopted by the competent authority or in bioregional plans;	The development of the new powerline, access tracks and water crossings will encroach onto watercourses and will be located within 32m of watercourses and is located within CBA's and ESA's. The powerline corridor in the Northern Cape is located more the 9km away from the Mountain Zebra Camdeboo Protected Environment whilst the portion of the powerline corridor within the Western Cape located within its 500m buffer.
Activity No(s):	Provide the relevant **Scoping and EIR Activity(ies)** as set out in **Listing Notice 2** of the EIA Regulations, 2014 as amended.	Describe the portion of the proposed project to which the applicable listed activity relates.

National Water Act (Act No. 36 of 1998)

In accordance with the provisions of the National Water Act (No. 36 of 1998) (NWA), all water uses must be licensed with the Competent Authority (i.e. the Regional DWS). Water use is defined broadly, and includes taking and storing water, activities which reduce stream flow, waste discharges and disposals, controlled activities (activities which impact detrimentally on a water resource), altering a watercourse, removing water found underground for certain purposes, and recreation.

Table 4.2 lists Water Uses associated with the proposed project and identified in terms of the NWA which require licensing either in the form of a GA, or in the form of a WUL. The table also includes a description of those project activities which relate to the applicable Water Uses.

Notice No.	Activity No.	Description of Water Use
NWA (No. 36 of 1998)	Section 21 (c)	Impeding or diverting the flow of water in a watercourse.
NWA (No. 36 of 1998)	Section 21 (i)	Altering the bed, banks, course or characteristics of a watercourse.

In the event that the flow of water in the ephemeral watercourses is affected and the bed, banks or course characteristics are altered, application would need to be made for a WUL in accordance with the requirements of the Regulations Regarding the Procedural Requirements for Water Use License Applications and Appeals (GNR 267), or a GA registered in accordance with the requirements of Revision of General Authorisation. A variety of risks have been identified for the proposed project. All seven of the risks associated with this project were determined to be low for the construction phase of the project (Refer to Table 9.3: DWS Risk Impact Matrix of the Aquatic Impact Assessment (Appendix E)) . This is due to the distance of all construction aspects outside of the delineated buffers (excluding water course crossings) combined with the low spatial scale of influence which results from the predominantly dry watercourses. Mitigation measures as well as appropriate rehabilitation have been suggested to further lower the identified risk in the DWS risk matrix.

The operation of the transmission line poses a risk to the identified water resources, with the level of risk determined to be low for all five potential risks (Refer to Table 9.3: DWS Risk Impact Matrix of the Aquatic Impact Assessment (Appendix E)). The resultant elevated risks result from the duration which they will occur for, being the lifetime of the activity. The potential for the hanging transmission line or the substation which are located a considerable distance from all watercourse buffers to have any effect on any watercourse is highly improbable.

Due to the low risks assigned to the project by the DWS risk assessment, authorisation under the provisions of the General Authorisation (GA) is deemed appropriate, provided mitigation measures and the recommendations are implemented.

The process of applying for a WUL or GA registration will addressed in parallel, but separate to, the Basic Assessment process.

National Heritage Resources Act (No. 25 of 1999) (NHRA)

Cultural Heritage in South Africa, includes all heritage resources, is protected by the National Heritage Resources Act (Act 25 of 1999) (NHRA). The National Heritage Resources Act (No. 25 of 1999) (NHRA) provides an integrated system which allows for the management of national heritage resources and to empower civil society to conserve heritage resources for future generations. Section 38 of NHRA provides a list of activities which potentially require the undertaking of a Heritage Impact Assessment.

Section 38: Heritage Resources Management
1). Subject to the provisions of subsections (7), (8) and (9), any person who intends to undertake a development categorised as –
a. the construction of a road, wall, power line, pipeline, canal or other similar form of linear development or barrier exceeding 300m in length;
b. the construction of a bridge or similar structure exceeding 50m in length;
c. any development or other activity which will change the character of a site –
i). exceeding 5 000m² in extent; or
ii). involving three or more existing erven or subdivisions thereof; or
iii). involving three or more erven or divisions thereof which have been consolidated within the past five years; or
iv). the costs of which will exceed a sum set in terms of regulations by SAHRA or a provincial heritage resources authority;
Must at the very earliest stages of initiating such a development, notify the responsible heritage resources authority and furnish it with details regarding the location, nature and extent of the proposed development.

In terms of Section 38(8), approval from the heritage authority is not required if an evaluation of the impact of such development on heritage resources is required in terms of any other legislation (such as NEMA), provided that the consenting authority ensures that the evaluation of impacts fulfils the requirements of the relevant heritage resources authority in terms of Section 38(3) and any comments and recommendations of the relevant resources authority with regard to such development have been taken into account prior to the granting of the consent. However, should heritage resources of significance be affected by the proposed grid connection infrastructure, a permit is required to be obtained prior to disturbing or destroying such resources as per the requirements of Section 48 of the NHRA, and the SAHRA Permit Regulations (GNR 668).

A Heritage Impact Assessment has been undertaken as part of the BA Process (refer to **Appendix F**).

National Forests Act (Act No. 84 of 1998)

Section 12 of the National Forest Act (NFA) (Act 84 of 1998), as amended prescribes that a licence is required if the project involves the cutting, disturbing, damaging or destroying of protected trees declared in terms of the said section. .A licence in terms of section 15 of the NFA will be required for the development of the grid connection infrastructure, associated access tracks & crossings within a 400m wide development corridor for one protected tree species , *Boscia albitrunca that may occur within the grid corridor* as identified in the Terrestrial Impact Assessment (Appendix D)

National Veld and Forest Fire Act (Act No. 101 of 1998)

The applicant should provide fire breaks as applicable in accordance with Chapter 4 of the National Veld and Forest Fire Act (Act 101 of 1998) and should consider amongst other the following:

- Fire rating
- Consultation of adjoining owners and the fire protection association (if any)
- be present at such burning or have an agent attend.

Summary of all applicable Legislation, Policies and/or Guidelines associated with the development of the proposed 132kV grid connection infrastructure, associated access tracks and water course crossings to support the authorised Emoyeni Wind Energy Facilities

Table 4.3: Applicable Legislation, Policies and/or Guidelines associated with the development of the proposed 132kV grid connection infrastructure, associated access tracks and crossings to support the authorised Emoyeni Wind Energy Facilities:

Title of legislation, policy or guideline	Applicability to the Proposed Project	Administering Authority	Date of Legislation
NEMA (Act 107 of 1998, as amended)	The proposed project will require the implementation of appropriate environmental management practices.	National DFFE	19 November 1998
NEMA EIA Regulations published in GN R982, R983, R984 and R985, and as amended on 7 April 2017 in GN R326, R327, R325 and R324	These Regulations provide the procedures that need to be followed for the BA process.	National DFFE	8 December 2014
NEMA EIA Regulations published in Government Notice R983 and	These Regulations contain the relevant	National DFFE	8 December 2014 and amended on 7 April 2017

R985, and as amended on 7 April 2017 in GN R327 and R324	listed activities that are triggered, thus requiring a BA. Please refer to Section 4) of this BA Report for the complete list of listed activities		
National Environmental Management: Waste Act (Act 59 of 2008) (NEMWA)	General and hazardous waste will be generated during the construction phase, which will require proper management.	National DFFE	6 March 2009
National Environmental Management: Waste Amendment Act (Act 26 of 2014)	General and hazardous waste will be generated during the construction phase, which will require proper management.	National DFFE	2 June 2014
National Environmental Management: Air Quality Act (Act 39 of 2004)	The proposed stockpiling activities, including earthworks, may result in the unsettling of, and temporary exposure to, dust. Appropriate dust control methods will need to be applied.	National DFFE	19 February 2005
Water Services Act (Act 108 of 1997)	Water will be required during the construction and decommissioning phases of the proposed project, for consumption purposes, earthworks and grassing etc.	National Department of Water and Sanitation (DWS)	1997
Hazardous Substances Act (Act 15 of 1973)	During the proposed project, fuel and diesel will be utilised to power vehicles and equipment. In addition, potential spills of hazardous materials could occur during the construction and decommissioning phases.	Department of Health	1973
Environmental Conservation Act (ECA) (Act 73 of 1989 Amendment Notice No.1183 of 1997)	The ECA was promulgated prior to the NEMA, and was the main piece of legislation in dealing with environmental issues in South Africa. The ECA has largely been repealed and replaced with NEMA.	National DFFE	1997

National Forests Act (Act 84 of 1998)	The National Forest Act (Act 84 of 1998) governs the removal, disturbance, cutting or damage and destruction of identified "protected trees". If any protected species are found on site during the search and rescue or construction phase, the Provincial Department of Agriculture, Forestry and Fisheries (DAFF) will be contacted to discuss the permitting requirements. It is not unlikely that any listed trees will be encountered during the construction of the proposed infrastructure, nor would the clearing of "natural forest", as defined within the Act, be required on the site.	DAFF	1998
National Water Act (NWA) (Act 36 of 1998)	The need for a WUL will be confirmed with the DWS during the 30-day review of the BA Report. Consultation with the DWS will also ensure that the relevant legislative requirements are complied with. Should any infrastructure need to be placed directly within an active channel of any freshwater resource, a WUL will be required and must be applied for by the proponent. In terms of Section 21 (c) and (i) of the NWA the relevant authorisation must be obtained from the DWS for any and all any activities that take place within the watercourses. The General Authorisations (GAs) for Section 21 (c) and (i) water uses (impeding or diverting flow or changing the	Department of Water and Sanitation	1998

	bed, banks or characteristics of a watercourse) as defined under the NWA have been revised (Government Notice R509 of 2016). The proposed works within or adjacent to the wetland areas and river channels are likely to change the characteristics of the associated freshwater ecosystems and may therefore require authorisation. Determining if a water use licence is required for these water uses is now associated with the risk of degrading the ecological status of a watercourse. A low risk of impact could be authorised in terms of a GA.		
Integrated Environmental Management (IEM) guideline series published by the DEA (various documents dated from 2002 to present)	The IEM Guideline series provides guidance on conducting and managing all phases and components of the required BA and PPP, such that all associated tasks are performed in the most suitable manner.	National DFFE	2002 - present
National Heritage Resources Act (Act 25 of 1999)	The proposed project may require a permit in terms of the National Heritage Resources Act (Act 25 of 1999) prior to any fossils or artefacts being removed by professional palaeontologists and archaeologists. Additional information regarding this is provided in the Heritage Impact Assessment	SAHRA Heritage Western Cape	1999
Conservation of Agricultural Resources Act (Act 43 of 1983)	The Conservation of Agricultural Resources Act (CARA) (Act 43 of 1983) has categorised a large number of alien invasive plants (AIPs) together with associated	National DFFE	1983

	obligations of the land owner. Invasive plant species that should be removed or maintained only under certain commercial situations are identified in terms of the CARA. This Act will be applicable to the project if and where such plants arise within or adjacent to the project area. Notably most listed alien invasive species are propagated and driven by the disturbance of land during and following construction. The Terrestrial Ecology Impact Assessment of this BA Report explains that the following AIP's were identified within the grid corridor i.e. *Agave americana, Atriplex nummularia subsp. Nummularia, Salsola kali, Schinus mole, Tagetes minuta, Opuntia ficus-indica, Opuntia robusta, Eucalyptus sp., Salix babylonica, and Datura stramonium.* Considering that the area is a CBA it is recommended that any AIP species that may colonize the area in the future be controlled by implementing an Alien Invasive Plant Management Programme in compliance of section 75 of the Act. The Alien Invasive Management Plan is to be implemented by the Contractor during construction , operation and maintenance of the grid infrastructure.		
National Environmental Management: Biodiversity Act (Act 10 of 2004)	This Act serves to control the disturbance and land utilisation within certain habitats, as well as	National DFFE	September 2004

	the planting and control of certain exotic species. The proposed development may not necessitate any particular application for a change in land use from an ecological perspective, however the effective disturbance and removal of species identified in the Terrestrial Ecology Impact Assessment as well as possible other species (i.e. TOPS species), will require specific permission from the applicable authorities. One is listed on the Red List *Monsonia crassicaulis*; listed as NT); 19 (nineteen) are listed on Schedule 4 of the Provincial (Western Cape) Nature Conservation Ordinance); 1 (one) (*Boscia albitrunca*) is a listed Protected Tree; and 0 (none) are TOPS listed species. In addition, the planting and management of exotic plant species on route, if and where required, will be governed by the Alien and Invasive Species (AIS) regulations, which were gazetted in 2014. These regulations compel landowners to manage exotic weeds on land under their jurisdiction and control.		
Biodiversity Sector Plan	The environmental goals of the Beaufort West Local Municipality are to promote, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity	National DFFE Beaufort West Local Municipality Ubuntu Local Municipality	2008

	loss. Above deliberations on the background of the municipality shows that it is sensitive area and should be developed with the necessary care to ensure sustainability and conservation of the natural environment and the natural resource base		
Minerals and Petroleum Resources Development Act (No. 28 of 2002) (MPRDA)	In accordance with the provisions of the MPRDA a mining permit is required in accordance with Section 27(6) of the Act where a mineral in question is to be mined, including the mining of materials from a borrow pit. Any person who wishes to apply for a mining permit in accordance with Section 27(6) must simultaneously apply for an Environmental Authorisation in terms of NEMA. No borrow pits are expected to be required for the construction of the project, and as a result a mining permit or EA is not required to be obtained. Section 53 of the MPRDA states that any person who intends to use the surface of any land in any way which may be contrary to any object of the Act, or which is likely to impede any such object must apply to the Minister for approval in the prescribed manner.	DMR	2002
National Veld and Forest Fire Act (No. 101 of 1998) (NVFFA)	Chapter 4 of the NVFFA places a duty on owners to prepare and maintain firebreaks, the procedure in this regard, and the role of adjoining owners and the	DAFF	1998

	fire protection association. Provision is also made for the making of firebreaks on the international boundary of the Republic of South Africa. The applicant must ensure that firebreaks are wide and long enough to have a reasonable chance of preventing a veldfire from spreading to or from neighbouring land, it does not cause soil erosion, and it is reasonably free of inflammable material capable of carrying a veldfire across it. Chapter 5 of the Act places a duty on all owners to acquire equipment and have available personnel to fight fires. Every owner on whose land a veldfire may start or burn or from whose land it may spread must have such equipment, protective clothing and trained personnel for extinguishing fires, and ensure that in his or her absence responsible persons are present on or near his or her land who, in the event of fire, will extinguish the fire or assist in doing so, and take all reasonable steps to alert the owners of adjoining land and the relevant fire protection association, if any. While no permitting or licensing requirements arise from this legislation, this Act will be applicable during the construction and operation of the proposed		

	infrastructure establishment, in terms of the preparation and maintenance of firebreaks, and the need to provide appropriate equipment and personnel for firefighting purposes.		
National Environmental Management: Waste Act (No. 59 of 2008) (NEM:WA)	The Minister may by notice in the Gazette publish a list of waste management activities that have, or are likely to have, a detrimental effect on the environment. The Minister may amend the list by » Adding other waste management activities to the list. » Removing waste management activities from the list. » Making other changes to the particulars on the list. In terms of the Regulations published in terms of NEM:WA (GNR 912), a BA or EIA is required to be undertaken for identified listed activities. Any person who stores waste must at least take steps, unless otherwise provided by this Act, to ensure that: » The containers in which any waste is stored, are intact and not corroded or in » Any other way rendered unlit for the safe storage of waste. » Adequate measures are taken to prevent accidental spillage or leaking.	National DFFE	2008

	» The waste cannot be blown away. No listed activities are triggered by the grid infrastructure establishment at the Emoyeni WEFs and therefore no Waste Management License is required to be obtained. General and hazardous waste handling, storage and disposal will be required during construction and operation. The National Norms and Standards for the Storage of Waste (GNR 926) published under Section 7(1)© of NEM:WA will need to be considered in this regard.		
National Road Traffic Act (No. 93 of 1996) (NRTA)	The technical recommendations for highways (TRH 11): "Draft Guidelines for Granting of Exemption Permits for the Conveyance of Abnormal Loads and for other Events on Public Roads" outline the rules and conditions which apply to the transport of abnormal loads and vehicles on public roads and the detailed procedures to be followed in applying for exemption permits are described and discussed. Legal axle load limits and the restrictions imposed on abnormally heavy loads are discussed in relation to the damaging effect on road pavements, bridges, and culverts. The general conditions, limitations, and escort requirements for abnormally	SANRAL – national roads Northern Cape DoT Western Cape DoT	1996

	dimensioned loads and vehicles are also discussed and reference is made to speed restrictions, power/mass ratio, mass distribution, and general operating conditions for abnormal loads and vehicles. Provision is also made for the granting of permits for all other exemptions from the requirements of the National Road Traffic Act and the relevant Regulations.		

This BA Report has been prepared in accordance with the requirements of the EIA Regulations published on 08 December 2014 (as amended) promulgated in terms of Chapter 5 of the National Environmental Management Act (No. 107 of 1998).

4.3 Assessment of Issues Identified through the BA Process

In terms of GN R960 (promulgated on 5 July 2019) and Regulation 16(1)(b)(v) of the 2014 EIA Regulations (as amended), the submission of Screening Reports generated from the national web based environmental screening tool is compulsory for the submission of applications in terms of Regulation 19 and 21 of the 2014 EIA Regulations.

The requirement for the submission of Screening Reports for the proposed development is applicable as it triggers Regulation 19 of the 2014 EIA Regulations (as amended). The table provides a summary of the specialist assessment requirements identified for the project site in terms of the screening tool and responses to each assessment requirement based on the nature and extent of the project.

Table 4.4: Sensitivity ratings from the DEFF's web-based online Screening Tool associated with the establishment of the 132kV grid connection infrastructure, (Preferred Alternative, Alternative I and Alternative 2) and associated access tracks and crossings to support the authorised Emoyeni Wind Energy Facilities.

Specialist Assessment as per DFFE Screening Tool	Sensitivity Rating as per the Screening Tool (relating to the need for the study)- Powerline Infrastructure	Sensitivity Rating as per the Screening Tool (relating to the need for the study)- Switching Station Infrastructure (Umsinde Emoyeni)	Sensitivity Rating as per the Screening Tool (relating to the need for the study)- Switching Station Infrastructure (Khangela Emoyeni)	Sensitivity Rating as per the Screening Tool (relating to the need for the study)- Switching Station Infrastructure (Ishwati Emoyeni)	Sensitivity Rating as per the Screening Tool (relating to the need for the study)- Watercourse crossings	Response to findings
Soil and Agricultural Impact Assessment	High	Low	Low	Medium	High	An Agricultural Compliance Statement has been undertaken and included as **Appendix H** of the BA Report.
Landscape/Visual Impact Assessment	Screening Report did not include a rating for this theme	Screening Report did not include a rating for this theme	Screening Report did not include a rating for this theme	Screening Report did not include a rating for this theme	Screening Report did not include a rating for this theme	A Visual Impact Assessment has been undertaken and included within **Appendix G** of the BA report.
Archaeological and Cultural Heritage Impact Assessment	Very High	Low	Low	Low	Very High	A Heritage Impact Assessment (which considers the impact on both archaeological and cultural aspects of the study area and the development area) has been undertaken for the study and development areas and is included in this BA Report as **Appendix F**.
Palaeontology Impact Assessment	Very High	Screening Report did not include a rating for this theme	Very High	Very High	Very High	The Palaeontological Impact Assessment (included as **Appendix F** of the BA Report) includes an assessment of the potential impact on palaeontological resources within the study and development areas.

Terrestrial Biodiversity Impact Assessment	Very High	Very High	Very High	Low	Very High	A Terrestrial Impact Assessment (including consideration of flora and fauna) has been undertaken for the proposed infrastructure development and is included as **Appendix D** of the BA Report.
Aquatic Biodiversity Impact Assessment	Very High	Very High	Very High	Low	Very High	An Aquatic Impact Assessment has been undertaken for the infrastructure development and is included as **Appendix E** of the BA Report.
Avifauna Impact Assessment	Screening Report did not include a rating for this theme	Screening Report did not include a rating for this theme	Screening Report did not include a rating for this theme	Screening Report did not include a rating for this theme	Screening Report did not include a rating for this theme	Given the nature of the proposed infrastructure that is to be included, an Avifauna Impact Assessment has been undertaken as part of the Terrestrial Ecology report (**Appendix D**).
Civil Aviation Assessment	Low	Low	Low	Low	Low	The proposed development is located 20km-30km to the North of the Murraysburg aerodrome. The CAA will be consulted during the BA process in order to determine any potential impacts and/or specific requirements. A separate application for "obstacle" approval has been submitted to the CAA, in accordance with the Civil Aviation Regulations, and this process will run in parallel (but separate to) the BA process
Defence Assessment	Low	Low	Low	Low	Low	The proposed study area and development area is not located within the vicinity of any military bases.
Plant Species Assessment	Medium	Low	Medium	Medium	Medium	A Terrestrial Impact Assessment (including

Animal Species Assessment	High	High	High	Medium	High	flora and fauna) has been undertaken for the proposed infrastructure establishment as per GN 1150 of October 2020 and is included as **Appendix D** of the BA Report.
Geotechnical Assessment	Screening Report did not include a rating for this theme	Screening Report did not include a rating for this theme	Screening Report did not include a rating for this theme	Screening Report did not include a rating for this theme	Screening Report did not include a rating for this theme	A Geotechnical Assessment of the development area will be undertaken by the proponent as part of the final design and planning process.

Based on the results of the screening, and from experience on similar projects and in the study area, the EIA project team has identified the following issues as requiring investigation.

In order to adequately identify and assess potential environmental impacts associated with the proposed grid connection infrastructure, associated access tracks and water course crossings for the authorised Umsinde and Khangela Emoyeni Wind Energy Facilities, the following specialist consultants have provided input into this Basic Assessment report:

Table 4.5: Issues identified for investigation and specialist consultants appointed to evaluate the potential impacts associated with the grid connection infrastructure for the Emoyeni Wind Energy Facilities.

Ecology Impact Assessment (Terrestrial Biodiversity & Avifauna)	Mr Andrew Husted	The Biodiversity Company	Appendix D
Aquatic Impact Assessment	Mr Andrew Husted	The Biodiversity Company	Appendix E
Heritage and Palaeontological Impact Assessment	Wouter Fourie & Elize Butler	PGS Heritage (Pty) Ltd	Appendix F
Visual Impact Assessment	Peter Velcich	NuLeaf Planning and Environmental (Pvt) Ltd	Appendix G
Soil and Agricultural Impact Assessment	Mr Andrew Husted	The Biodiversity Company	Appendix H

Specialist studies considered direct and indirect environmental impacts associated with the development of all components of the grid connection infrastructure proposed. Issues were assessed in terms of the following criteria:

- The **nature**, a description of what causes the effect, what will be affected, and how it will be affected;
- The **extent**, wherein it is indicated whether the impact will be local (limited to the immediate area or site of development), regional, national or international. A score of between 1 and 5 is assigned as appropriate (with a score of 1 being low and a score of 5 being high);
- The **duration**, wherein it is indicated whether:
  - The lifetime of the impact will be of a very short duration (0–1 years) – assigned a score of 1;
  - The lifetime of the impact will be of a short duration (2-5 years) - assigned a score of 2;
  - Medium-term (5–15 years) – assigned a score of 3;

- Long term (> 15 years) - assigned a score of 4;
- Permanent - assigned a score of 5.

» The **magnitude**, quantified on a scale from 0-10, where a score is assigned:

- 0 is small and will have no effect on the environment;
- 2 is minor and will not result in an impact on processes;
- 4 is low and will cause a slight impact on processes;
- 6 is moderate and will result in processes continuing but in a modified way;
- 8 is high (processes are altered to the extent that they temporarily cease);
- 10 is very high and results in complete destruction of patterns and permanent cessation of processes.

» The **probability of occurrence**, which describes the likelihood of the impact actually occurring. Probability is estimated on a scale, and a score assigned:

- Assigned a score of 1–5, where 1 is very improbable (probably will not happen);
- Assigned a score of 2 is improbable (some possibility, but low likelihood);
- Assigned a score of 3 is probable (distinct possibility);
- Assigned a score of 4 is highly probable (most likely);
- Assigned a score of 5 is definite (impact will occur regardless of any prevention measures).

» The **significance**, which is determined through a synthesis of the characteristics described above (refer formula below) and can be assessed as low, medium or high;

» The **status**, which is described as either positive, negative or neutral;

» The degree to which the impact can be reversed;

» The degree to which the impact may cause irreplaceable loss of resources;

» The degree to which the impact can be mitigated.

The **significance** is determined by combining the criteria in the following formula:

S = (E+D+M) P;

S = Significance weighting.
E = Extent.
D = Duration.
M = Magnitude.
P = Probability.

The **significance weightings** for each potential impact are indicated as follows:

- **< 30 points:** Low (i.e. where this impact would not have a direct influence on the decision to develop in the area);
- **30-60 points:** Medium (i.e. where the impact could influence the decision to develop in the area unless it is effectively mitigated);
- **> 60 points:** High (i.e. where the impact must have an influence on the decision process to develop in the area).

As the Applicant has the responsibility to avoid or minimise impacts and plan for their management (in terms of the EIA Regulations, 2014 (as amended)), the mitigation of significant impacts is discussed. Assessment of impacts with mitigation is made in order to demonstrate the effectiveness of the proposed mitigation measures. The Environmental Management Programme's (EMPr's) is included as **Appendix I** to **J**.

4.4 Assumptions and Limitations of the BA Process

The following assumptions and limitations are applicable to the studies undertaken within this BA process:

- All information provided by the developer and I&APs to the environmental team was correct and valid at the time it was provided. It is assumed that the development footprint for infrastructure identified by the developer represents a technically suitable site for the establishment of the 132kV grid connection infrastructure, switching stations and associated access tracks and water course crossings to support the authorised Emoyeni Wind Energy Facilities which is based on the design undertaken by technical consultants for the project.
- This report and its investigations are project-specific, and consequently the environmental team did not evaluate any other power generation alternatives.

Refer to the specialist studies in **Appendices D – H** for specialist study specific limitations.

4.5 Details and Expertise of the Environmental Assessment Practitioner (EAP)

In accordance with Regulation 12 of the 2014 EIA Regulations (GN R326), the applicant, Eskom Holdings SOC Limited has appointed Nala Environmental (Pty) Ltd as the independent environmental consultant to undertake the Basic Assessment and prepare a Basic Assessment Report for establishment of new grid connection infrastructure, associated access tracks and water course crossings within a 400m wide development corridor to support the authorised Umsinde and Khangela Emoyeni WEFs. Nala Environmental nor any of its specialists are subsidiaries of/or are affiliated to Eskom Holdings SOC Limited. Nala Environmental declares that there are no interests in secondary developments that may arise out of the authorisation of the proposed infrastructure.

Nala Environmental (Pty) Ltd was established in 2020 as an enterprise of environmental consultants that provide services to the renewable energy, construction and infrastructure sectors. Nala Environmental is involved in integrated environmental and social consulting services. Our intellectually gifted team boasts the capacity and technical expertise to also provide project management services at all stages of project development and implementation. We are wholly women owned with a 100% black women shareholding.

The Nala Environmental team comprises:

- **Arlene Singh.** She holds a Bachelor degree in Environmental Science and an Honours degree in Environmental Management and has ten years of experience in the environmental management field. Her key focus is on undertaking environmental impact assessments, public participation, environmental management plans and programmes**.** She is registered as an Environmental Assessment Practitioner with the Environmental Assessment Practitioners Association of South Africa (EAPASA) (2019/898) and registered as a Candidate Natural Scientist with the South African Council for Natural Scientific Professions (SACNASP).

- **Norman Chetsanga.** He holds Bachelor of .Environmental Science. (Hons.) Pollution Science(2008), Bindura University of Science Education. He has 10 years of experience in the environmental management field. Vast experience in environmental impact assessments review, approval and associated environmental compliance inspections. Well experienced in environmental legislation interpretation and compliance thereof. Has also attained auditing skills in Health and Safety matters during his career. He is registered as a Professional Natural Scientist with the South African Council for Natural Scientific Professions (SACNASP).

- **Charleen Smuts.** is operating as sole-proprietor trading as Ecofluence Consulting, based on Cape Town. She is an Ecological and Wetland Scientist, registered as a Professional Natural Scientist (Pri. Sci. Nat) in the fields Ecological Science and Botanical Science. She has gained 9 years of professional experience in the environmental sector in which she has been actively involved with numerous legislated environmental processes in South Africa working with a range of clients. She is skilful in the field of Geographic Information Systems (GIS) leading to involvement in numerous large and small-scale mapping projects.

- **Justin Jacobs.** He holds a Bachelor's degree in Zoology from the University of Pretoria, and an Honours degree in Biological Sciences from the University of Cape Town

Curricula Vitae (CVs) detailing the Nala Environmental team's expertise and relevant experience are provided in Appendix A

4.6 Planning context and Regulatory Context

4.6.1. Electricity Supply in South Africa

The development of the authorised Umsinde, Ishwati and Khangela Emoyeni Wind Energy Facilities and their associated infrastructure development, associated access tracks and water course crossings in the Beaufort West and Ubuntu Local Municipal areas located in the Western Cape and Northern Cape Provinces is being initiated at a time when there is a considerable need and demand for additional electrical power into the national grid especially from renewable sources. This need stems from severe constraints that are placed on Eskom's power supply due to aging infrastructure, multiple malfunctions as a result and growing economy that requires stable electrical power supply to continue its growth. There have been more frequent interruptions to coal supply to coal fired powerplants that are also in need of maintenance work. The current interruptions to power supply in South Africa results in periodic load shedding more frequently and has resulted in risk to the economy, stunted economic growth and development.

The current electricity supply constraints experienced in South Africa are not temporary and are expected to increase with population and projected economic growth over time due to growing demand and anticipated declines in power generation from the existing coal power plants. As indicated by the Integrated Energy Plan (IEP) existing electricity generation capacity will decline from 2025, with power plant retirement anticipated by 2031, 2041 and 2048. It is anticipated that in 2050 approximately 20% of the current electricity generation capacity will remain. Large capital investments are therefore required in the electricity sector to maintain an adequate supply of power to support economic growth. There are various import options that have become available since 2020 as per the IRP, i.e. when new coal capacity is added along with new wind, solar and gas. The plan envisages a more diverse, and hence more stable, electricity generation system by 2050.

The need for diversity of the energy generation mix from renewable sources stems from international and local pressure on South Africa to reduce its carbon emissions. South Africa has one of the most carbon intensive economies in the world and has higher CO2 emissions per GDP purchasing power parity (2002 figures) from energy and cement production (Green Jobs Study, 2011) than China or the USA. This makes the greening of the electricity mix of national importance. The energy sector accounts for approximately 83% of the total GHG emissions (DEA, 2014) as coal is the primary fuel for combustion in the energy sector and accounts for atleast 85% of the countries power generation.

The National Development Plan (NDP) – Vision for 2030 (National Planning Commission, 2011) identifies 'energy' as a key area for investment in infrastructure, with an objective of at least 20 000MW of capacity to come from renewable sources.

Wind energy is associated with exceptionally low lifecycle emissions and does not emit carbon dioxide (CO2) in generating electricity. The construction period for a wind energy facility and it associated infrastructure is considerably shorter than that of coal fired power stations,. The greenhouse gases (GHG) associated with the construction phase of the projects are offset within a very short period of time compared with the project's lifespan. In a water scarce country like South Africa it is wind energy which is independent of water consumption as compared to coal fired power stations and poses limited health risks, and environmental pollution.

The national Integrated Resource Plan (IRP) 2010 developed the preferred energy mix to meet the electricity needs over a 20-year planning scope to 2030. In line with the national commitment to transition to a low carbon economy, 17 800 MW of the 2030 IRP target are expected to be from renewable energy sources, with 5 000 MW to be operational by 2019 and a further 2000 MW (i.e. combined 7000 MW) operational by 2020. In terms of the IRP 2019, South Africa continues to pursue a diversified energy mix that reduces reliance on a single or a few primary energy sources.

SNAPSHOT OF THE UPDATED ENERGY MIX

	Coal	Coal (Decommis-sioning)	Nuclear	Hydro	Storage	PV	Wind	CSP	Gas & Diesel	Other (Distributed Generation, CoGen, Biomass, Landfill)
Current Base	37,149		1 860	2,100	2 912	1 474	1 980	300	3 830	499
2019	2,155	-2,373					244	300		Allocation to the extent of the short term capacity and energy gap.
2020	1,433	-557				114	300			
2021	1,433	-1403				300	818			
2022	711	-844			513	400 1,000	1,600			
2023	750	-555				1000	1,600			500
2024			1,860				1,600		1000	500
2025						1000	1,600			500
2026		-1,219					1,600			500
2027	750	-847					1,600		2000	500
2028		-475				1000	1,600			500
2029		-1,694			1575	1000	1,600			500
2030		-1,050		2,500		1000	1,600			500
TOTAL INSTALLED CAPACITY by 2030 (MW)	33,364		1,860	4,600	5,000	8,288	17,742	600	6,380	
% Total Installed Capacity (% of MW)	43		2.36	5.84	6.35	10.52	22.53	0.76	8.1	
% Annual Energy Contribution (% of MWh)	58.8		4.5	8.4	1.2*	6.3	17.8	0.6	1.3	

Installed Capacity
Committed/Already Contracted Capacity
Capacity Decommissioned
New Additional Capacity
Extension of Koeberg Plant Design Life
Includes Distributed Generation Capacity for own use

- 2030 Coal Installed Capacity is less capacity decommissioned between years 2020 and 2030.
- Koeberg power station rated/installed capacity will revert to 1,926MW (original design capacity) following design life extension work.
- Other/ Distributed generation includes all generation facilities in circumstances in which the facility is operated solely to supply electricity to an end-use customer within the same property with the facility.
- Short term capacity gap is estimated at 2,000MW.

Figure 4.1: IRP 2019 as promulgated in October 2019

This plan provides for the development of 17GW of electricity from wind energy and 2088MW of new storage capacity by 2030. The establishment of the proposed grid connection infrastructure to support the Emoyeni WEFs would support the development of these WEFs, and ultimately contribute towards this goal.

4.6.2. Strategic Integrated Projects (SIPs)

The Presidential Infrastructure Coordinating Committee (PICC) is integrating and phasing investment plans across 18 Strategic Integrated Projects (SIPs) which have five core functions: to unlock opportunity, transform the economic landscape, create new jobs, strengthen the delivery of basic services and support the integration of African economies. A balanced approach is being fostered through greening of the economy, boosting energy security, promoting integrated municipal infrastructure investment, facilitating integrated urban development, accelerating skills development, investing in rural development and enabling regional integration. SIP 8 and 9 of the energy SIPs supports the development of infrastructure at the wind energy facility:

» SIP 8: Green energy in support of the South African economy: Support sustainable green energy initiatives on a national scale through a diverse range of clean energy options as envisaged in the Integrated Resource Plan (IRP 2010 – 2030) and supports bio-fuel production facilities.

- SIP 9: Electricity generation to support socio-economic development: The proposed Umsinde and Khangela Emoyeni WEF is a potential SIP 9 Project as electricity will be generated and social and economic upliftment, development and growth will take place within the surrounding communities. SIP 9 supports the acceleration of the construction of new electricity generation capacity in accordance with the IRP 2010 to meet the needs of the economy and address historical imbalances.

The proposed infrastructure for the realisation of the authorised Emoyeni WEFs is located within the Beaufort West REDZ and could be registered as a SIP project once it is under development. The project would then contribute to the above-mentioned SIPs. The Umsinde Emoyeni WEF has been registered as a SIP 20c by the SIP office. SIP 20c i.e The Embedded Generation Investment Programme (EGIP) entails a R2.6-billion-rand investment with an estimated R6 billion of additional private sector investment to be crowded-in. The programme involves the development, installation and operation of a total aggregate of up to 469 MegaWatt of solar PV and wind embedded generation Projects in South Africa through the provision of Subordinated Loans and Broad Based Black Economic Empowerment (B-BBEE) funding.

4.6.3. National Climate Change Bill, 2018

The Minister of Environmental Affairs published the National Climate Change Bill ("the Bill") for public comment on 08 June 2018. The National Climate Change Bills addresses issues related institutional and coordination arrangement across the three spheres of government namely national, provincial and local. It highlights the need the spheres of government and entities, sectors as well business to respond to challenges of climate change. The bill further address the matters relating to, the national adaptation to impacts of climate change, greenhouse gas emissions and removals, and policy alignment and institutional arrangements. The Bill provides a procedural outline that will be developed through the creation of frameworks and plans. The following objectives are set within the Bill:

a) Provide for the coordinated and integrated response to climate change and its impacts by all spheres of government in accordance with the principles of cooperative governance;
b) Provide for the effective management of inevitable climate change impacts through enhancing adaptive capacity, strengthening resilience and reducing vulnerability to climate change, with a view to building social, economic, and environmental resilience and an adequate national adaptation response in the context of the global climate change response;
c) Make a fair contribution to the global effort to stabilise greenhouse gas concentrations in the atmosphere at a level that avoids dangerous anthropogenic interference with the climate system within a timeframe and in a manner that enables economic, employment, social and environmental development to proceed in a sustainable manner.

The proposed grid connection and associated infrastructure will support the development of the Emoyeni Wind Energy Facilities and will enable the uptake of renewable energy into the national grid which will reduce the need for the use of non-renewable resources as an energy resource, thereby assisting in addressing climate change and global warming.

4.6.4. National Climate Change Response Policy, 2011

South Africa's National Climate Change Response Policy (NCCRP) establishes the approach to addressing climate change, including adaptation and mitigation responses. The NCCRP formalises the South African Government's vision for a transition to a low carbon economy, through the adoption of the 'Peak, Plateau and Decline' (PPD) GHG emissions trajectory whereby South Africa's emissions should peak between 2020 and 2025, plateau for approximately a decade, and then decline in absolute terms thereafter, and based on this the country has pledged to reduce emissions by 34% and 42% below Business As Usual (BAU) emissions in 2020 and 2025, respectively.

As an integral part of the policy, a set of near-term priority flagship programmes will be implemented to address the challenges of climate change, one of which includes the Renewable Energy Flagship Programme. The flagship programme includes a scaled-up renewable energy programme, based on the current programme specified in the IRP 2010, and using the evolving South African Renewables Initiative led by the Department of Public Enterprise and Department of Trade and Industry (DTI), as a driver for the deployment of renewable energy technologies. The programme will be informed by enhanced domestic manufacturing potential and the implementation of energy efficiency and renewable energy plans by local government.

The establishment of the grid connection and associated infrastructure for the Emoyeni WEF is aligned with the Renewable Energy Flagship Programme identified under South Africa's NCCRP and could therefore be argued to be aligned with the country's approach to addressing climate change.

4.6.2.1. Northern Cape Spatial Development Framework (PSDF) 2012

The Northern Cape Provincial Spatial Development Framework (PSDF) 2012 states that the overarching goal for the Province is to enable sustainability through sustainable development. The Province considers social and economic development as imperative in order to address the most significant challenge facing the Northern Cape, which is poverty.

The PSDF considers the release of greenhouse gas (GHG) emissions created by human activity as the key cause of global warming, which in turn could result in major negative effects and disasters in the short- and medium-term. This effect would increasingly undermine human development gains. Innovative strategies would have to be implemented to reduce the impact of global deterioration.

The PSDF identifies key sectoral strategies and plans which are considered to be the key components of the PSDF. Sectoral Strategy 19 refers to a provincial renewable energy strategy. Within the PSDF a policy has been included which states that renewable energy sources are to comprise 25% of the Province's energy generation capacity by 2020.

The overall energy objective for the Province also includes promoting the development of renewable energy supply schemes which are considered to be strategically important for increasing the diversity of domestic energy supply and avoiding energy imports, while also minimising the detrimental environmental impacts. The implementation of sustainable renewable energy is also to be promoted within the Province through appropriate financial and fiscal instruments.

4.6.2.2 Western Cape Spatial Development Framework (PSDF) 2014

The Western Cape Spatial Development Framework (SDF) names energy diversification as a key policy that must be pursued for the Western Cape to transition to a low carbon, sustainable energy future, and delink economic growth from energy use. It states that emergent IPPs and sustainable energy producers must be supported and encouraged to thrive in the rural areas as means to uplift stagnating economies. It also encourages and supports renewable energy generation at scale for climate change mitigation.

As per OneCape 2040's vision to create a resilient, inclusive, and competitive Western Cape with higher rates of employment producing growing incomes, greater equality, and an improved quality of life; there is a key ecological transition that needs to take place from unsustainable, carbon-intensive resource use in 2012 to Sustainable, low-carbon resource use by 2040.

The current land use is non-arable, low-potential grazing land with a low per m^2 yield. Therefore, the opportunity cost of not proceeding is high in terms of yield per m^2. The proposed development itself will not cause a significant change in land use, as the development site is primarily low intensity agriculture (sheep grazing), which can still proceed once the development is constructed.

The proposed development is in line with the Beaufort West Local Municipality Integrated Development Plan (IDP), which states 'Basic Service delivery and infrastructure development' including electricity, as well as local economic development as key performance areas.

4.6.3.1. The Northern Cape Climate Change Response Strategy

The key aspects of the Northern Cape Climate Change Response Strategy (NCCCRS) Report are summarised in the MEC's (NCPG: Environment and Nature Conservation) 2011 budget speech: "The Provincial Climate Change Response Strategy will be underpinned by specific critical sector climate change adaptation and mitigation strategies that include the Water, Agriculture and Human Health sectors as the 3 key Adaptation Sectors, the Industry and Transport alongside the Energy sector as the 3 key Mitigation Sectors with the Disaster Management, Natural Resources and Human Society, livelihoods and Services sectors as 3 remaining key. Sectors to ensure proactive long-term responses to the frequency and intensity of extreme weather events such as flooding and wildfire, with heightened requirements for effective disaster management".

Key points from the MEC address include the NCPG's commitment to develop and implement policy in accordance with the National Green Paper for the National Climate Change Response Strategy (2010), and an acknowledgement of the NCP's extreme vulnerability to climate-change driven desertification. The development and promotion of a provincial green economy, including green jobs, and environmental learnership is regarded as an important provincial intervention in addressing climate change. The renewable energy sector, including solar and wind energy (but also biofuels and energy from waste), is explicitly indicated as an important element of the Provincial Climate Change Response Strategy. The MEC further indicated that the NCP was involved in the processing 7 wind energy facility and 11 solar energy facility EIA applications (March 2011) .

The development of the proposed infrastructure will assist in achieving (although only to a limited extent) the promotion of the provincial green economy of the Northern Cape

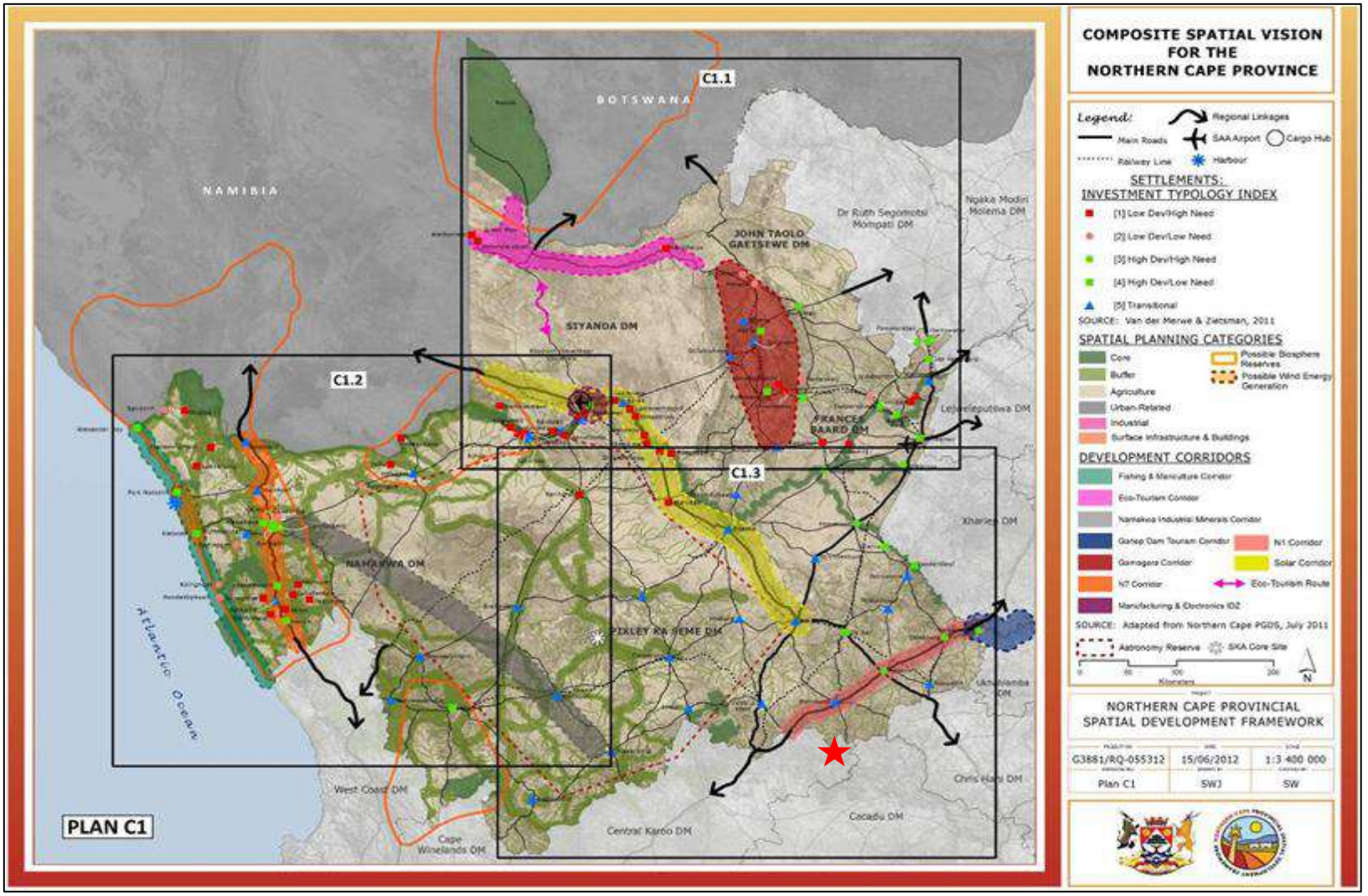


Figure 4.2. Development regions and corridors of the Northern Cape (Source: Northern Cape PSDF 2012). The position of the proposed infrastructure site is indicated by the red star.

4.6.3.2. The Western Cape Climate Change Response Strategy (2014)

Building on the 2008 Western Cape Climate Change Response Strategy and Action Plan, the updated Strategy is newly aligned with the National Climate Change Response Policy and geared to strategically direct and mainstream climate change actions and related issues throughout relevant Provincial transversal agendas.

In line with the National Climate Change Response Policy, the Strategy takes a two-pronged approach to addressing climate change:

- Mitigation: Contribute to national and global efforts to significantly reduce GHG emissions and build a sustainable low carbon economy, which simultaneously addresses the need for economic growth, job creation and improving socio-economic conditions;
- Adaptation: Reduce climate vulnerability and develop the adaptive capacity of the Western Cape's economy, its people, its ecosystems and its critical infrastructure in a manner that simultaneously addresses the province's socio-economic and environmental goals.

Given the status quo of infrastructure in the province, and the changing and uncertain world facing the Western Cape over the next 28 years, a new approach to infrastructure is needed: one that satisfies current needs and backlogs, maintains the existing infrastructure, and plans proactively for a desired future outcome. The 2040 vision requires a number of transitions to shift fundamentally the way that infrastructure is provided and the type of infrastructure that is provided in the Western Cape.

The high-level results of the analysis transitions for each infrastructure system, which all relate to the Western Cape climate change response, are:

Energy:

- Introduce natural gas processing infrastructure to use gas as a transition fuel;
- Promote the development of renewable energy plants in the province and associated manufacturing capability;
- Shift transport patterns to reduce reliance on liquid fuels.

Policy decisions on new infrastructure investments must consider climate change impacts to avoid the lock-in of emissions-intensive technologies into the future. However, in the short-term, due to the age of existing infrastructure and the planning around new infrastructure, the most promising mitigation options are primarily energy efficiency and demand-side management, coupled with increasing investment in a renewable energy programme in the electricity sector.

The development of the proposed grid connection and associated infrastructure associated with the Umsinde, and Khangela Emoyeni Wind Energy Facilities will assist in achieving the promotion of the provincial green economy of the Western Cape Province.

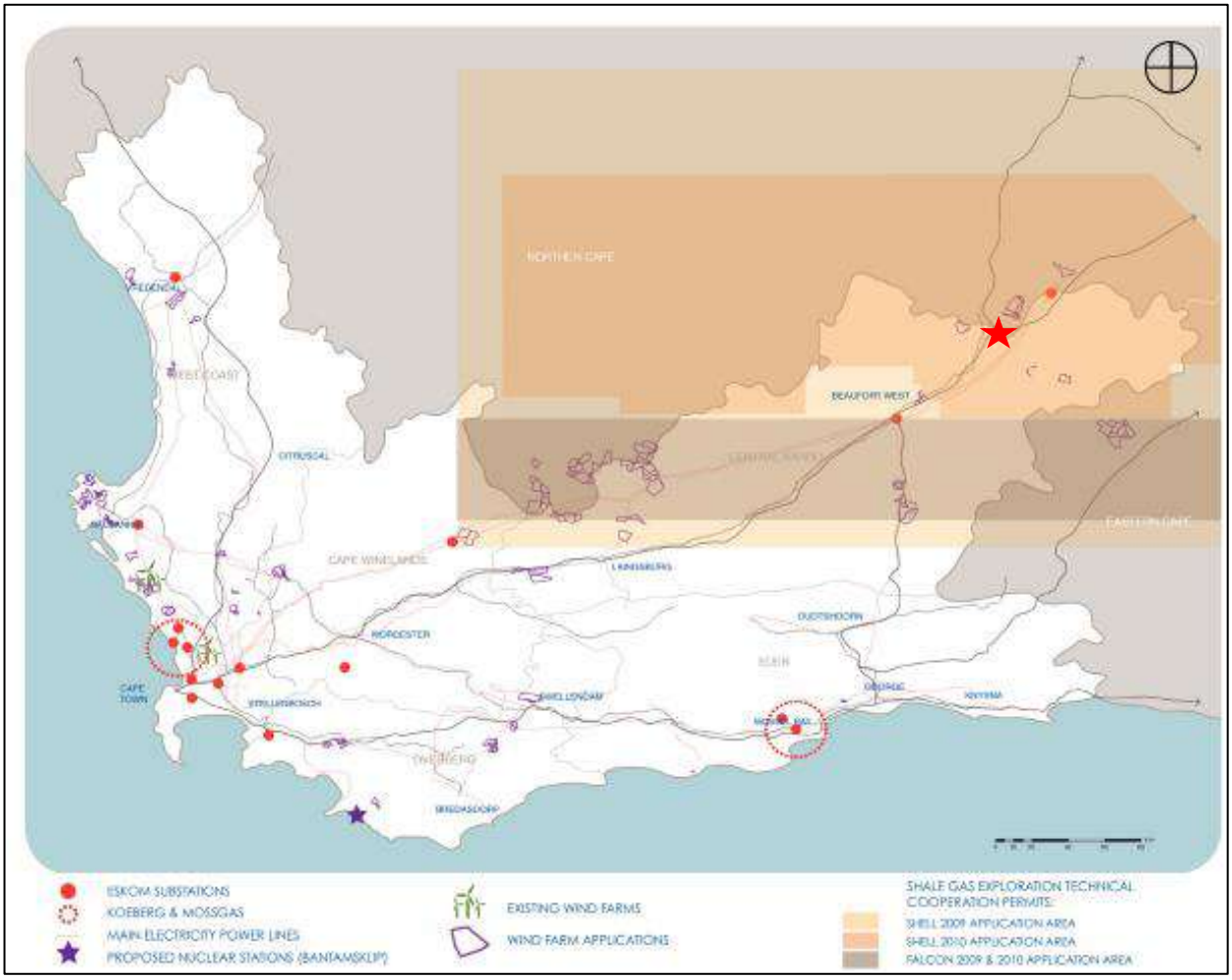


Figure 4.3. Western Cape Province – Energy Infrastructure (Source: Western Cape PSDF 2014). The position of the proposed infrastructure site is indicated by the red star

4.6.4. Local Policy and Planning Context

The local level of government in the proposed infrastructure, associated access tracks and water course crossings and infrastructure within a 400m wide development corridor for the Emoyeni WEFs are located in the Ubuntu and Beaufort West Local Municipalities within the Pixley ka Seme and Central Karoo District Municipalities. The policies at both the district and local level contain objectives which are in line with the proposed project. This includes, economic growth, poverty alleviation, job creation and community upliftment.

4.6.4.1. Central Karoo Municipality Integrated Development Plan (IDP) (Draft 2017- 2022)

The Central Karoo District Municipality (CKDM) Draft IDP (2017 - 2022) indicates that the jurisdiction of the Central Karoo District Municipality (as a category C municipality) covers an area of 38 854 km², which is also 27.7% of the total area that constitutes the Western Cape province. This district municipal area is the eastern-most district municipality within the Western Cape, and borders on the Northern Cape and Eastern Cape provinces. There are 3 category B municipalities within the category C municipality, viz. Beaufort West, Laingsburg and Prince Albert. The following main towns in these category B municipalities represent an even spread throughout the district as central places and agricultural service centres: Beaufort West, Laingsburg and Prince Albert. Beaufort West is by far the 'largest' of these towns, i.e. more than double the amount of people living in the other two towns. The closest major cities

to these towns are Cape Town, approached from the western segment of the municipal area, and Port Elizabeth, approached from the eastern segment. Each of the three towns plays a particular role in the regional economy with little change over time in the nature and extent of these roles. However, the introduction of renewable energy generation and the Square Kilometer Array project in the greater Karoo region, as well as possible exploration for shale gas, will add value to the GDP within certain economic sectors and, by implication, change the composition and character of the towns.

The population in 2016 was estimated at 74 247, i.e. an increase of 3 236 at a growth rate of 4.6% over the 5-year period. It is estimated that the population in 2020 will total 77 020 i.e. an increase of 2 773 at a growth rate of 3.7% over the next 4-year period. The economic activities in the Central Karoo municipal area are dominated by agriculture and the services sector. In this regard, the contribution to the Central Karoo District GDP by the economic sectors that includes 'services', is about 70% of the total contribution. However, the sector with the highest average annual GDP growth rate between 2004 and 2015 (8%) is the construction sector which is 5% more than the average for the district. Note that the highest average growth rates in the next 5 years are expected in the construction sector (11 per cent) and in the finance, insurance, real estate and business services sector (5.0 per cent). For the coming years, a negative overall growth rate of -1,1% is expected within the district. Of particular importance is the downward trend in the agricultural sector.

The following objectives have been targeted by the municipality:

- Public employment programmes should reach 1 million by 2015 and 2 million people by 2030;
- The proportion of people with access to the electricity grid should rise to at least 90% by 2030, with non-grid options available for the rest.Ensuring community and/or beneficiary involvement and ownership;
- Ensure that all people have access to clean, potable water and that there is enough water for agriculture and industry, recognising the trade-offs in the use of water.Equitable socio-economic development with equitable benefits for all.
- Reduce water demand in urban areas to 15% below the business-as-usual scenario by 2030.
- Competitively priced and widely available broadband
- Absolute reductions in the total volume of waste disposed to landfill each year
- At least 20 000MW of renewable energy should be contracted by 2030
- Strong and efficient spatial planning system, well integrated across the spheres of government
- Upgrade all informal settlements on suitable, well located land by 2030
- More people living closer to their places of work
- More jobs in or close to dense, urban townships
- Make early childhood development a top priority among the measures to improve the quality of education and long-term prospects of future generations.
- Ensure progressively and through multiple avenues that no one lives below a defined minimum social floor
- All children should enjoy services and benefits aimed at facilitating access to nutrition, health care, education, social care and safety.
- Staff at all levels has the authority, experience, competence and support they need to do their jobs.
- Relations between national, provincial and local government are improved through a more proactive approach to managing the intergovernmental system.
- A corruption-free society, a high adherence to ethics throughout society and a government that is accountable to its people.
- Our vision is a society where opportunity is not determined by race or birthright; where citizens accept that they have both rights and responsibilities. Most critically, we seek a united, prosperous, nonracial, non-sexist and democratic South Africa.

Based on the objectives of the Central Karoo District Municipality the development of the grid infrastructure related to the Umsinde and Khangela Emoyeni WEFs are aligned with the municipalities strategy.

4.6.4.2. Pixley ka Seme Municipality Integrated Development Plan (IDP), Revision (2020/21)

The Fifth Generation IDP is coincidentally and fortunately developed alongside the evolution of the District Development Model which was initialized by the Honourable President Cyril Ramaphosa on his state of the Nation Address of 2019 where it was also adopted by the Cabinet. As the move toward a developed and sustainable District for future generations, the municipalities vision is in line with the district one plan vision of placing the Pixley ka Seme district as the leading innovative region and global centre for renewable energy and space science which drives knowledge industry, mining, tourism, agriculture, industrialization, and empowerment of communities using latest technology. According to the IDP the Municipality has identified development programmes associated with SKA, mining and Renewable Energy as a strength in the infrastructure, housing and development planning sectors. The Pixley Ka Seme District Municipality currently has privately owned solar and wind energy renewable energy projects all over the region and they do fund sound mitigation and adaptation projects through their Corporate Social Investment (CSI) Programmes. The municipality has identified the opportunity of tapping into the Climate Change Fund for all the ailing Local Municipalities that host the solar and wind energy renewable energy projects and the investment in renewable energy projects (solar, wind, hydro) is required within the District. As the Ubuntu Local Municipality falls within the jurisdiction of the Pixely ka Seme District Municipality, the IDP has identified one of the strengths of the Ubuntu LM as having large expanses of unoccupied land space with an opportunity for renewable energy projects.

Based on the strengths and opportunities identified by the Pixel ka Seme Municipality the project aligned with objectives on the municipality.

4.6.5.1. Ubuntu Municipality Integrated Development Plan Draft (2022/2023)

The vision of Ubuntu Municipality, to be championed by the Ubuntu Municipal Council working together with the administration shall be by 2030 the best rural municipality through relentless pursuit of excellence through focused governance, effective administration, and effective service delivery for inclusive targeted social and economic development against all odds.

The mission of the Ubuntu Municipality, also to be championed by the Ubuntu Municipal Council working together with the administration shall be to:

- maximize the utility of the municipal resources in a suitable developmental and economic manner to better the life of all,
- to improve institutional effectiveness and efficiency,
- to optimally develop our human, financial and natural resources, to create an enabling environment for local economic growth in order to create employment opportunities and alleviate poverty,
- to work with all our existing and prospective partners to establish a vibrant tourism industry,
- to participate in the fight to reduce the HIV/AIDS infection rate and lessen the impact thereof,
- to focus on youth development women empowerment and enabling the disabled to play a meaningful role in unlocking human potential,
- to ensure a safe, secure and community friendly environment,
- and to maintain sound and sustainable management to financial and fiscal affairs

The Ubuntu Municipality falls within the ambit of the Karoo, a semi-desert area. The name "Karoo" finds it origins in the Khoi and means "land of drought". No natural surface water is found in the region. The rainfall is low and the region is a part of the Central lower Nama Karoo division that in turn forms part of the Nama Karoo biome. Only 0.03% of the total biome is under conservation. The vegetation is adapted to the dry region and consists mainly of bush-veld and grass is very scarce. Farming is adapted to the situation and is mainly around small livestock. As the region is sensitive to development an environmental management plan is essential in order to protect the environment and to manage development.

Livestock and game are the nucleus of farming activities in the Ubuntu Region. Irrigation is limited. Livestock farming mainly comprises of sheep, goat and cattle. The main agricultural products are wool for the export market and meat for the local market.

The municipal service levels in the Ubuntu Local Municipality all improved over the period 2001 to 2011. This represents a socio-economic improvement. The service levels in the Ubuntu Local Municipality are, except for households that use electricity for energy, all higher than the provincial averages for the Northern Cape Province (85.4 %).

The municipality has identified Load shedding as a core challenge for development, and the rapid increase in electricity tariffs, as issues in their energy supply. The development of the grid connection infrastructure to support the Emoyeni Wind Energy facilities will assist South Africa and the municipality to alleviate the challenges met by on-going load shedding.

4.6.5.2. Beaufort West Municipality 5 Year plan fourth generation Integrated Development Plan (IDP 2017-2022)

The Beaufort West Local Municipality (BWLM) is a category-B municipality, comprising the towns of Beaufort West, Merweville, Nelspoort and Murraysburg in the Central Karoo District. In February 1837, the BWLM became South Africa's first and therefore oldest municipality. It is the centre of an agricultural district based mainly on sheep farming and meat production, and is strategically positioned on the N1 national road, which links Cape Town with the interior of South Africa.

A priority for the Municipality is to provide for sustainable economic growth. One of the pillars for economic growth is the investment in economic infrastructure.

Various innovative solutions can contribute towards growth and development, such as the introduction of solar energy and biogas as well as the clean water programme for the Municipality. Sustainable development will be emphasised to ensure that a clean environment, air quality, water quality and carbon reduction measures will remain on the agenda of the Municipality Continued investment is required to ensure that quality; adequacy and reliability of electricity supply are achieved and maintained in compliance with the South African distribution grid code. While demand-side measures will make some contribution to the slowing of the rate of growth in demand, the electricity demand will continue to grow as the Municipality develops. The necessary infrastructure must be available to support development initiatives and policies, such as land-use densification. There is also a strong focus on the refurbishment and replacement of existing assets to achieve a balanced, cost effective approach to the long term viability of infrastructure.

The Beaufort West Municipality 5 Year plan fourth generation Integrated Development Plan includes:

- Increase the share of national income of the bottom 40% from 6% to 10%.
- Establish a competitive base of infrastructure, human resources and regulatory frameworks.
- Ensure that skilled, technical, professional and managerial posts better reflect the country's racial, gender and disability makeup.
- Broaden ownership of assets to historically disadvantaged groups.
- Increase the quality of education so that all children have at least two years of preschool education and all children in grade 3 can read and write.
- Provide affordable access to quality health care while promoting health and wellbeing.
- Establish effective, safe and affordable public transport.
- Produce sufficient energy to support industry at competitive prices, ensuring access for poor households, while reducing carbon emissions per unit of power by about one-third.
- Ensure that all South Africans have access to clean running water in their homes.
- Make high-speed broadband internet universally available at competitive prices.
- Realise a food trade surplus, with one-third produced by small-scale farmers or households.

- Ensure household food and nutrition security.
- Entrench a social security system covering all working people, with social protection for the poor and other groups in need, such as children and people with disabilities.
- Realise a developmental, capable and ethical state that treats citizens with dignity.
- Ensure that all people live safely, with an independent and fair criminal justice system.
- Broaden social cohesion and unity while redressing the inequities of the past.
- Play a leading role in continental development, economic integration and human rights.

In order to sustain the economy the the Beaufort West Municipality has used the towns strategic location on the N1 to identify a number of stratgies. This includes the support of Major infrastructure projects inlcuding the provision of new 132kV substations, and promotion of domestic large wind and solar energy projects.

In this regard the proposed project is aligned with the objectives of the municipality in supporting the strategies identified by the municipality to support large wind energy projects and grid infrastructure.

4.6.6.1. Ubuntu Local Municipality Spatial Development Framework

As per the Ubuntu Local Municipality vision: "Ubuntu Municipality commit ourselves to be developmental and economically viable to ensure a better life for all"

The mission of the Ubuntu Local Municipality: We strive to achieve — Effective and efficient service delivery — Optimal human and natural resource development — Local economic growth and development, job creation and poverty alleviation — A vibrant tourism industry — To participate in the fight to reduce the infection rate and lessen the impact of HIV/aids, alcohol abuse and other communicable diseases — A safe, secure and community friendly environment — To ensure sound and sustainable management of Financial and Fiscal affairs of the Municipality.

The following conclusions can be drawn from the Ubuntu Local Municipality Spatial Development Framework (2008):

- The Ubuntu Local Municipality is a Category A.b municipality situated in the Pixley ka Seme District Municipality of the Northern Cape Province. It is the second-largest of the six municipalities in the district, making up a quarter of its geographical area.Somerset East has the highest potential to support services via revenue generation;
- Main Economic Sectors: Community, social and personal services (42.5%), transport, storage and communication (15%), wholesale and retail trade, catering and accommodation (13.7%), agriculture, forestry and fishing (13%), finance, insurance, real estate and business services (8.8%), manufacturing (5.9%).
- 22% of households still require access to electricity. Households without electricity tend to be located in rural areas where no, or limited exiting infrastructure exist.
- One of the objectives includes promoting off-grid development and making use of renewable energy.
- Renewable energy projects should be promoted to ensure at least basic services provision to all communities.
- Appropriate instruments / mechanisms for implementing renewable energy projects should be developed.
- Renewable energy projects should be sensitively located in the receiving environment.

Based on the conclusions from the SDP , the proposed development of the grid connection infrastrutcure to support the authorised Emoyeni Wind Energy Facilities is aligned with the objectives othe SDP.

4.6.6.2. Beaufort West Municipality Spatial Development Framework

Beaufort West, land of space in the Great Karoo, aims to improve the quality of life for all its residents, including Merweville and Nelspoort by being a sustainable, expanding and safe town.

In order to achieve this vision for the Beaufort West Municipal area, the following goals for were identified:

- To reflect the will of the South African People as reflected by the Constitution and Parliament;
- An effective municipal system, maintained with the highest standards;
- To create affordable and sustainable infrastructure for all residents and tourists;
- To introduce business initiatives and to optimise tourism (South African and foreign);
- To empower personnel, management and council members for effective service delivery;
- To create and maintain an effective financial management system;
- To develop the region as a sport and recreation Mecca of the Karoo;
- To create a crime free, safe and healthy environment;
- To develop agricultural business to improve job creation potential;
- To create employment thereby reducing unemployment to acceptable levels
- To reduce poverty and to promote the empowerment of women;
- To involve HIV/ AIDS sufferers in economic and household responsibilities

As part of the natural systems found in the municipality the SDP has identified wind speeds of 6- 8m/s which are fairly high and could be potential energy generators.

Supporting Policy Documents:

The main drivers for renewable energy projects are supported by the following International, National and Provincial (Northern Cape) policy and planning documents.

Table 4.6 Supporting Policy Documents:

Policy Document	Relevance to the proposed project
The Kyoto Protocol (2002)	The Kyoto Protocol is relevant as the proposed project will contribute to a reduction in the production of greenhouse gases by aiding in the provision of a renewable source of electricity and will assist South Africa in proving its continued commitment to meeting its international obligations in terms of reducing its emissions.
The United Nations Framework Convention on Climate Change (UNFCCC)	The UNFCCC is relevant as the proposed project will contribute to the reduction in the production of greenhouse gases by providing a renewable source of electricity. South Africa has committed to reducing emissions to demonstrate its commitment to meeting international obligations.
National Development Plan (2012)	The proposed project will contribute towards additional energy capacity in South Africa.

National Climate Change Response White Paper (2012)	The proposed project will provide an alternative to fossil fuel-derived energy generation i.e. the renewable source from the Emoyeni WEFs and will contribute to climate change mitigation.
White Paper on Renewable Energy Policy (2003)	The proposed project is in line with the White Paper and the objectives therein to develop an economy in which renewable energy has a significant market share and provides access to electricity throughout South Africa, therefore contributing to sustainable development and environmental conservation.
Integrated Energy Plan for the Republic of South Africa (2003)	The proposed project is in line with the plan with regards to diversification of energy generation and the promotion of universal access to clean energy
Integrated Resource Plan 2019	The proposed project is in line with the IRP 2019 with respect to the energy mix and movement to a low carbon targets up to 2030.
Long Term Mitigation Scenarios (2007)	The proposed project will contribute towards an overall reduction in emissions and aligns with the world stance on efforts towards the mitigation of climate change.
Strategic Integrated Projects (2020)	The proposed project will contribute to SIP project role out.

When considering the overall need for the development of the Emoyeni Wind Energy Facilities and consequently the proposed transmission infrastructure, associated access tracks and crossings, it is clear from the above that renewable energy is strongly supported from a planning and policy perspective on the national, provincial, district, and local level.

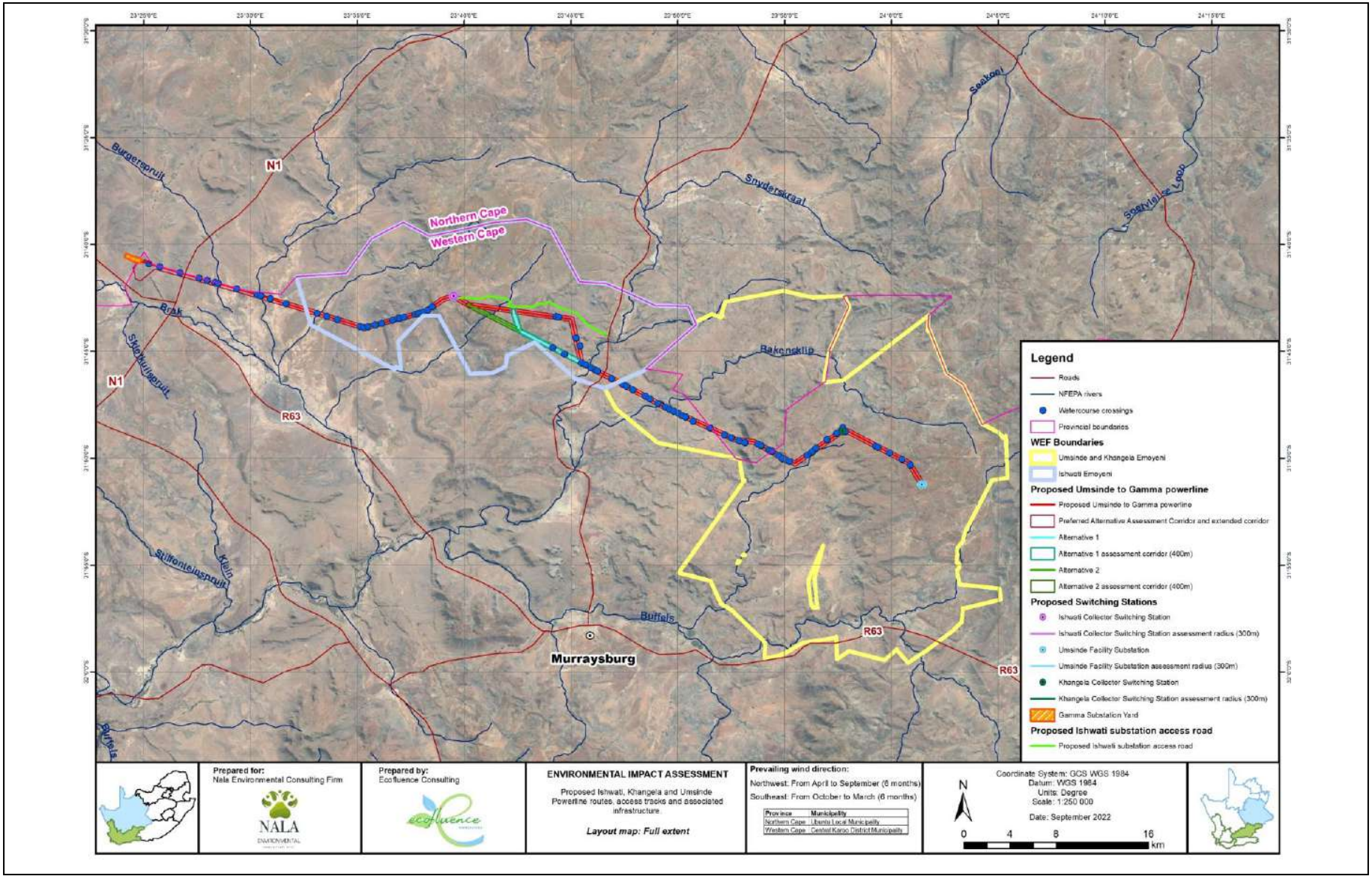


Figure 4.4. Map illustrating the overall/full layout of the proposed transmission infrastructure, associated access tracks and crossings to support the Emoyeni Wind Energy Facilities

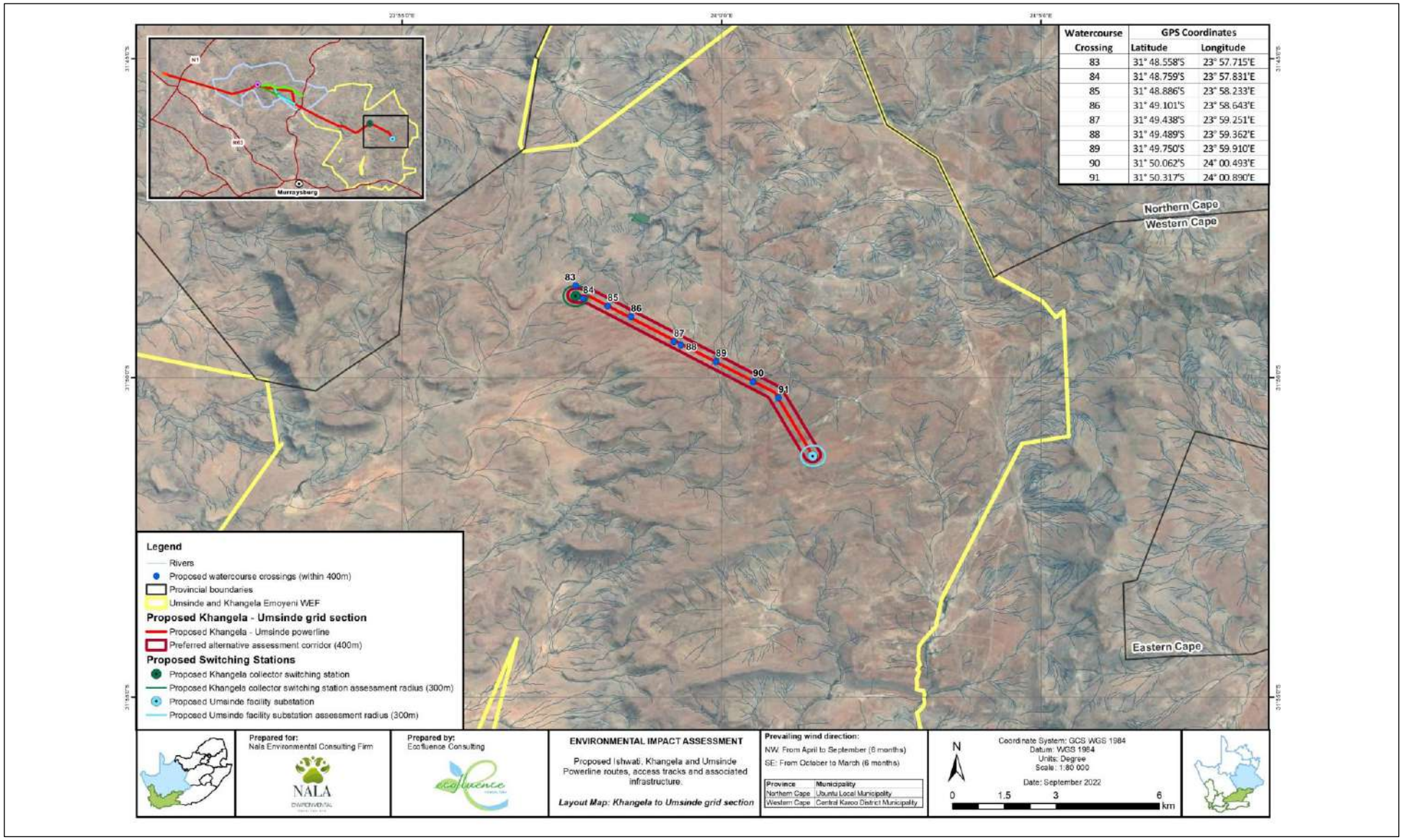


Figure 4.5: Map illustrating the layout of the proposed transmission infrastructure, associated access tracks and crossings to support the Emoyeni Wind Energy Facilities from the Khangela Emoyeni switching station to the Umsinde Emoyeni Switching Station (inset maps/zoomed in per section of grid for ease of reference).

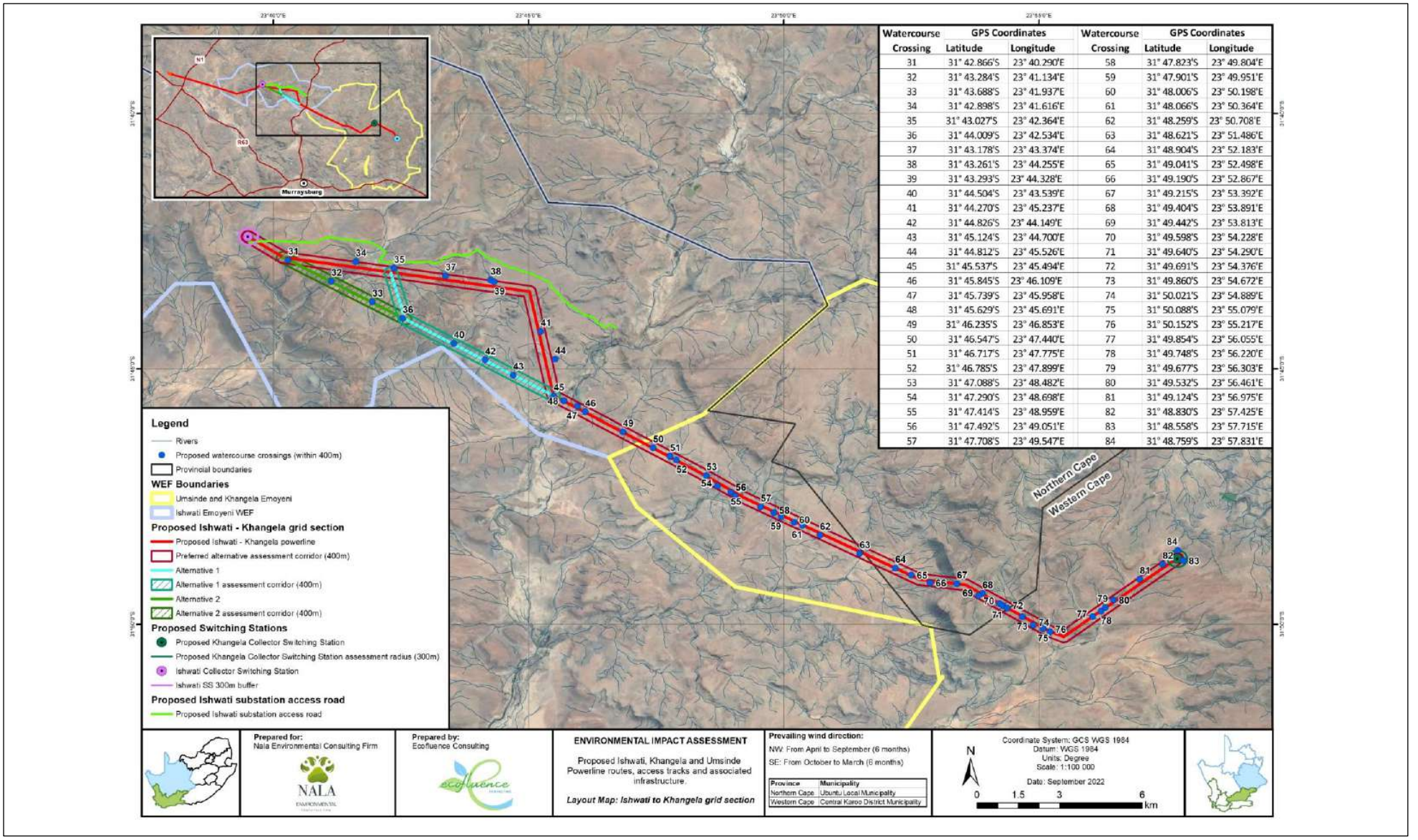
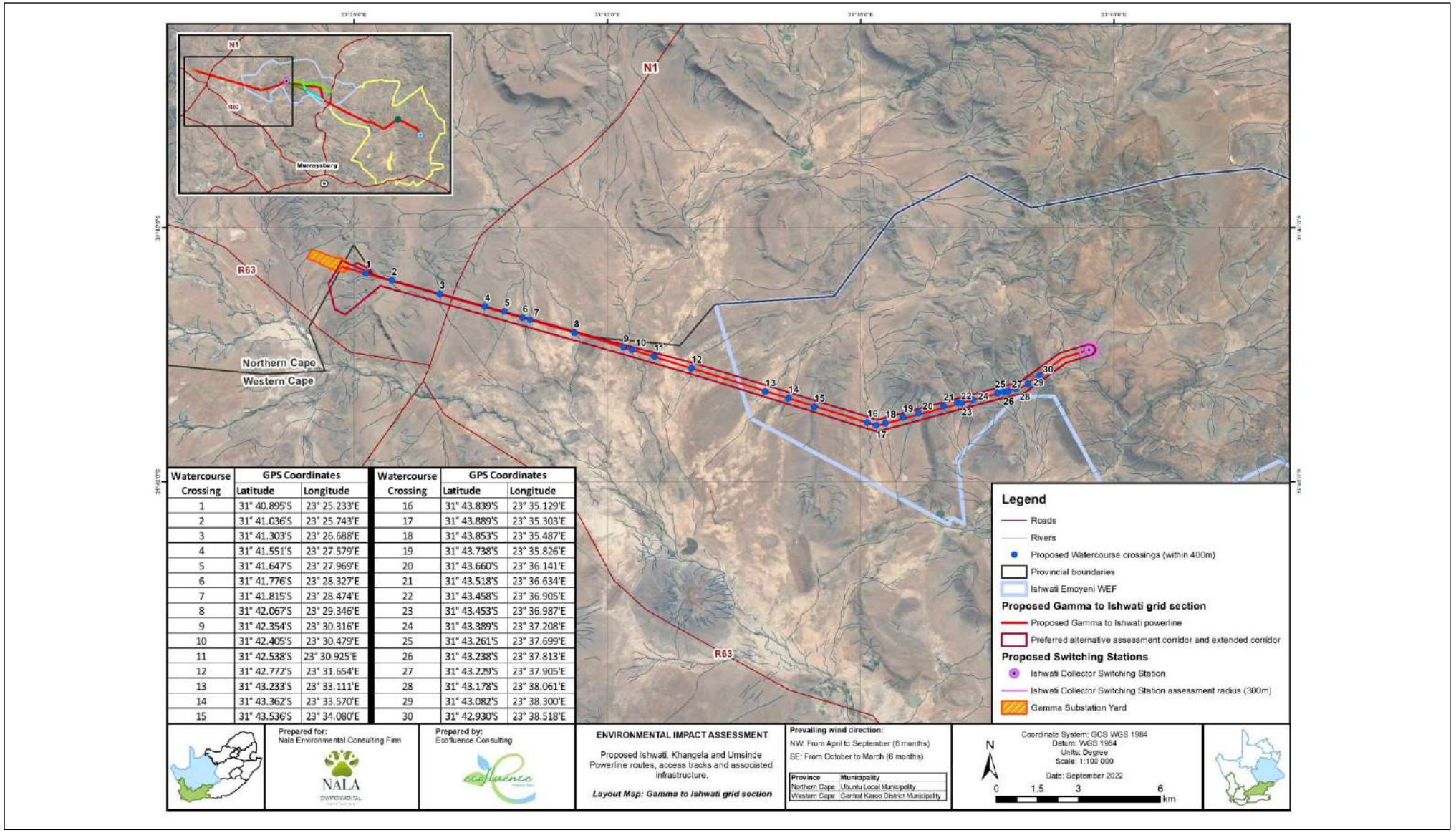


Figure 4.6: Map illustrating the layout of the proposed transmission infrastructure, associated access tracks and crossings to support the Emoyeni Wind Energy Facilities from the Ishwati Emoyeni switching station to the Khangela Emoyeni Switching Station including the proposed grid connection alternatives (inset maps/zoomed in per section of grid for ease of reference).



Watercourse Crossing	GPS Coordinates Latitude	GPS Coordinates Longitude	Watercourse Crossing	GPS Coordinates Latitude	GPS Coordinates Longitude
1	31° 40.895'S	23° 25.233'E	16	31° 43.839'S	23° 35.129'E
2	31° 41.036'S	23° 25.743'E	17	31° 43.889'S	23° 35.303'E
3	31° 41.303'S	23° 26.688'E	18	31° 43.853'S	23° 35.487'E
4	31° 41.551'S	23° 27.579'E	19	31° 43.738'S	23° 35.826'E
5	31° 41.647'S	23° 27.969'E	20	31° 43.660'S	23° 36.141'E
6	31° 41.776'S	23° 28.327'E	21	31° 43.518'S	23° 36.634'E
7	31° 41.815'S	23° 28.474'E	22	31° 43.458'S	23° 36.905'E
8	31° 42.067'S	23° 29.346'E	23	31° 43.453'S	23° 36.987'E
9	31° 42.354'S	23° 30.316'E	24	31° 43.389'S	23° 37.208'E
10	31° 42.405'S	23° 30.479'E	25	31° 43.261'S	23° 37.699'E
11	31° 42.538'S	23° 30.925'E	26	31° 43.238'S	23° 37.813'E
12	31° 42.772'S	23° 31.654'E	27	31° 43.229'S	23° 37.905'E
13	31° 43.233'S	23° 33.111'E	28	31° 43.178'S	23° 38.061'E
14	31° 43.362'S	23° 33.570'E	29	31° 43.082'S	23° 38.300'E
15	31° 43.536'S	23° 34.080'E	30	31° 42.930'S	23° 38.518'E

Figure 4.7: Map illustrating the layout of the proposed transmission infrastructure, associated access tracks and crossings to support the Emoyeni Wind Energy Facilities from the Gamma Substation to the Ishwati switching station (inset maps/zoomed in per section of grid for ease of reference).

4.7 Overview of the public participation

4.7.1 Overview of the BA process undertaken for establishment of the 132kV grid connection infrastructure, associated access tracks and crossings within a 400m wide development corridor to support the authorised Emoyeni Wind Energy Facilities

Key tasks undertaken for the BA included:

- Consultation with relevant decision-making and regulating authorities (at National, Provincial and Local levels).
- Submission of a Pre-Application Meeting Request to DFFE to present the details of the proposed development.
- Submission of the completed Application for Environmental Authorisation to the competent authority (i.e. DFFE) in terms of Regulations 5 and 6 of the EIA Regulations, 2014 (GNR 326), as amended.
- Undertaking a public participation process in accordance with Chapter 6 of GNR326, and the Department of Forestry, Fisheries and the Environment (2017), Public Participation guidelines in terms of NEMA EIA Regulations, Department of Forestry, Fisheries and the Environmental, Pretoria, South Africa (hereinafter referred to as "the Guidelines") in order to identify issues and concerns associated with the proposed project
- Undertaking of independent specialist studies in accordance with Appendix 6 of the EIA Regulations, 2014 (GNR326), as amended and the relevant Specialist Protocols defined in Government Notice 320 of 20 March 2020, as per the DFFE Screening Tool report and as relevant.
- Preparation of a BA report and Generic EMPrs for the proposed 132kV powerline, and 132kV on-site switching station inclusivf access tracks and watercourse crossings in accordance with the requirements of Appendix 1 and Appendix 4 of GNR326.
- 30-day public and authority review period of the BA report.
- Compilation of a Comments and Responses (C&R) report detailing the comments raised by I&APs, addressing these comments in detail and finalisation of the BA report.
- Submission of a final BA report to the DFFE for review and decision-making

4.7.2. Authority Consultation and Application for Authorisation in terms of the 2014 EIA Regulations (as amended)

In terms of Government Notice 779 of 01 July 2016, the National Department of, Forestry, Fisheries and Environment (DFFE) is the competent authority for all projects related to the IRP. As the project is located within the Northern and Western Cape Province, the Northern Cape Department of Agriculture, Environmental Affairs, Rural Development and Land Reform and the Western Cape Government Environmental Affairs and Development Planning are the commenting authority as the proposed infrastructure fall within both the Northern Cape and Western Cape Provinces. Consultation with the regulating authorities (i.e. DFFE, Department of Agriculture, Environmental Affairs, Rural Development and Land Reform and Western Cape Government Environmental Affairs And Development Planning.) as well as with all other relevant Organs of State has been undertaken and will continue throughout the BA process. To date, this consultation has included the following:

- Submission of a pre-application meeting request to the DFFE.
- Submission of the application for Environmental Authorisation to the DFFE.
- Submission of the BA Report for review and comment by:
    - The competent and commenting authorities.
    - State departments that administer laws relating to a matter affecting the environment relevant to an application for Environmental Authorisation.
    - Organs of State which have jurisdiction in respect of the activity to which the application relates.

A record of all authority correspondence undertaken during the BA process is included in **Appendix C.**

4.7.3. Public Participation Process

Public participation is guided by Regulations 41 to 44 of the EIA Regulations 2014 (GN R326) (as amended) and is an essential and regulatory requirement for an environmental authorisation process. The purpose of public participation is clearly outlined in Regulation 40 of the EIA Regulations 2014 (GN R326) (as amended) and is being followed for this proposed project.

The sharing and availability of information forms the basis of the public participation process and offers the opportunity to I&APs to become actively involved in the BA process from the commencement of the public participation process. The public participation process is designed to provide sufficient and accessible information to I&APs in an objective manner. The public participation process affords I&APs opportunities to provide input into and receive information regarding the BA process in the following ways:

During the BA process the Nala Environment's website will allow for the following:

- Enables a wider reach, allowing more widespread consultation for projects, not just in the immediate project area but also within the surrounding towns/cities.
- Allows stakeholders and I&APs the opportunity to engage on a project from anywhere in South Africa and at any time.
- Enables stakeholders and I&APs to express their interest in a project and register on the project (for inclusion on the project database).
- Allows for instant messaging via the whatsapp to chat function

The public participation process therefore aims to ensure that:

- Public participation is facilitated in such a manner that all I&APs are provided with an opportunity to comment on the project and ensure that I&AP's are made aware of the proposed project in their community , municipality and town.

- Adequate review period is provided for I&APs to comment on the findings of the BA Report both online and via hard copy reports that are made available at public locations and upon request from I&AP's and stakeholders.

- Different ways are made available to I&APs to correspond and submit their comments i.e. the Nala Environmental website via WhatsApp to chat function, fax, post, email, WhatsApp, SMS and Telegram.

- Different platforms are made available to I&AP's to undertake meetings to discuss aspects related to the project or to present the findings of the project i.e. telephonic, MS Teams, Zoom or WhatsApp video calls.

- Information containing all relevant facts in respect of the application is made available to potential stakeholders and I&APs for their review, this can be provided via hard copy documentation or electronic tablet, and available via download from the Nala Environmental website, WeTransfer or Dropbox.

- The information presented during the public participation process is presented in such a manner that it avoids the possible isolation of the public or and prevents them from participating.

The Public Participation Process undertaken for the proposed establishment of the 132kV grid connection infrastructure associated access tracks and water course crossings within a 400m wide development corridor to support the Emoyeni Wind Energy Facilities takes into consideration the National Health Act that came into effect after the COVID-19 restrictions and the national state of disaster that limited the movement of people came to an end 04 April 2022. Public Participation will be undertaken in a manner that ensures all I&AP's and stakeholders are comfortable with the method in which they prefer to receive communication on the proposed development.

Tasks undertaken as part of the public participation process are described in the section which follow.

i. Stakeholder identification and Register of Interested and Affected Parties

A proponent or applicant must ensure the opening and maintenance of a register of interested and affected parties and submit such a register to the competent authority, which register must contain the names, contact details and addresses of—
(a) All persons who, as a consequence of the public participation process conducted in respect of that application, have submitted written comments or attended meetings with the proponent, applicant or EAP;
(b) All persons who have requested the proponent or applicant, in writing, for their names to be placed on the register; and
(c) All organs of state which have jurisdiction in respect of the activity to which the application relates.

I&APs have been identified through a process of networking and referral and obtaining information from liaison with potentially affected parties in the greater surrounding area, through databases previously used for the Emoyeni Wind Energy facilities and a registration process involving the completion of a reply form. Key stakeholders and affected and surrounding landowners have been identified and registered on the project database. Other stakeholders are required to formally register their interest in the project through either directly contacting the Nala Environmental via email or fax or use of the WhatsApp to chat function on the Nala Environmental website. An initial list of key stakeholders identified and registered is listed in **Table 4.7**.

Table 4.7: List of Stakeholders identified for the inclusion in the project database during the public participation process for of the 132kV grid connection infrastructure, associated access tracks and crossings associated with the authorised Emoyeni WEFs

National Government Department	➢ Department of Mineral Resources and Energy (DMRE) ➢ Department of Forestry, Fisheries and the Environment (DFFE) ➢ Department of Forestry, Fisheries and the Environment (DFFE): Biodiversity ➢ Department of Agriculture, Rural Development and Land Reform (DARDLR) ➢ Department of Water and Sanitation (DWS) ➢ Northern Cape Department of Agriculture, Environmental Affairs, Rural Development and Land Reform ➢ Western Cape Government Environmental Affairs And Development Planning
Government Bodies and State-Owned Companies	➢ National Energy Regulator of South Africa (NERSA) ➢ South African Civil Aviation Authority (CAA) ➢ South African Heritage Resources Agency (SAHRA) ➢ South African National Roads Agency Limited (SANRAL)
Provincial Government Departments	➢ Department of Agriculture, Environmental Affairs, Rural Development and Land Reform. ➢ Northern Cape Department of Roads and Public Works ➢ Western Cape Government Environmental Affairs And Development Planning Western Cape Department of Roads and Public Works ➢ SANRAL (Northern Cape-Western region) ➢ Heritage Western Cape ➢ Northern Cape Heritage Resources Authority
Local Government Departments	➢ Central Karoo District Municipality ➢ Beaufort West Local Municipality

	➢ Pixley ka Seme District Municipality ➢ Ubuntu Local Municipality
Key Stakeholders	➢ BirdLife South Africa ➢ Endangered Wildlife Trust (EWT) ➢ Cape Nature
Landowners	➢ Neighbouring landowners, tenants and occupiers

As per Regulation 42 of the EIA Regulations, 2014 (as amended), all relevant stakeholder and I&AP information has been recorded within a register of I&APs (refer to Appendix C1 for a listing of the recorded parties). In addition to the above-mentioned EIA Regulations, 4.1 of the Public Participation Guidelines has been followed. The register of I&APs contains the names of:

- all Organs of State that hold jurisdiction in respect of the activity to which the application relates; and all persons who submitted written comments or
- everyone who requested to be registered on the database through via writing in, emailing and sending their feedback through the WhatsApp to chat function and disclosed their interest in the project during the public participation period.
- I&APs have been encouraged to register their interest in the BA process from the onset of the project, and the identification and registration of I&APs will be an on-going process for the life-cycle of the Basic Assessment process.

ii. Interested and Affected Parties & Stakeholder Notifications

(d) Giving written notice, in any of the manners provided for in section 47 D of the Act, to—
(i) The occupiers of the site and, if the proponent or applicant is not the owner or person in control of the site on which the activity is to be undertaken, and to any alternative site where the activity is to be undertaken;
(ii) Owners, persons in control of, and occupiers of land adjacent to the site where the activity is or is to be undertaken and to any alternative site where the activity is to be undertaken;
(iii) The municipal councillor of the ward in which the site and alternative site is situated and any organisation of ratepayers that represent the community in the area;
(iv) The municipality which has jurisdiction in the area;
(v) Any organ of state having jurisdiction in respect of any aspect of the activity; and
(vi) Any other party as required by the competent authority;

An inception notice, which included a Background Information Document (attached as **Appendix C2**), was circulated on the 05 September 2022 to all I&APs via email, registered mail and telephonically. All notification proofs are provided in **Appendix C4 & C5.** All I&APs were notified on the **15th of September 2022** of the availability of the initial DBAR for public review by means of email, registered mail and telephonically (all notifications and proofs are attached in Appendix C4 & C5).

Following liaison with DFFE on the process to be followed regarding the applicability of GNR 2313[3], it was determined that a new Application for Environmental Authorisation would need to be submitted to the DFFE considering the applicability of GNR 2313 and the public participation would need to be restarted once an acknowledgment from the DFFE had been received, confirming that GNR 2313 is not applicable to the proposed development. Acknowledgement of the revised Application was received from the DFFE on the 10 October 2022. Following which the new public participation could proceed. Following this an inception notice, which included a Background Information Document (BID) (Appendix 2), was circulated on the **11 October 2022** to all Registered I&AP's and stakeholders. via email, registered mail and telephonically. All notification proofs are provided in Appendix C4 & C5.

[3] The "*Standard for the development and expansion of powerlines and substations within identified geographical areas and the exclusion of this infrastructure from the requirement to obtain an environmental authorization*" as published in Government Notice 2313 on 27 July 2022.

All I&APs were notified on the 13th of October 2022 of the availability of the revised DBAR and related Appendices for public review by means of email, registered mail and telephonically (all notifications and proofs are attached in Appendix C4 & C5).

iii. Newspaper Advertisements

(e) Placing an advertisement in— (i) One local newspaper; or (ii) Any official Gazette that is published specifically for the purpose of providing public notice of applications or other submissions made in terms of these Regulations; (f) Placing an advertisement in at least one provincial newspaper or national newspaper, if the activity has or may have an impact that extends beyond the boundaries of the metropolitan or district municipality in which it is or will be undertaken: Provided that this paragraph need not be complied with if an advertisement has been placed in an official Gazette referred to in paragraph (c)(ii);

A newspaper advertisement was placed in the Die Burger on the **7th of September 2022** in order to notify the general public of the proposed development and an opportunity to register as an interested and affected party to receive further communication on the project. Proof of placement is provided in Appendix C3.

iv. Review of Basic Assessment report

The initial Draft Basic Assessment report had been made available for review and comment on 16 September 2022. However, the DFFE subsequently instructed the Applicant to resubmit a new Application for Environmental Authorisation, together with a revised Draft Basic Assessment report, updated to include the applicability of GNR 2313. The original 30-day review period was thus halted on 03 October 2022 (i.e. 17 days of comment). All comments originally received during the 17 day period have been included and responded to in this updated BAR.

A new application has been resubmitted to DFFE and the BAR updated as per DFFE's instruction. This updated Draft Basic Assessment report has been made available for a 30-day review period from **13 October 2022 to the 14 November 2022 (both days inclusive).** Notifications regarding the availability of this draft BAR for review and comment were circulated to I&APs at the commencement of the review period I&APs were encouraged to view the reports and submit written comments. Electronic copies of the BA were circulated to Organs of State, at the onset of the review period. Electronic copies of the BA report and appendices have been made available on the Nala Environmental website for download and review in the readers own time. A copy of the Basic Assessment report and appendices in electronic tablet format has been made available to public for review at the Ubuntu Local Municipality in Victoria West (Northern Cape Province) and Beaufort West Public Library (Western Cape Province) on the 13 October 2022.

Ms Sharifa Januarie the Librarian at the Beaufort West Public Library (Western Cape Province) has been tasked with making the tablet available to the public and Ms Nonceba Mkontwana from the Ubuntu Local Municipality in Victoria West (Northern Cape Province) has been tasked with making the tablet available to all interested and affected parties that may request to view the documentation.

v. Issues raised by Interested & Affected Parties

The applicant must ensure that the comments of interested and affected parties are recorded in reports and plans and that such written comments, including responses to such comments and recordings of meetings, are attached to the reports and plans that are submitted to the competent authority in terms of these regulations.

Formal comments and issues that have been raised by I&APs regarding the proposed grid and associated infrastructure have been included and responded to in the Comments and Responses report (**Appendix C8**). Proof of all comments received is presented in **Appendix C7**.

vi. Advertisements and Notifications

According to Regulation 41(2) of the NEMA EIA Regulations 2014 (and subsequent 2017 amendments) "The person conducting a public participation process must take into account any relevant guidelines applicable to public participation as contemplated in section 24J of the Act and must give notice to all potential interested and affected parties of an application or proposed application which is subjected to public participation by:

(a) Fixing a notice board at a place conspicuous to and accessible by the public at the boundary, on the fence or along the corridor of—
(i) The site where the activity to which the application or proposed application relates is or is to be undertaken; and
(ii) Any alternative site.

During the initial site visit, seven site notices (one English and one Afrikaans) were placed on site at the following coordinates below (see **Appendix C3** for proof of placement). Process notices in English and Afrikaans were placed at the Beaufort West and Ubuntu Local Municipality Notice Boards and the Murraysburg Library Notice Board. The other four site notices were placed along the proposed grid corridor.

Site notices and processes notices were placed at each of the following locations on the 09 of September 2022:

Table 4.8 Site Notice placement coordinates

Notice No/Name	Co-ordinates: English & Afrikaans (site notices)
1) Notice 1 (fencing of Portion 4 (a Portion of Portion 1) of Farm Driefontein No. 26	31°49'50.62"S 23°56'4.57"E
2) Notice 2 (fencing of Remainder of Farm Riet Poort No. 9)	31°45'51.7"S 23°46'10.6"E
3) Notice 3 (fencing of Portion 4 (a Portion of Portion 1) of Farm Allemansfontein No.7	31°43'51.00"S 23°35'30.98"E
4) Notice 4 (fencing of Remainder of the Farm Schietkuil No.3)	31°41'25.64"S 23°27'9.15"E
5) Beaufort West Local Municipality	32°21'00.4"S 22°35'00.4"E
6) Ubuntu Local Municipality	31°24'13.35"S 23°06'37.02"E
7) Murraysburg Library	31°57'47.4"S 23°45'47.6"E

SECTION 5: DESCRIPTION OF THE RECEIVING ENVIRONMENT

This section provides a description of the environment that may be affected by the establishment of the 132kV grid connection infrastructure, associated access tracks and water course crossings within the 400m wide development corridor associated with the authorised Emoyeni Wind Energy Facilities. The information is provided in order to assist the reader in understanding the pre-development environment and the possible effects of the project on the environment within which it is proposed to be developed. Aspects of the biophysical and social environments that could be directly or indirectly affected by the development or could affect proposed infrastructure have been described. This information has been sourced from both existing information available for the area as well as collected field data by specialist consultants and aims to provide the context within which this BA process is being conducted.

5.1 Regional Setting

The project takes place in both the Northern cape and Western Cape Provinces.

5.1.1. Northern Cape Province

Northern Cape is the largest province in South Africa, taking up nearly a third of the country's land area. It covers an area of 372 889km² and has a population of 1 193 780, the least populous of South Africa's provinces. It is bordered by Namibia and Botswana to the north, and by the North West, Free State, Eastern Cape and Western Cape provinces. The capital city is Kimberley. Other important towns are Upington, centre of the karakul sheep and dried-fruit industries, and the most northerly winemaking region of South Africa; Springbok, in the heart of the Namaqualand spring-flower country; Kuruman and De Aar, the second most important junction of South Africa's railway network. Sutherland is host to the southern hemisphere's largest astronomical observatory, the multinational sponsored Southern African Large Telescope. The interior Karoo relies on sheep farming, while the karakul-pelt industry is one of the most important in the Gordonia district of Upington. Wheat, fruit, peanuts, maize and cotton are produced at the Vaalharts Irrigation Scheme near Warrenton.

The Northern Cape is rich in minerals. Alluvial diamonds are extracted from the beaches and the sea between Alexander Bay and Port Nolloth. The Sishen Mine near Kathu is the biggest source of iron ore in South Africa, while the copper mine at Okiep is one of the oldest mines in the country. Copper is also mined at Springbok and Aggeneys. The province is rich in asbestos, manganese, fluorspar, semi-precious stones and marble.

The province has fertile agricultural land in the Orange River Valley, especially at Upington, Kakamas and Keimoes, where grapes and fruit are cultivated intensively. The interior Karoo relies on sheep farming, while the karakul-pelt industry is one of the most important in the Gordonia district of Upington. Wheat, fruit, peanuts, maize and cotton are produced at the Vaalharts Irrigation Scheme near Warrenton.

Northern Cape maintained its status as the province with the lowest population in the country with a population estimated at 1,29 million people. Northern Cape's eastern half and southwest form part of the Highveld, an arid plateau that gradually rises to the Great Escarpment (more than 6,000 feet [1,900 metres] in elevation) along the province's southern border. To the northwest is desert, including the sand dunes of Kgalagadi Transfrontier Park, a conservation area jointly managed by South Africa and Botswana. The Orange River traverses the province from east to west and provides water for irrigation. The Orange is joined by one of its main tributaries, the Vaal River, near Douglas, in the east. In the west, near the Namibian border, the river plunges in a series of cataracts and rapids at Augrabies Falls, a total drop of more than 600 feet (183 metres). Thornveld is the natural vegetation of the province, and the climate is generally hot and arid. Annual rainfall increases from 4 inches (100 mm) in the west to about 14 inches (350 mm) in the east

The Northern Cape is made up of five (5) district municipalities, namely Francis Baard, John Taolo Gaetsewe, Namakwa, Pixely Ka Seme and ZF Mgcawu. It is further subdivided into 26 local municipalities, (refer to **Figure 5.1.1**).

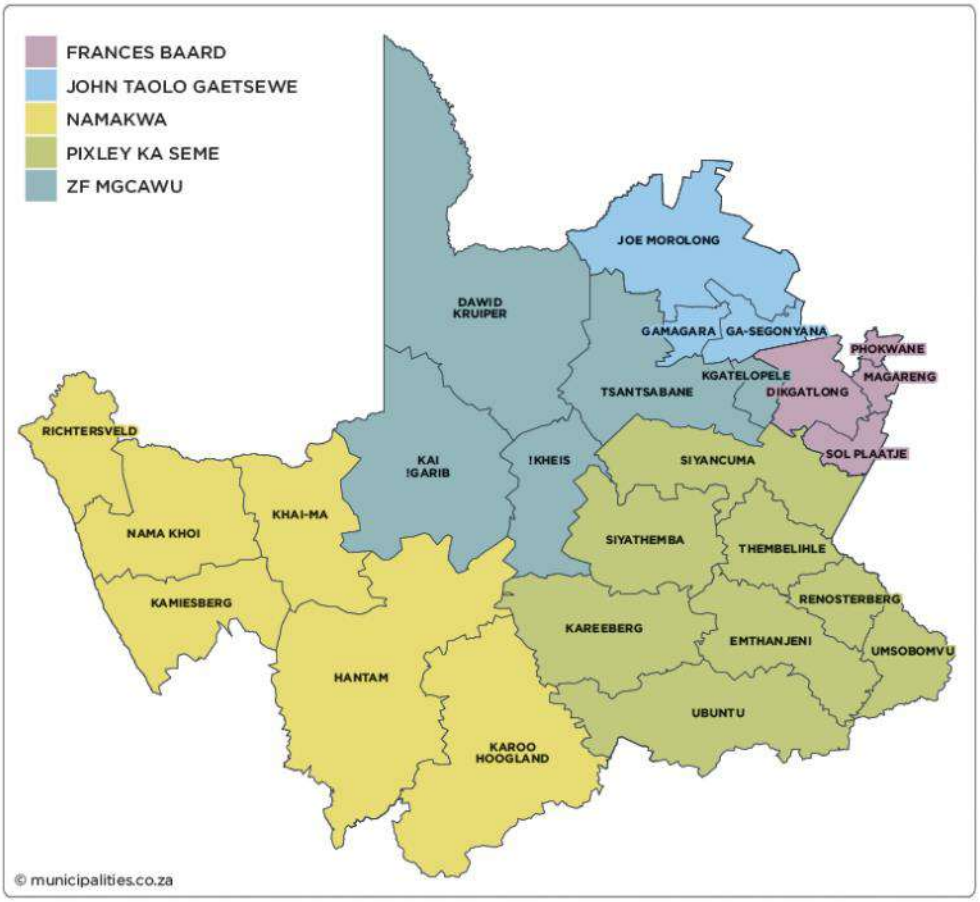


Figure 5.1.1: District municipalities of the Northern Cape Province (Source: https://municipalities.co.za/)

Pixley Ka Seme District Municipality

The Pixley Ka Seme District Municipality is a Category C municipality situated in the south-east of the Northern Cape Province. It shares its borders with three other provinces, namely the Free State to the east, the Eastern Cape to the south-east, and the Western Cape to the south-west. It is the second-largest district (103 222km²) of the five in the province but makes up almost a third of its geographical area. The district is comprised of eight local municipalities: Ubuntu, Umsobomvu, Emthanjeni, Kareeberg, Renosterberg, Thembelihle, Siyathemba and Siyancuma. Its main town is De Aar. Traffic flows through the region, linking the major industrial areas of the country.

The area has a low rainfall, while the largest river in South Africa flows through it. Two of the major dams in South Africa, the Vanderkloof and Gariep Dams, are situated on the borders of the district municipality.

The main economic sectors are community services (26.6%), agriculture (16.6%), transport (15.1%), trade (12.9%), finance (12.8%), electricity (7.0%), construction (3.3%), manufacturing (3.2%), mining (2.6%).

The closest town to the authorised Khangela and Umsinde WEFs is Muraysburg, which is located approximately 20km to the south.

Ubuntu Local Municipality

The Ubuntu Local Municipality is a Category B municipality within the Pixley Ka Seme District in the Northern Cape Province. It is bordered by Kareeberg and Emthanjeni in the north, the Western Cape and Eastern Cape Provinces in the south, the Eastern Cape in the east, and the Namakwa District in the west.

It is the largest (20 393km²) of the eight municipalities that make up the district, accounting for almost a quarter of its geographical area. Its seat is Victoria West. The main economic sector is Agriculture.

5.1.2. Western Cape Province

The Western Cape is located on the southern tip of the African continent between the Indian and Atlantic Oceans. It is bordered by the Northern Cape and Eastern Cape provinces. The Western Cape's natural beauty makes the province one of the world's greatest tourist attractions. The region is topographically and climatically diverse. It has a temperate southern coastline fringed with mountains. To the north it stretches deep into the Karoo plateau, while the west coast is extremely dry.

It covers an area of 129 462km² and has a population of 6 279 730. It is the fourth-largest province in South Africa by surface area and ranks fourth in population. The capital is Cape Town. Other major cities and towns include George, Knysna, Paarl, Swellendam, Oudtshoorn, Stellenbosch, Worcester, Mossel Bay and Strand.

The Western Cape is rich in agriculture and fisheries. The climate of the peninsula and the mountainous region beyond it is ideal for grape cultivation, with a number of vineyards producing excellent wines. Other fruit and vegetables are also grown here, and wheat is an important crop to the north and east of Cape Town. Fishing is the most important industry along the west coast and sheep farming is the mainstay of the Karoo. The province has a well-established industrial and business base, and the lowest unemployment rate in the country. Sectors such as finance, real estate, ICT, retail and tourism have shown substantial growth, and are the main contributors to the regional economy. Many of South Africa's major insurance companies and banks are based in the Western Cape. The majority of the country's petroleum companies, and the largest segment of the printing and publishing industry are located in Cape Town.

The Western Cape is divided into one metropolitan municipality (City of Cape Town Metropolitan Municipality) and five district municipalities, which are further subdivided into 24 local municipalities (refer to **Figure 5.1.2**).

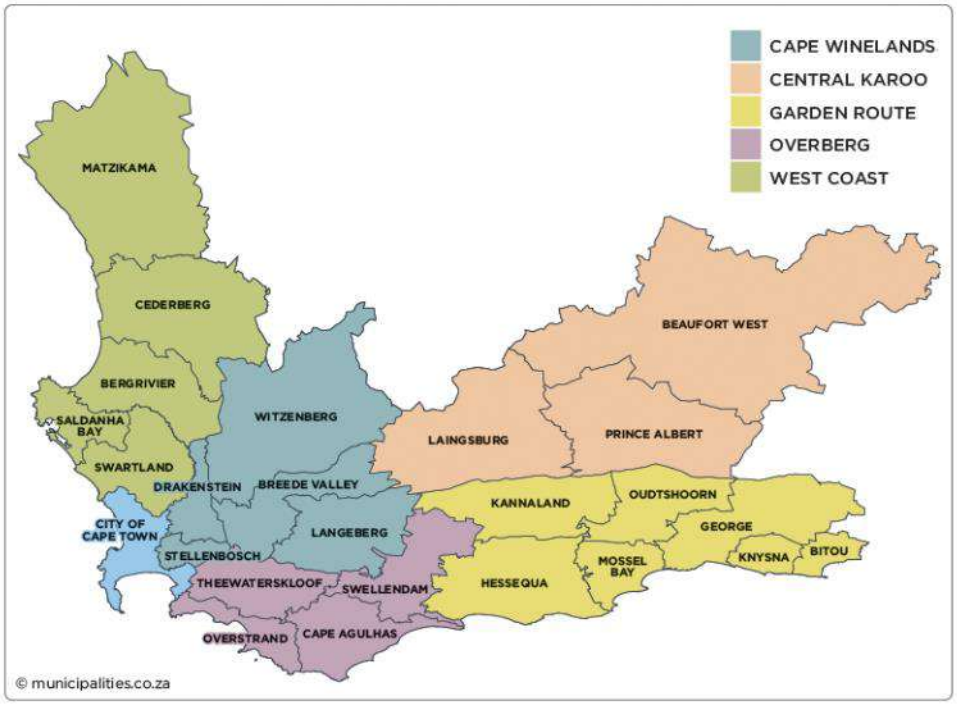


Figure 5.1.2: District municipalities of the Western Cape Province (Source: https://municipalities.co.za/)

Central Karoo District Municipality

The Central Karoo District Municipality is a Category C municipality located in the Western Cape Province. It is bordered by the Pixley Ka Seme District Municipality in the north, Namakwa District Municipality in the north-west, Garden Route District Municipality in the south, Sarah Baartman District Municipality in the east and Cape Winelands District Municipality in the west.

Central Karoo is the largest (38 854km²) district in the province, making up a third of its geographical area. It is comprised of three local municipalities: Laingsburg, Prince Albert and Beaufort West. The seat of the district is Beaufort West. The main economic sectors are agriculture (47%), finance and business services (22%), community services (19%), construction (7%).

Beaufort West Local Municipality

The Beaufort West Local Municipality is a Category B municipality located within the Central Karoo District in the Western Cape Province. It is bordered by the Northern Cape to the north and west, Prince Albert to the south, and the Eastern Cape to the east. It is the largest (21 917km²) municipality of three in the district, making up more than half its geographical area.

Beaufort West is the oldest municipality in South Africa. The new district was proclaimed on 27 November 1818. The then governor of the Cape, Lord Charles Somerset, named the town and district 'Beaufort' in honour of his father, the 5th Duke of Beaufort. To avoid confusion with Fort Beaufort and Port Beaufort, the name 'Beaufort' was changed to Beaufort West in the 1860s.

In December 1994, the former black township Kwa-Mandlenkosi was amalgamated with Beaufort West Municipality. In December 2000, the rural towns of Merweville and Nelspoort were also incorporated as part of the Beaufort West Municipality. The main economic sectors are community services (29.1%), transport (17.0%), trade (14.0%), finance (13.5%). The Umsinde and Khangela Emoyeni WEFs are located 20km north of the town of Murraysburg.

5.2 Climatic Conditions

The climate of the project area is defined in Figure 5.2 below as per nearest town climate data. Murraysburg's climate is a local steppe climate.
The study area is location is classified as BSk (cold semi-arid climate) by Köppen and Geiger. system which is defined by a severe lack of available water. This is reflected in the few rain days and the low precipitation amounts. In Murraysburg, the average annual temperature is 15.7 °C. At an average temperature of 21.6 °C, January is the hottest month of the year. The lowest average temperatures in the year occur in July, when it is around 8.6 °C. The variation in temperatures throughout the year is 12.9 °C. There is little rainfall throughout the year. About 373 mm of precipitation falls annually. Precipitation is the lowest in July, with an average of 15 mm. The greatest amount of precipitation occurs in January, with an average of 53 mm. Between the driest and wettest months, the difference in precipitation is 38 mm. The month with the highest number of rainy days is February (8.03 days). The month with the lowest number of rainy days is July (3.20 days). The month with the highest relative humidity is June (53.04 %). The month with the lowest relative humidity is September (35.81 %).

Figure 5.2. Climate for the project area (Climate data.org)

5.3 Land use, Landcover and Land scape

The Umsinde Emoyeni Windfarm project area is located south-east of the R63, starting with portions of the corridor crossing the N1, 22 km south-east of the town of Murraysburg in the Western Cape and some sections in the Northern Cape Provinces. The project will be mainly located in fifteen farms within the Central Karoo district under the Beaufort West municipality and few sections under the Ubuntu local municipality in the Northern Cape. The combined transmission powerline will stretch for 68 km with three switching station namely, Ishwati, Khangela and Umsinde 132kV switching stations. The surrounding land use predominantly includes agriculture (grazing), game farms and mountainous areas.

The topography of the study area is undulating with mountainous areas at the start of the power line in the vicinity of the proposed Umsinde switching station whereby the OHL traverses a high lying area of 1710 metres above mean sea level (m.a.m.s.l.) where it connects to the Khangela switching station. From here the OHL traverses over Trouberg, passes between Driekop and Bakenskop where it connects to the Ishwati switching station. The elevation ranges from 1500 to 1230 m.a.m.s.l From the Ishwati switching station the OHL travels over slightly lower lying land to the Gamma substation. Elevation is approximately 1200 m.a.m.s.l. Land cover consists predominately of shrubland and bare rock and soil. Near the centre of the line small areas of erosion, grassland and agriculture can be found. The study area is located predominately within the Nama Karoo biome, with rainfall ranging from 123 mm -248 mm per annum. The vegetation type is classified as Eastern Upper Karoo which is a mix of grass and shrub with small portions of Southern Karoo Riviere. The majority of the study area is sparsely populated and consists of a landscape of wide-open expanses. The scarcity of water and other natural resources has influenced settlement within this region, keeping numbers low, and distribution limited to the availability of permanent water. Settlements, where they occur, are usually rural homesteads and farmsteads. Access to the study area is via the N1 and secondary roads which link with one another, providing access to farmsteads.

Other industrial infrastructure within the study area includes the existing Gamma and Victoria Cap Substations in the west of the study area. Additionally existing high voltage power lines traverse the study area in the west from north to south. The N1 is a national road and is the main link from Gauteng to Cape Town. Seeing as the N1 is a main route serving the region, it can be considered to be a route that is most likely to carry tourists. The R63 can also be considered an alternative route to Graaf-Reinet which is a popular tourist town located within the Camdeboo National Park in the Eastern Cape Province.

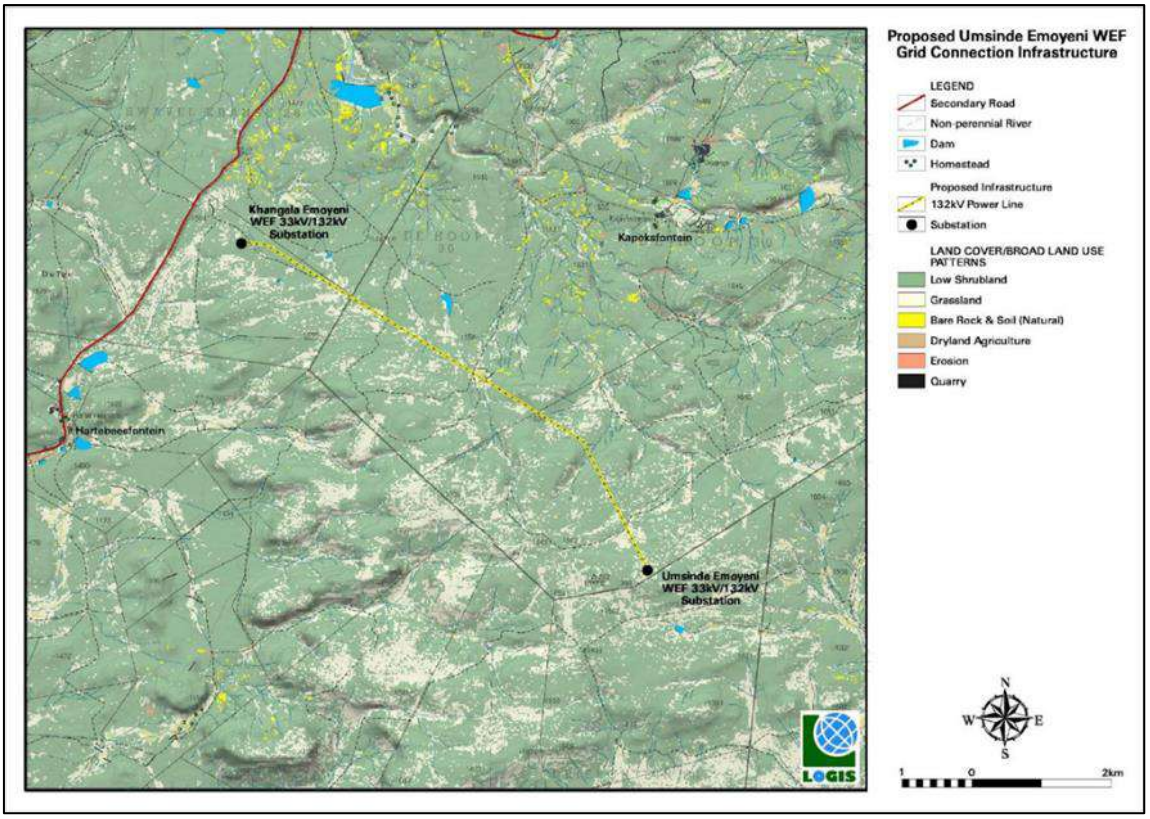


Figure 5.3 Land cover/ broad land use patterns for the study area, Umsinde to Khangela switching stations

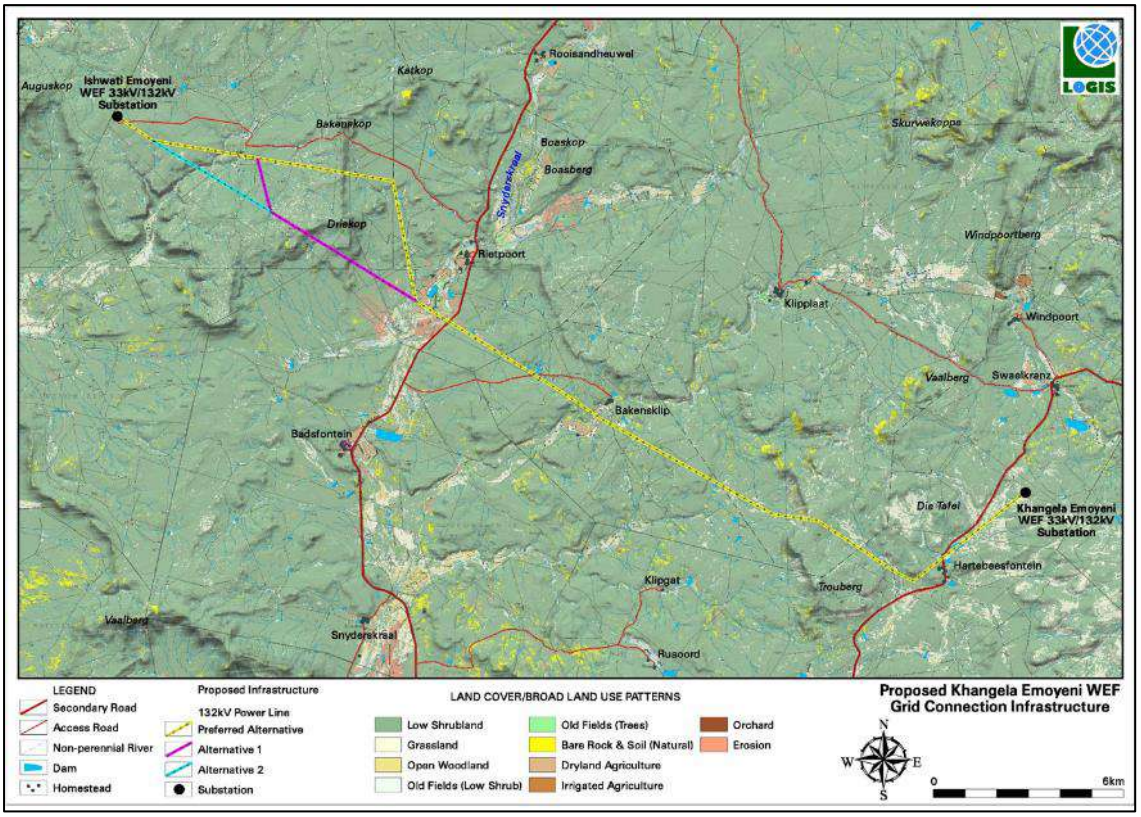


Figure 5.4. Land cover/broad land use patterns of the study area, Khangela to Ishwati switching stations including the access road to the ishwati switching station

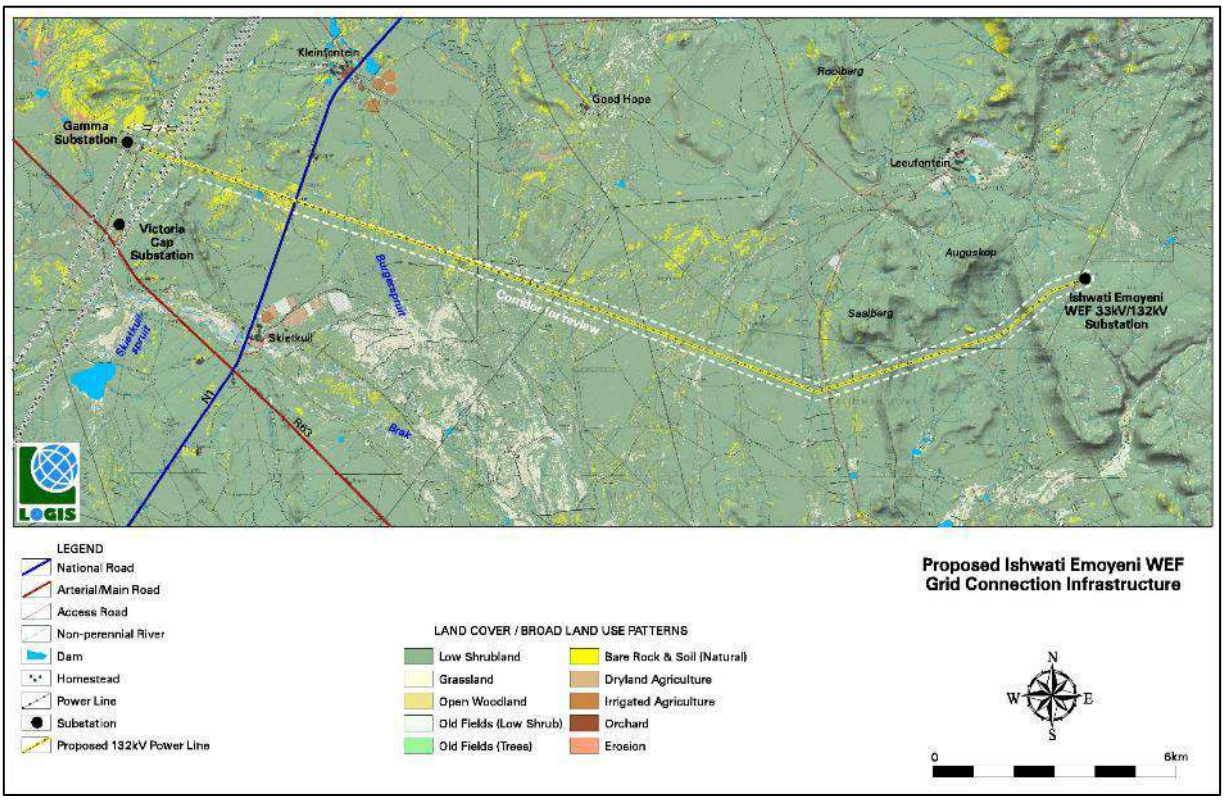


Figure 5.5. Land cover/ broad land use patterns of the study area; Ishwati to Gamma substations

The land cover within the study area is predominately low shrubland and bare rock and soil with small scattered areas of dryland agriculture. As a result, the landscape is characterised by wide-open expanses of extreme isolation. Overall, the Visual Absorption Capacity (VAC) of the receiving environment is deemed to be low by virtue of the low growing vegetation and sparsely populated/limited development overall. The significant height of power line structures adds to the potential visual intrusion of the power lines, with the tall towers (pylons) against the background of the horizon. In addition, the scale and form of the structures mean that it is unlikely that the environment will visually absorb them in terms of texture, colour, form and light/shade characteristics. Overall, the Visual Absorption Capacity (VAC) of the receiving environment and the areas in close proximity to the proposed powerline alignments is deemed to be low by virtue of the low-growing vegetation.

An analysis has been undertaken within the proposed 400 m assessment corridor in order to determine the general visual exposure (visibility) of the area under investigation. A generic height of 45m was used in order to illustrate the anticipated visual exposure of the proposed infrastructure (i.e. the maximum height of the power line structures). The visibility analysis for each alignment was generated from a number of points along the alignment, spaced at intervals of approximately 400m. Receptor height was set at eye level.

The height of the substations (switching stations) will not exceed two storeys (i.e. 6m), therefore the visual exposure of this component will fall within the viewshed generated for the power line alignments. As access roads and servitudes have no elevation or height, the visual impact of this associated infrastructure will be absorbed by the visual impact of the primary infrastructure.

Figures 5.6, 5.7 and 5.8 below indicates that the proposed grid connection infrastructure will be visually exposed to some extent within the study area, due to the tall power line infrastructure. It is thus anticipated that the infrastructure would be visible to observers (i.e. people travelling along roads, residing in homesteads or visiting the region), and could potentially constitute a high visual prominence, potentially resulting in a visual impact.

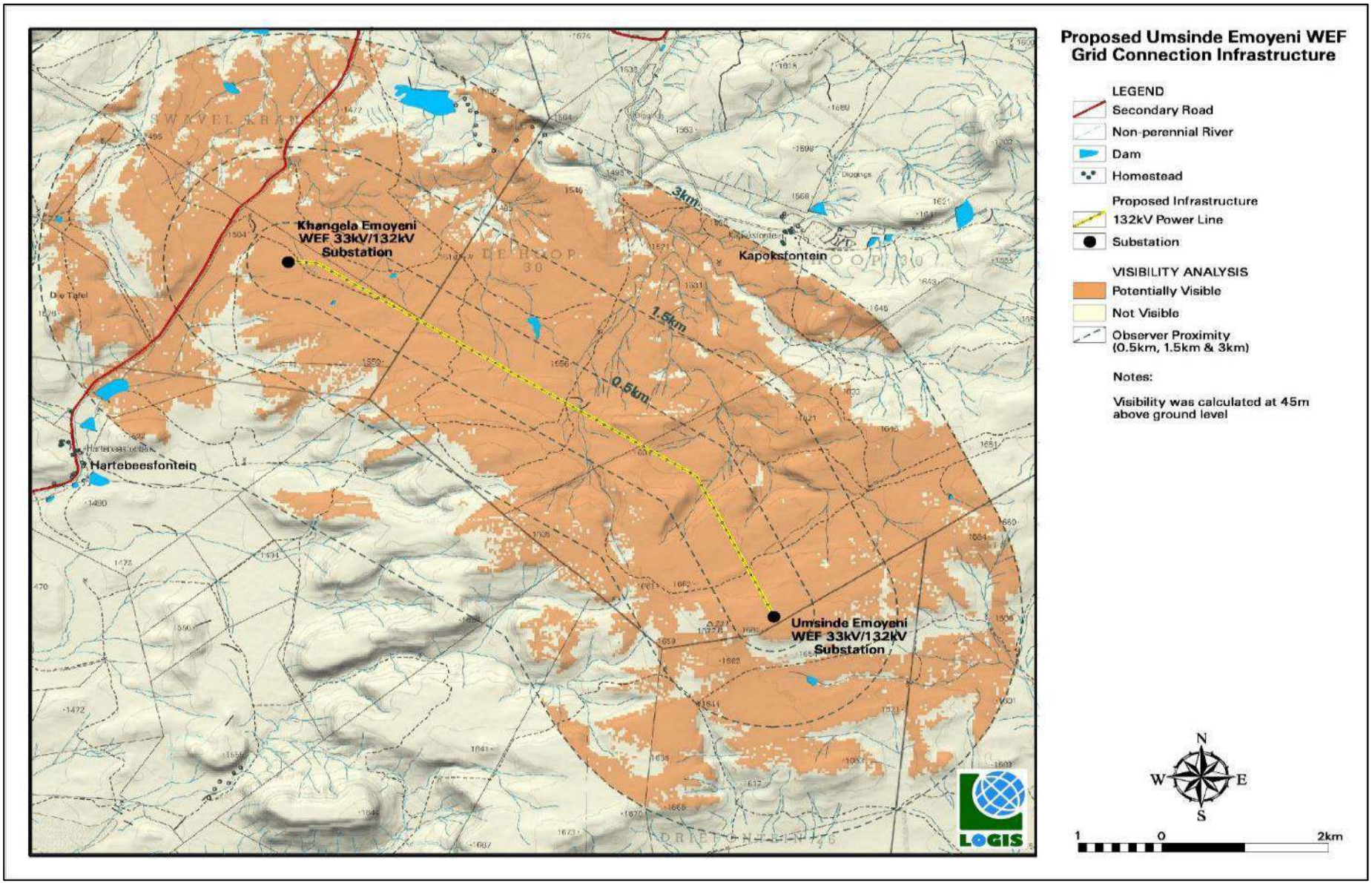


Figure 5.6. Potential visual exposure for the proposed alignment- Umsinde to Khangela switching stations

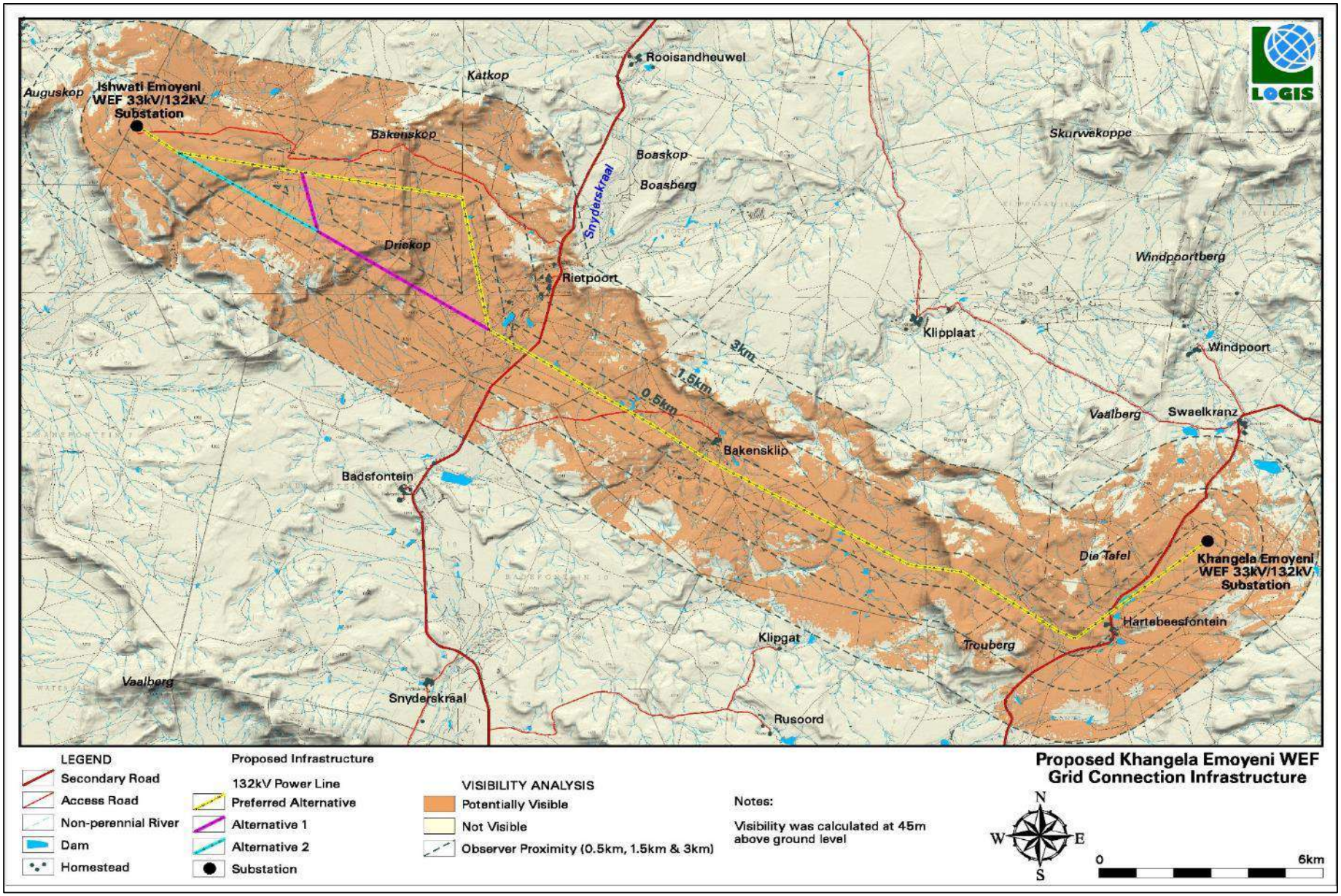


Figure 5.7. Potential visual exposure of the proposed alignment- Khangela to Ishwati switching stations

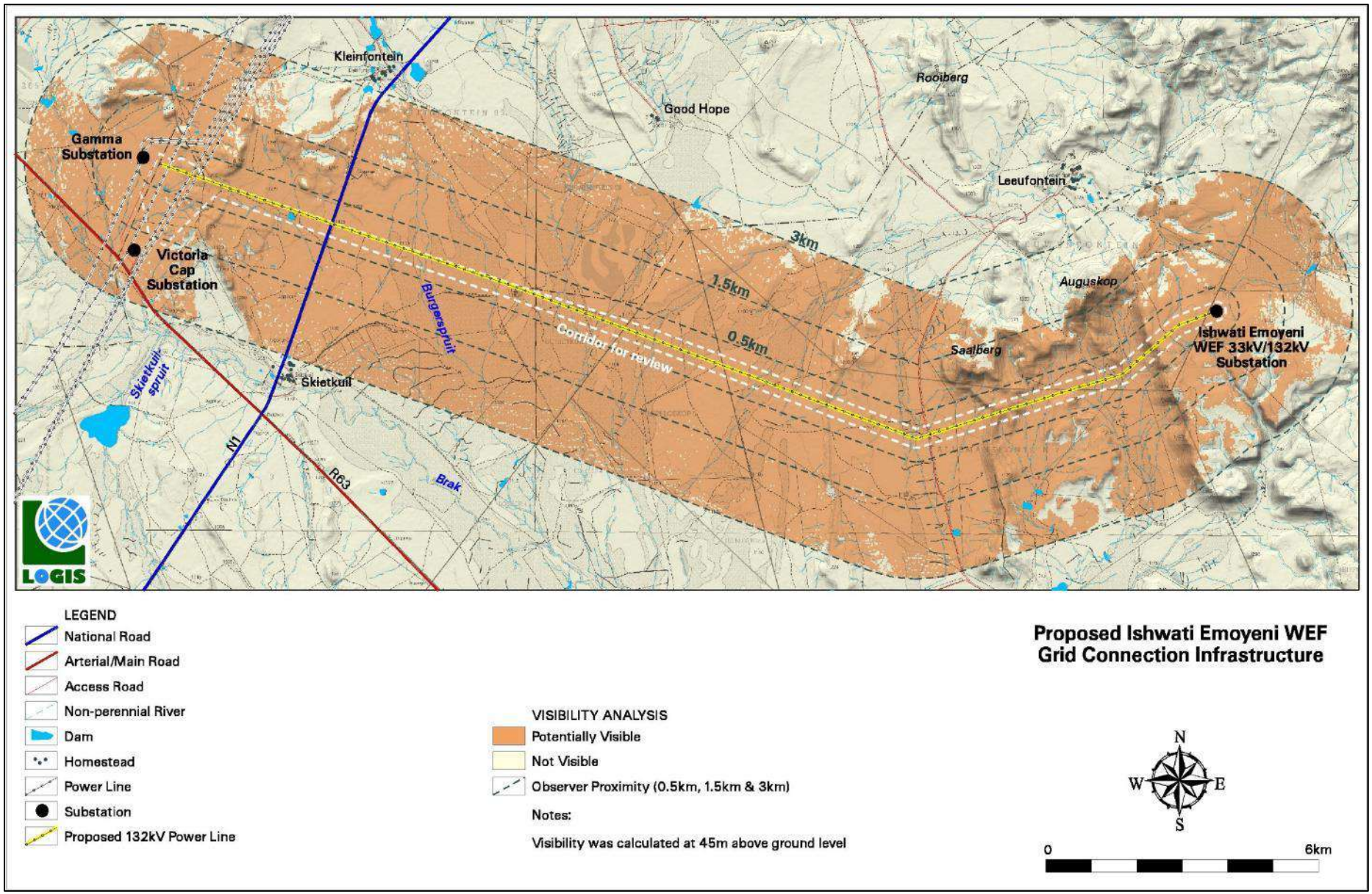


Figure 5.8. Potential visual exposure of the proposed alignment- Ishwati to Gamma Substation

Seeing as Alternatives 1 and 2 are such slight deviations from the Preferred Alternative, the potential visual exposure of these lines fall within the viewshed of the Preferred Alternative. The following is therefore applicable to the Preferred Alternative, Alternative 1 and Alternative 2:

The potential visual exposure of the infrastructure is contained to a core area on the site itself and within a 0.5 km radius thereof.

- Visual exposure includees observers travelling along the N1 and secondary roads, as well as, residents of Bakensklip, Hartebeesfontein and an unknown dwelling/homestead.
- Potential visual exposure in the short to medium distance (i.e. between 0.5 and 1.5km), is concentrated throughout this radius with small pockets of visually screened areas to the east of the Umsinde substation and south west of the Khangela substation.
- Sensitive visual receptors include observers travelling along the N1 and secondary roads as well as residents of unknown dwelling/homesteads.
- In the medium to long distance (i.e. between 1.5 and 3km offset), the extent of potential visual exposure is reduced largely owing to the hilly and mountainous topography. Visually screened areas are found to the south of the Umsinde substation, south east of the Khangela substation north and south of the centre of the line, west and north west of the Ishwati substation.
- Sensitive visual receptors include residents of Rietpoort, as well as observers travelling along the N1, R63 and secondary roads.
- Beyond the 3km offset from the proposed infrastructure, potential visual exposure becomes extremely scattered and very low. Sensitive visual receptors are not likely to be visually exposed to the proposed infrastructure, despite lying within the viewshed.
- In general, as a result of the scattered and lower population density of the study area, the proposed New 132kv Grid Connection and Associated Infrastructure may constitute a visual prominence, potentially resulting in a moderate- low visual impact.

5.4 Soil and Land Types

According to the land type database (Land Type Survey Staff, 1972 - 2006) the assessment corridor to be focused on falls within the Fb 488, Fc 131, Db 147, Ia 94 and Ib 126 land types. The Fc land type mostly consisting of Mispah, Valsrivier, Swartland, soil forms with the possibility of other soils as well as rocky areas also occurring throughout. Lime is rare or absent within this land type in upland soils but generally present in low-lying areas. The Db 147 land type consists of miscellaneous land classes including rocky areas with Glenrosa, Mispah and Valsrivier soil forms. The Ia 94 and Ib 126 land type also consists of miscellaneous land classes including rocky areas with Mispah and Oakleaf soils forms according to the SA soil classification working group (1990). The terrain units and expected soils for the land types are illustrated below.

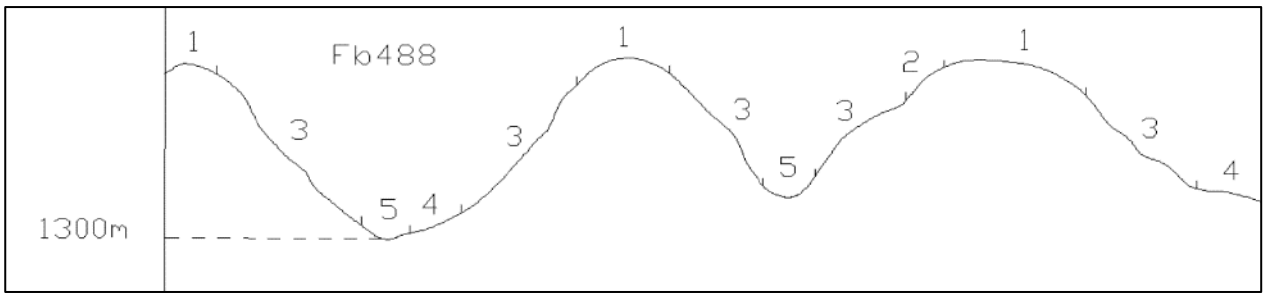


Figure 5.9. Illustration of land type Fb 488 terrain unit (Land Type Survey Staff, 1972 – 2006)

Table 5.1. Soils expected at the respective terrain units within the Fb 488 land type (Land Type Survey Staff, 1972 – 2006)

Terrain Units									
1 (18%)		**2 (2%)**		**3 (60%)**		**4 (10%)**		**5 (10%)**	
Bare Rock	40%	Bare Rock	100%	Mispah	35%	Mispah	30%	Oakleaf	60%
Mispah	40%			Swartland	20%	Swartland	20%	Bare Rock	15%
Hutton	10%			Hutton	20%	Oakleaf	20%	Mispah	15%
Glenrosa	10%			Bare Rock	15%	Bare Rock	10%	Swartland	10%
				Glenrosa	10%	Hutton	10%		
						Glenrosa	10%		

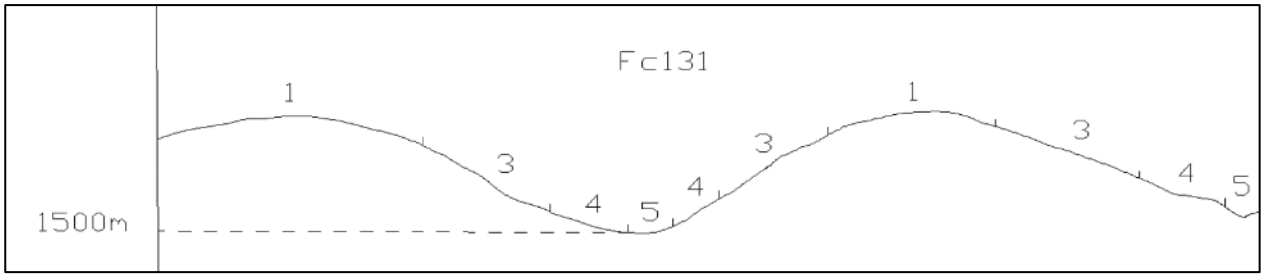


Figure 5.10. Illustration of land type Fc 131 terrain unit (Land Type Survey Staff, 1972 - 2006)

Table 5.2. Soils expected at the respective terrain units within the Fc 131 land type (Land Type Survey Staff, 1972 - 2006)

Terrain Units							
1 (15%)		**3 (40%)**		**4 (30%)**		**5 (15%)**	
Mispah	50%	Mispah	45%	Mispah	25%	Valsirivier	35%
Bare Rock	25%	Bare Rock	15%	Valsrivier	20%	Oakleaf	25%
Hutton	10%	Hutton	15%	Hutton	15%	Mispah	20%
Glenrosa	5%	Glenrosa	10%	Swartland	10%	Glenrosa	5%
Swartland	5%	Swartland	5%	Glenrosa	5%	Dundee	5%
Clovelly	5%	Clovelly	5%	Clovelly	5%	Estcourt	5%
Shortland	5%	Shortland	5%	Oakleaf	5%	Inhoek	5%

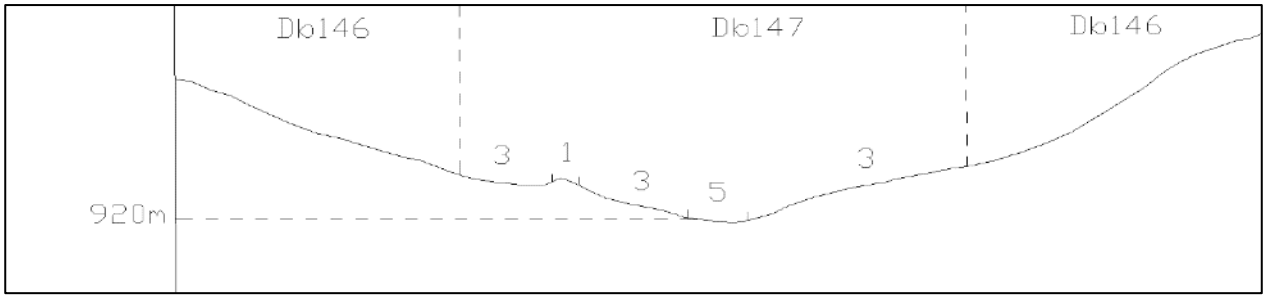


Figure 5.11. Illustration of land type Db 147 terrain unit (Land Type Survey Staff, 1972 - 2006)

Table 5.3. Soils expected at the respective terrain units within the Db 147 126 land type (Land Type Survey Staff, 1972 - 2006)

Terrain Units					
1 (3%)		**2(90%)**		**3 (7%)**	
Glenrosa	35%	Valsrivier	50%	Valsrivier	20%
Mispah	35%	Estcourt	15%	Estcourt	20%
Swartland	15%	Swartland	10%	Rensburg	20%
Westleigh	10%	Glenrosa	7%	Erosion	20%
Wasbank	5%	Mispah	7%	Stream beds	20%
		Westlegh	3%		
		Longlands	3%		
		Sterkspruit	2%		

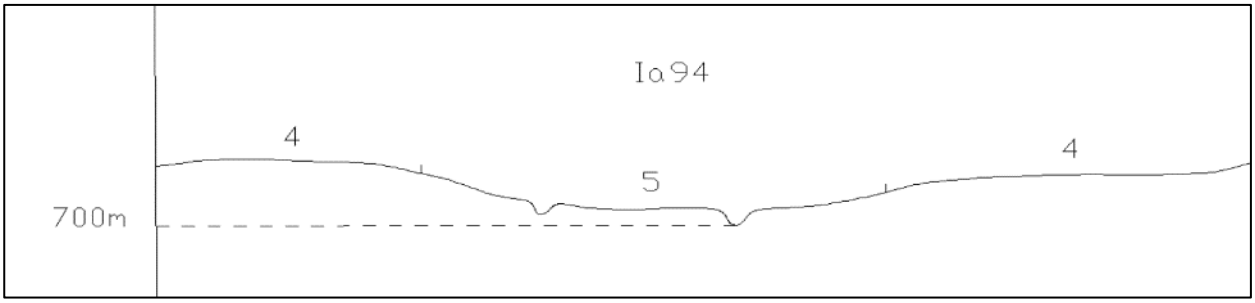


Figure 5.12. Illustration of land type Ia 94 terrain unit (Land Type Survey Staff, 1972 - 2006)

Table 5.4. Soils expected at the respective terrain units within the Ia 94 land type (Land Type Survey Staff, 1972 – 2006)

Terrain Units			
1 (60%)		**2(40%)**	
Oakleaf	75%	Oakleaf	80%
Swartland	10%	Valsrivier	10%
Glenrosa	8%	Dundee	7%
Bare Rock	5%	Bare Rock	3%
Mispah	2%		

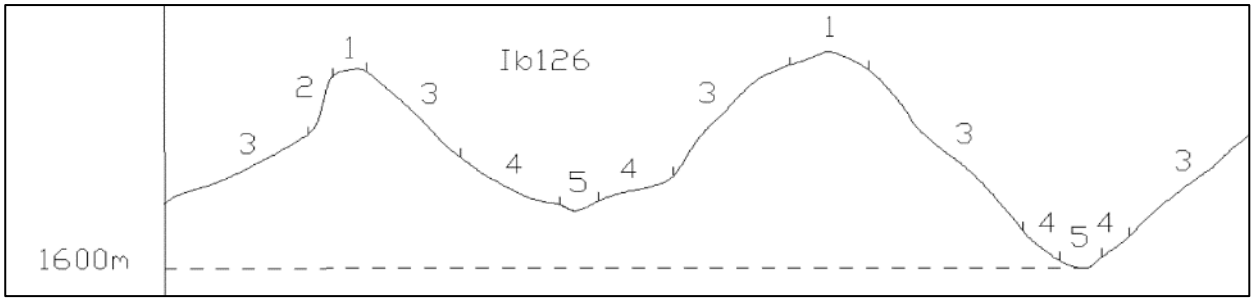


Figure 5.13. Illustration of land type IB 126 terrain unit (Land Type Survey Staff, 1972 - 2006)

Table 5.5. Soils expected at the respective terrain units within the IB 126 land type (Land Type Survey Staff, 1972 - 2006)

Terrain Units									
1 (20%)		**2(5%)**		**3 (70%)**		**4 (2%)**		**5 (3%)**	
Bare Rock	60%	Barerock	100%	Bare Rock	65%	Oakleaf	30%	Valsirivier	45%
Mispah	25%			Mispah	20%	Valsiriveir	15%	Oakleaf	40%
Glenrosa	5%			Valsiriveir	5%	Glenrosa	10%	Inhoek	5%
Swartland	5%			Glenrosa	5%	Swartland	10%	Estcourt	5%
Hutton	5%			Swartland	3%	Mispah	5%	Sterkspruit	5%
				Hutton	2%	Hutton	5%		
						Sterspruit	5%		

Terrain

The slope percentage of the project area (assessment corridor) has been calculated. The majority of the regulated area within the development corridor is characterised by a slope percentage between 0 and 20%, with some smaller patches within the project area characterised by a slope percentage above 70%. This illustration indicates a non-uniform area with undulating slopes, mountainous areas and ridges. The majority of the regulated Ishwati access road route is characterised by a slope percentage between 0 and 10%, with some smaller patches within the project area characterised by a slope percentage above 50%. This illustration indicates a non-uniform area with undulating slopes, mountainous areas and ridges.

Land Capability

Given the nature of the compliance statement and the fact that baseline findings correlate with the screening tool's sensitivities, land capability was solely determined by means of the National Land Capability Evaluation Raster Data Layer (DAFF, 2017). Land capability and land potential will also briefly be calculated to match to that of the screening tool to ultimately determine the accuracy of the land capability sensitivity from (DAFF, 2017).

Land capability and agricultural potential will briefly be determined by a combination of soil, terrain and climate features. Land capability is defined by the most intensive long-term sustainable use of land under rain-fed conditions. At the same time an indication is given about the permanent limitations associated with the different land use classes.

Land capability is divided into eight classes, and these may be divided into three capability groups. Table 5.6 below shows how the land classes and groups are arranged in order of decreasing capability and ranges of use. The risk of use increases from class I to class VIII (Smith, 2006).

The land potential classes are determined by combining the land capability results and the climate capability of a region as shown in Table 5.7. The final land potential results are then described in Table 5.8.

Table 5.6. Land capability class and intensity of use (Smith, 2006)

Land Capability Class	Increased Intensity of Use									Land Capability Groups
I	W	F	LG	MG	IG	LC	MC	IC	VIC	Arable Land
II	W	F	LG	MG	IG	LC	MC	IC		
III	W	F	LG	MG	IG	LC	MC			
IV	W	F	LG	MG	IG	LC				
V	W	F	LG	MG						Grazing Land
VI	W	F	LG	MG						
VII	W	F	LG							
VIII	W									Wildlife
W - Wildlife		**MG - Moderate Grazing**			**MC - Moderate Cultivation**					
F- Forestry		**IG - Intensive Grazing**			**IC - Intensive Cultivation**					
LG - Light Grazing		**LC - Light Cultivation**			**VIC - Very Intensive Cultivation**					

Table 5.7. The combination table for land potential classification

Land capability class	Climate capability class							
	C1	C2	C3	C4	C5	C6	C7	C8
I	L1	L1	L2	L2	L3	L3	L4	L4
II	L1	L2	L2	L3	L3	L4	L4	L5
III	L2	L2	L3	L3	L4	L4	L5	L6
IV	L2	L3	L3	L4	L4	L5	L5	L6
V	Vlei	Vlei	Vlei	Vlei	Vlei	Vlei	Vlei	Vlei
VI	L4	L4	L5	L5	L5	L6	L6	L7
VII	L5	L5	L6	L6	L7	L7	L7	L8
VIII	L6	L6	L7	L7	L8	L8	L8	L8

Table 5.8. The Land Potential Classes.

Land potential	Description of land potential class
L1	Very high potential: No limitations. Appropriate contour protection must be implemented and inspected.
L2	High potential: Very infrequent and/or minor limitations due to soil, slope, temperatures or rainfall. Appropriate contour protection must be implemented and inspected.
L3	Good potential: Infrequent and/or moderate limitations due to soil, slope, temperatures or rainfall. Appropriate contour protection must be implemented and inspected.
L4	Moderate potential: Moderately regular and/or severe to moderate limitations due to soil, slope, temperatures or rainfall. Appropriate permission is required before ploughing virgin land.
L5	Restricted potential: Regular and/or severe to moderate limitations due to soil, slope, temperatures or rainfall.
L6	Very restricted potential: Regular and/or severe limitations due to soil, slope, temperatures or rainfall. Non-arable
L7	Low potential: Severe limitations due to soil, slope, temperatures or rainfall. Non-arable
L8	Very low potential: Very severe limitations due to soil, slope, temperatures or rainfall. Non-arable

Two sensitive soil forms were identified namely, Oakleaf and Quaggafontein soil forms. The Oakleaf soil form consists of an orthic topsoil on top of a deep neocutanic horizon. The Quaggafontein soil form consists of an orthic topsoil on top of a neocutanic horizon underlain with an alluvial subsurface diagnostic horizon.

The above-mentioned soils have been determined to have a land capability of class "III" as well as a climate capability level 8 given the low Mean Annual Precipitation (MAP) and the high Mean Annual Potential Evapotranspiration (MAPE) rates. The combination between the determined land capabilities and climate capabilities results in a land potential of "L6", which is defined as having very restricted potential. *Regular and/or severe limitations due to soil, slope, temperatures or rainfall. Non-arable*. The sensitivity of this land potential is characterised by a "Low Sensitivity".

Land potential level 6 has been determined (this land potential level is defined as having very restricted potential. Regular and/or severe limitations due to soil, slope, temperatures or rainfall. Non-arable. The sensitivity of this land potential is characterised by a "Low Sensitivity". Fifteen land capabilities have been digitised by (DAFF, 2017) across South Africa, of which eight potential land capability classes are located within the proposed footprint area's assessment corridor, including Land Capability 1 to 5 (very low to low); and Land Capability 6 to 8 (moderately low to moderate).
The baseline findings and the sensitivities as per the Department of Agriculture, Forestry and Fisheries (DAFF, 2017) national raster file concur with one another. Sensitivities in all the combined power stations, powerline and the proposed alternatives are classified in the same category. Hence, any of the various sections in the powerline grid can be presented to illustrate the sensitivities. The land capability and land potential of the resources in the regulated area is characterised by "Low" to "Moderate" sensitivities, which conforms to the requirements of an agricultural compliance statement only. The DEA screening tool, (2022) shows that some of the available crop fields within the assessment area between the Khangela to Ishwati switching station are categorised as high sensitivity. Hence, it is recommended that the crop fields be regarded as no-go areas for substations, pylons and service tracks (unless agreed otherwise with the land owners). The powerline may however span these areas without any effects on the crop fields. The development within the 400 m corridor required for soils also has similar sensitivities (Low to Medium).

The most sensitive soil forms identified for the access road to the Ishwati switching station include Vaalbos, Carolina and Dundee soil forms. The Vaalbos soil form consist of an orthic topsoil on top of a red apedal subsoil, which is underlain by a hard rock. Carolina soil form consist of an orthic topsoil on top of a yellow-brown apedal subsoil, which is underlain by a hard rock. The Dundee soil form consists of an orthic topsoil on top of thick alluvial subsoil horizon. The above-mentioned soils have been determined to have a land capability of class "IV" as well as a climate capability level 8 given the low Mean Annual Precipitation (MAP) and the high Mean Annual Potential Evapotranspiration (MAPE) rates. The combination between the determined land capabilities and climate capabilities results in a land potential of "L6", which is defined as having very restricted potential. Regular and/or severe limitations due to soil, slope, temperatures or rainfall. Non-arable. The sensitivity of this land potential is characterised by a "Low Sensitivity".

5.5 Hydrology and Surface Water

The hydrological context of the project is also extensive as presented in Figure 5.14 below. The transmission line starts in the west with the substation in catchment L21A and traverses the landscape to the east into the L21C catchment followed by the L21E catchment at the Ishwati substation and back into L21C to the final Umsinde substation. These quaternary catchments fall within the Breede - Gouritz Water Management Area (WMA - 8) or the old Fish to Keiskamma WMA (15) within the Drought Corridor aquatic ecoregion. The proposed transmission line will be crossing the L21A-06493 (Burgerspruit River), L21B-06559 (Unnamed), L21B-06573 (Unnamed), L21B-06585 (Unnamed), L21C-06652 (Snyderskraal River), L21C-06621 (Bakensklip River), L21E-06748 (Unnamed River) NFEPA rivers along with multiple tributaries of these systems.

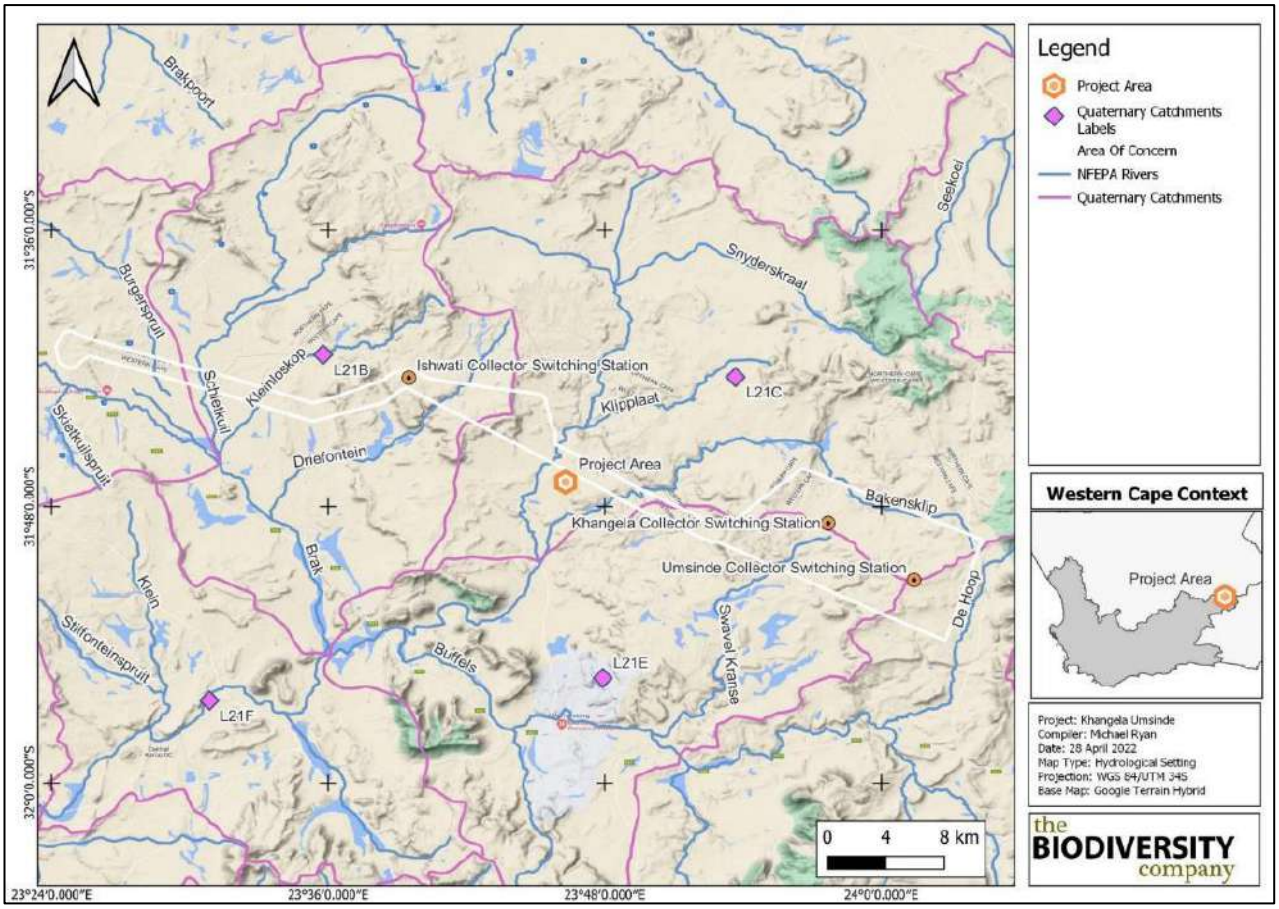


Figure 5.14. Hydrological context of the project area

The project area traverses multiple Sub-quaternary catchment as presented in Figure 5.15 and Figure 5.16. below. These include 6539, 6607, 6493, 6559, 6573, 6685, 6652, 6621, 6748, 6810 and 6756 Sub-quaternary catchments. The status of these Sub-quaternary catchments are presented in Figure 5.15 below of the Aquatic Assessment report (Appendix E). These include 6539, 6607, 6493, 6559, 6573, 6685, 6652, 6621, 6748, 6810 and 6756 Sub-quaternary catchments. . The Sub-quaternary catchments 6539, 6607, 6493, 6559, 6573, 6685 and 6756 are considered upstream management areas. Care should be taken when potential modification may result as modification in these upper reaches may result in modification in catchments further downstream which are NFEPA's. Catchments 6652, 6748 and 6810 are considered fish support area for *Barbus anoplus* (now *Enteromius anoplus*) and *Pseudobarbus asper*. The 6621 Sub-quaternary catchment is considered a River NFEPA and fish sanctuary: other threatened. The habitat type protected is the ephemeral river ecosystem type - Drought Corridor - Lower foothill as well as the Upper foothill. Care therefore should be taken to avoid degradation to the project area to avoid placing stress on the supported fish species and NFEPA's within the project area. The National Freshwater Ecosystem Priority Areas (NFEPAs) (Driver et al., 2011) spatial data has been incorporated in the South African Inventory of Inland Aquatic Ecosystems (SAIIAE) spatial data set. They are included here as the database is intended to be conservation support tools and are envisioned to guide the effective implementation of measures to achieve the National Environment Management Biodiversity Act (NEM:BA) biodiversity goals (Nel et al., 2011). The NFEPA spatial layer indicates that the wetlands are not classified as a Ramsar site. The assessment area overlaps with FEPA rivers, upstream management areas and fish support areas. The proposed development is not located within a SWSA.

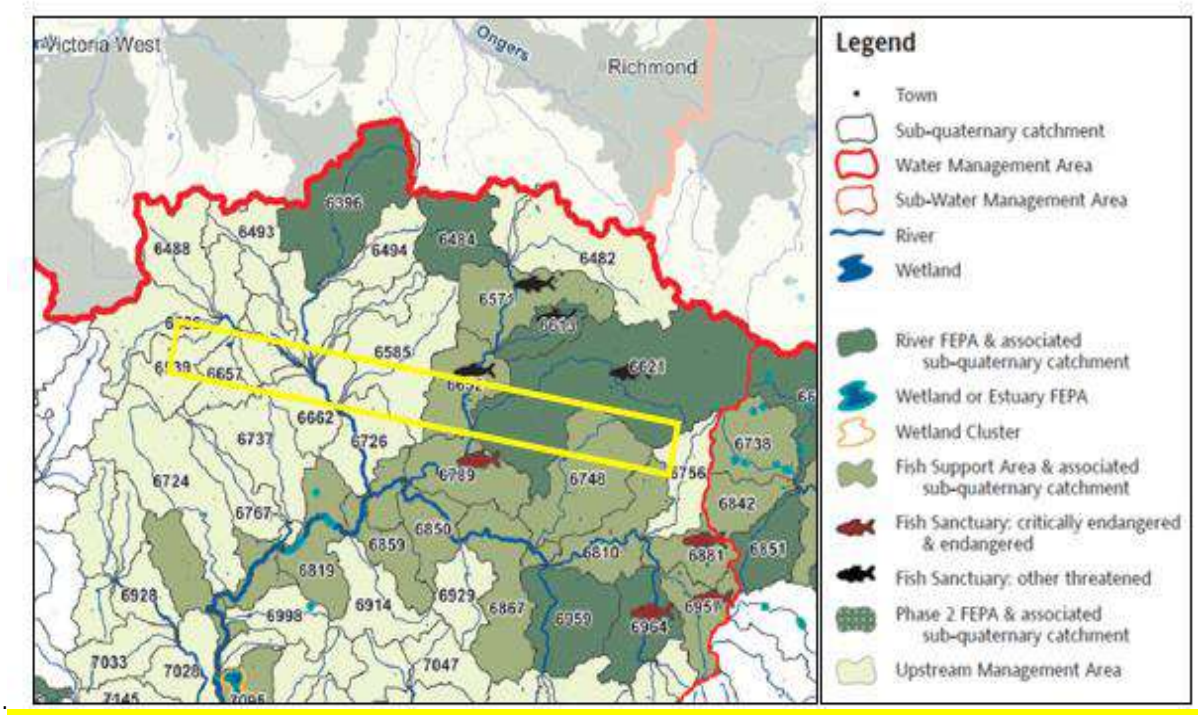


Figure 5.15. Map illustrating fish and river FEPAs for the project area, the project area is represented by the yellow square (Nel et al., 2011)

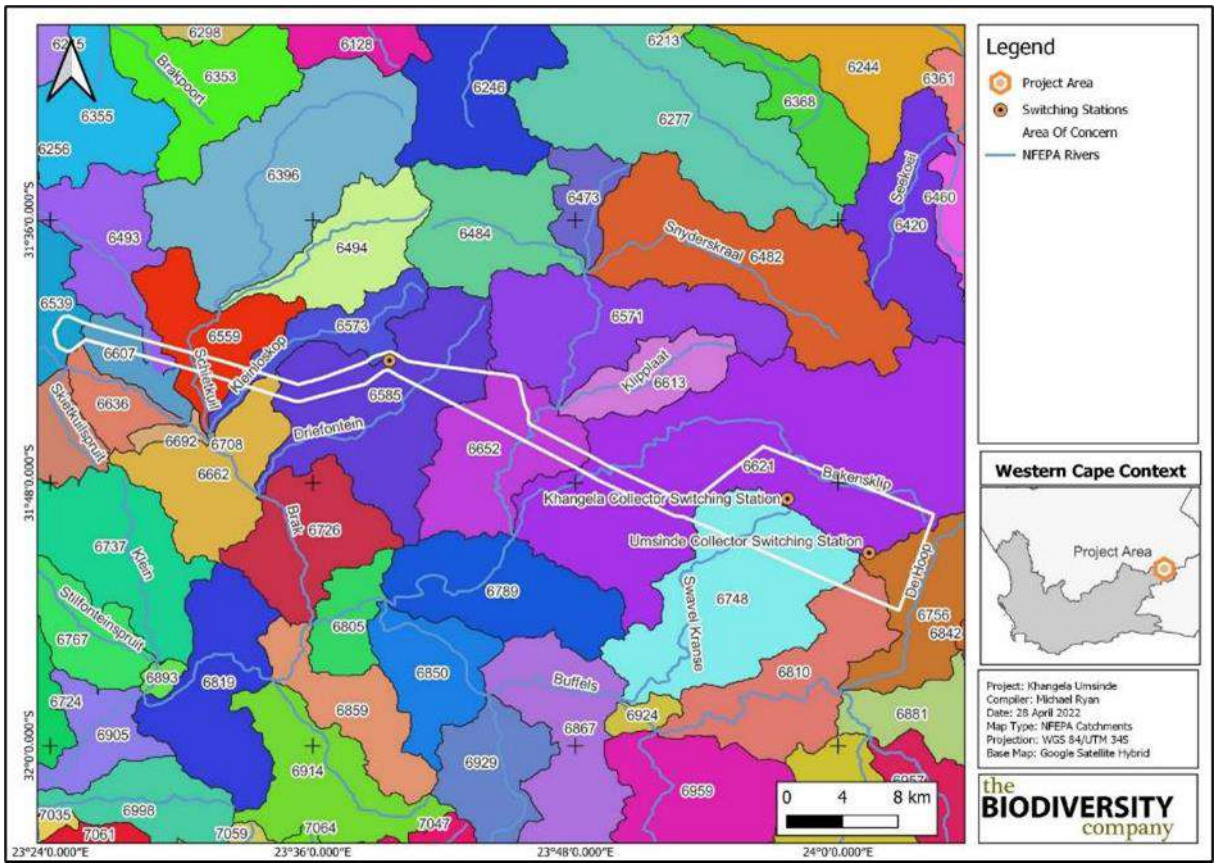


Figure 5.16. Layout of the proposed development area in relation to the riverine National Freshwater Priority Areas

The transmission line crosses multiple watercourses of which seven are considered SQRs. All other watercourses form part of the drainage networks of these seven SQR's (Table 5.9 below). The desktop PES category of the seven reach's range from a class A (natural/close to natural) to a class D (largely modified). The modification status of these reaches are a result of impacts to instream habitat, wetland and riparian zone continuity, flow modifications and potential impacts on physio-chemical conditions (water quality).

Table 5.9. Summary of the Present Ecological State of the SQRs associated with the transmission line (DWS, 2014)

SQR Importance and Sensitivity	Score
L21A-06493 (Burgerspruit River)	
Present Ecological Status	Moderately Modified (class C)
Ecological Importance	Moderate
Ecological Sensitivity	Moderate
Default Ecological Category	C
L21B-06559 (Unnamed)	
Present Ecological Status	Natural/Close to Natural (class A)
Ecological Importance	High
Ecological Sensitivity	Moderate
Default Ecological Category	B
L21B-06573 (Unnamed)	
Present Ecological Status	Largely Natural (class B)
Ecological Importance	High
Ecological Sensitivity	Moderate
Default Ecological Category	B
L21B-06585 (Unnamed)	
Present Ecological Status	Largely Natural (class B)
Ecological Importance	Moderate
Ecological Sensitivity	Moderate
Default Ecological Category	C
L21C-06652 (Snyderskraal River)	
Present Ecological Status	Moderately Modified (class C)
Ecological Importance	Moderate
Ecological Sensitivity	Moderate
Default Ecological Category	C
L21C-06621 (Bakensklip River)	
Present Ecological Status	Moderately Modified (class C)
Ecological Importance	Moderate
Ecological Sensitivity	Moderate
Default Ecological Category	C
L21E-06748 (Unnamed River)	
Present Ecological Status	Largely Modified (class D)
Ecological Importance	Moderate
Ecological Sensitivity	Moderate
Default Ecological Category	C

Strategic Water Source Areas

Strategic Water Source Areas are areas that supply a disproportionate amount of mean annual runoff to a geographical region of interest. The areas supplying ≥ 50% of South Africa's water supply (which were represented by areas with a mean annual runoff of ≥ 135 mm/year) represent national Strategic Water Source Areas (SANBI, 2013). According to the Strategic Water Source Areas (SWSAs) of South Africa, Lesotho and Swaziland, the

project area is not located within the SWSAs with all SWSA aligned along the coast. The project area is considered local steppe climate that receives limited rainfall (annual 373 mm) with an average annual temperature in Murraysburg of 15.7°C (climate-data.org, 2022).

Freshwater Critical Biodiversity Areas

The project area falls along the border of the Northern Cape and Western Cape and therefore both data sets were considered. These include the Western Cape Biodiversity Spatial Plan for the Beaufort West and the Northern Cape Critical Biodiversity Area (CBA) Map for freshwater biodiversity (SANBI, 2008). The area of concern crosses multiple Freshwater Critical Biodiversity Area of varying sensitivity with different watercourses considered Critical Biodiversity Area (CBA 1 and 2), Ecological Support Area (ESA 1 and 2) . The surrounding habitat of the project area are considered Ecological Support Areas (ESA) and protected areas.

CBAs are terrestrial and aquatic areas of the landscape that need to be maintained in a natural or near-natural state to ensure the continued existence and functioning of species and ecosystems and the delivery of ecosystem services. CBAs are areas of high biodiversity value and need to be kept in a natural state, with no further loss of habitat or species (MTPA, 2014). Thus, if these areas are not maintained in a natural or near natural state then biodiversity targets cannot be met. Maintaining an area in a natural state can include a variety of biodiversity compatible land uses and resource uses (SANBI, 2017).

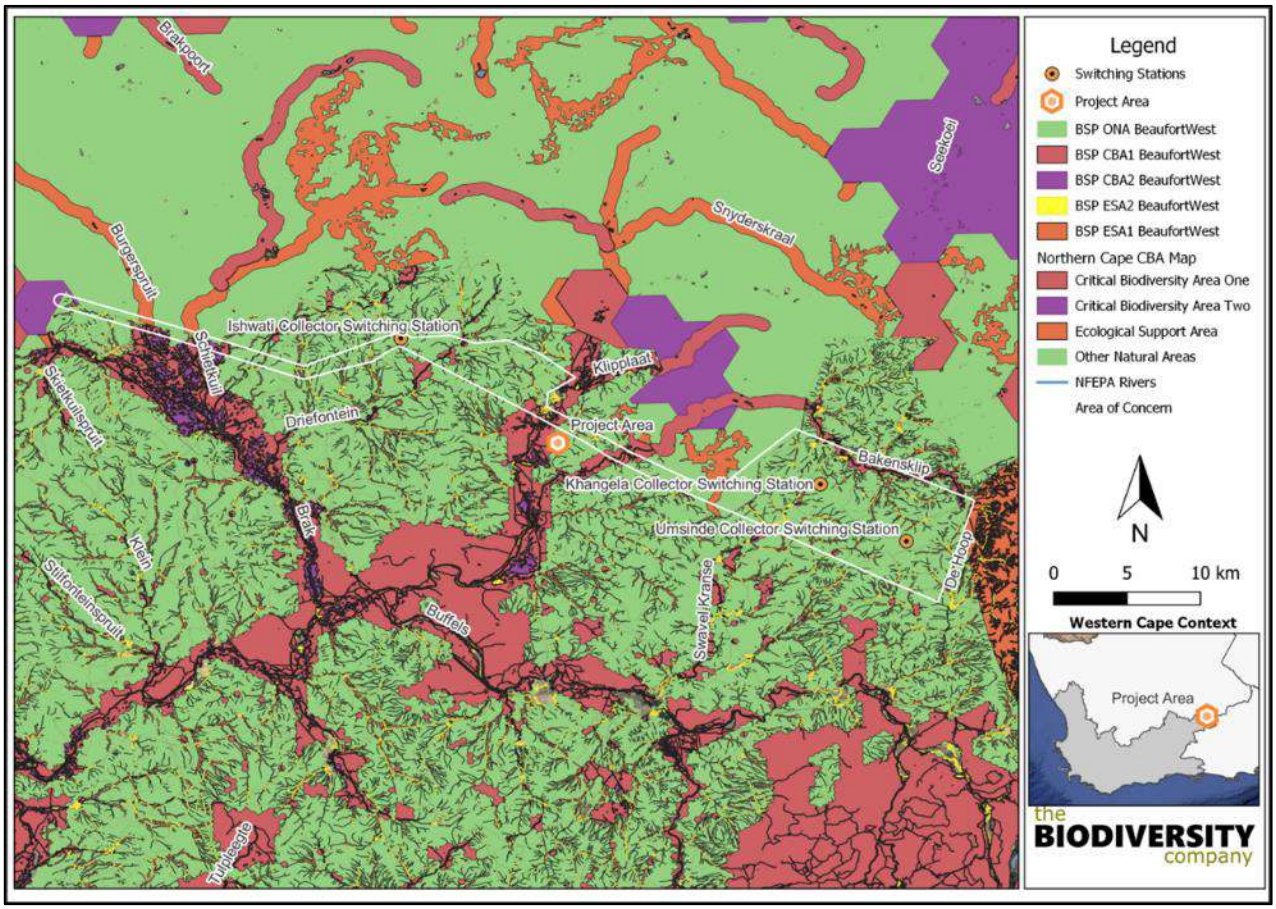


Figure 5.17. Illustration of the Freshwater Critical Biodiversity Areas within the project area (SANBI, 2008)

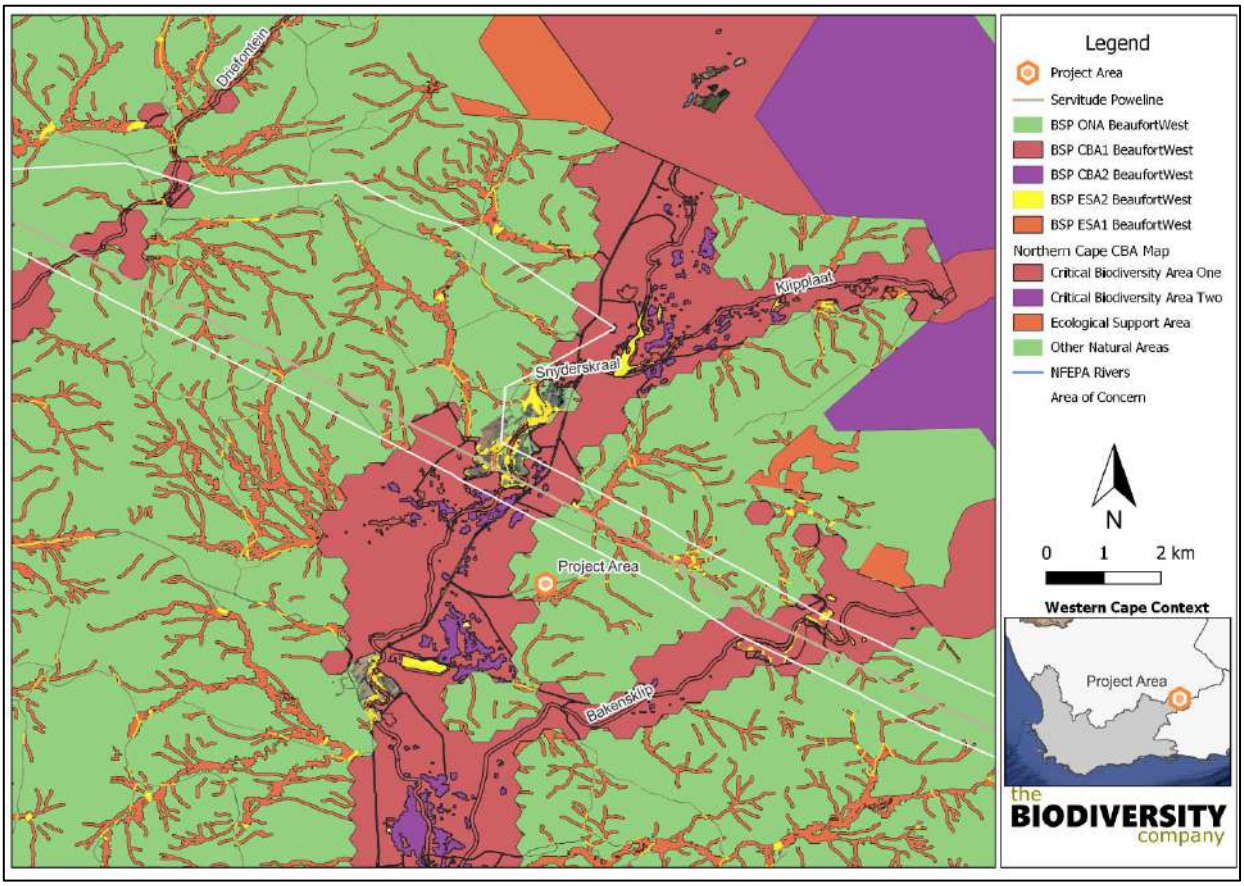


Figure 5.18. Zoomed in illustration of the Freshwater Critical Biodiversity Areas of a section of the Khangela-Ishwati transmission line, including the access road to the Ishwati switching station (SANBI, 2008)

Ecosystem Threat Status

Ecosystem threat status outlines the degree to which ecosystems are still intact or alternatively losing vital aspects of their structure, function and composition, on which their ability to provide ecosystem services ultimately depends (Skowno et al., 2019). Ecosystem types are categorised as Critically Endangered (CR), Endangered (EN), Vulnerable (VU) or Least Threatened (LT), based on the proportion of each ecosystem type that remains in good ecological condition (Skowno et al., 2019). The Ecosystem Threat Status (ETS) of each river assessed was based on the extent to which the system had been modified from its natural condition (SANBI, 2018). According to the South African Inventory of Inland Aquatic Ecosystems (SAIIAE) released with the National Biodiversity Assessment (NBA) of rivers, the rivers which were superimposed on the aquatic ecosystem threat status indicate that the area of concern crosses multiple watercourses which are considered either Critically Endangered or Endangered ecosystems. Systems which are of least concern are located outside of the project area.

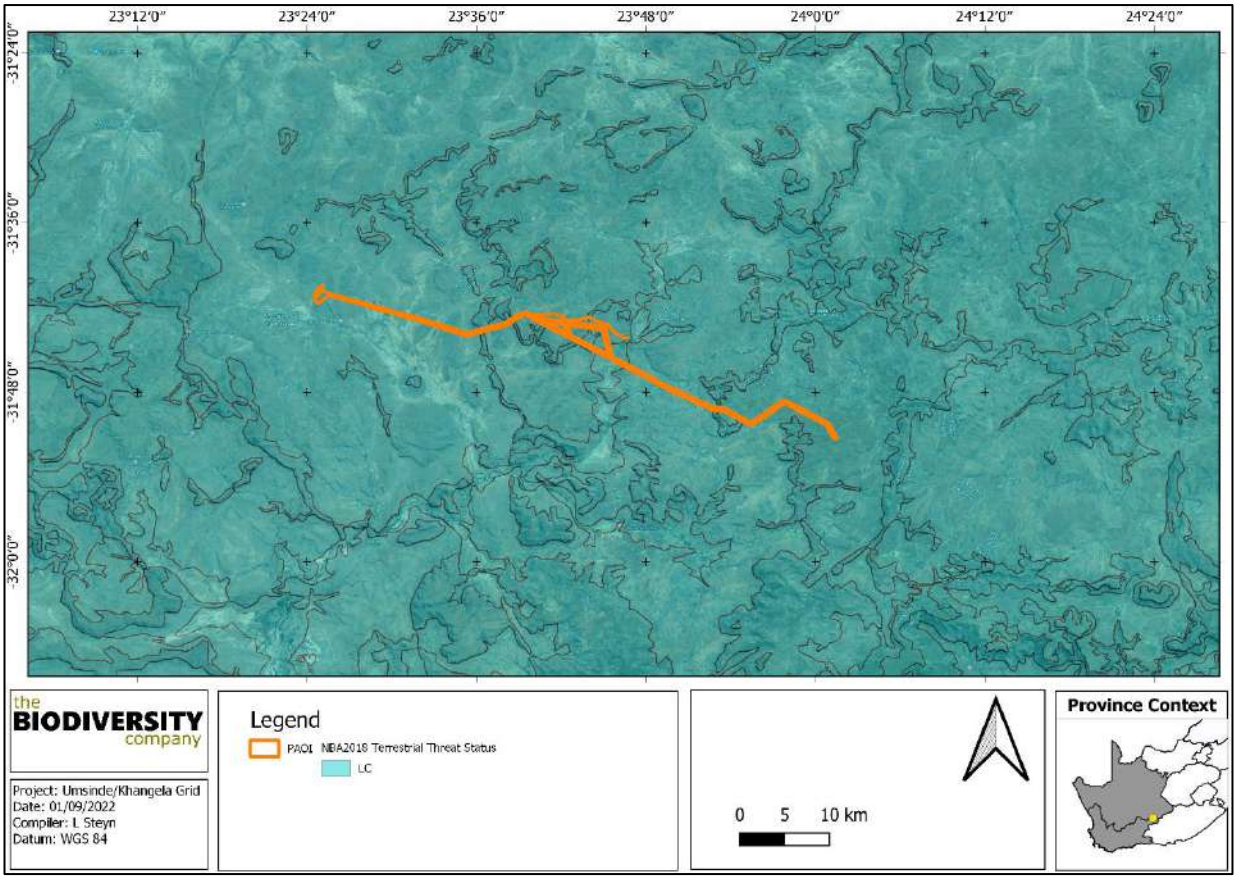


Figure 5.19. Illustration of the Ecosystem Threat Status of the project area (SANBI, 2018)

Ecosystem Protection Level

The project area was superimposed on the ecosystem protection level map to assess the protection status of aquatic ecosystems associated with the development. This indicates that the aquatic ecosystems associated with the project area are rated as poorly protected (PP) or not protected.

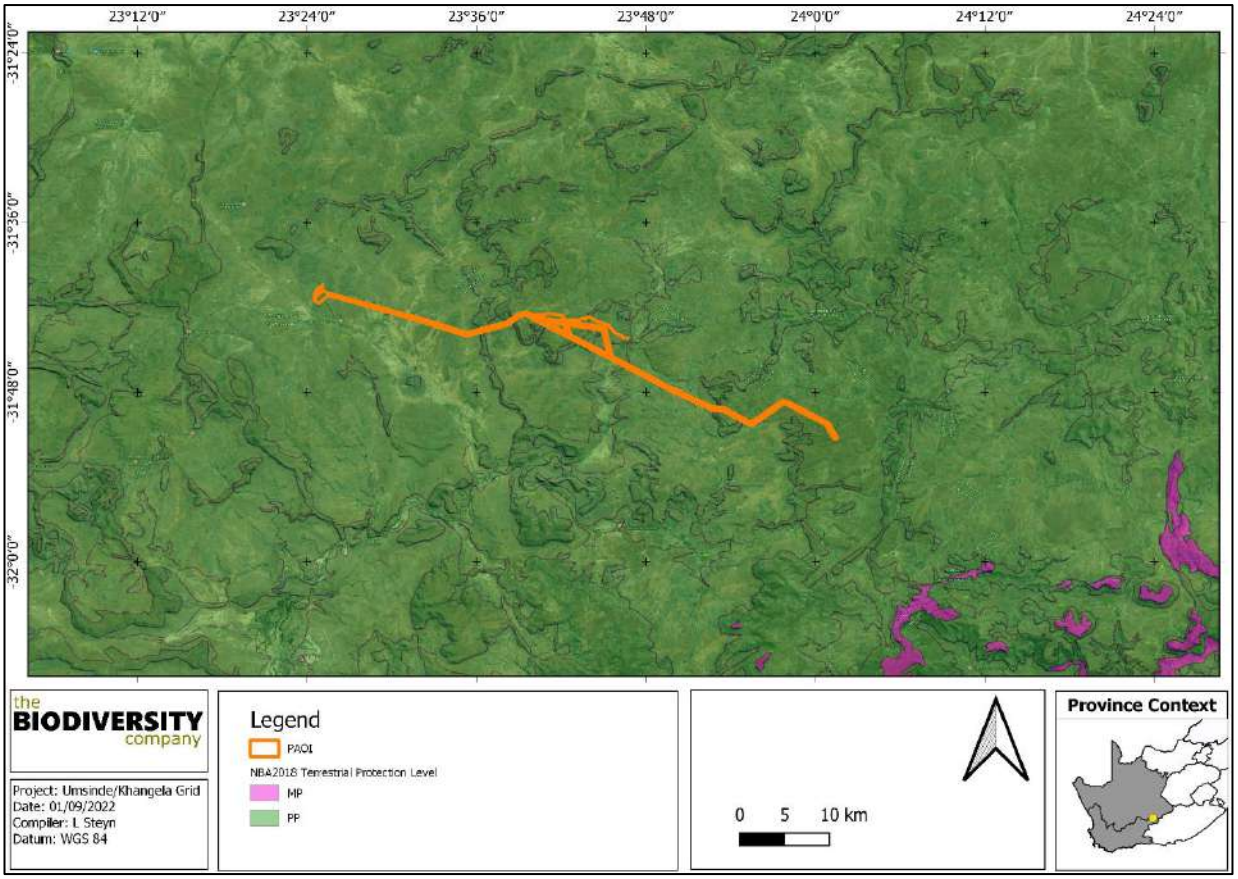


Figure 5.20. Map illustrating the ecosystem protection level associated with the assessment area

Fish species

An expected species list was generated from DWS (2014), and Skelton (2011) for the L21A-06493, L21B-06559, L21B-06573, L21B-06585, L21C-06652, L21C-06621, L21E-06748 SQR's. A total of 3 fish species are expected to occur in the rivers of the project area. The expected species are generated on a reach basis, and the occurrence of all species in the system is unlikely as different species are specialists of different habitats which are present along a reach. The multiple SQR's are varied in habitat with multiple systems non perennial/ephemeral in nature. As a result, the expected fish species list for the respective river systems includes only three different fish species. This includes one Vulnerable (V) species in *Pseudobarbus asper* (*Smallscale Redfin*).

L21A-06493	L21B-06559	L21B-06573	L21B-06585	L21C-06652	L21C-06621	L21E-06748	Common Name	IUCN Status (2019)
None	*Enteromius anoplus*	*None*	*Enteromius anoplus*	*Enteromius anoplus*	*Enteromius anoplus*	*Enteromius anoplus*	Cubbyhead Barb	LC
	x		x	*Labeo umbratus*	x	x	Moggel	LC
	x		x	x	x	*Pseudobarbus asper*	Smallscale Redfin	VU

LC - Least Concern, NT – Near Threatened, VU – Vulnerable; x - not expected

Two fish species fish were observed during the survey. The most common species observed was *Enteromius anoplus* which were present throughout the project area in systems with water which were connected. Multiple river systems which occurred as pools lacked the interconnectedness of the reach for fish species to travel through the system. *Pseudobarbus asper* represents a vulnerable fish species which was not sampled in the March survey. It was expected within the L21E-06748 SQR which was dry at the time of the survey. It is therefore unlikely that the species is prolific in the reach.

In-situ Water Quality

In situ water quality for the project area indicates natural conditions for the majority of the watercourses of the project area, as all recorded parameters conform with TWQR. Due to the scale of the project area and multitude of sampling sites considered across multiple river systems the potential for modification within the project area increases. This was seen as drainage networks which belong to De Hoop, Buffels Swavel Kranse and Brak were considered natural as all recorded parameters were within TWQR. The recorded parameters assessed within in-situ water quality indicate conditions which would be hinder aquatic life in systems with elevated pH concentrations, however detailed chemical analysis would be required to understand the physiochemical conditions in the reach.

Riparian Habitat

The project area traverses through three vegetation types namely the Eastern Upper Karro (NKu4), Upper Karoo Hardeveld (NKu2) and Southern Karoo Riviere (AZi6). These southern Karoo Riviere vegetation type which is located within the Snyderkraal and Klipplaat drainage networks while the Eastern Upper Karro is the dominant vegetation type covering majority of the project area. The Upper Karoo Hardeveld covers a minority of watercourses within the project area. The distribution of the vegetation types are are within the Nama- Karoo Biome. The Eastern Upper Karro is distributed across the Northern Cape, Eastern Cape and Western Cape Provinces at altitude between mostly 1 000–1 700 m, forming flats and gently sloping plains. This vegetation type is considered as least threatened from a conservational perspective with a target of 21% to be protected. Currently on 2% is transformed. The important taxa within the vegetation type are (Mucina & Rutherford, 2006):

Tall Shrubs: *Lycium cinereum* (d), *L. horridum*, *L. oxycarpum*.

Low Shrubs: *Chrysocoma ciliata* (d), *Eriocephalus ericoides* subsp. *ericoides* (d), *E. spinescens* (d), *Pentzia globosa* (d), *P. incana* (d), *Phymaspermum parvifolium* (d), *Salsola calluna* (d), *Aptosimum procumbens*, *Felicia muricata*, *Gnidia polycephala*, *Helichrysum dregeanum*, *H. lucilioides*, *Limeum aethiopicum*, *Nenax microphylla*, *Osteospermum leptolobum*, *Plinthus karooicus*, *Pteronia glauca*, *Rosenia humilis*, *Selago geniculata*, *S. saxatilis*.

Succulent Shrubs: *Euphorbia hypogaea*, *Ruschia intricata*.

Herbs: *Indigofera alternans*, *Pelargonium minimum*, *Tribulus terrestris*.

Geophytic Herbs: *Moraea pallida* (d), *Moraea polystachya*, *Syringodea bifucata*, *S. concolor*.

Succulent Herbs: *Psilocaulon coriarium*, *Tridentea jucunda*, *T. virescens.*

Graminoids: *Aristida congesta* (d), *A. diffusa* (d), *Cynodon incompletus* (d), *Eragrostis bergiana* (d), *E. bicolor* (d), *E. lehmanniana* (d), *E. obtusa* (d), *Sporobolus fimbriatus* (d), *Stipagrostis ciliata* (d), *Tragus koelerioides* (d), *Aristida adscensionis*, *Chloris virgata*, *Cyperus usitatus*, *Digitaria eriantha*, *Enneapogon desvauxii*, *E. scoparius*, *Eragrostis curvula*, *Fingerhuthia africana*, *Heteropogon contortus*, *Sporobolus ludwigii*, *S. tenellus*, *Stipagrostis obtusa*, *Themeda triandra*, *Tragus berteronianus*.

The riparian areas within the project areas observed were uniform geomorphologically as well as in vegetation composition with few differences across river systems. The riparian area composition was divided into two which are based on weather a system had flowing water in the channel or not which influenced the present vegetation. Ephemeral channels were at very shallow gradients with poorly sloping banks which were dominated by terrestrial vegetation which encroach on the riparian areas due to the lack of wetted soils. Drainage lines formed chasm/canyon channels where the steep gradient of the hillsides resulted in high levels of erosion. Vegetation within the riparian areas were composed of succulent herbs and shrubs as mentioned above as well as *Pentzia incana, Galium tomentosum, Roepera morgsana, Thesium lineatum, Melianthus comosus, Lessertia sp.).* Other species observed include, *Diospyros autro-Africana, Selago geniculate, Solanum tomentosum, Lobostemon argenteus* and *Arctotheca calendula.* Riparian areas are in a natural state with little modification and low concentrations and variability in alien invasive species observed. The only species observed in these systems include Amaranthus sp. and *Cereus jamacaru* (Queen of the night) which is a NEMBA class Ib.

The second type of river systems were the perennial systems which have flow all year round where wetted soils allow for a larger diversity of vegetation species. The first observed difference is the presence of sedges such as multiple *Cyprus sp. Pragmatism australis* and *Typha capensis* .

The diversity of shrubs also increase as compared to ephemeral systems and include species such as *Lycium cinereum, Berula thunbergii, Gomphocarpus fruticosus, Chrysocoma ciliata, Chrysocoma Aristida c.f. congesta, Euryops imbricatus, Berkheya sp. Chaenostoma uncinatum* and *Lycium sp.* Both ephemeral and perennial systems were characterized by a multitude of graminoids with the ephemeral systems more prolific wish grasses. These included *Cynodon dactylon, Themeda triandra, Paspalum dilatatum, Eragrostis curvula* and *Panicum* maximum among others. The largest difference between the two types of systems is the presence of large and small trees. The available water allows for tree species to flourish along the banks of the perennial systems which are very sparse in the ephemeral systems riparian area. These include *Vachellia haematoxylon, Sericea lancea, Vachellia Karoo, Solanum c.f. elaeagnifolium and Diospyros lycioides* . The alien invasive *Betula pendula* (Silver birch) was observed along the Bakensklip at site BKMS which is suspected to have been planted by the farmers at the house which is along the river.

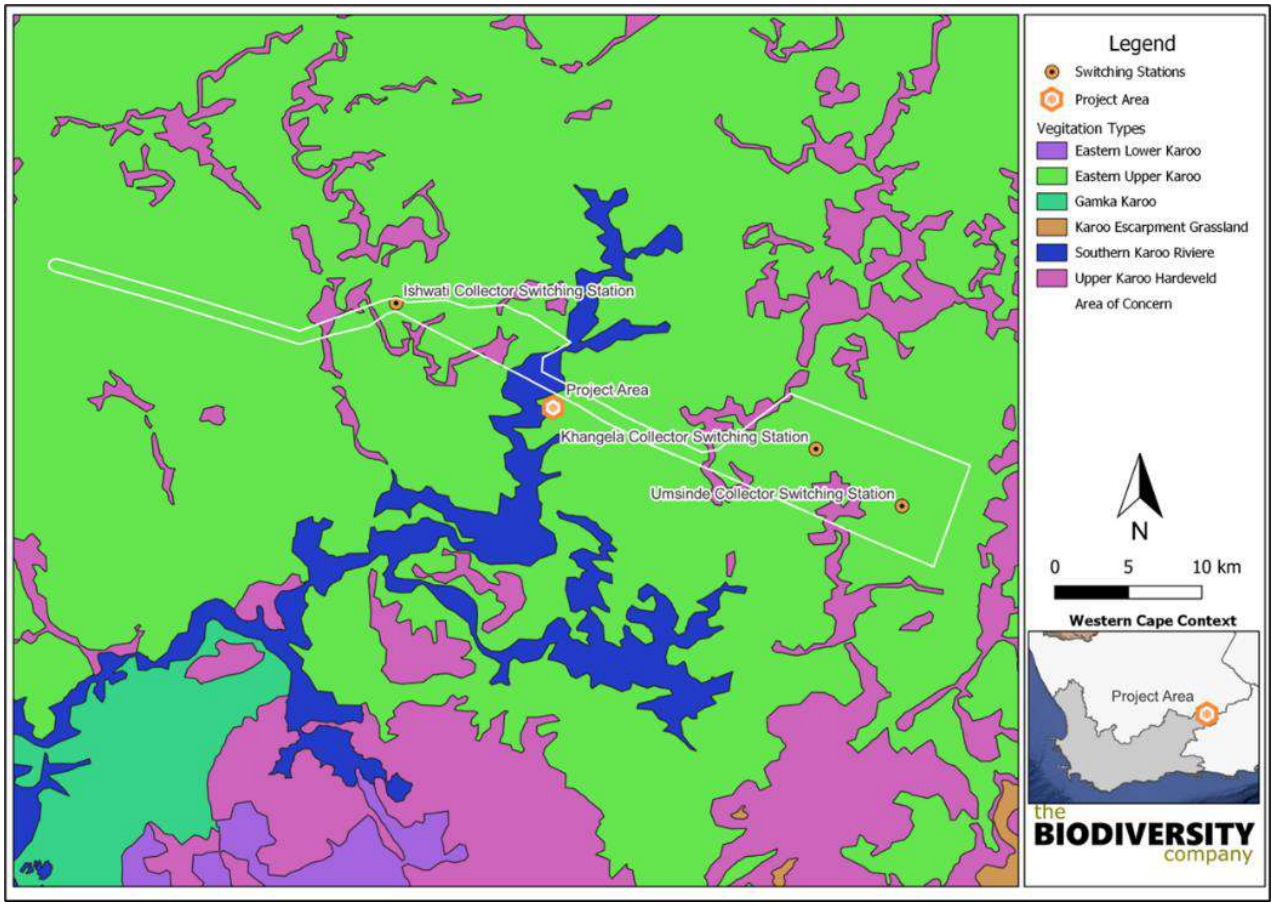


Figure 5.21. The vegetation type of the project area

Buffer Zones

According to the buffer guidelines the maximum required buffer should be applied to a system (Macfarlane, et al., 2014). Riparian areas have high conservation value and can be considered most important part of a watershed for a wide range of values and resources. They provide important habitat for a large volume of wildlife and often forage for domestic animals. The vegetation they contain are an important part of the water balance for the hydrological cycle through evapotranspiration. They are crucial for riverbank stability and in preventing erosion within the channel (Elmore and Beschta, 1987). This is especially true for ephemeral systems where due to dry nature of the system, the habitat provided by vegetation within the riparian area are the only existing aspect of the watercourse until thunderstorm events. Due to the scale of the project, main stem rivers classified as NFEPA scale rivers are given a 30 m buffer (Ezemvelo, 2013). The smaller systems which are considered either tributaries or drainage lines were assigned an 18 m buffer according to Dosskey (2000) to protect this habitat type. The delineated riparian areas and associated buffer zones are considered no go areas for any infrastructure such as pylons for the transmission lines should be located outside the riparian buffers in accordance with the precautionary principle. It is however understood that the access road and service tracks will invariably cross systems which is unavoidable. The delineation of the watercourse extents riparian zone observed in the study area are presented in the figures below.

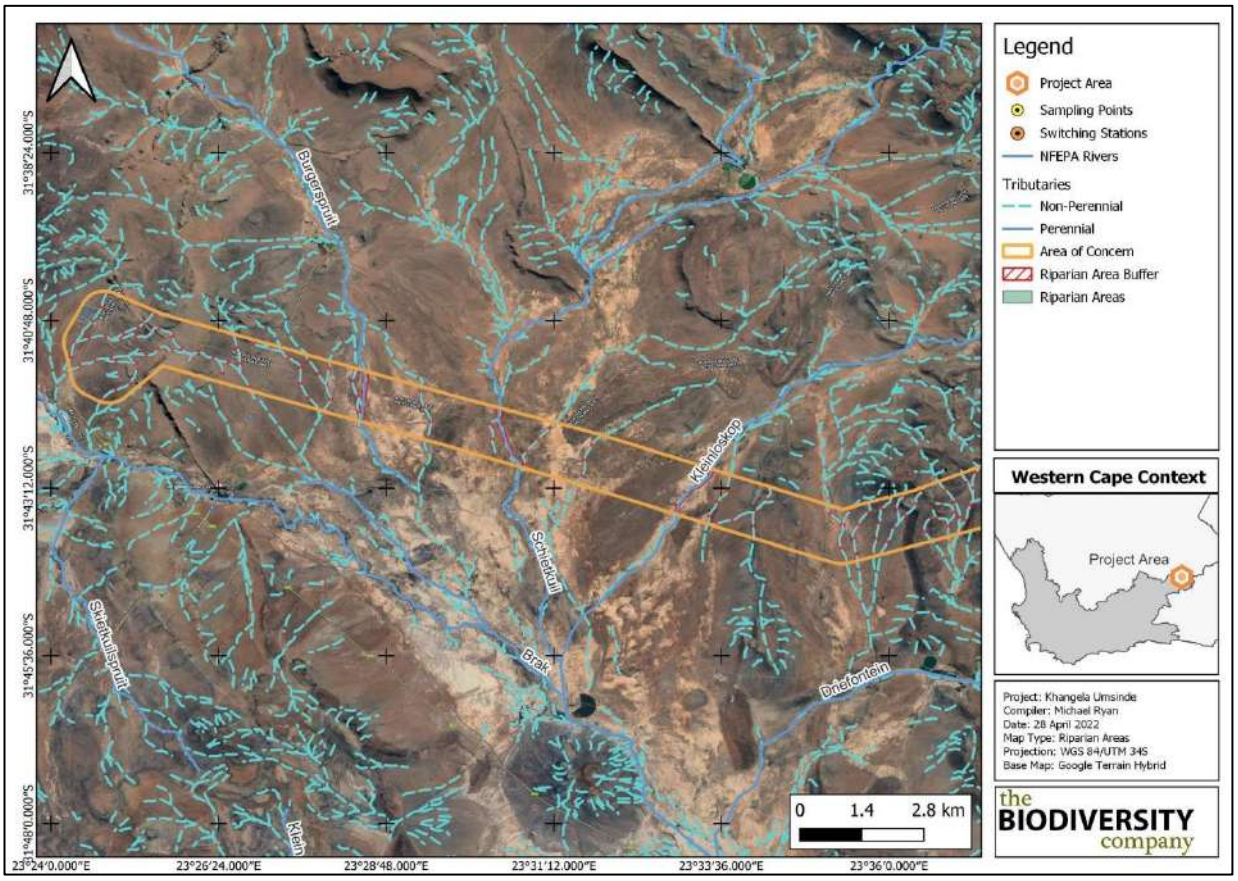


Figure 5.22. Riparian delineation and associated buffer of the watercourses associated with the project area

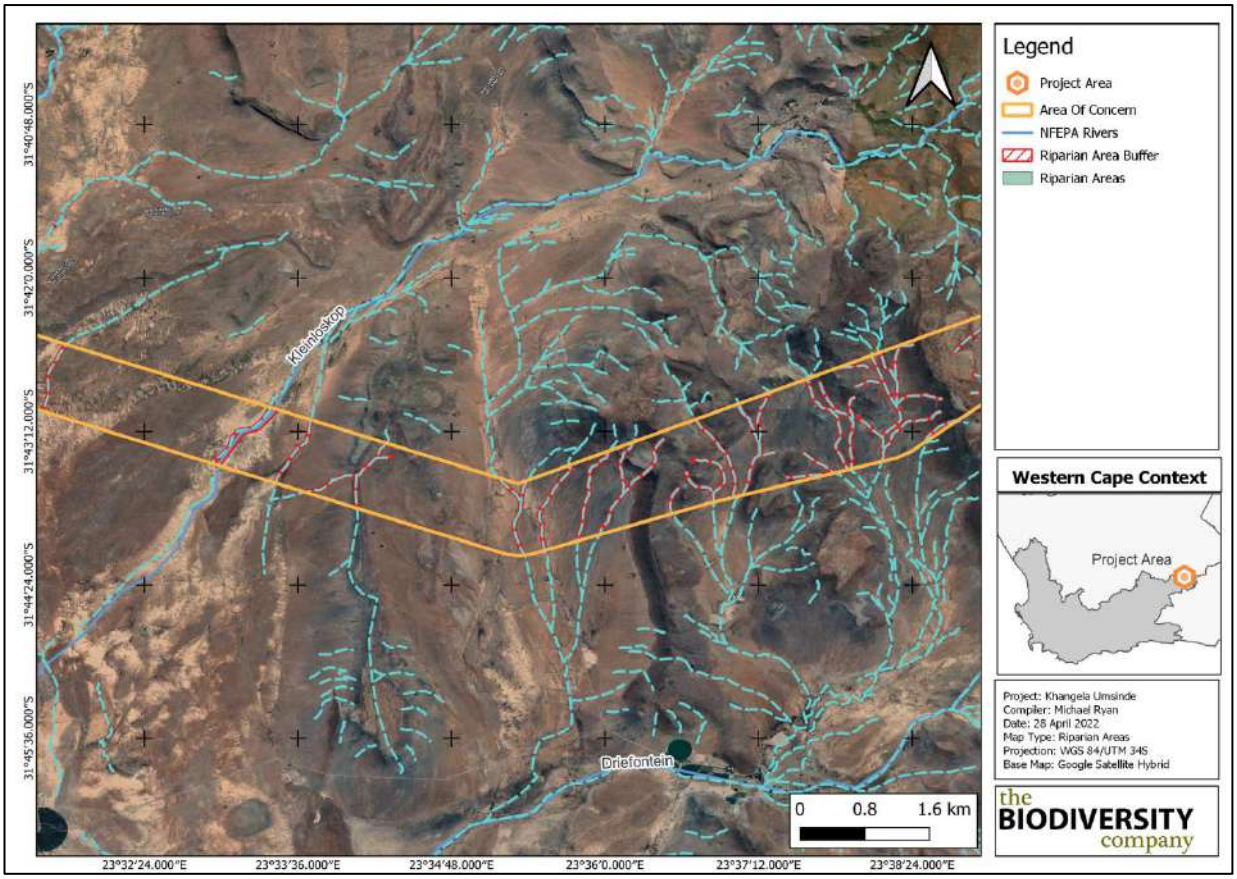


Figure 5.23. Riparian delineation and associated buffer of the watercourses associated with the project area.

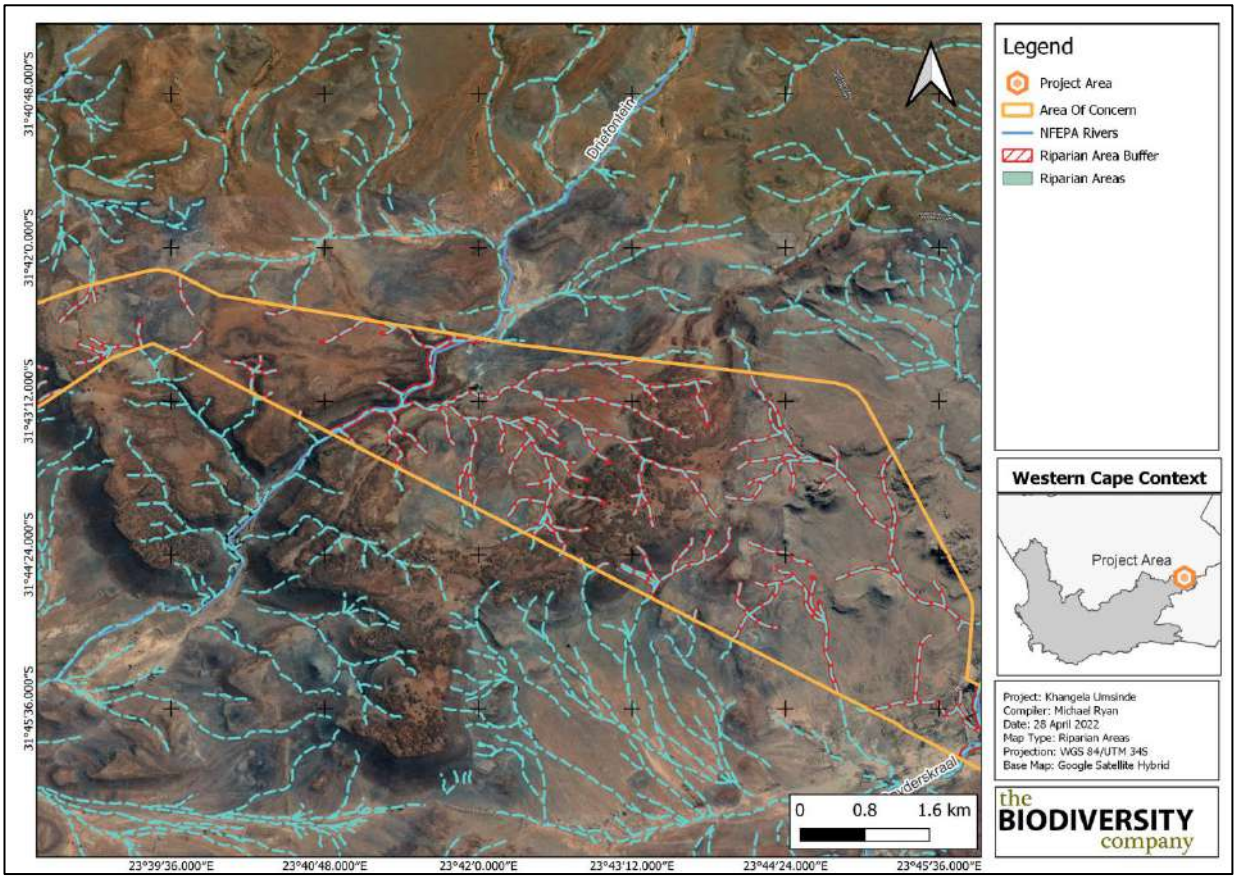


Figure 5.24. Riparian delineation and associated buffer of the watercourses associated with the project area.

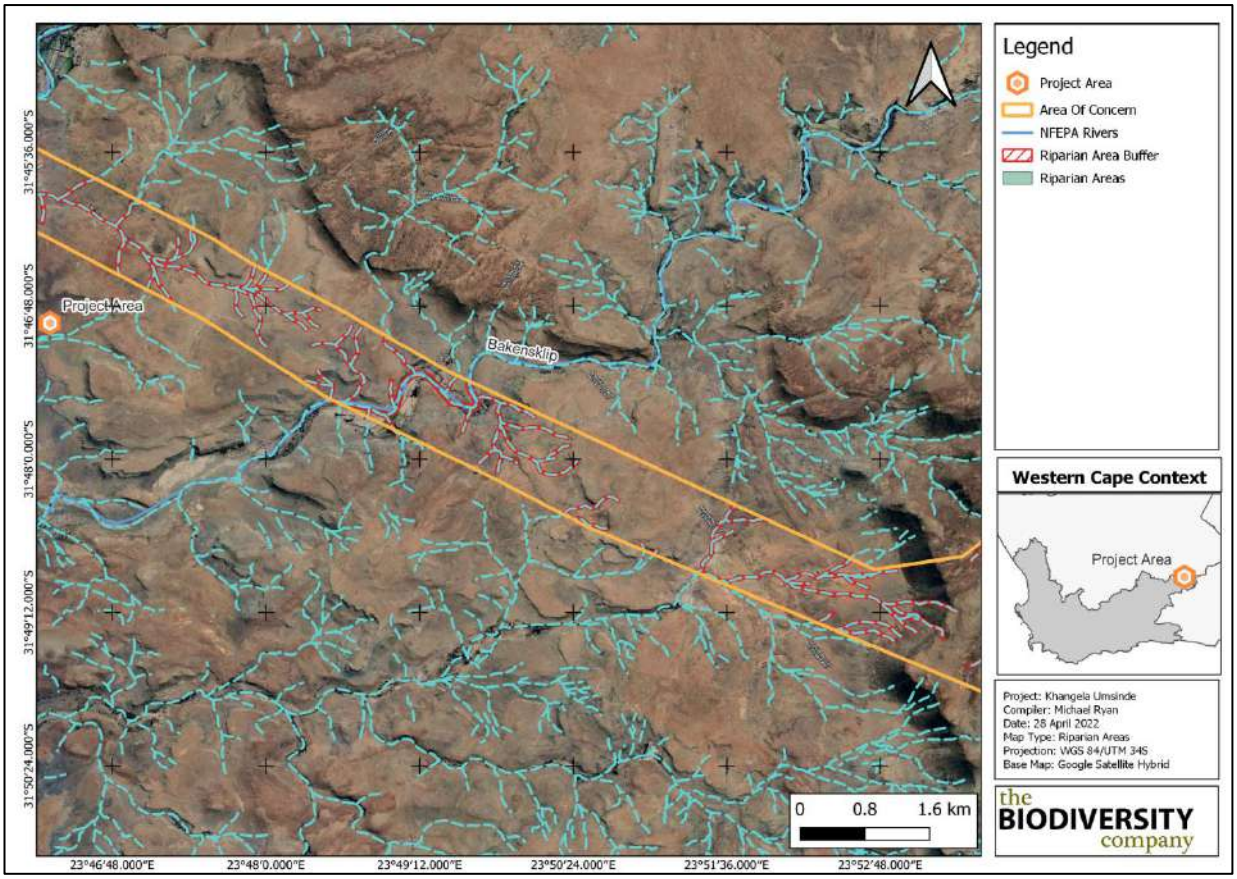


Figure 5.25. Riparian delineation and associated buffer of the watercourses associated with the project area

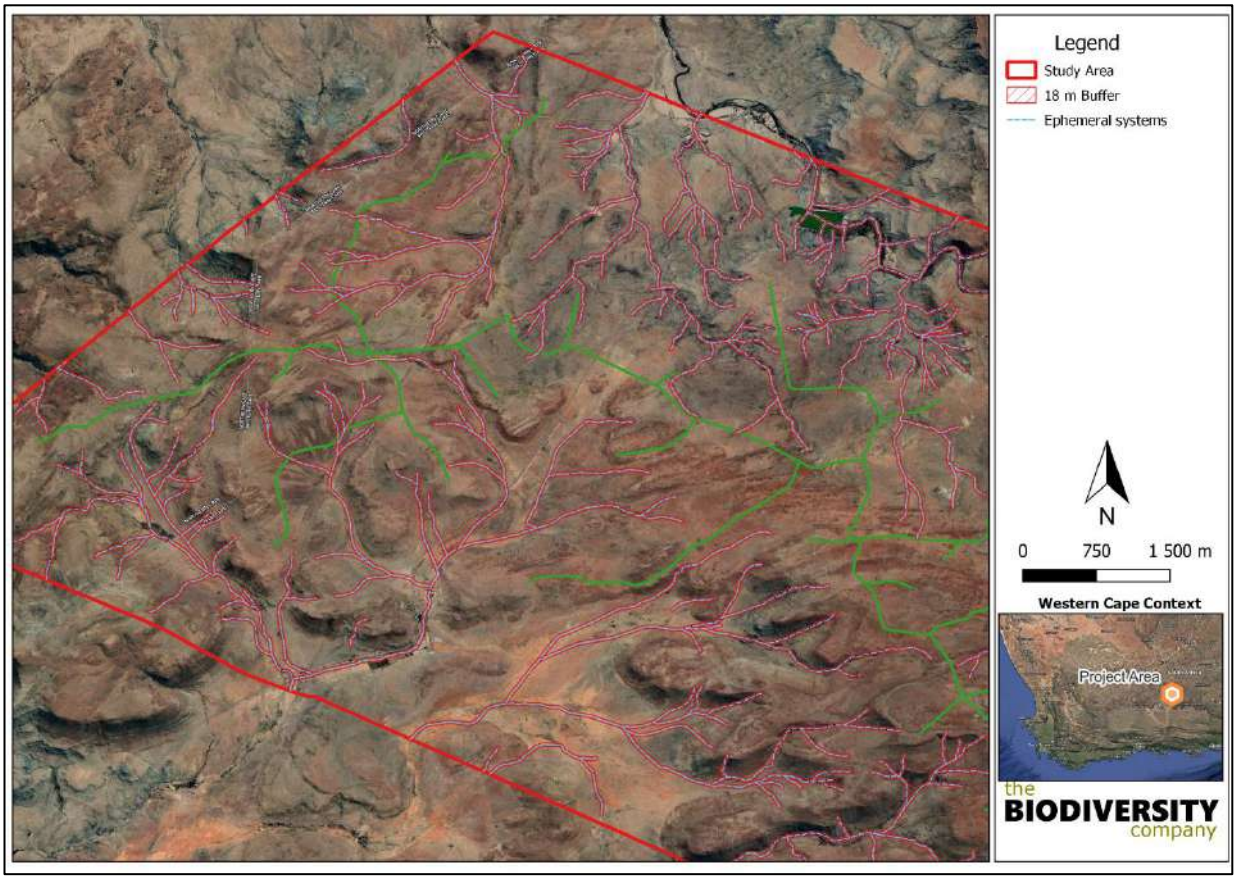


Figure 5.26. Riparian delineation and associated buffer of the watercourses associated with the project area

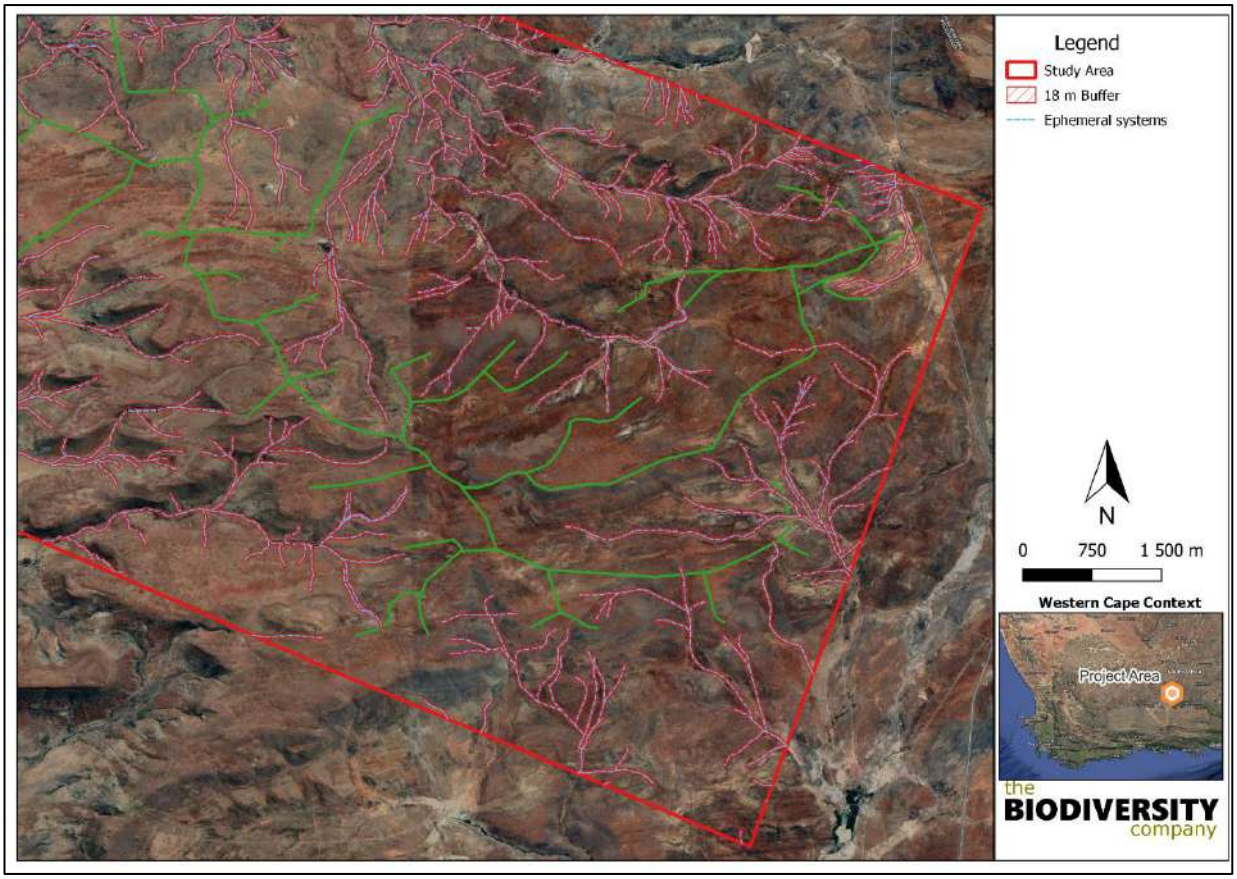


Figure 5.27. Riparian delineation and associated buffer of the watercourses associated with the project area

Site Ecological Importance

Three habitat units are delineated for the project area based on their geomorphology: Perennial watercourses and Ephemeral watercourses. Those watercourses which have surface flow are predominantly main stem rivers considered as NFEPA rivers based on scale not sensitivity by the GIS layer. These systems are known as perennial rivers. The majority of watercourses within the project area however lack surface flow and are predominantly smaller systems which compromise the tributaries and drainage lines of the main stem systems. These systems are known as ephemeral rivers.

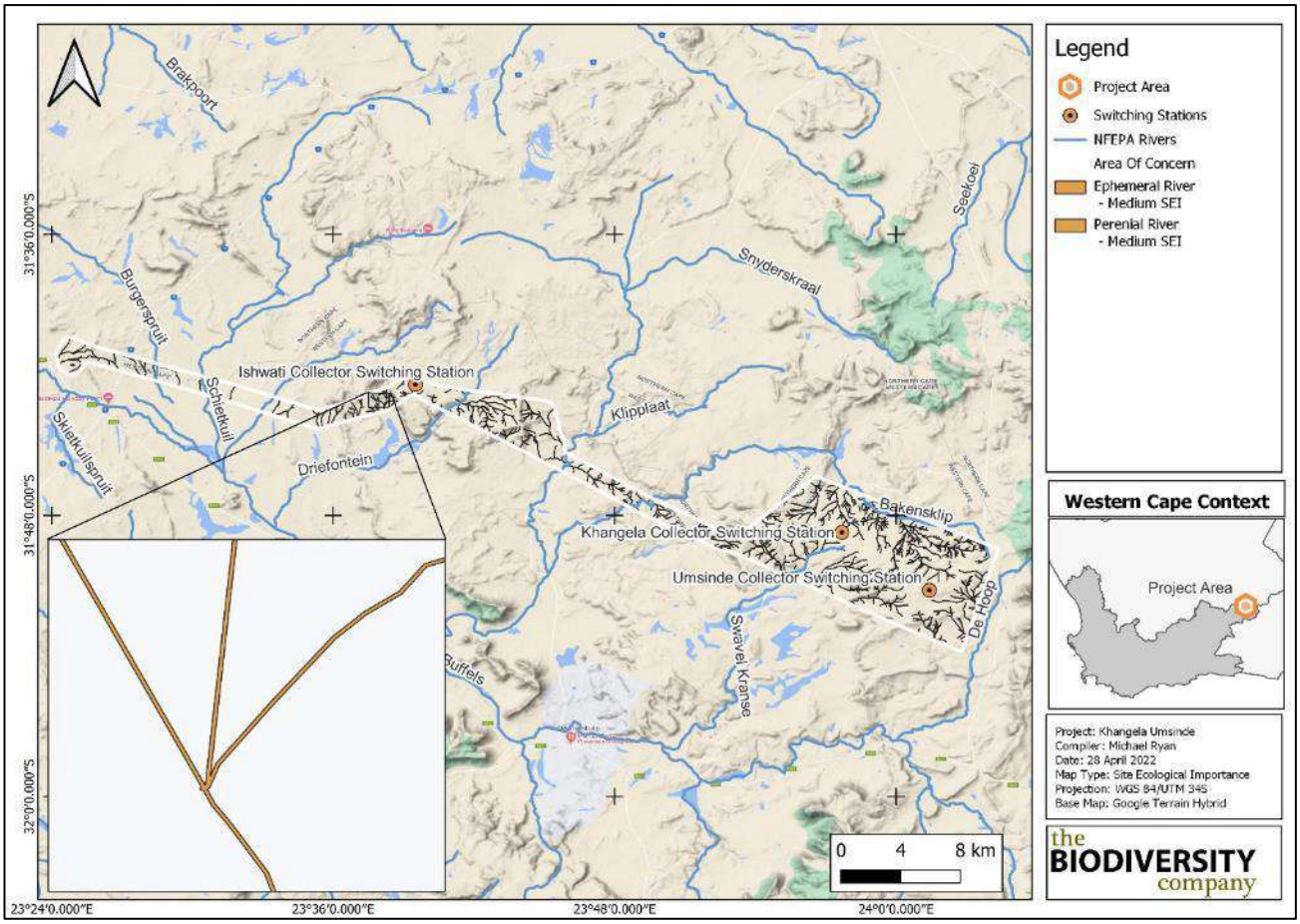


Figure 5.28. Biodiversity Site Ecological Importance (SEI) delineation relevant to the project area

5.6 Ecological Profile of the Study Area and Development Area

Protected Areas

According to the protected area spatial datasets from SAPAD (DFFE, 2022a), the proposed development does not occur within any protected area (Figure 5.29 below). It is however adjacent to the Mountain Zebra Camdeboo Protected Environment and within the 500m protected areas buffer. The proposed development is not located within any focus area for the National Protected Area Expansion Strategy (NPAES) (Figure 5.29) or IBA (Figure 5.30).

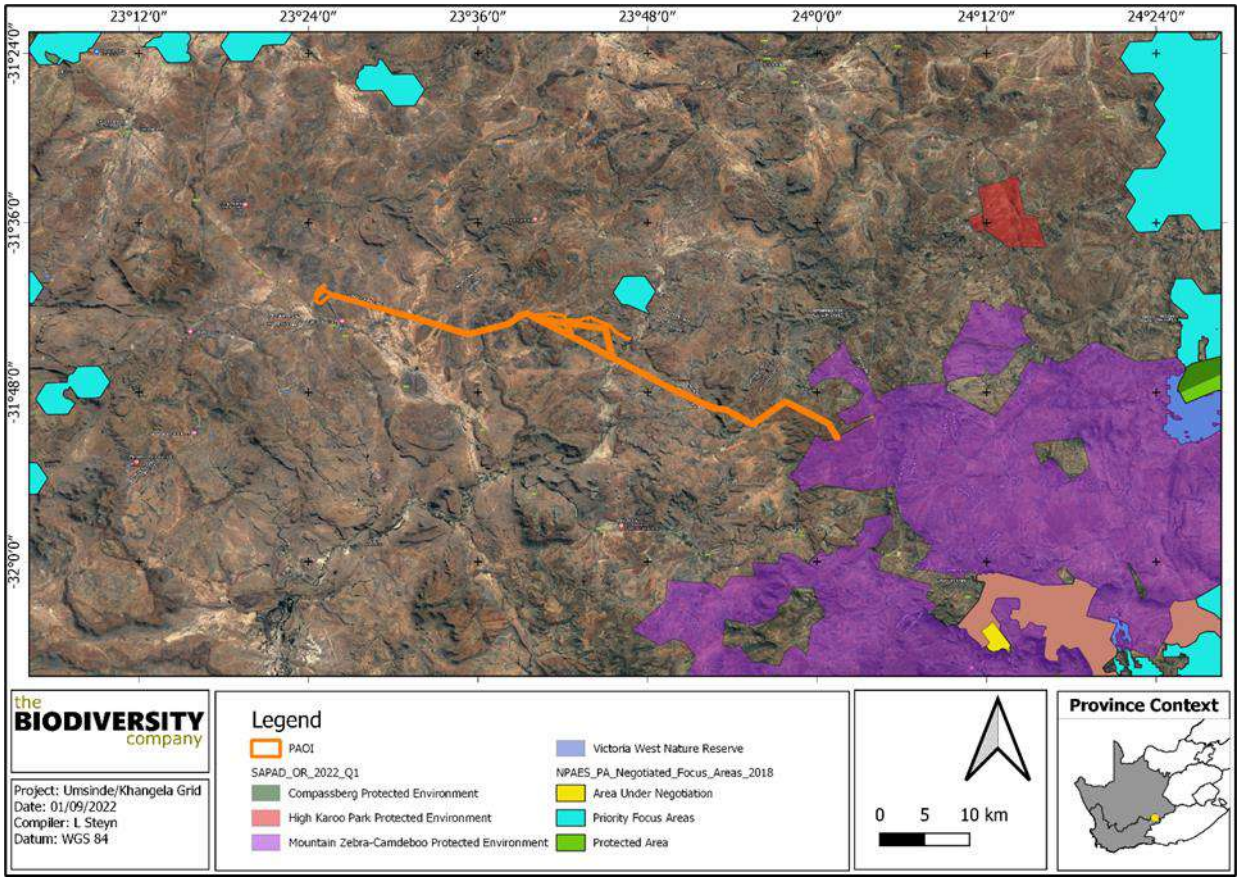


Figure 5.29. Map illustrating the location of protected areas proximal to the assessment area

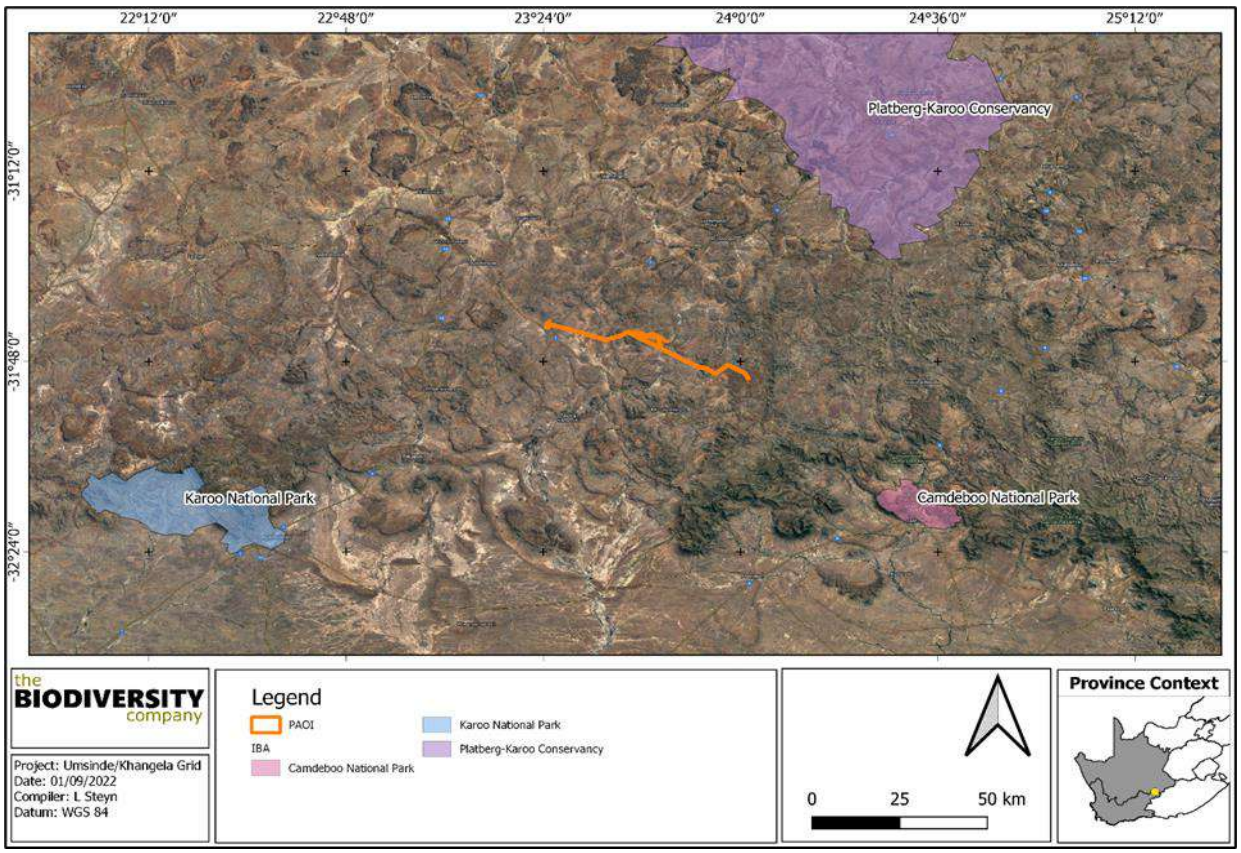


Figure 5.30. Map illustrating the location of Important Bird and Biodiversity Areas (IBAs) proximal to the assessment area

Terrestrial Critical Biodiversity Areas

The Northern Cape Department of Environment and Nature Conservation has developed the Northern Cape CBA Map which identifies biodiversity priority areas for the province, called Critical Biodiversity Areas (CBAs) and Ecological Support Areas (ESAs). These biodiversity priority areas, together with protected areas, are important for the persistence of a viable representative sample of all ecosystem types and species as well as the long-term ecological functioning of the landscape as a whole. Figure 5.31 below shows the project area superimposed on the Terrestrial CBA map. The project area overlaps with a CBA 1 and CBA 2 area.

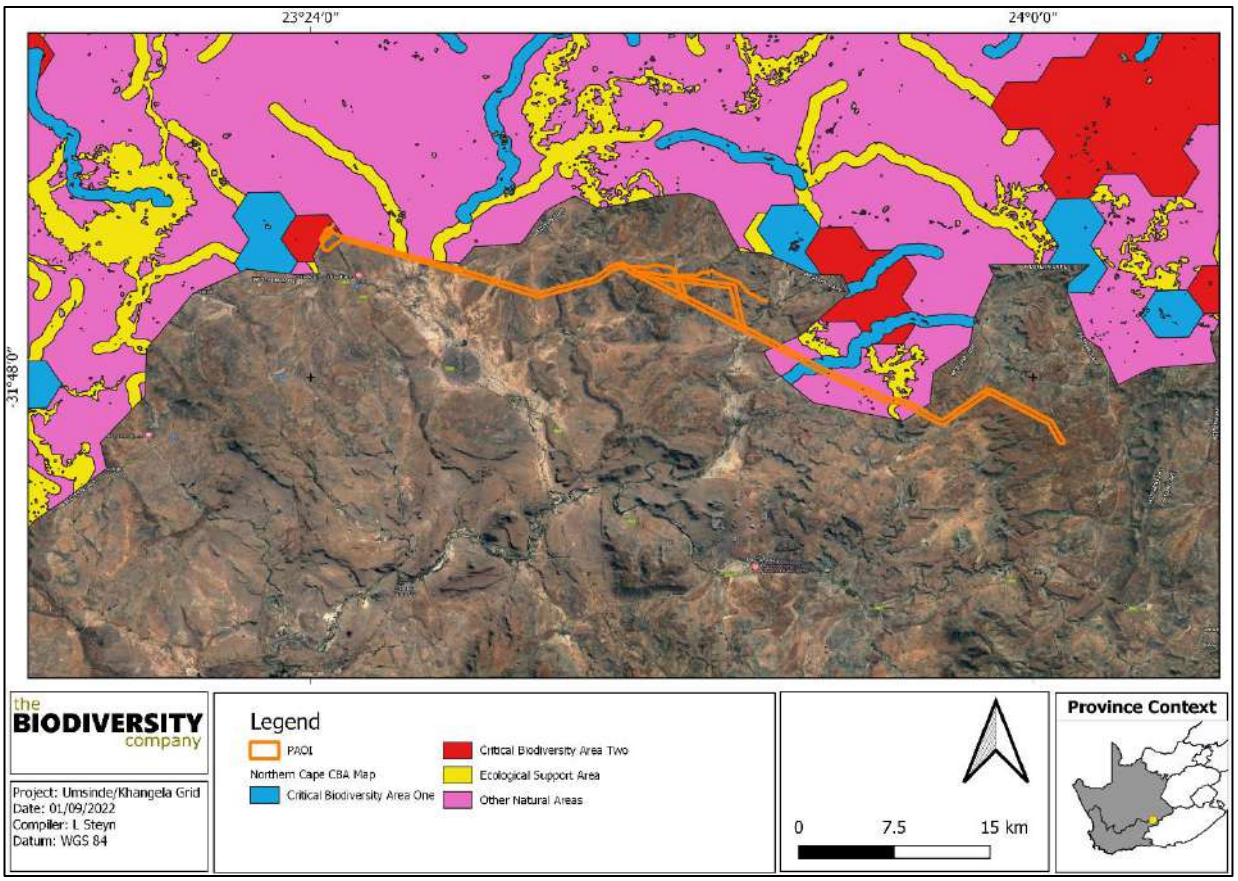


Figure 5.31. Map illustrating the location of Terrestrial Biodiversity Spatial Plan features proximal to the assessment area – Northern Cape

The Western Cape Biodiversity Sector Plan (WCBSP) has been developed by CapeNature Scientific Services Land Use Team in order to identify the priority biodiversity areas and ecological infrastructure that must be conserved to meet the provincial biodiversity mandate (Pool-Stanvliet et.al. 2017). The plan includes land use guidelines along with biodiversity priority areas, covering terrestrial, freshwater, coastal and marine areas. The plan identified areas as Critical Biodiversity Areas (CBAs) which cannot be lost if conservation goals are to be met, and Ecological Support Areas (ESAs), which are required to support the functioning of ecosystems and CBAs (Pool-Stanvliet et.al. 2017). The proposed corridor and access road to the Ishwati switching station traverses both CBA1 and CBA2 areas (Figure 5.32 below). Both CBA1 and CBA2 land use guidelines are to maintain in a natural state, with little to no biodiversity loss permitted.

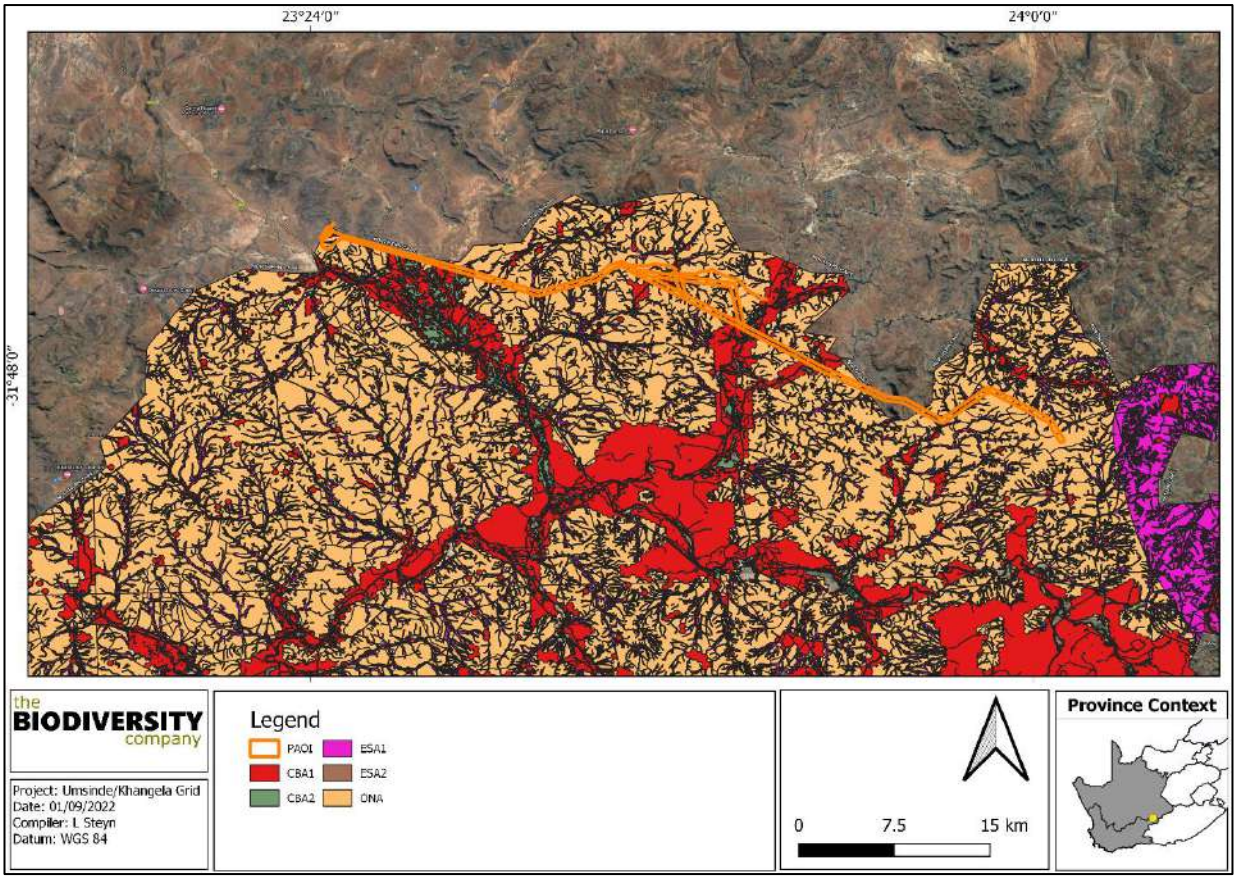


Figure 5.32. Map illustrating the location of Biodiversity Spatial Plan features proximal to the assessment area – Western Cape

Vegetation

The area falls into the Upper Karoo Vegetation Unit, within the Nama-Karoo Biome, forming the predominant karoo group, accounting for 19.6% of the extent of the entire vegetation map (Mucina & Rutherford, 2006). This vegetation is flanked by six biomes (the Succulent Karoo, Desert, Kalahari, Grassland, Albany Thicket and Fynbos and has a continental-type climate with highly variable rainfall and extreme temperatures (Mucina & Rutherford 2006). On a fine-scale vegetation type, the proposed development overlaps with three vegetation types, the Eastern Upper Karoo, Southern Karoo riviere and the Upper Karoo Hardeveld (Figure 5.33 below). The Upper Karoo Hardeveld is described as follows:

Important Taxa (d= dominant) –

Tall Shrubs: *Lycium cinereum* (d), *Rhigozum obovatum* (d), *Cadaba aphylla*, *Diospyros austro-africana*, *Ehretia rigida* subsp. *rigida*, *Lycium oxycarpum*, *Melianthus comosus*, *Searsia burchellii*.

Low Shrubs: *Chrysocoma ciliata* (d), *Eriocephalus ericoides* subsp. *ericoides* (d), *Euryops lateriflorus* (d), *Felicia muricata* (d), *Limeum aethiopicum* (d), *Pteronia glauca* (d), *Amphiglossa triflora*, *Aptosimum elongatum*, *A. spinescens*, *Asparagus mucronatus*, *A. retrofractus*, *A. striatus*, *A. suaveolens*, *Eriocephalus spinescens*, *Euryops annae*, *E. candollei*, *E. empetrifolium*, *E. nodosus*, *Felicia filifolia* subsp. *filifolia*, *Garuleum latifolium*, *Helichrysum lucilioides*, *H. zeyheri*, *Hermannia filifolia* var. *filifolia*, *H. multiflora*, *H. pulchella*, *H. vestita*, *Indigofera sessilifolia*, *Jamesbrittenia atropurpurea*, *Lessertia frutescens*, *Melolobium candicans*, *M. microphyllum*, *Microloma armatum*, *Monechma incanum*, *Nenax microphylla*, *Pegolettia retrofracta*, *Pelargonium abrotanifolium*, *P. ramosissimum*, *Pentzia globosa*, *P. spinescens*, *Plinthus karooicus*, *Polygala seminuda*, *Pteronia adenocarpa*, *P. sordida*, *Rosenia humilis*, *Selago albida*, *Solanum capense*, *Sutera halimifolia*, *Tetragonia arbuscula*, *Wahlenbergia tenella*.

Succulent Shrubs: *Aloe broomii*, *Drosanthemum lique*, *Faucaria bosscheana*, *Kleinia longiflora*, *Pachypodium succulentum*, *Trichodiadema barbatum*, *Zygophyllum flexuosum*.

Semiparasitic Shrub: *Thesium lineatum* (d).

Herbs: *Troglophyton capillaceum* subsp. *capillaceum*, *Dianthus caespitosus* subsp. *caespitosus*, *Gazania krebsiana*, *Lepidium africanum* subsp. *africanum*, *Leysera tenella*, *Pelargonium minimum*, *Sutera pinnatifida*, *Tribulus terrestris*.

Geophytic Herbs: *Albuca setosa*, *Androcymbium albomarginatum*, *Asplenium cordatum*, *Boophone disticha*, *Cheilanthes bergiana*, *Drimia intricata*, *Oxalis depressa*,

Graminoids: *Aristida adscensionis* (d), *A. congesta* (d), *A. diffusa* (d), *Cenchrus ciliaris* (d), *Enneapogon desvauxii* (d), *Eragrostis lehmanniana* (d), *E. obtusa* (d), *Sporobolus fimbriatus* (d), *Stipagrostis obtusa* (d), *Cynodon incompletus*, *Digitaria eriantha*, *Ehrharta calycina*, *Enneapogon scaber*, *E. scoparius*, *Eragrostis curvula*, *E. nindensis*, *E. procumbens*, *Fingerhuthia africana*, *Heteropogon contortus*, *Merxmuellera disticha*, *Stipagrostis ciliata*, *Themeda triandra*, *Tragus berteronianus*, *T. koelerioides*.

Conservation – Least threatened. Target 21%. Only about 3% statutorily conserved in Karoo National Park and Karoo Nature Reserve. Small percentage also protected in private reserves such as Rupert Game Farm. Erosion is moderate (64%) and high (2%).

The Eastern Upper Karoo is described as follows:

Important Taxa –

Tall Shrubs: *Lycium cinereum* (d), *L. horridum*, *L. oxycarpum*.

Low Shrubs: *Chrysocoma ciliata* (d), *Eriocephalus ericoides* subsp. *ericoides* (d), *E. spinescens* (d), *Pentzia globosa* (d), *P. incana* (d), *Phymaspermum parvifolium* (d), *Salsola calluna* (d), *Aptosimum procumbens*, *Felicia muricata*, *Gnidia polycephala*, *Helichrysum dregeanum*, *H. lucilioides*, *Limeum aethiopicum*, *Nenax microphylla*, *Osteospermum leptolobum*, *Plinthus karooicus*, *Pteronia glauca*, *Rosenia humilis*, *Selago geniculata*, *S. saxatilis*.

Succulent Shrubs: *Euphorbia hypogaea*, *Ruschia intricata*. Herbs: *Indigofera alternans*, *Pelargonium minimum*, *Tribulus terrestris*.

Geophytic Herbs: *Moraea pallida* (d), *Moraea polystachya*, *Syringodea bifucata*, *S. concolor*.

Succulent Herbs: *Psilocaulon coriarium*, *Tridentea jucunda*, *T. virescens*.

Graminoids: *Aristida congesta* (d), *A. diffusa* (d), *Cynodon incompletus* (d), *Eragrostis bergiana* (d), *E. bicolor* (d), *E. lehmanniana* (d), *E. obtusa* (d), *Sporobolus fimbriatus* (d), *Stipagrostis ciliata* (d), *Tragus koelerioides* (d), *Aristida adscensionis*, *Chloris virgata*, *Cyperus usitatus*, *Digitaria eriantha*, *Enneapogon desvauxii*, *E. scoparius*, *Eragrostis curvula*, *Fingerhuthia africana*, *Heteropogon contortus*, *Sporobolus ludwigii*, *S. tenellus*, *Stipagrostis obtusa*, *Themeda triandra*, *Tragus berteronianus*.

Conservation – Least threatened. Target 21%. Statutorily conserved in Mountain Zebra and Karoo National Parks as well as in Oviston, Commando Drift, Rolfontein and Gariep Dam Nature Reserves. About 2% of the unit has been transformed, largely due to building of dams (Gariep, Grassridge, Killowen, Kommandodrift, Kriegerspoort, Lake Arthur, Modderpoort, Schuil Hoek, Vanderkloof, Victoria West, Wonderboom and Zoetvlei). *Medicago laciniata* is a common and widespread alien plant. Erosion is moderate (60%) and high (38%). Veld managers perceive much of the Eastern Upper Karoo to be experiencing changes in species composition requiring high-priority action.

The Southern Karoo Riviere is described as follows:

Important Taxa –

Riparian thickets Small Trees: *Vachellia karroo* (d), *Searsia lancea* (d).

Tall Shrubs: *Diospyros lycioides* (d), *Tamarix usneoides* (d), *Cadaba aphylla*, *Euclea undulata*, *Grewia robusta*, *Gymnosporia buxifolia*, *Melianthus comosus*.

Low Shrub: *Asparagus striatus*.

Succulent Shrubs: *Lycium cinereum* (d), *Amphiglossa callunoides*, *Lycium hirsutum*, *L. oxycarpum*.

Rocky slopes of river canals

Graminoid: *Stipagrostis namaquensis* (d).

Alluvial shrublands & herblands

Low Shrubs: *Ballota africana*, *Bassia salsoloides*, *Carissa haematocarpa*, *Pentzia incana*. Succulent Shrubs: *Malephora uitenhagensis* (d), *Salsola aphylla* (d), *S. arborea* (d), *Drosanthemum lique*, *Salsola geminiflora*, *S. gemmifera*. Graminoids: *Cynodon incompletus* (d), *Cenchrus ciliaris*, *Cyperus marginatus*.

Reed beds Megagraminoid: *Phragmites australis* (d).

Conservation – Least threatened. Target 24%. Only about 1.5% statutorily conserved in the Karoo National Park as well as in the Aberdeen, Bosberg, Commando Drift, Gamkapoort and Karoo Nature Reserves and in about 10 private reserves, mainly set up for game farming. Some 12% transformed for cultivation and building of dams, including Beaufort West, Beervlei, De Hoop, Floriskraal, Kommandodrift, Lake Arthur, Leeu-Gamka, Mentz and Vanryneveldspas Dams. Frequent disturbance (floods, concentrated grazing pressure), and associated input of nutrients, increase vulnerability of these habitats to invasion of alien woody species such as *Agave americana*, *Opuntia* species, *Prosopis* species, *Salix babylonica* and *Schinus molle*, and forbs including *Atriplex eardleyae*, *A. lindleyi* subsp. *inflata*, *Cirsium vulgare*, *Salsola kali* and *Schkuhria pinnata*.

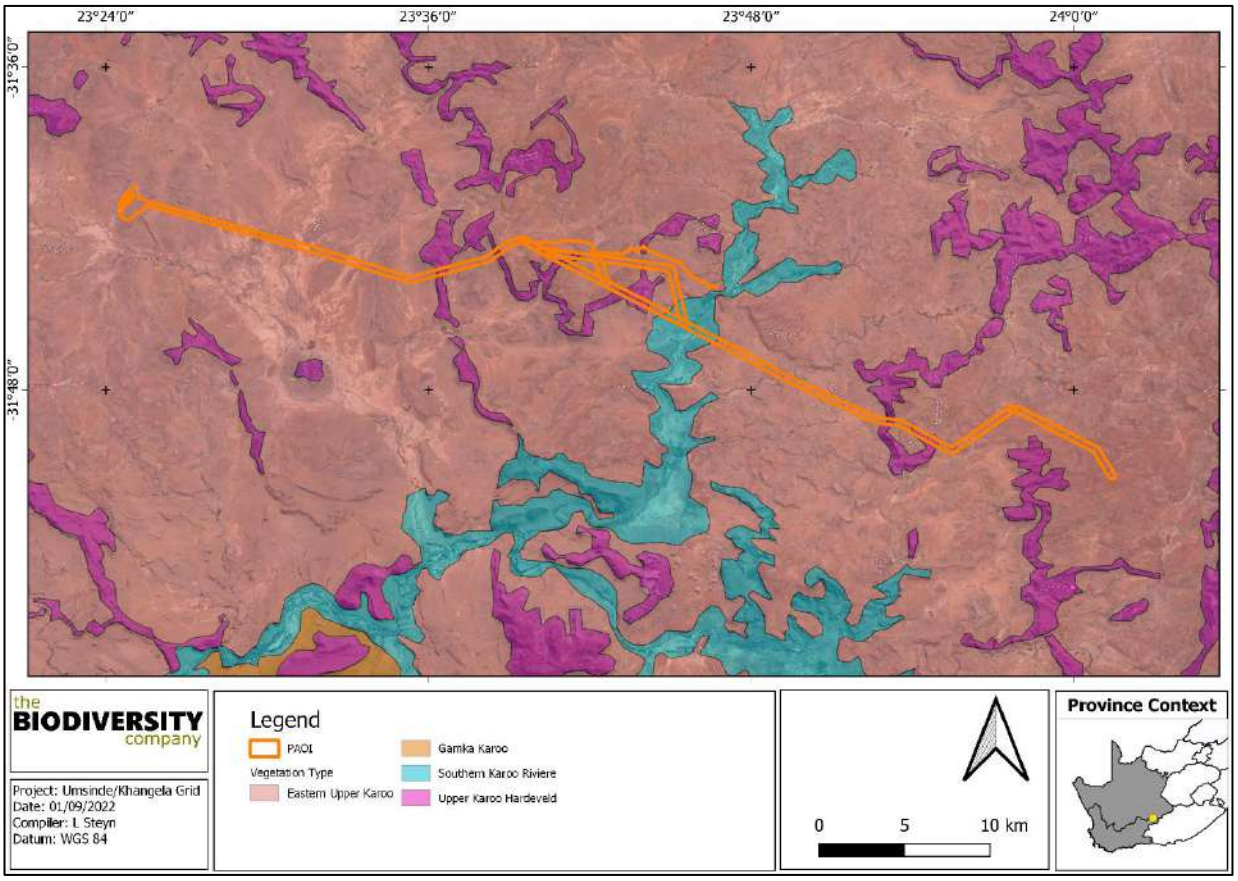


Figure 5.33. Map illustrating the vegetation types associated with the assessment area and surrounding landscape based on the Vegetation Map of South Africa, Lesotho & Swaziland.

Terrestrial Site Ecological Importance (SEI)

The combined Terrestrial Biodiversity Theme Sensitivity for the assessment area was derived to be Very High as indicated in the National Environmental Screening Tool.

Four (4) different habitat types were delineated within the assessment area. All habitats within the assessment area of the proposed development were allocated a sensitivity category or SEI. The sensitivities of the habitat types delineated are illustrated in Figure 5.34 below. The interpretations of the categories can be found in Table 5.10 below.

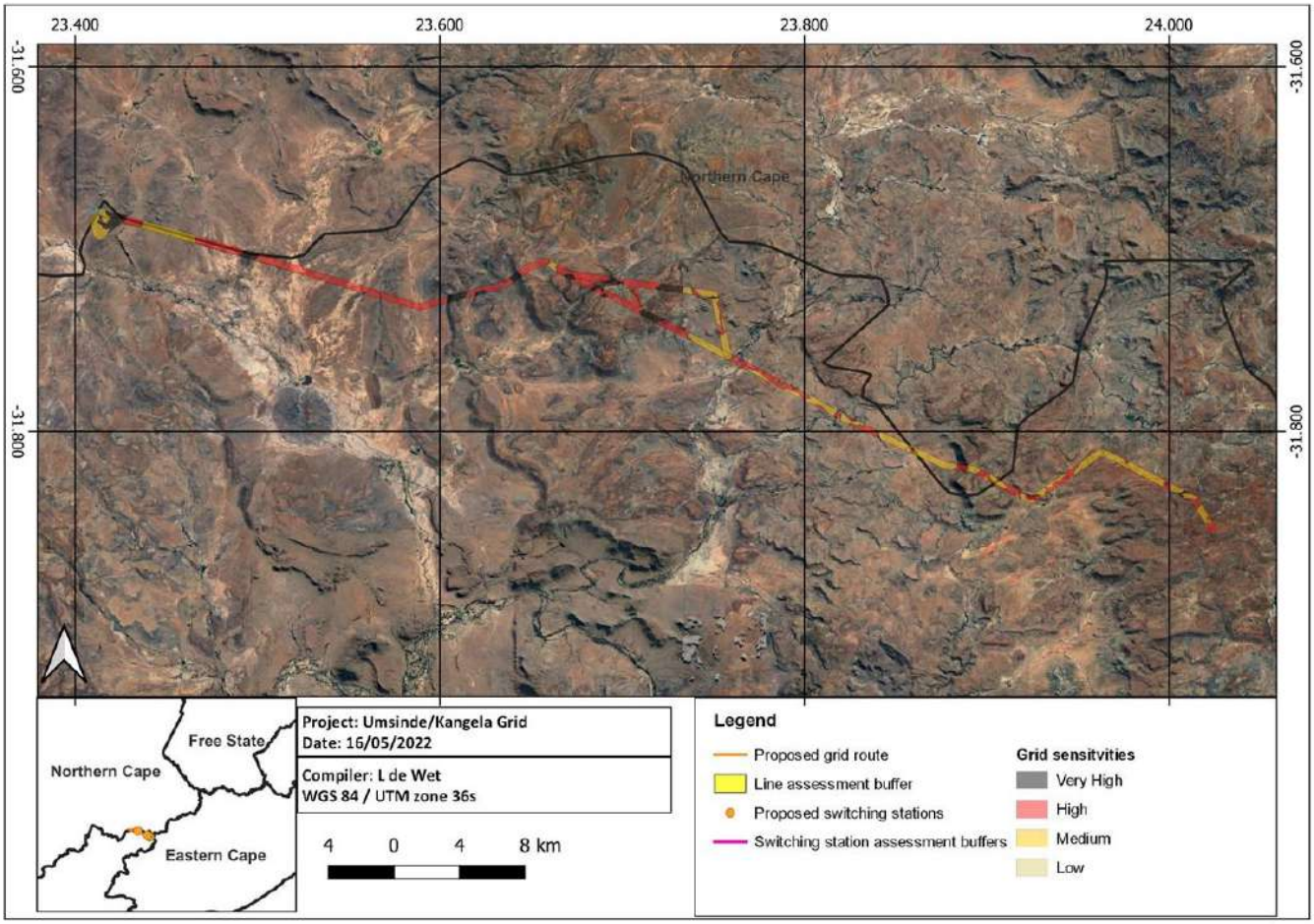


Figure 5.34. Map illustrating Site Ecological Importance (SEI) of the terrestrial habitat types within the assessment area

Table 5.10. Summary of habitat types delineated within the field assessment area of the proposed development

Habitat	Conservation Importance	Functional Integrity	Biodiversity Importance	Receptor Resilience	Site Ecological Importance
Transformed	Very Low	Very Low	**Very Low**	Very High	**Very Low**
Karoo scrub (flat)	Medium	High	**Medium**	Medium	**Medium**
Rocky outcrops	High	High	**High**	Low	**Very high**
Wash (wetland) areas	Medium	High	**High**	Medium	**High**

Access Road Habitats

Karoo Scrub: Karoo Scrub is dominated by grasses (most notably *Aristida congesta*) with a scattered woody plant layer consisting of tree or shrub species such as *Searsia burchellii, Vachellia karroo* and *Lycium cinereum*. Other frequently recorded plant species in the Open Bushveld included *Albuca setosa, Dimorphotheca cuneata, Lasiopogon muscoides, Moraea pallida* and *Ruschia spinosa*.

Rocky Outcrops: Rocky Outcrops were hills with exposed igneous rocks dominated by grasses with some scattered woody plants. Recorded plant species unique to the Rocky Outcrops included *Boophone disticha, Chasmatophyllum musculinum* and *Cheilanthes eckloniana*.

Riparian Zone: Riparian Zone consist of plant species mostly found in or near water bodies, most notably sedges such as *Cyperus laevigatus*.

Degraded: This habitat has been disturbed by the trampling of livestock (cattle and sheep), resulting in large areas of bare ground and scattered rocks. Degraded areas were most likely either Open Bushveld or Grassland before the disturbance, because the same plant species that occur in those two habitats also occur here but in much smaller numbers. Massonia sp. has been recorded only in the Degraded habitat.

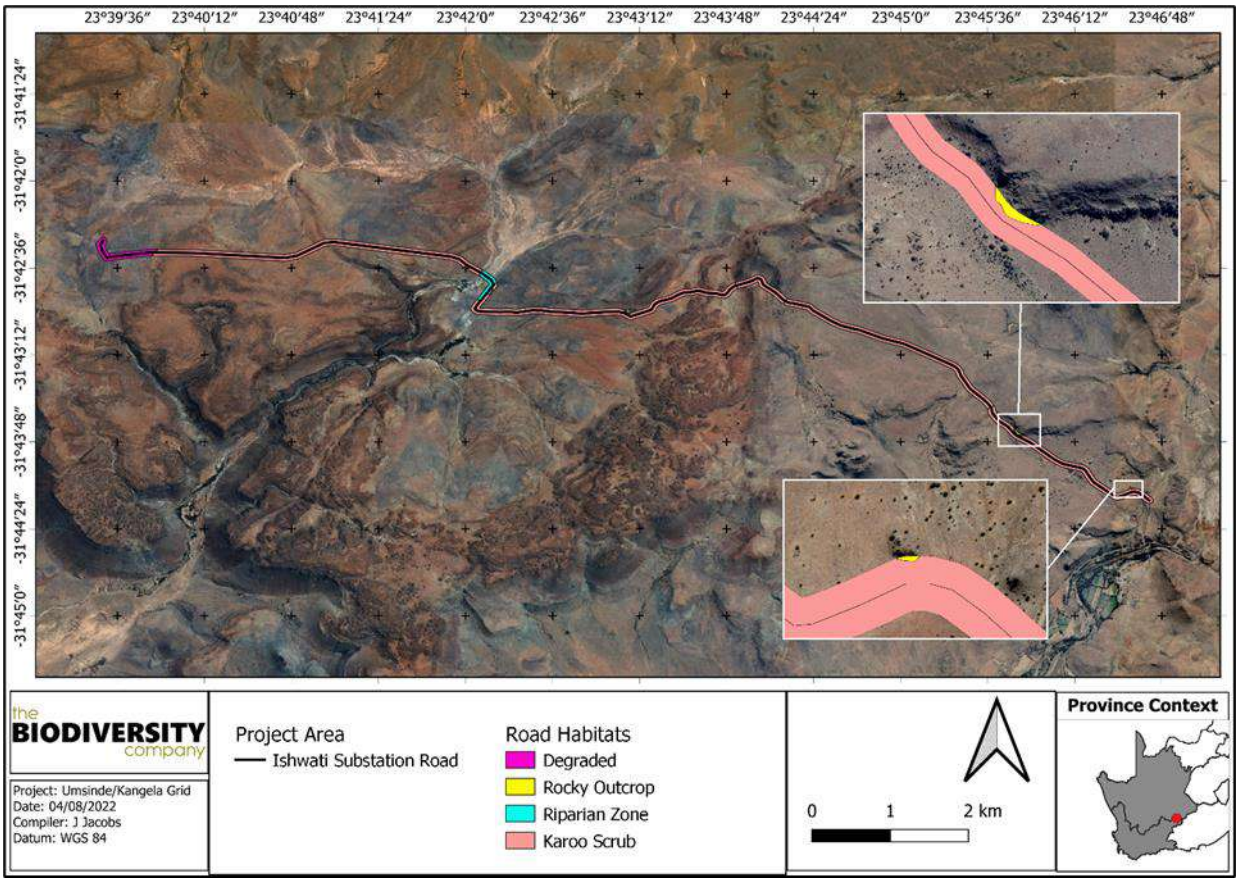


Figure 5.35. Habitats at the proposed access road

The sensitivities of the delineated habitat types for the access road to the Ishwati switching station are illustrated in Figure 5.36 below:

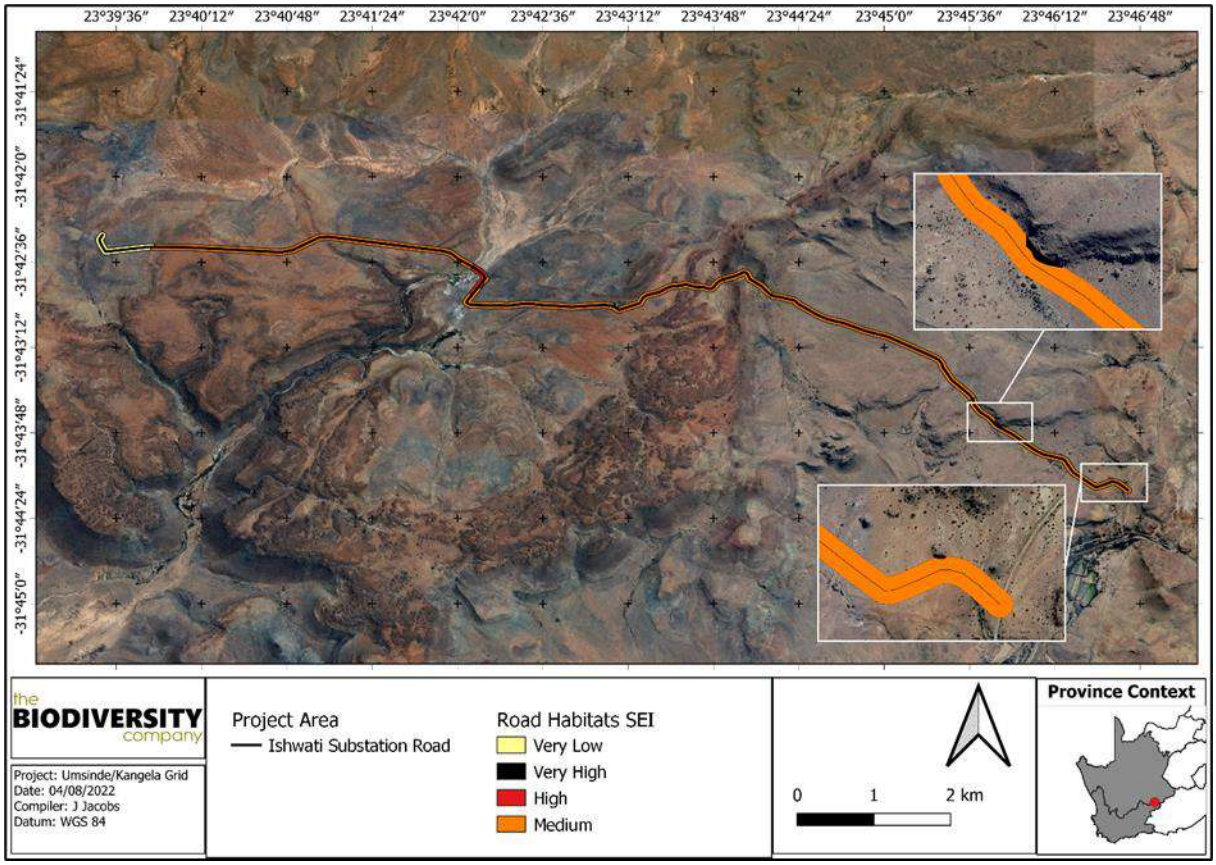


Figure 5.36. Sensitivities of the access road assessment

The Plants of Southern Africa (POSA) database indicates that 192 species of indigenous plants are expected to occur within the development area and surrounding landscape. Refer to Appendix B of the Terrestrial Ecology Report (Appendix D). The POSA database and the screening tool indicates that 5 threatened species are expected to occur within the assessment area. As per the best practise guideline that accompanies the protocol and screening tool, the name of the sensitive species may not appear in the final EIA report nor any of the specialist reports released into the public domain. It should be referred to as sensitive plant or sensitive animal and its threat status may be included, e.g. critically endangered sensitive plant or endangered sensitive animal.

Threatened flora species that are expected to occur within the assessment area associated with proposed project area. EN = Endangered, NT = Near Threatened and VU = Vulnerable

Family	Scientific name	Conservation Status	Endemism	Habitat	Likelihood of occurrence
Cyperaceae	*Isolepis expallescens*	VU	Endemic	Known from three locations in damp areas along stream channels.	Moderate
Aizoaceae	*Hereroa concava*	VU	Endemic	Plants occur sheltered among shrubs on flats and plateaus with shale outcrops	Low
Malvaceae	*Antisodontea malvastroides*	Rare	Endemic	Occurs in arid grassland on summit plateaus and escarpments.	Low
Apocynaceae	*Tridentea virescens*	Rare	Not endemic	Stony ground or hard loam in floodplains.	Moderate

	Sensitive species 945				

The list of flora species recorded within the assessment area are provided in Table 5.11 below. A total of 138 species were recorded within the assessment area. None of the expected threatened flora species report were recorded within the assessment area during the survey period.

Table 5.11. Flora species recorded within the assessment area and their respective growth form and conservation status. Species in Provincial, TOPS and Protected Trees columns are protected by legislation. EN = Endangered, NT= Near Threatened, VU = Vulnerable and LC = Least Concern

Family	Scientific name	Provincial	TOPS	National Forest Act	Red List
Acanthaceae	*Blepharis capensis*				LC
Acanthaceae	*Justicia incana*				LC
Agavaceae	*Agave americana*				
Aizoaceae	*Aizoon africanum*	Sch. 4			LC
Aizoaceae	*Delosperma multiflorum*	Sch. 4			LC
Aizoaceae	*Drosanthemum hispidum*	Sch. 4			LC
Aizoaceae	*Malephora lutea*	Sch. 4			LC
Aizoaceae	*Mesembryanthemum coriarium*	Sch. 4			LC
Aizoaceae	*Ruschia intricata*	Sch. 4			LC
Aizoaceae	*Ruschia spinosa*	Sch. 4			LC
Aizoaceae	*Stomatium duthiae*	Sch. 4			LC
Amaranthaceae	*Amaranthus hibridus*				
Amaranthaceae	*Amaranthus spinosus*				
Amaranthaceae	*Atriplex lindleyi*				
Amaranthaceae	*Atriplex nummularia subsp. nummularia*				
Amaranthaceae	*Salsola kali*				
Amaranthaceae	*Salsola sp.*				
Amaryllidaceae	*Boophone disticha*	Sch. 4			LC
Anacardiaceae	*Schinus molle*				
Anacardiaceae	*Searsi burchellii*				LC
Anacardiaceae	*Searsia pallens*				LC
Anacardiaceae	*Searsia pyroides*				LC
Apiaceae	*Berula thunbergii*				LC
Apocynaceae	*Gomphocarpus fruticosus*	Sch. 4			LC
Apocynaceae	*Pachypodium succulentum*	Sch. 4			LC
Asparagaceae	*Asparagus burchellii*				LC
Asparagaceae	*Asparagus capensis var. capensis*				LC
Asparagaceae	*Asparagus retrofractus*				LC
Asparagaceae	*Asparagus sp.*				
Asparagaceae	*Asparagus sp.*				
Asparagaceae	*Asparagus striatus*				LC
Asparagaceae	*Asparagus suaveolens*				LC
Asphodelaceae	*Aloe broomii*	Sch. 4			LC
Asphodelaceae	*Aloe claviflora*	Sch. 4			LC
Asphodelaceae	*Bulbine abyssinica*				LC
Asphodelaceae	*Bulbinella elegans*				LC
Asphodelaceae	*Haworthia semiviva*	Sch. 4			LC

Family	Scientific name	Provincial	TOPS	National Forest Act	Red List
Asteraceae	*Amphiglossa tomentosa*				LC
Asteraceae	*Arctotis arctoides*				
Asteraceae	*Artemisia afra*				LC
Asteraceae	*Berkeya sp.*				
Asteraceae	*Chrysocoma ciliata*				LC
Asteraceae	*Dimophotheca cuneata*				LC
Asteraceae	*Dimorphotheca cuneata*				LC
Asteraceae	*Elytropappus rhinocerotis*				LC
Asteraceae	*Eriocephalus africanus*				LC
Asteraceae	*Eriocephalus ericoides*				LC
Asteraceae	*Eriocephalus spinescens*				LC
Asteraceae	*Eriospermum sp.*				
Asteraceae	*Euryops lateriflorus*				LC
Asteraceae	*Felicia filifolia subsp. filifolia*				LC
Asteraceae	*Felicia muricata*				LC
Asteraceae	*Gazania krebsiana*				LC
Asteraceae	*Geigera sp.*				
Asteraceae	*Helichrysum zeyheri*				LC
Asteraceae	*Hirpicium alienatum*				LC
Asteraceae	*Oedera genistifolia*				LC
Asteraceae	*Osteospermum sinuatum*				LC
Asteraceae	*Pentzia incana*				LC
Asteraceae	*Pteronia glauca*				LC
Asteraceae	*Rosenia spinescens*				LC
Asteraceae	*Tagetes minuta*				
Asteraceae	*Ursinia nana*				LC
Bignoniaceae	*Rhigozum obovatum*				LC
Bignoniaceae	*Rhigozum trichotomum*				LC
Brassicaceae	*Boscia albitrunca*			x	LC
Cactaceae	*Opuntia ficus-indica*				
Cactaceae	*Opuntia robusta*				
Campanulaceae	*Whalenbergia nodosa*				LC
Crassulaceae	*Adromischus liebenbergii*				LC
Crassulaceae	*Crassula deltoidea*				LC
Crassulaceae	*Tylecodon ventricosus*				LC
Cucurbitaceae	*Cucumis myriocarpus*				LC
Cyperaceae	*Pseudoschoenus inanis*				LC
Ebenaceae	*Diospyros austro-africana*				LC
Ebenaceae	*Diospyros lycioides subsp. lycioides*				LC
Euphorbiaceae	*Euphorbia caput-medusae*				LC
Fabaceae	*Indigofera alternans*				LC
Fabaceae	*Lessertia frutescens*				LC
Fabaceae	*Lessertia sp.*				
Fabaceae	*Lotononis pungens*				LC
Fabaceae	*Vachellia karoo*				LC
Fabaceae	*Wiborgia sericea*				LC

Family	Scientific name	Provincial	TOPS	National Forest Act	Red List
Geraniaceae	*Monsonia crassicaulis*				LC
Geraniaceae	*Pelargonium minimum*				LC
Hyacinthaceae	*Ledebouria sp.*				
Iridaceae	*Moraeae polystachya*	Sch. 4			LC
Iridaceae	*Moraeae sp.*	Sch. 4			
Iridaceae	*Romulea tortuosa*	Sch. 4			LC
Kewaceae	*Kewa salsoloides*				LC
Lamiaceae	*Salvia sp.*				
Loranthaceae	*Moquiniella rubra*				LC
Malvaceae	*Hermannia coccocarpa*				LC
Molluginaceae	*Limeum aethiopicum*				LC
Myrtaceae	*Eucalyptus sp.*				
Oxalidaceae	*Oxalis obliquifolia*				LC
Poaceae	*Aristisa congesta*				LC
Poaceae	*Cenchrus ciliaris*				LC
Poaceae	*Ehrharta erecta*				LC
Poaceae	*Enneapogon sp.*				
Poaceae	*Eragrostis capensis*				LC
Poaceae	*Eragrostis curvula*				LC
Poaceae	*Eragrostos lehmanniana*				LC
Poaceae	*Phragmites australis*				LC
Poaceae	*Stipagrostis sp.*				
Poaceae	*Themeda triandra*				LC
Poaceae	*Tragus beteronianus*				LC
Polygalaceae	*Polygala ephedroides*				LC
Pteridaceae	*Cheilanthus eckloniana*				LC
Rhizophoraceae	*Salix mucronata*				LC
Rosaceae	*Leucosidea sericea*				LC
Rubiaceae	*Galium tomentosum*				LC
Salicaceae	*Populus nigra*				
Salicaceae	*Salix babylonica*				
Santalaceae	*Lacomucinaea lineata*				LC
Santalaceae	*Thesium sp.*				
Santalaceae	*Viscum rotundifolium*				LC
Scrophulariaceae	*Aptosimum indivisum*				LC
Scrophulariaceae	*Aptosimum spinescens*				LC
Scrophulariaceae	*Chaenostoma caeruleum*				LC
Scrophulariaceae	*Chaenostoma caeruleum*				LC
Scrophulariaceae	*Jamesbrittenia atropurpurea*				LC
Scrophulariaceae	*Jamesbrittenia pinnatifida*				LC
Scrophulariaceae	*Nemisia fruticans*				LC
Scrophulariaceae	*Peliostomum leucorrhizum*				LC
Scrophulariaceae	*Selago densiflora*				LC
Scrophulariaceae	*Selago geniculata*				LC
Scrophulariaceae	*Selago geniculata*				LC
Scrophulariaceae	*Selago sp.*				

Family	Scientific name	Provincial	TOPS	National Forest Act	Red List
Solanaceae	*Datura stramonium*				
Solanaceae	*Lycium cinereum*				LC
Solanaceae	*Lycium ferocissimum*				LC
Solanaceae	*Lycium pumilum*				LC
Solanaceae	*Solanum tomentosum*				LC
Zygopyllaceae	*Roepera lichtensteiniana*				LC
Zygopyllaceae	*Roepera morgsana*				LC
Zygopyllaceae	*Tribulus terrestris*				LC

Species of Conservation Concern (SCC)

The list of SCC have been extracted from the overall species list and are presented in Table 5.12 below. The species list includes species listed on the following:

- National Protected Tree List (Government Gazette Vol. 593, 21 November 2014, No. 38215);
- Provincial Protected Species List (Nature Conservation Ordinance No. 19 of 1974);
- National Protected Species List or TOPS (R 1187 of 2007); and
- The National Red List for Plants (redlist.sanbi.org).

The SCC recorded for the study site include 20 species in total (though others may occur on site and were not recorded, of may have been recorded and identifications have yet to be confirmed). Of these species:

- One is listed on the Red List *Monsonia crassicaulis*, listed as NT)
- 19 (nineteen) are listed on Schedule 4 of the Provincial (Western Cape) Nature Conservation Ordinance)
- 1 (one) (*Boscia albitrunca*) is a listed Protected Tree
- 0 (none) are TOPS listed species.

Table 5.12. Flora protected species recorded within the assessment area and their respective growth form and conservation status. Species in bold are protected by legislation. EN = Endangered, NT= Near Threatened, VU = Vulnerable and LC = Least Concern

Family	Scientific name	Provincial	TOPs	National Forest Act	Red List
Aizoaceae	*Aizoon africanum*	Sch. 4			LC
Aizoaceae	*Delosperma multiflorum*	Sch. 4			LC
Aizoaceae	*Drosanthemum hispidum*	Sch. 4			LC
Aizoaceae	*Malephora lutea*	Sch. 4			LC
Aizoaceae	*Mesembryanthemum coriarium*	Sch. 4			LC
Aizoaceae	*Ruschia intricata*	Sch. 4			LC
Aizoaceae	*Ruschia spinosa*	Sch. 4			LC
Aizoaceae	*Stomatium duthiae*	Sch. 4			LC
Amaryllidaceae	*Boophone disticha*	Sch. 4			LC
Apocynaceae	*Gomphocarpus fruticosus*	Sch. 4			LC
Apocynaceae	*Pachypodium succulentum*	Sch. 4			LC
Asphodelaceae	*Aloe broomii*	Sch. 4			LC
Asphodelaceae	*Aloe claviflora*	Sch. 4			LC
Asphodelaceae	*Haworthia semiviva*	Sch. 4			LC
Brassicaceae	*Boscia albitrunca*			x	LC
Iridaceae	*Moraeae polystachya*	Sch. 4			LC

Iridaceae	*Moraeae sp.*	Sch. 4			
Iridaceae	*Romulea tortuosa*	Sch. 4			LC
Geraniaceae	*Monsonia crassicaulis*				NT

Alien Invasive Plants

Alien Invasive Plants (AIPs) tend to dominate or replace indigenous flora, thereby transforming the structure, composition and functioning of ecosystems. Therefore, it is important that these plants are controlled by means of an eradication and monitoring programme. Some invader plants may also degrade ecosystems through superior competitive capabilities to exclude native plant species.

The legislation calls for the removal and / or control of alien invasive plant species (Category 1 species). In addition, unless authorised thereto in terms of the National Water Act, 1998 (Act No. 36 of 1998), no land user shall allow Category 2 plants to occur within 30 meters of the 1:50 year flood line of a river, stream, spring, natural channel in which water flows regularly or intermittently, lake, dam or wetland. Category 3 plants are also prohibited from occurring within proximity to a watercourse. Below is a brief explanation of the three categories in terms of the National Environmental Management: Biodiversity Act (Act 10 of 2004) (NEMBA):

- Category 1a: Invasive species requiring compulsory control. Remove and destroy. Any specimens of Category 1a listed species need, by law, to be eradicated from the environment. No permits will be issued.
- Category 1b: Invasive species requiring compulsory control as part of an invasive species control programme. Remove and destroy. These plants are deemed to have such a high invasive potential that infestations can qualify to be placed under a government sponsored invasive species management programme. No permits will be issued.
- Category 2: Invasive species regulated by area. A demarcation permit is required to import, possess, grow, breed, move, sell, buy or accept as a gift any plants listed as Category 2 plants. No permits will be issued for Category 2 plants to exist in riparian zones.
- Category 3: Invasive species regulated by activity. An individual plant permit is required to undertake any of the following restricted activities (import, possess, grow, breed, move, sell, buy or accept as a gift) involving a Category 3 species. No permits will be issued for Category 3 plants to exist in riparian zones.

Note that according to the regulations, a person who has under his or her control a category 1b listed invasive species must immediately:

- Notify the competent authority in writing;
- Take steps to manage the listed invasive species in compliance with:
  - Section 75 of the Act;
  - The relevant invasive species management programme developed in terms of regulation 4; and
  - Any directive issued in terms of section 73(3) of the Act

Eleven (11) Alien Invasive Plants were present within the area and are listed in Table 5.13 below.

Table 5.13. Alien plant species, including listed invasives, recorded from the study area.

Family	Scientific name	NEM:BA
Agavaceae	*Agave americana*	3
Amaranthaceae	*Atriplex nummularia subsp. nummularia*	2
Amaranthaceae	*Salsola kali*	1b
Anacardiaceae	*Schinus molle*	Not listed
Asteraceae	*Tagetes minuta*	Not listed
Cactaceae	*Opuntia ficus-indica*	1b (excluding spineless cultivars)
Cactaceae	*Opuntia robusta*	1a (excluding spineless cultivars)

Myrtaceae	*Eucalyptus sp.*	Not listed in Nama Karoo biome
Salicaceae	*Salix babylonica*	Not listed
Solanaceae	*Datura stramonium*	1b

Considering that the area is a CBA it is recommended that any AIP species that may colonize the area in the future, as a result of the proposed development, be controlled by implementing an Alien Invasive Plant Management Programme in compliance of section 75 of the Act.

Fauna

Amphibians

Based on the IUCN Red List Spatial Data and Frog Map database, 21 amphibian species are expected to occur within the assessment area (Refer to Appendix C of the Terrestrial Ecology report). No species were regarded as threatened. Four (4) amphibian species were recorded during the survey period. No amphibian species recorded are of conservation concern.

Table 5.14. Summary of amphibian species recorded within the assessment area during the survey period. LC = Least Concern

Family	Scientific name	Common name	Conservation Status
Bufonidae	*Sclerophrys gutturalis*	Guttural Toad	LC
Pipidae	*Xenopus laevis*	Common Platanna	LC
Pyxicephalidae	*Amietia poyntoni*	Poynton's River Frog	LC
Pyxicephalidae	*Tomopterna tandyi*	Tandy's Sand Frog	LC

Reptiles

Based on the IUCN Red List Spatial Data and Reptile Map database, 32 reptile species are expected to occur within the assessment area (Refer to Appendix D of the Terrestrial Ecology Report). Two species are regarded as threatened (Table 5.15 below).

Table 5.15. Threatened reptile species that are expected to occur within the assessment area of the proposed development. NT = Near Threatened

Family	Scientific Name	Common Name	Conservation Status	Likelihood of Occurrence
			Regional	
Testudinidae	*Psammobates tentorius tentorius*	Karoo Tent Tortoise	NT	High
Lamprophiidae	*Macrelaps microlepidotus*	Natal Black Snake	NT	Moderate

Psammobates tentorius tentorius (Karoo Tent Tortoise) is widespread and fairly common but the populations of this reptile are scattered and few and declining at approximately 10-20% on average over three generations (Hofmeyr et al. 2018). Impacts include overgrazing, destructive or illegal mining and unsustainable land use.

Macrelaps microlepidotus (Natal Black Snake) is a semi-fossorial species with an affinity for forests, where it tends to frequent moist leaf litter and humic soil. In coastal bush, it is associated with damp localities near water (IUCN, 2017). The likelihood of occurrence is rated as moderate as some patches of suitable habitat can be found in the project area.

Eleven (11) reptile species, representing nine (9) families were recorded within the assessment area during the survey periods as per the table below. The lack of species richness was likely due to the combination of the inherent secretive nature of reptile species, and limited time available for fieldwork (a true representative sample requires an extensive sampling period over several surveys). The presence of suitable habitat suggests that the area supports a diverse reptile community.

Table 5.16. Summary of reptile species recorded within the assessment area during the survey period. LC = Least Concern NE = Not Evaluated.

Family	Scientific name	Common name	RedList
Agamidae	*Agama aculeata aculeata*	Ground agama	LC
Agamidae	*Agama atra*	Southern Rock Agama	LC
Chamaeleonidae	*Bradypodion ventrale*	Eastern Cape Dwarf Chameleon	LC
Cordylidae	*Karusasaurus polyzonus*	Karoo Girdled Lizard	LC
Lacertidae	*Pedioplanis lineoocellata pulchella*	Common Sand Lizard	LC
Pelomedusidae	*Pelomedusa galeata*	South African Marsh Terrapin	NE
Scincidae	*Trachylepis variegata*	Variegated Skink	LC
Testudinidae	*Chersina agulata*	Angulate tortoise	LC
Testudinidae	*Stigmochelys pardalis*	Leopard Tortoise	LC
Varanidae	*Varanus albigularis albigularis*	Rock Monitor	LC
Viperidae	*Bitis arietans*	Puff adder	LC

Mammals

The IUCN Red List Spatial Data lists 44 indigenous mammal species that could be expected to occur within the assessment area (Refer to Appendix E of the Terrestrial Ecology Report). Three of these expected species are regarded as threatened as per Table 5.17 below.

Table 5.17. Mammal species of conservation concern that may occur within the assessment area associated with the proposed project area. NT= Near Threatened, VU = Vulnerable and LC = Least Concern

Family	Scientific name	Common name	Conservation Status	Likelihood of occurrence
Chrysochloridae	*Amblysomus corriae*	Fynbos Golden Mole	NT	Low
Felidae	*Felis nigripes*	Black-footed Cat	VU	High
Leporidae	*Bunolagus monticularis*	Riverine Rabbit	CR	Moderate

Felis nigripes (Black-footed cat) is endemic to the arid regions of southern Africa. This species is naturally rare, has cryptic colouring is small in size and is nocturnal. These factors have contributed to a lack of information on this species. Given that the highest densities of this species have been recorded in the more arid Karoo region of South Africa, the habitat in the Project area can be considered to be ideal for the species and the likelihood of occurrence is rated as high.

Amblysomus corriae (Fynbos Golden Mole) was recorded last in December of 1989 with 4 records in the GDS 3123DD (Animal Demography Virtual Museum records: https://vmus.adu.org.za/vm_sp_list.php) and is considered unlikely to be re-recorded in the area.

Bunolagus monticularis (Riverine Rabbit) which is critically endangered (CR) is identified as a possible species occurring in the region by the Screening Tool. This species is endemic to semi-arid central Karoo regions of South Africa, where they inhabit dense riparian growth along seasonal rivers. Significant threats from ongoing habitat degradation and fragmentation due to detrimental land-use practices and habitat transformation for amongst others energy development has led to their decline. Although there is suitable habitat in the area, the Grid infrastructure avoids riparian areas, with low impacts expected to occur to any populations of this species should it occur in the region. Moreover, this species has been recorded more than 50km away, and not within or close to the site boundaries.

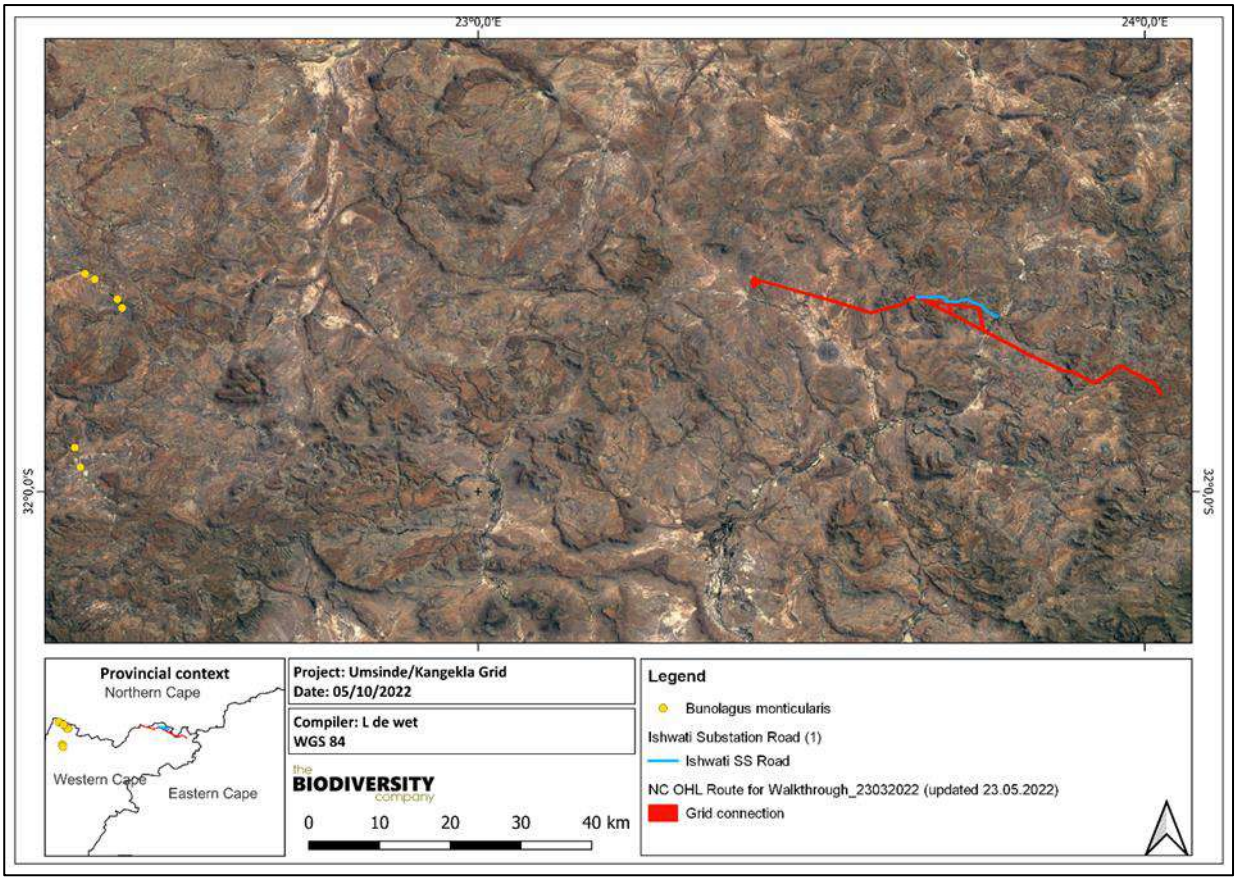


Figure 5.36.1. Bunolagus monticularis (Riverine Rabbit) records in relation to the project site.

A total of nineteen (19) mammal species were recorded within the assessment area during the survey period as per the table below. It is considered highly likely that additional small mammal species would be recorded from the site with extensive sampling. In the area proposed for the access road several rocky outcrops were observed, which provided dens for Cape Rock Hyrax (Procavia capensis). The PAOI and surrounding landscape also supports a species rich assemblage of mesocarnivores. Mesocarnivores have strong effects on their prey species, and this especially so in simple ecological communities or in regions where apex predators are lacking (Roemer et al, 2009). Consequently, shifts in the population or diversity of the mesocarnivore community may lead to trophic cascade effects. This may result in the population explosion of lower trophic organisms, including groups that reach pest proportions such as rodents. It is thus important to ensure that the impact on these species are limited.

Table 5.18. Mammal species recorded within the assessment area during the survey periods. LC = Least Concern

Family	Scientific name	Common name	Conservation Status
Bovidae	*Antidorcas marsupialis*	Springbok	LC
Bovidae	*Sylvicapra grimmia*	Bush Duiker	LC
Bovidae	*Tragelaphus strepsiceros*	Kudu	LC
Canidae	*Canis mesomelas*	Black-backed Jackal	LC
Canidae	*Otocyon megalotis*	Bat-eared Fox	LC
Cercopithecidae	*Papio ursinus*	Chacma Baboon	LC
Felidae	*Caracal caracal*	Caracal	LC
Herpestidaae	*Suricata suricata*	Meerkat	LC
Hyaenidae	*Proteles cristatus*	Aardwolf	LC
Hystricidae	*Hystrix africaeaustralis*	Porcupine	LC
Leporidae	*Lepus saxatilis*	Scrub Hare	LC
Leporidae	*Pronolagus rupestris*	Smith's Red Rock Hare	LC

Muridae	*Rhabdomys pumilio*	Xeric Four-striped Grass Rat	LC
Mustelidae	*Ictonyx striatus*	Striped Polecat	LC
Mustelidae	*Mellivora capensis*	Honey Badger	LC
Pedetidae	*Pedetes capensis*	South African Spring Hare	LC
Pedetidae	*Pedetes capensis*	Springhare	LC
Procaviidae	*Procavia capensis*	Cape Rock Hyrax	LC
Sciuridae	*Xerus inauris*	South African Ground Squirrel	LC

Avifauna

The SABAP2 Data lists 221 avifauna species that could be expected to occur within the area (Refer to Appendix B of the Terrestrial Ecology Report). Seventeen (17) of these expected species are regarded as threatened (Table 5.19 below). One of the species have a low likelihood of occurrence due to lack of suitable habitat and food sources in the project area or based on the range restrictions of the species.

Table 5.19. Threatened avifauna species that are expected to occur within the project area

Species	Common Name	Conservation Status		Likelihood of occurrence
		Regional (SANBI, 2016)	IUCN (2021)	
Anthus crenatus	Pipit, African Rock	NT	NT	Moderate
Aquila verreauxii	Eagle, Verreaux's	VU	LC	Confirmed
Ardeotis kori	Bustard, Kori	NT	NT	Confirmed
Ciconia microscelis	Stork, Woolly-necked	Unlisted	NT	Low
Ciconia nigra	Stork, Black	VU	LC	Moderate
Circus macrourus	Harrier, Pallid	NT	NT	Low
Circus maurus	Harrier, Black	EN	EN	High
Coracias garrulus	Roller, European	NT	LC	High
Eupodotis vigorsii	Korhaan, Karoo	NT	LC	Confirmed
Falco biarmicus	Falcon, Lanner	VU	LC	Confirmed
Geocolaptes olivaceus	Woodpecker, Ground	Unlisted	NT	High
Grus paradisea	Crane, Blue	NT	VU	Confirmed
Neotis ludwigii	Bustard, Ludwig's	EN	EN	Confirmed
Phoenicopterus roseus	Flamingo, Greater	NT	LC	Low
Polemaetus bellicosus	Eagle, Martial	EN	EN	Confirmed
Sagittarius serpentarius	Secretarybird	VU	EN	Confirmed
Terathopius ecaudatus	Bateleur, Bateleur	EN	EN	Low

Ninety-nine (99) bird species were recorded in the first survey. The full list of species recorded, their threat status, guild and location observed is shown in Appendix F of the Terrestrial Ecology Report. A list of the species incidentally recorded moving between point count locations are provided in Appendix G of the Terrestrial Ecology Report. Eight of the species recorded were SCCs on a national or international as per the table below. The Karoo Korhaan were observed in most counts, followed by the Blue Crane. The location of the SCCs that were recorded in and around the project area is shown in Figure 5.37.

Table 5.20. Species of conservation concern observed during the survey (VU, Vulnerable; EN, Endangered; NT, Near Threatened; LC, Least Concerned)

Common Name	Scientific Name	Regional (SANBI, 2016)	IUCN (2021)	Total Number of birds	Total Sightings
Blue Crane	*Grus paradisea*	NT	VU	51	17
Karoo Korhaan	*Eupodotis vigorsii*	NT	LC	49	19
Kori Bustard	*Ardeotis kori*	NT	NT	2	2
Ludwig's Bustard	*Neotis ludwigii*	EN	EN	11	6
Martial Eagle	*Polemaetus bellicosus*	EN	EN	1	1
Secretarybird	*Sagittarius serpentarius*	VU	EN	2	1
Verreaux's Eagle	*Aquila verreauxii*	VU	LC	5	3
Lanner Falcon	*Falco biarmicus*	VU	LC	3	2

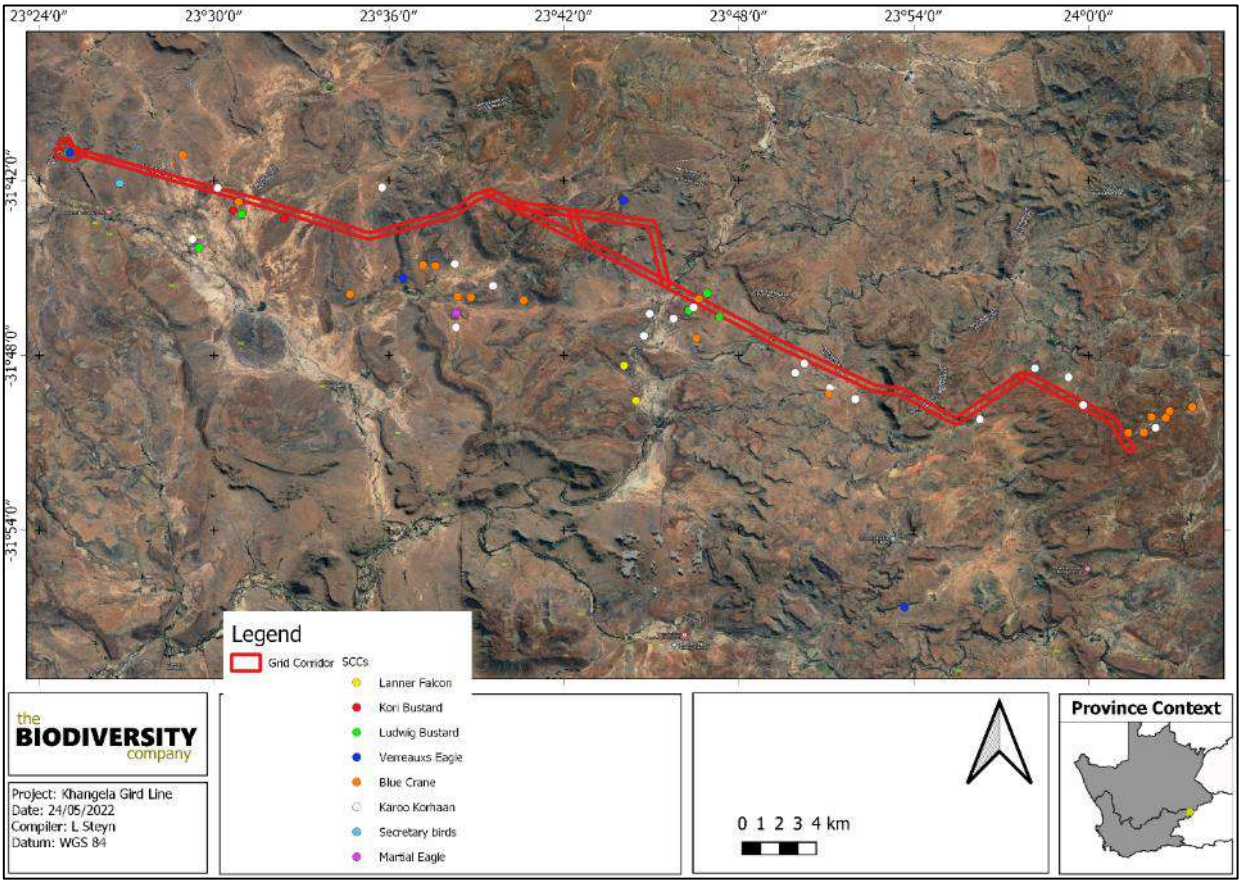


Figure 5.37. The location of the recordings of the species of conservation concern

A number of species were found that would be regarded as high risk species (Table 5.21 and Figure 5.38 below). Risk species are species that would be sensitive to habitat loss, that are regarded as collision prone species and species that would have a high electrocution risk. Species recorded at the nearby river and dam were included as they could very likely be influenced should they be moving between water sources. The proposed 132kV powerline may pose a collision and electrocution risk.

Table 5.21. Avifaunal species recorded in the assessment corridor that may be at risk of collision, electrocution and/or impacted by habitat loss associated with the proposed development. * The priority scores are based on the vulnerability of species to windfarm development.

Common Name	Scientific Name	Collisions	Electrocution	Habitat Loss	Priority score* (Ralston et al., 2017)
African Harrier-Hawk	*Polyboroides typus*	X	X		95
Amur Falcon	*Falco amurensis*			X	105
Black Sparrowhawk	*Accipiter melanoleucus*	X	X		85
Black-headed Heron	*Ardea melanocephala*	X	X		
Blue Crane	*Grus paradisea*	X	X	X	115
Egyptian Goose	*Alopochen aegyptiaca*	X	X		
Greater Kestrel	*Falco rupicoloides*			X	87
Hadeda (Hadada) Ibis	*Bostrychia hagedash*	X	X		
Hamerkop	*Scopus umbretta*	X			
Helmeted Guineafowl	*Numida meleagris*		X		
Jackal Buzzard	*Buteo rufofuscus*	X	X		125
Karoo Korhaan	*Eupodotis vigorsii*	X	X	X	95
Kori Bustard	*Ardeotis kori*	X	X	X	105
Ludwig's Bustard	*Neotis ludwigii*	X	X	X	115
Martial Eagle	*Polemaetus bellicosus*	X	X	X	130
Northern Black Korhaan	*Afrotis afraoides*	X	X		90
Pied Crow	*Corvus albus*		X		
Rock Kestrel	*Falco rupicolus*			X	
Secretarybird	*Sagittarius serpentarius*		X	X	125
South African Shelduck	*Tadorna cana*	X	X		
Spotted Eagle-Owl	*Bubo africanus*		X		85
Spur-winged Goose	*Plectropterus gambensis*	X	X		
Verreaux's Eagle	*Aquila verreauxii*	X	X	X	145
White-necked Raven	*Corvus albicollis*		X		

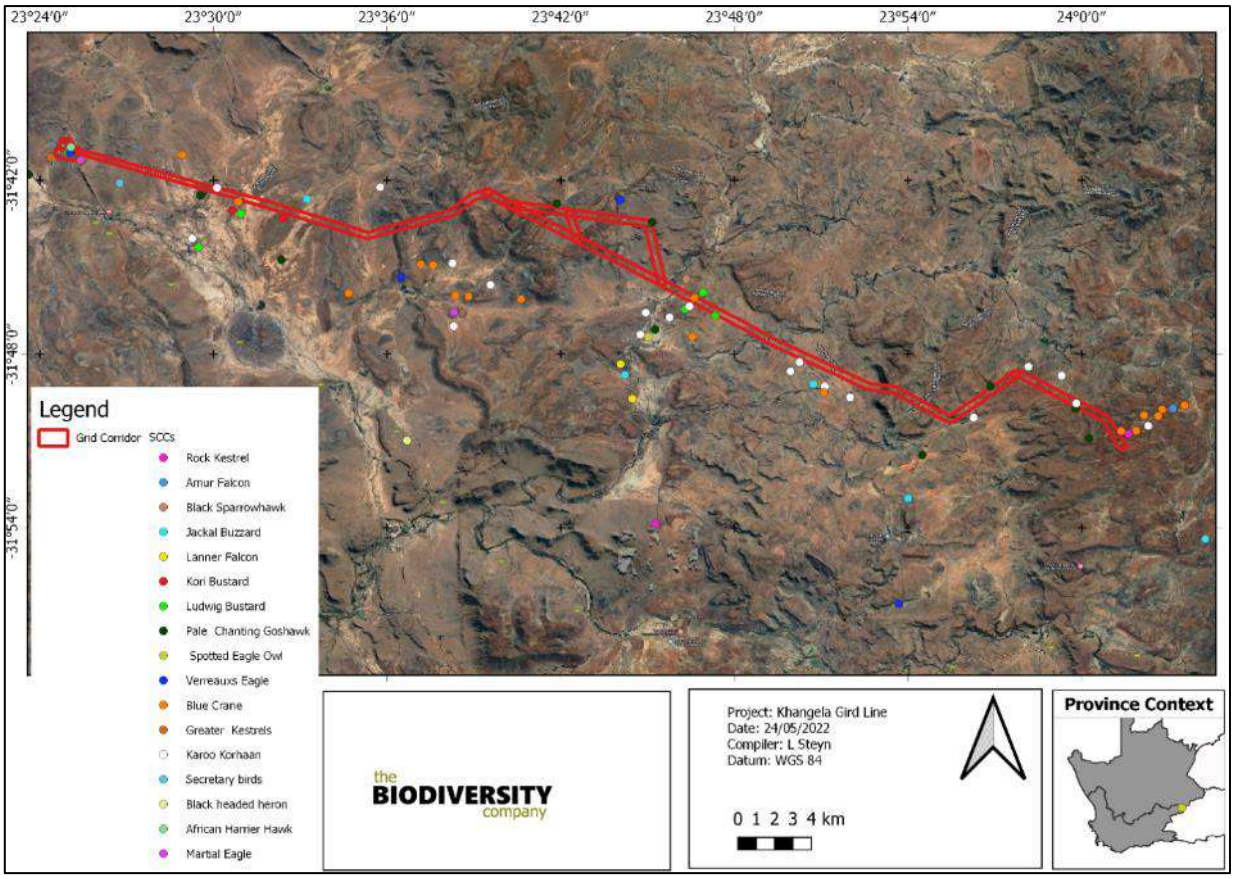


Figure 5.38. Locations of some of the risk species recorded

During the field survey recording flight-paths and nesting sites were undertaken for certain species. There are eight (8) SCC, and twenty-five species that are regarded as priority species for powerline infrastructure. Various flight paths are shown in Figure 5.39 below. One Verreauxs Eagle (Black Eagle) nest was confirmed during the assessment while two more could possibly be found nearby based on information from local farmers. **A buffer was not placed around the nest as it was found in an existing powerline, and it is thus assumed that the eagles are habituated to powerline infrastructure to some extent. Mitigation measures to be applied for the development of the 132kV powerline within ~500m of the nest have been proposed.**

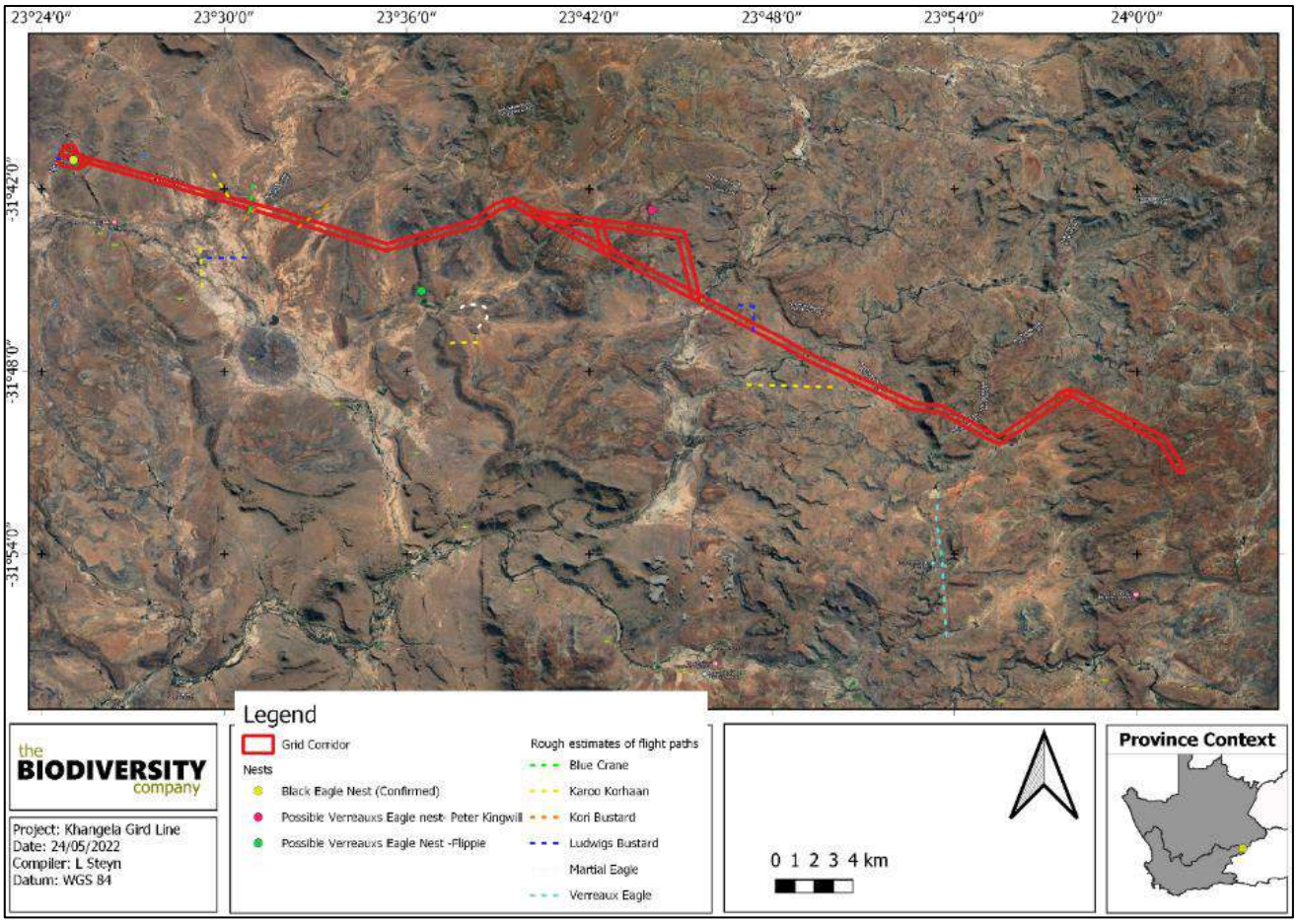


Figure 5.39. Flight paths and nest locations

Avifauna habitats

Fine-scale habitats within the landscape are important in supporting a diverse avifauna community as they provide differing nesting, foraging and reproductive opportunities. Four habitats were identified in the assessment, transformed, Karoo Scrub, Rocky Outcrops and Wash (wetland) areas (Dam and rivers). These habitats were based on the species compositions in the various areas. The terrestrial habitats describe provides the overall vegetation composition of the habitats and is also relevant to the avifauna. The following is to highlight what species were common in the various habitats.

Transformed habitat are more important for the avifauna community in this instance as a Verreauxs Eagle nest was found close to this area. In the Rocky outcrop habitat Rock Kestrels, Greater striped Swallows, Mountain Wheatears, Grey-backed Cisticola and Bokmakieries were found. Karoo scrub were home to species such as Rufous-eared Warblers, Kori Bustard, Northern Black Korhaan and Large-billed Lark. The water resource areas support all the species in terms of water but species exclusively found here were South African Shelduck and Egyptian Goose.

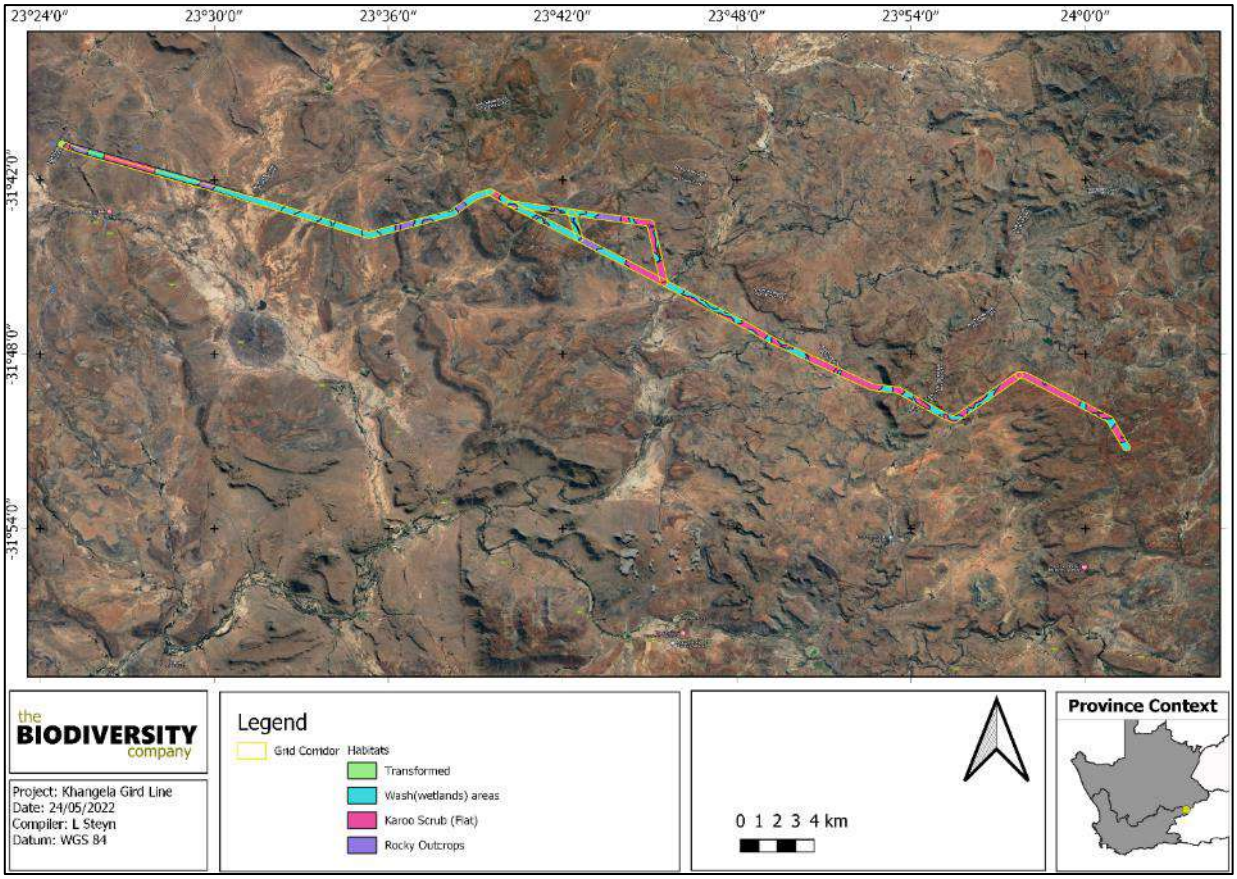


Figure 5.40. The habitats found in the project area

All habitats within the assessment area of the proposed project were allocated a sensitivity category (Table 5.22 below). The sensitivities of the habitat types delineated are illustrated in Figure 5.41 below. The reason for the very high rating in the transformed area is based on the presence of the Verreaux's Eagle Nest. Interpretation of the SEI in the context of the proposed project is provided in Table 5.21.

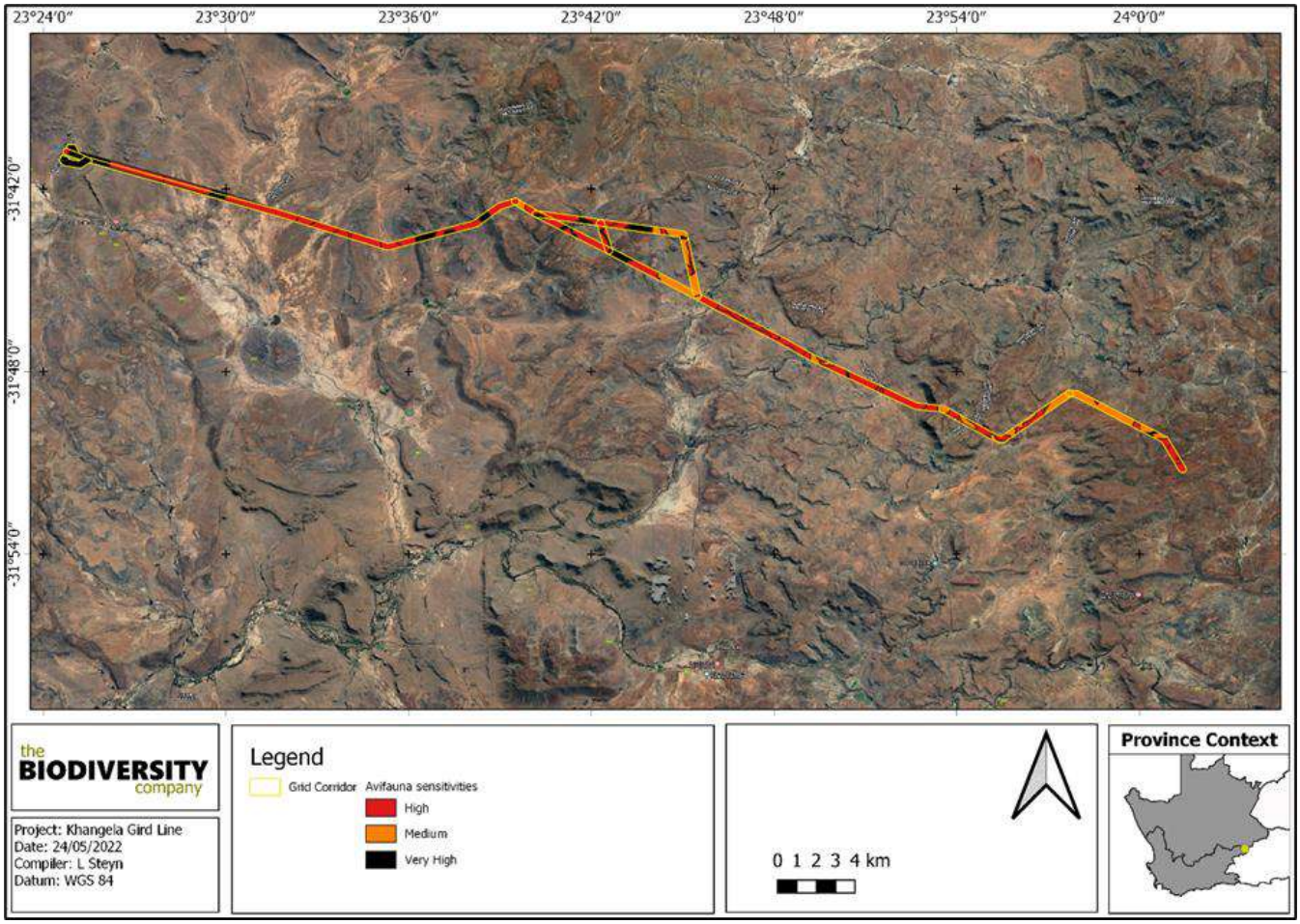


Figure 5.41. Sensitivities of the avifauna assessment

Table 5.22. Guidelines for interpreting Site Ecological Importance in the context of the proposed development activities

Site Ecological Importance	Interpretation in relation to proposed development activities
Very High	Avoidance mitigation – no destructive development activities should be considered. Offset mitigation not acceptable/not possible (i.e., last remaining populations of species, last remaining good condition patches of ecosystems/unique species assemblages). Destructive impacts for species/ecosystems where persistence target remains.
High	Avoidance mitigation wherever possible. Minimisation mitigation – changes to project infrastructure design to limit the amount of habitat impacted, limited development activities of low impact acceptable. Offset mitigation may be required for high impact activities.
Medium	Minimisation and restoration mitigation – development activities of medium impact acceptable followed by appropriate restoration activities.
Low	Minimisation and restoration mitigation – development activities of medium to high impact acceptable followed by appropriate restoration activities.
Very Low	Minimisation mitigation – development activities of medium to high impact acceptable and restoration activities may not be required.

5.7 Heritage Resources, including archaeology and palaeontology

5.7.1. Palaeontology

The proposed development of a 132kV powerline, 132kV on-site substations/ switching stations, new access/service tracks and watercourse crossing points associated with the authorised Emoyeni Wind Energy Facilities is depicted on two 1:250 000 Geological Maps (Council of Geoscience, Pretoria; Figure 5.42). The largest portion of the development is depicted on the 1:250 000 Victoria West 3122 (1989) Geological Map in the west while a small portion of the development is depicted on the 3124 Middelburg (1997) Geological Map in the east. These maps indicates that the proposed development is underlain by Quaternary superficial deposits (yellow, single bird figure), Balfour (Pb, green), Teekloof (Pto/Pth, dark green) Formations of the Adelaide Subgroup (Beaufort Group, Karoo Supergroup) while large areas of the development footprint are underlain by Jurassic dolerite (Jd, red).

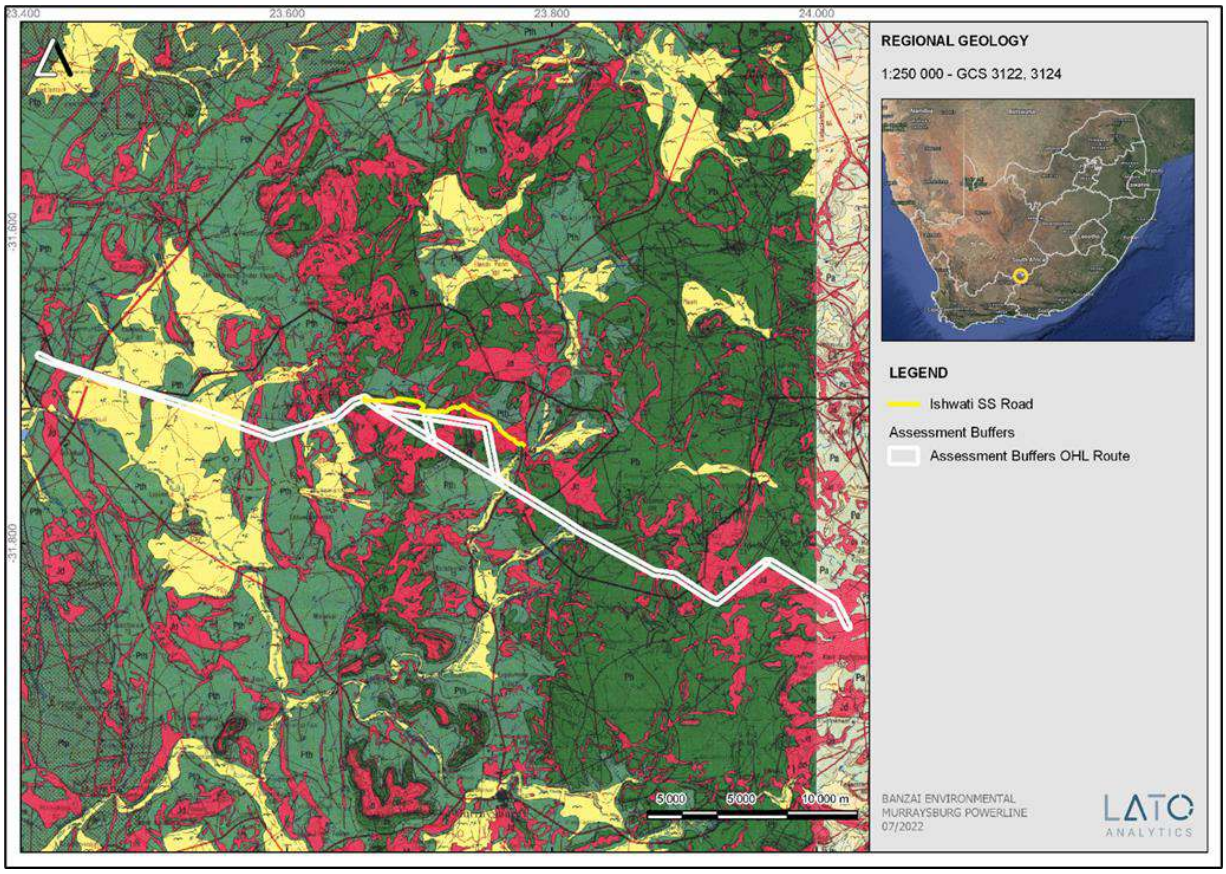


Figure 5.42: Extract of the 1:250 000 Victoria West 3122 (1989) and 3124 Middelburg (1997) Geological map (Council of Geoscience, Pretoria) indicating the surface geology of the proposed development. In the west the development is mainly underlain by Quaternary superficial deposits (yellow, single bird figure), Balfour (Pb, green), Teekloof Formations (Pto/Pth, dark green) of the Adelaide Subgroup (Beaufort Group, Karoo Supergroup) while large areas of the development footprint are underlain by Jurassic dolerite (Jd, red).

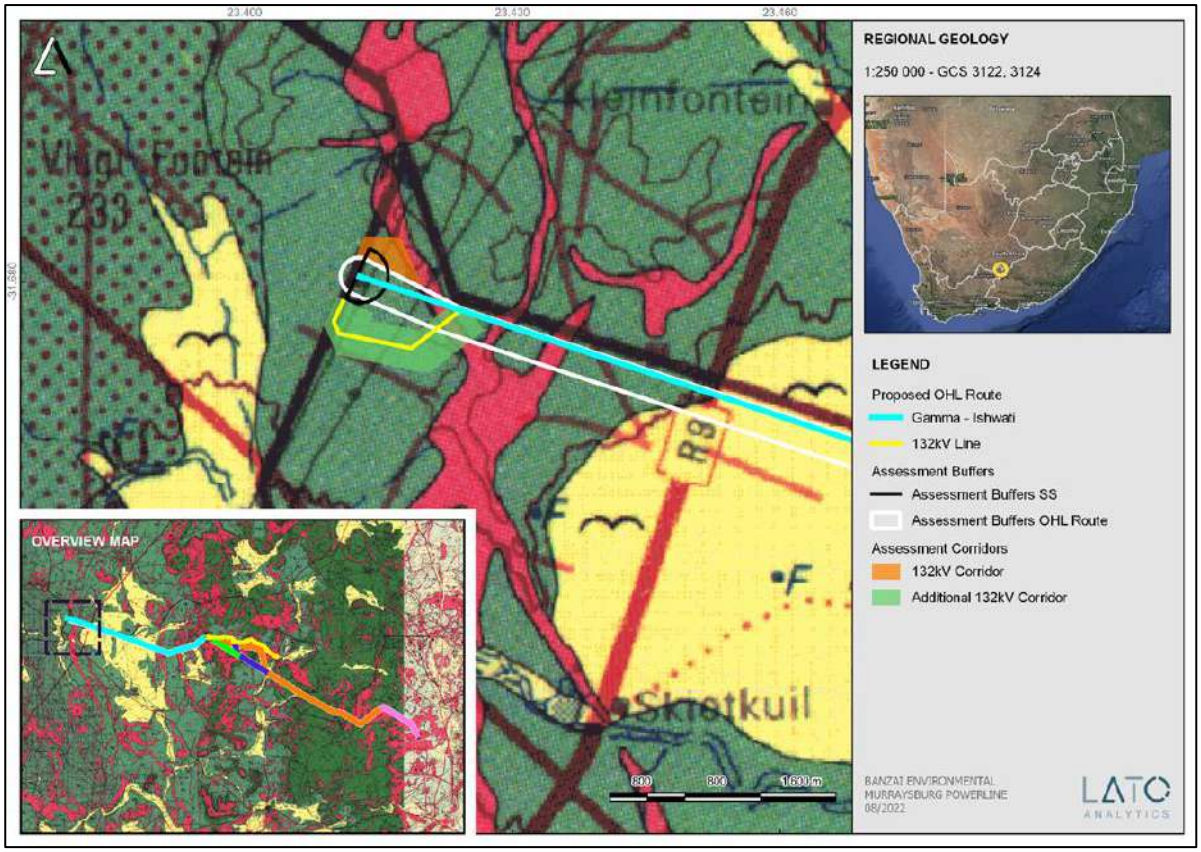


Figure 5.43: Extract of the 1:250 000 Victoria West 3122 (1989) Geological map (Council of Geoscience, Pretoria) indicating the Gamma substation and western margin of the proposed development underlain by Jurassic dolerite (red, Jd), Quaternary superficial deposits (yellow, single bird figure), and Teekloof (Pto/Pth, dark green) Formation of the Adelaide Subgroup

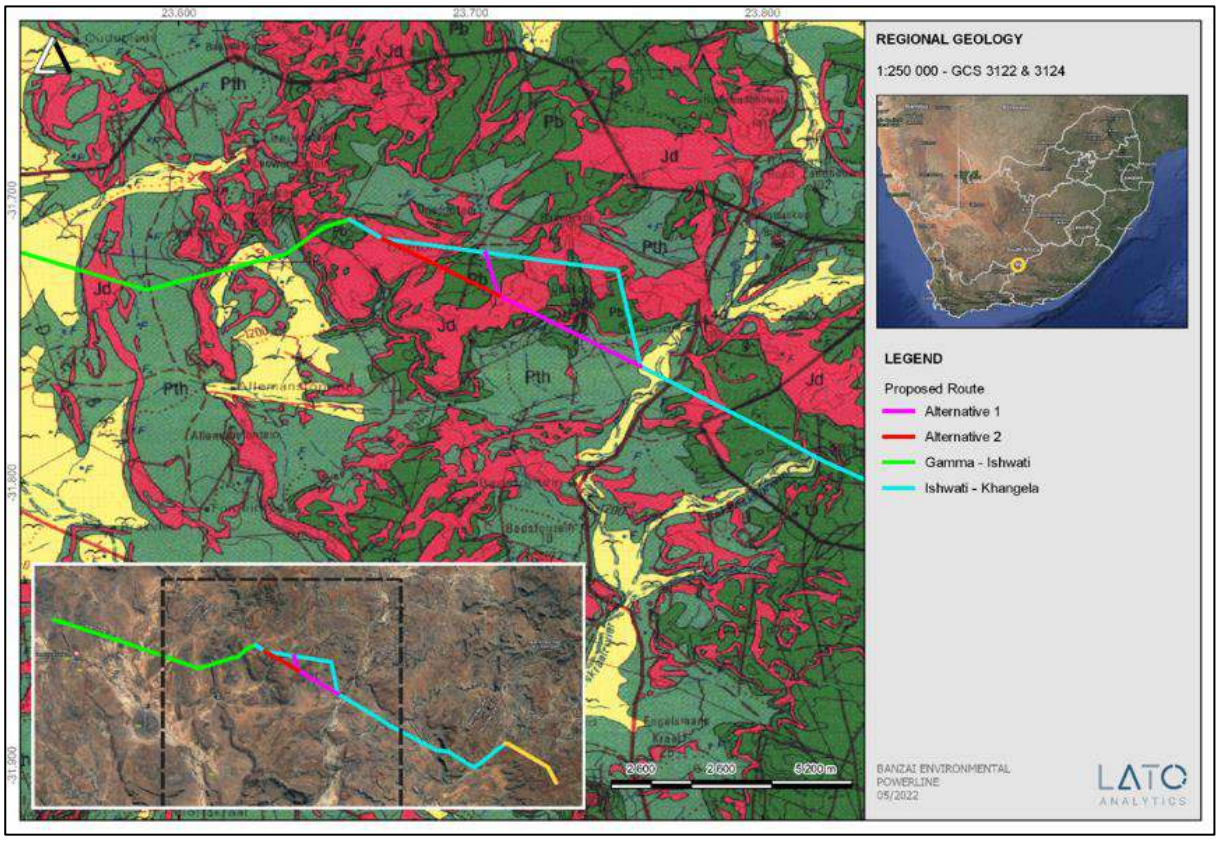


Figure 5.44. Extract of the middle section of the proposed development indicates that the development is underlain by the Balfour Formations (Pb, green), Jurassic dolerite (Jd, red) as well as small portions of the Teekloof Formation (Pto/Pth, dark green) as well as Quaternary superficial deposits (yellow, single bird figure).

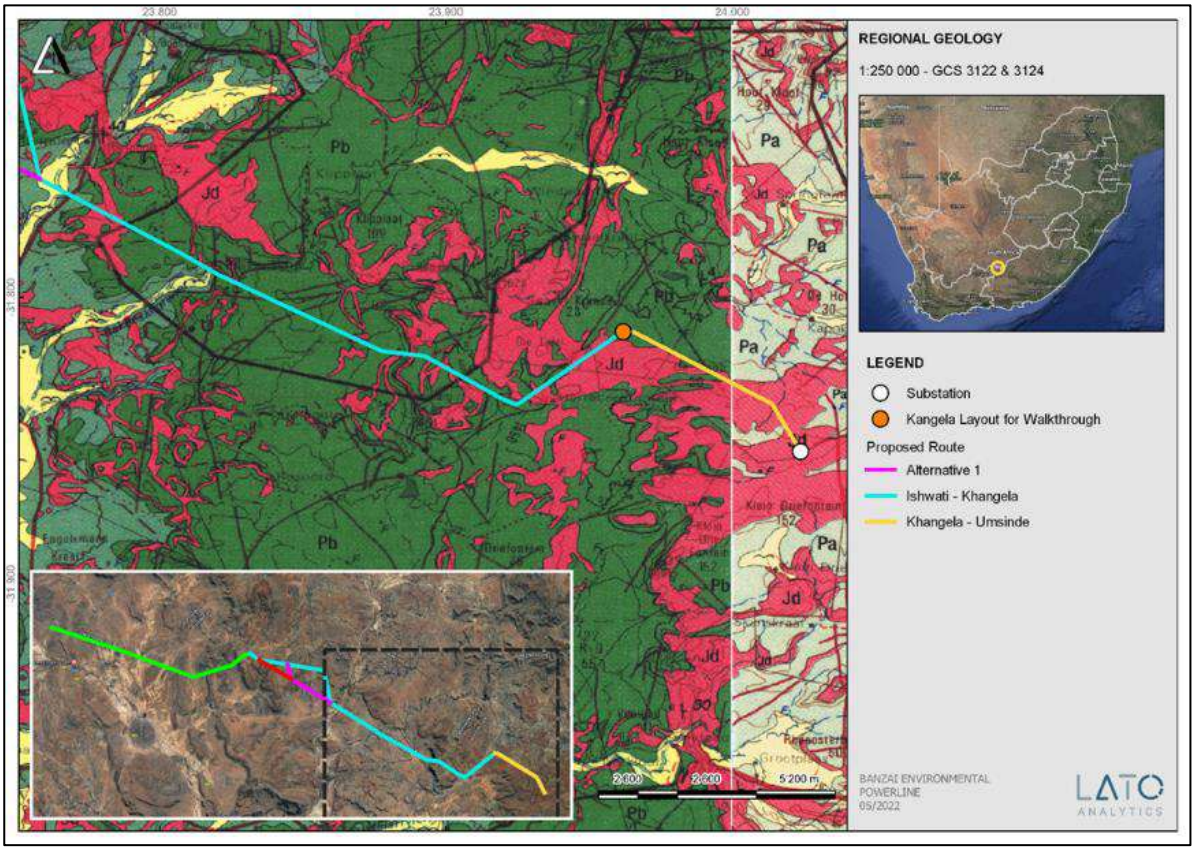


Figure 5.45. Extract of the eastern section of the proposed development indicates that the development is underlain by the Balfour Formations (Pb, green), Jurassic dolerite (Jd, red) as well as a very small portion of the Quaternary superficial deposits (yellow, single bird figure).

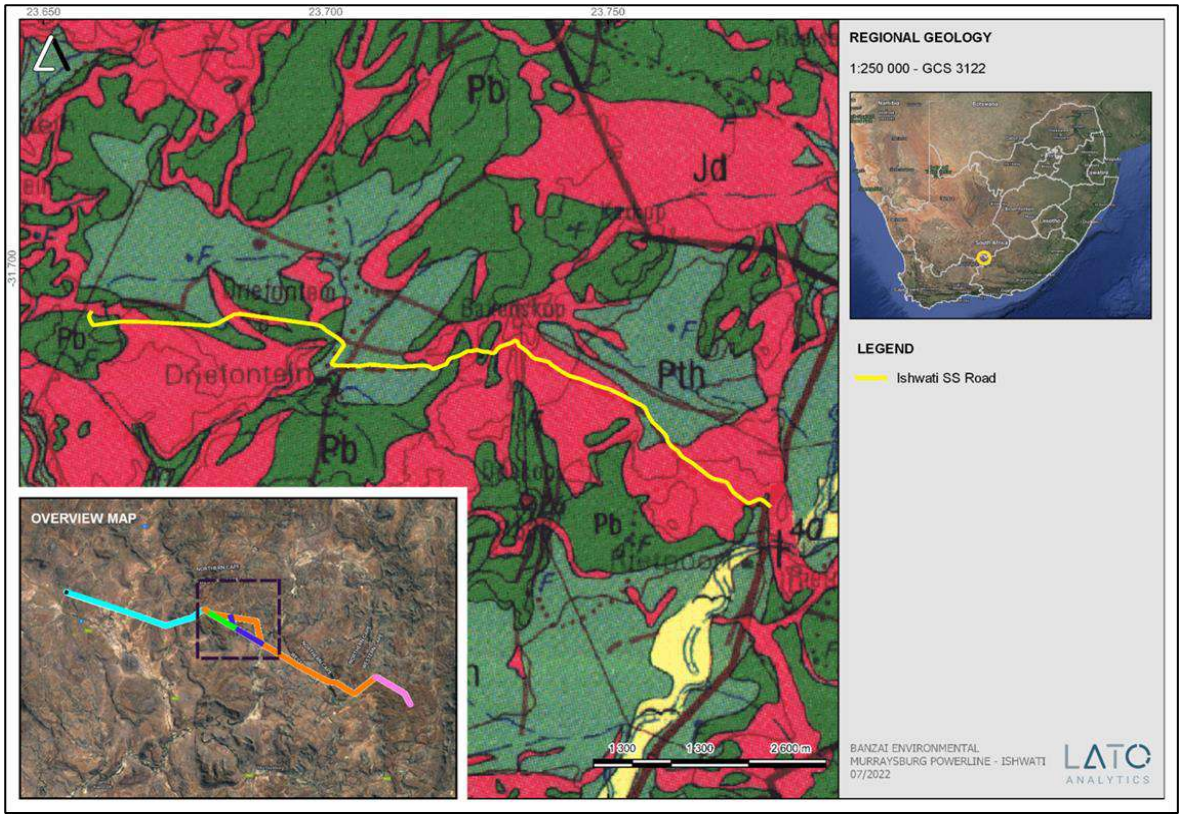


Figure 5.46. Extract of the proposed Ishwati SS Road indicates that the development is underlain by the Balfour Formations (Pb, dark green), the Teekloof Formation (Pth, green); Jurassic dolerite (Jd, red) as well as a very small portion of the Quaternary superficial deposits (yellow, single bird figure)

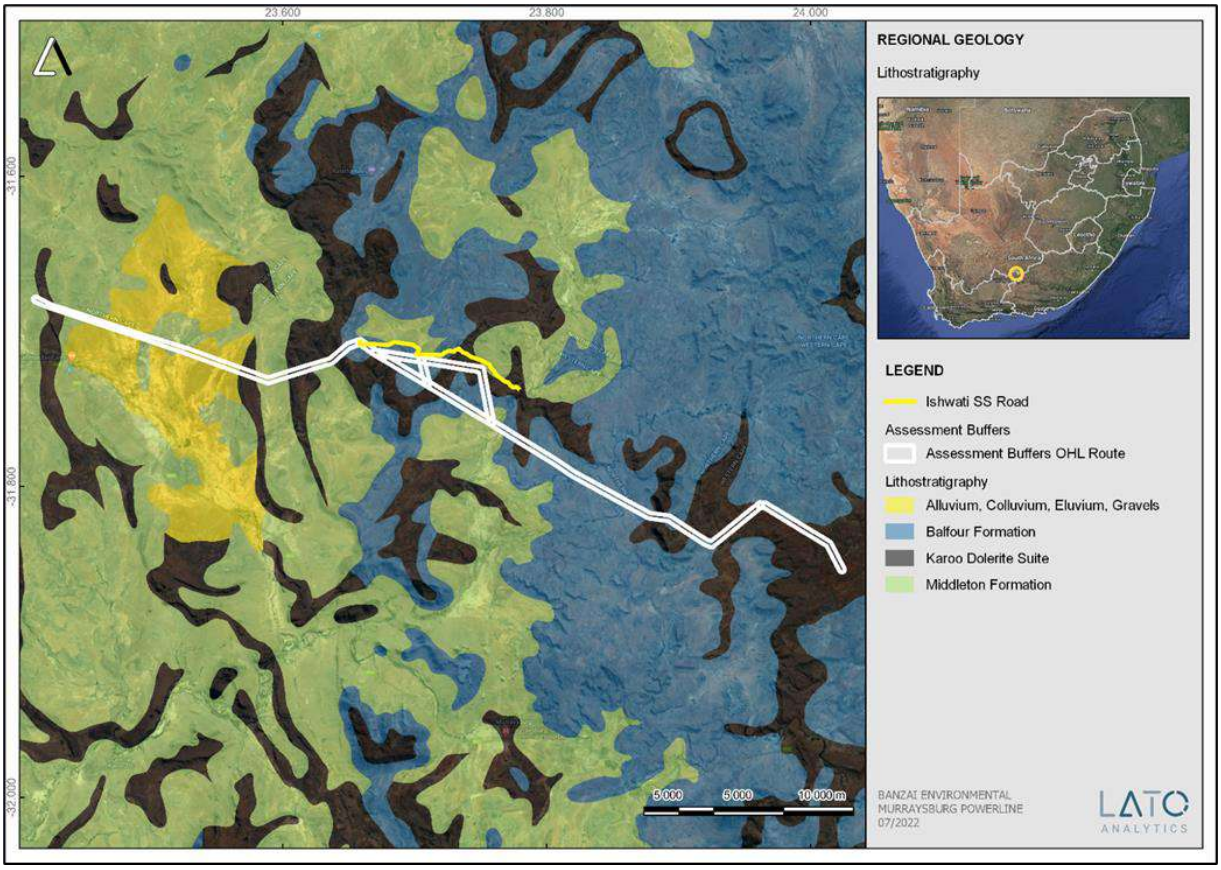


Figure 5.47. Geology indicated by Shape Files (compiled by the Council of Geesciences, Pretoria). The proposed development is underlain by Quaternary sediments (alluvium, colluvium and elluvium) the Balfour, and Middleton Formations of the Beaufort Group (Karoo Supergroup) as well as Jurassic Dolerite.

The PalaeoMap of the South African Heritage Resources Information System indicates that the Palaeontological Sensitivity of the Jurassic Dolerite is Zero as it is igneous in origin and thus unfossiliferous, that of the Quaternary deposits is Moderate while that of the Adelaide Subgroup is Very High (Almond and Pether, 2009; Almond et al., 2013).

Quaternary superficial deposits are the youngest geological deposits formed during the Quaternary (approximately 2.6 million years ago to present). In the proposed development, areas of alluvium, colluvium and eluvium is present. Research has indicated that Quaternary deposits reveal palaeoclimatic changes in the different geological formations (Hunter et al., 2006). The climatic fluctuations in the Cenozoic Era were responsible for the formation of most geomorphologic features in southern Africa (Maud, 2012). Various warming and cooling events occurred in the Cenozoic but climatic changes during the Quaternary, specifically the last 1.8 Ma, were the most drastic climate changes relative to all climate variations in the past Barnosky (2005). Climate in the Quaternary Period were both drier and wetter than the present and resulted in changes in river flow patterns, sedimentation processes and vegetation variation (Tooth et al., 2004).

Fossil assemblages of this Group are generally very low in diversity and occur over a wide range. These fossils represent terrestrial plants and animals with a close resemblance to living forms. Fossil assemblages include bivalves, diatoms, gastropod shells, ostracods and trace fossils. The palaeontology of the Quaternary superficial deposits has been relatively neglected in the past. Late Cenozoic calcrete may comprise of bones, horn corns as well as mammalian teeth. Tortoise remains have also been uncovered as well as trace fossils which includes termite and insect's burrows and mammalian trackways. Amphibian and crocodile remains have been uncovered where the depositional settings in the past were wetter. According to the SAHRIS Palaeosensitivity map the proposed development is underlain by sediments with a Very High (red), Moderate (green) and Zero (grey) Palaeontological Sensitivity.

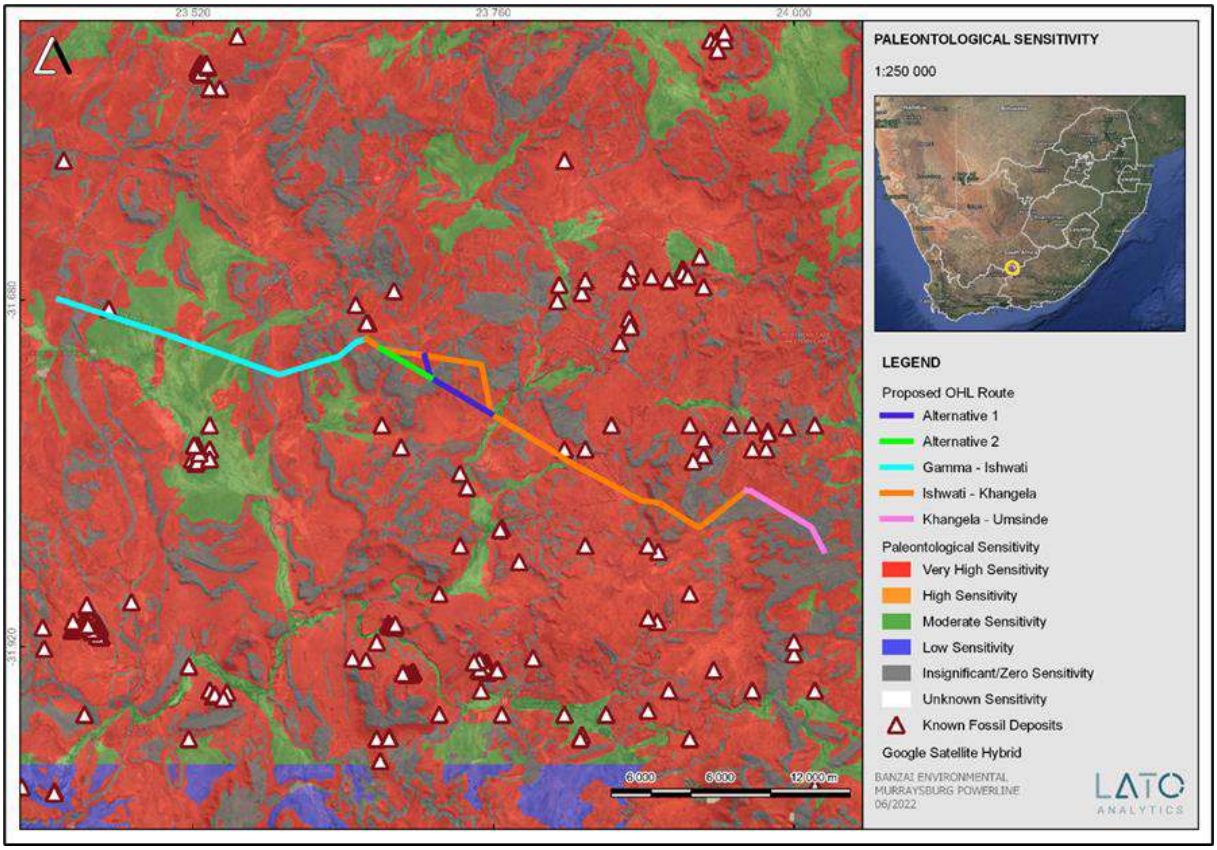


Figure 5.48. SAHRIS PalaeoMap indicating fossil finds of the National Palaeontological Database with white triangles. Only three fossiliferous areas are present close to the development footprint.

The proposed development is underlain by Quaternary superficial deposits, Balfour-, Teekloof and Abrahamskraal Formations of the Adelaide Subgroup (Beaufort Group, Karoo Supergroup) while large areas of the development footprint are underlain by Jurassic dolerite. The PalaeoMap of the South African Heritage Resources Information System indicates that the Palaeontological Sensitivity of the Jurassic Dolerite is Zero as it is igneous in origin and thus unfossiliferous, Quaternary deposits has a Moderate Palaeontological Sensitivity while that of the Adelaide Subgroup is Very High (Almond and Pether, 2009; Almond et al., 2013). Due to the Very High Sensitivity of the Adelaide Subgroup a field assessment was triggered. Three powerline alternatives (i.e., Preferred Alternative, Alternative 1 and Alternative 2) as well as an extended development corridor enabling the 132kV powerline to connect either to the south face of the Gamma substation yard or approach from the east) is considered for the development. From a Palaeontological view there is no preference between these alternatives. The development will thus not lead to detrimental impacts on the palaeontological reserves of the area (if mitigations measures are followed) and construction of the development may be authorised to its whole extent.

5.7.2. Archaeological and Cultural Aspects

The Karoo has been an area that has historically been sparsely occupied. Karoo is a Khoesan word, that can be translated to mean "the place of great dryness" (Raper, 2004; Rusch, 2016). Before pre-colonial farmers (at around 2000 years ago) and colonial settlers from the Cape (at around 500 years ago) moved into the region, the area was occupied by groups of hunters and gathers. Evidence of their presence within the area can be seen on the various rock engravings scattered around the region (Rusch, 2010). The /Xam, a hunters and gather group, occupied the Karoo region (Rusch, 2010). With the movement of pre-colonial farmers and later the Cape Colonists the /Xam groups in the Karoo were displaced and forcefully incorporated into the dominant cultural groups that moved into the region (Rusch, 2010). According to Orton et al., (2016) within the southern African landscape, the unique sense of place of the Karoo region derives from the "expansiveness, remoteness and endless horizons" characterised by undulating mountains and ridges surrounded by grassy plains.

Before the occupation of the area by the pre-colonial farmers and colonial settlers, the area was characterised by herds of antelope and other game species, which the /Xam hunted (Schoeman, 2013; Winter, 2021). With the occupation of the area by pre-colonial farmers, sheep replaced many of the game species found in the area. A marked change in vegetation also followed as grass receded (Winter et al 2009; Winter & Oberholzer 2013 in Winter, 2021). By the 1700s pre-colonial farmers or Trekboers moved into the Karoo area (Schoeman, 2013).

As more people settled in the area, small towns and infrastructure developed in the area. By the mid-nineteenth century, the Cape railway line was extended from Worcester into the Karoo (Schoeman, 2013).

There were several structures identified within the vicinity of the proposed development area. The structures identified are a farmstead and associated structures. A section of the First Edition of the 3123DD Topographical Sheet is depicted in Figure 5.49. The map was compiled from aerial photography undertaken in 1966, surveyed in 1972 and drawn in 1973 by the Director-General of Surveys. A few structures associated with a farmstead were identified within the preferred 400m wide power line corridor. All these identified sites are likely to be at least 50 years old.

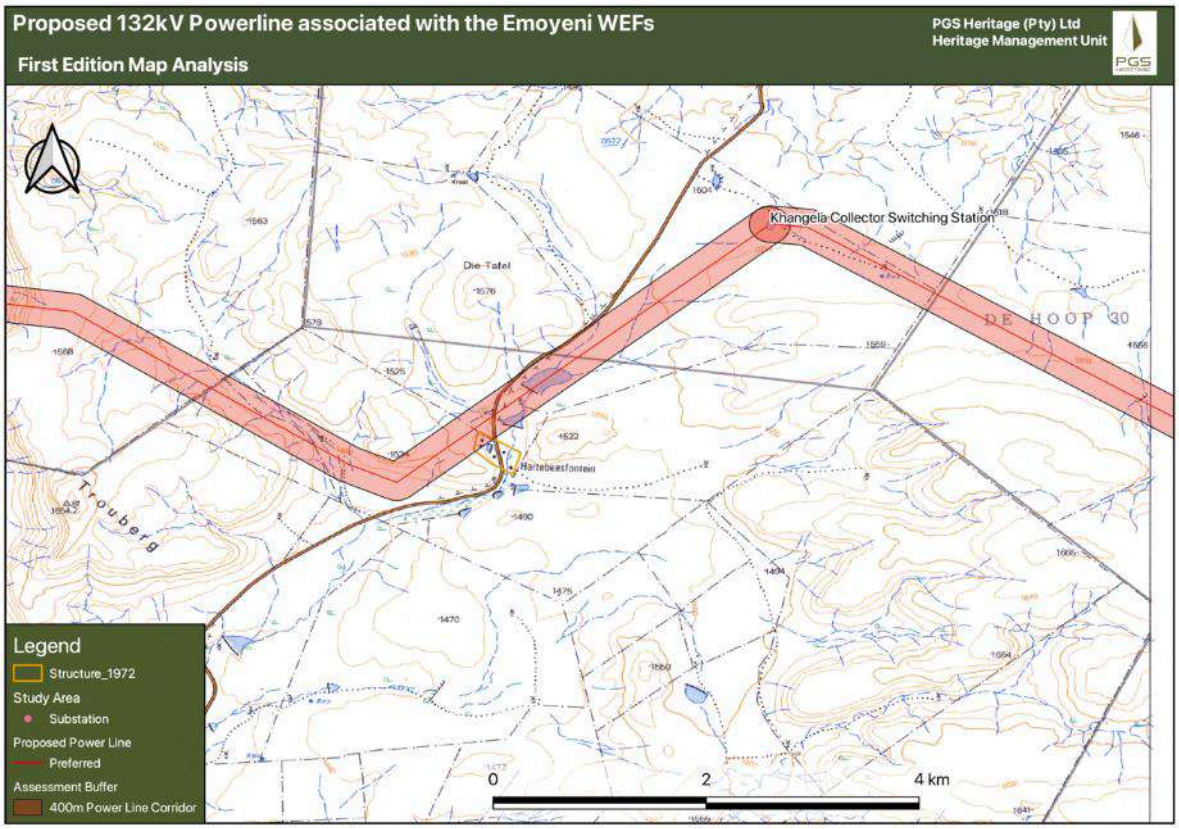


Figure 5.49. Enlarged section of 3123DD Ed 1 1972 sheet, depicting a farmstead (orange polygon) adjacent to the proposed powerline route.

A section of the First Edition of the 3123DA Topographical Sheet is depicted in Figure 5.50 below. The map was compiled from aerial photography undertaken in 1966, surveyed in 1972 and drawn in 1973 by the Director-General of Surveys. A farmstead and associated structures were identified within the preferred power line corridor. All these identified sites are likely to be at least 50 years old.

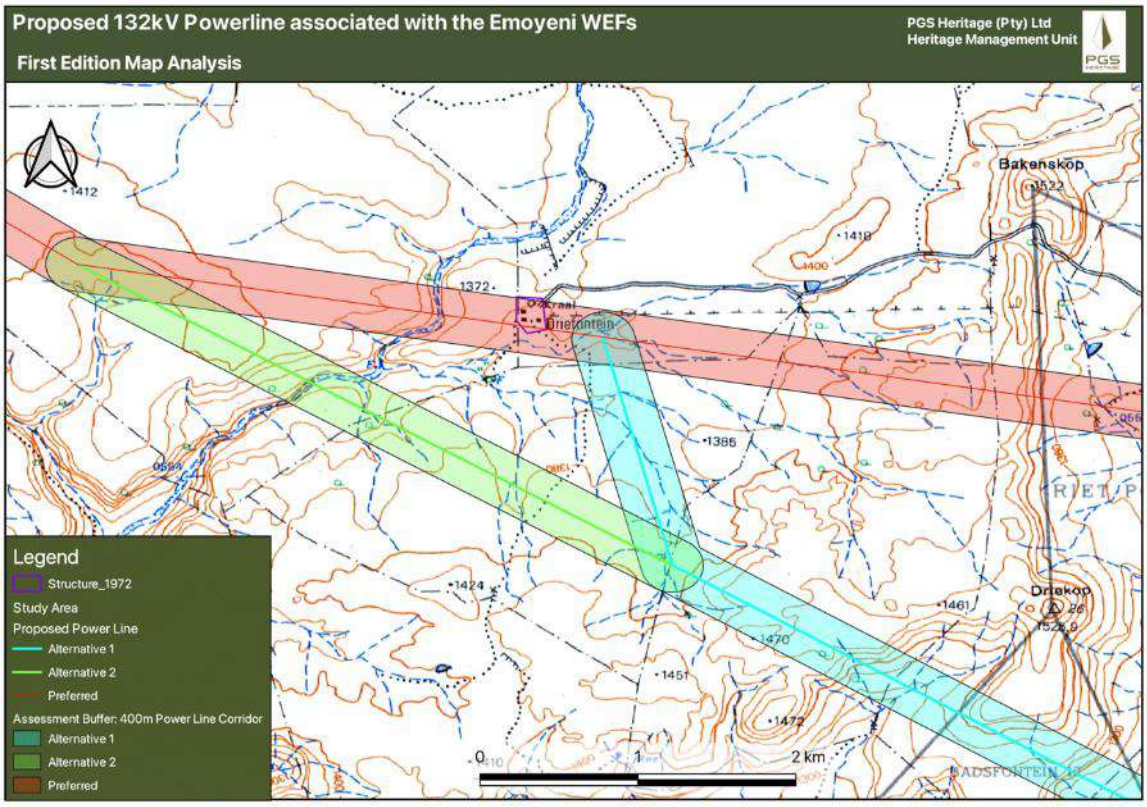


Figure 5.50. Enlarged section of 3123DA Ed 1 1972 sheet, depicting a farmstead (purple polygon) within the preferred power line corridor.

The following areas within the study area have been referenced as having possible heritage sensitivity:

Drainage lines/ Dry Water Courses:

Drainage lines, such as dry riverbeds, erosion dongas as well as sheet erosion has been shown to yield rich archaeological deposits due to the exposure of archaeological material as well as the fact that human settlement is drawn to water sources in arid regions (Kruger 2012; Orton 2012; PGS 2012).

Ridges/Outcrops:

Numerous ridges, koppies and mountains have been identified in the study area and are associated with human settlement and activity. Stonewalling from herders, rock engravings and knapping sites associated with Later Stone Age manufacturing technology is known to occur in these areas (Arthur, 2008, Kruger 2012; Orton 2012; PGS 2011 and 2012, Van Ryneveld 2008).

The fieldwork conducted for the evaluation of the possible impact of the 132kV grid connection and associated powerline infrastructure considering the three alternative powerline routes and access road within the larger assessment area has revealed the presence of thirteen (14) heritage resources.

These include:

- One (1) historical farmstead (PL_06) is located on the farm Driefontein and falls within the 400m wide assessment corridor. It is a multi-component site which provides evidence for the presence of both Stone Age and historic peoples within the landscape. The site comprises several elements, namely: stone tool surface scatters, historic structures (incl. kraals) and middens associated with the original farmstead, a historic burial ground, informal grave sites, a farm labourers' residence and a natural spring. The site was assessed as having high heritage significance with a Grade 3A rating.

- Four (4) structures (PL_02, PL_05, PL_08, PL_10) were rated as having low heritage significance/no heritage significance.
- Two (2) sites with rock engravings (K002, K003) were rated as having medium-low heritage significance.
- Five (5) lithic surface scatters (PL_01, PL_03, PL_04, PL_07, PL_09) were rated as having low heritage significance. These are primarily from the Middle Stone Age (MSA), although Later Stone Age (LSA) material was also identified. All these artefact assemblages occur in heavily deflated and eroded areas, so their scientific potential and heritage significance is somewhat lowered. Based on findings from a range of other heritage reports in the area, these types of sites are to be expected in this region.
- One (1) rock art site (PL_11) however it is located a considerable distance (>2km) from the proposed development area and will therefore not be impacted upon.
- One (1) small stone packed feature of unknown purpose and origin was rated as having low heritage significance along the proposed access road to the Ishwati switching station

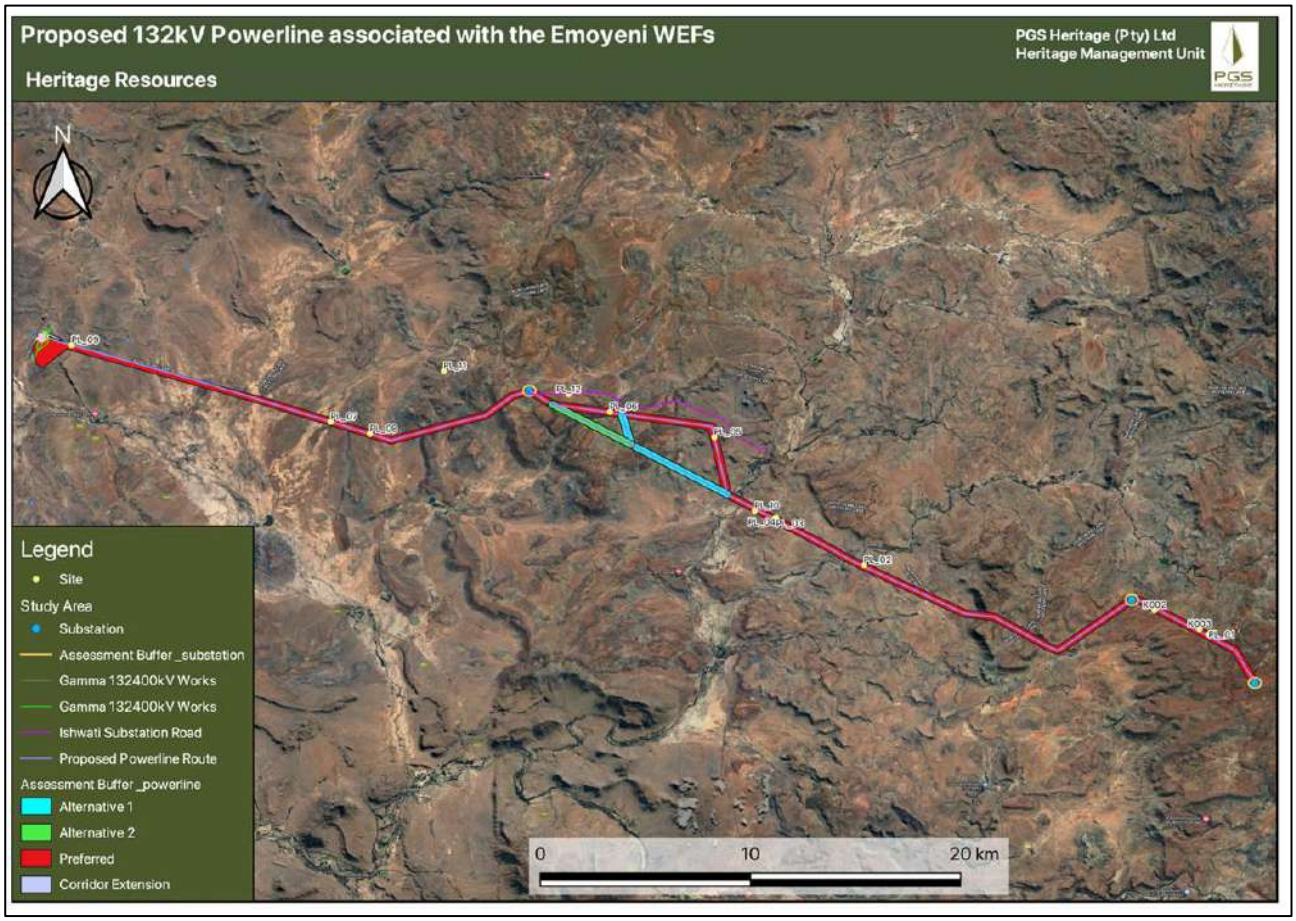


Figure 5.51. Satellite Image showing the finds ("sites") identified during the fieldwork

List of sites identified along the 400m wide development corridor:

Table 5.23. Heritage resources noted during the field assessment

Site Nr	Site Co-ordinates		Time Period	Brief Site Description	Grading	Heritage Significance
	x	y				
K002	23.97331525	-31.81708619	Historical Period	**Rock engravings** (cross-hatching) on several dolerite boulders in a mountainous region.	Grade 3 - B (IIIB) – Grade 3 - C (IIIC)	Medium - Low
K003	23.99597427	-31.82651667	Historical Period	**Rock engravings** (parallel lines) on several dolerite boulders in a flat-lying region.	Grade 3 - B (IIIB) – Grade 3 - C (IIIC)	Medium - Low
PL_01	24,00061528	-31,82932528	Stone Age	**Low Density Surface Scatter of MSA Lithics** located near the foot of a mountain. Hornfels flakes, blades, retouched flakes, rudimental scrapers and chips.	Grade 3 - C (IIIC)	Medium
PL_02	23,827	-31,79442	Historical Period	**Structure (ruin)** located near a non-perennial stream/river.	NCW	No research potential or other cultural significance
PL_03	23,7827731	-31,770724	Stone Age	**Low Density Surface Scatter of Lithics** located within a plain. 3 hornfels flakes.	NCW	No research potential or other cultural significance
PL_04	23,7823935	-31,770698	Stone Age	**Three lithics** and **one potsherd** (Khoekhoen) located within a deflated land surface. Hornfels scrapers (2) and core (1).	NCW	No research potential or other cultural significance
PL_05	23,751610182	-31,730035832	Historical Period	**Stone-packed dam wall** located near a non-perennial stream/river. Some sections of the wall have collapsed.	Grade 3 - C (IIIC)	Medium
PL_06	23,69912641	-31,71728888	Historical Period	**Historical homestead** located near the foot of a mountain and adjacent to a natural spring. Includes: stone tool surface scatters, historic structures (incl. kraals), historical middens, a historic burial ground, informal grave sites, and a farm labourers' residence. Additional information about the farmstead was obtained through communications with a local farmer. Pre-1850s, the original owners of the farmstead (surname: Tront) were established on the land and were living a very isolated life. They had to take a horse cart and travel a great distance to make contact with other farmers. Due to its isolation, Driefontein became one of the dwellings for the Boers during the Anglo-Boer war. The kloof in the region is referred to as Malan's Kloof as General Wynand Malan was operating from the area. The farm Leeufontein was also a hiding location for the Boers. Malan would use local farmers in the region as informants to pass on information about the British soldiers to him.	Grade 3 - A (IIIA)	High
PL_07	23,55846964	-31,722368083	Stone Age	**Low Density Surface Scatter of Lithics** located within a plain. 5 flakes (hornfels and silcrete).	NCW	No research potential or other cultural significance

Site Nr	Site Co-ordinates		Time Period	Brief Site Description	Grading	Heritage Significance
	x	y				
PL_08	23,57820459	-31,72842712	Historical Period	**Multiple Stone Kraals** and **scatter of glass, ceramic and metal fragments** located near the foot of a mountain.	Grade 3 - C (IIIC)	Low
PL_09	23,42794808	-31,68376756	Stone Age	**Medium to Low Density Surface Scatter of Lithics** located at foot of a hillock within a secondary context. Hornfels flakes, blades, retouched flakes, and chunks.	Grade 3 - C (IIIC)	Low
PL_10	23,77195637	-31,76706698	Historical Period	**Historical Structure (collapsed)** located on the bank of a non-perennial stream. No other material culture.	Grade_3_-_C (IIIC)	Low
PL_11	23,61533	-31,69678	Stone Age	**Rock art** (lines and a possible ostrich figure) within a rock-overhang. *Located outside of the current study area.	Grade_3_-_A (IIIA)	High
PL_12	23.67820	-31.70852	Historical Period/Recent	**Small stone packed feature** of unknown purpose and origin. No cultural material observed.	Grade 3 - C (IIIC)	Low

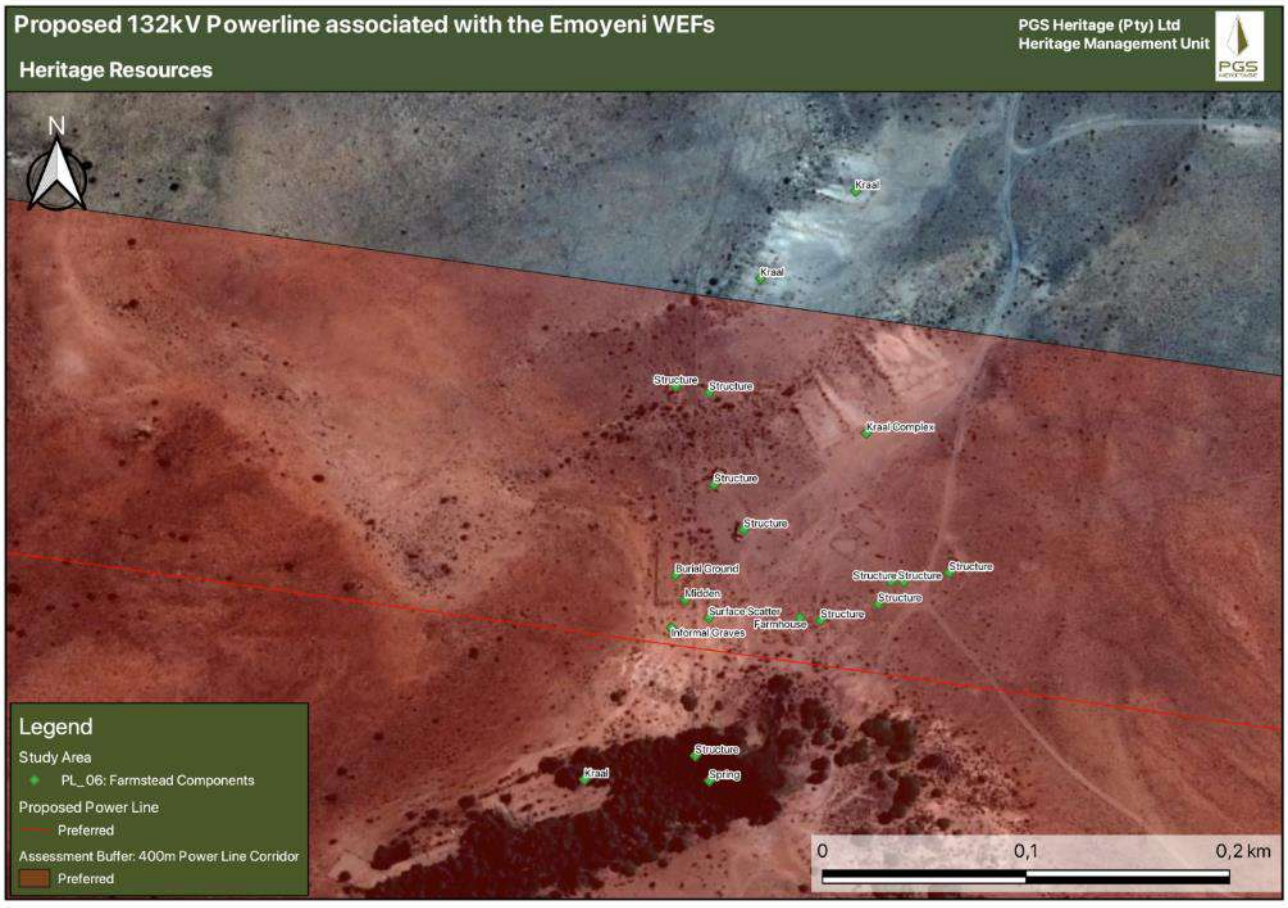


Figure 5.52. Overview of the historical farmstead located at PL_06

Owing to the location of the historical farmstead (PL_06) within the proposed 400m grid corridor, the "Preferred" and "Alternative 1" powerline routes are less preferred. If possible, "Alternative 2" should be considered from a heritage perspective. However, all three alternatives are acceptable subject to the recommended mitigation. The proposed development can be placed anywhere within the assessed corridors, provided that the delineated no-go areas are avoided, and the recommended mitigations are applied.

SECTION 6: ASSESSMENT OF IMPACTS

This section serves to assess the significance of the positive and negative environmental impacts (direct and indirect expected to be associated with the proposed 132kV Grid Connection Infrastructure, Associated Access Tracks & Water Ccourse Crossings within a 400m wide development corridor associated with the authorised Khangela and Umsinde Emoyeni Wind Energy Facilities. The proposed project will comprise the following key infrastructure and components:

- The establishment of a 132kV collector substation (switching station) within the authorised Umsinde Emoyeni WEF site (adjacent to the WEF facility substation) with a footprint of approximately 100m X 80m (~0.8ha) to be located within an assessment footprint that encompasses a 300m radius.
- The establishment of a 132kV collector substation (switching station) within the authorised Khangela Emoyeni WEF site (adjacent to the WEF facility substation) with a footprint of approximately 100m X 80m (~0.8ha) to be located within an assessment footprint that encompasses a 300m radius.
- The establishment of a 132kV collector substation (switching station) within the authorised Ishwati Emoyeni WEF site (adjacent to the WEF facility substation) with a footprint of approximately 120m X 100m (~1.2 ha) with an assessment footprint that encompasses a 300m radius.
- The establishment of a 132kV powerline within a 400m wide corridor that will extend from the Khangela switching station to the Ishwati switching station (~36km), and then onward for ~25km to the Eskom Gamma Substation. In addition, a further length of 132kV powerline (within a 400m wide corridor) will extend from the Umsinde switching station to the Khangela switching station for ~8km OR it may connect directly into the Khangela-Ishwati powerline at the Khangela switching station. An extended powerline development corridor of approximately 1.91 km^2 has been assessed in the vicinity of the Gamma Substation, that will enable the 132kV powerline to connect to either the south face of the Gamma Substation yard or approach from the east, depending on the available connection point at the time of connection. The 132kV Powerline from Umsinde to Khangela, and from Khangela to Ishwati and onward to Gamma Substation will be a single- or double-circuit overhead powerline, with a single set of pylons structures with a maximum height of 35m. Access/service tracks (jeep track) up to 7m wide and associated watercourse crossings will be associated with the powerline, and will be located within the assessed powerline corridor.
- The establishment of a new access road approximately 14km long from the existing public road from Richmond to the Ishwati switching station site. The proposed new access road will be unsealed and up to 12m wide during construction , but will be reduced to a maximum of 6 m width during operation

The full extent of the identified development areas was considered through the BA process by the independent specialists and the EAP through the review of existing information, desktop evaluations and field surveys.

The proposed infrastructure will comprise the following phases:

» ***Pre-Construction and Construction*** – will include pre-construction surveys; site preparation; establishment of access roads, laydown areas; construction of foundations involving excavations; the transportation of components/construction equipment to site, manoeuvring and operating vehicles for unloading and installation of equipment; and commissioning of new equipment and site rehabilitation. The construction phase for the various infrastructure is estimated to be ~24 months.

» ***Operation*** – will include the operation of the grid connection infrastructure, and other associated infrastructure. The operation phase is expected to be at least 20 years (with maintenance) which is aligned with the anticipated lifespan of the authorised Emoyeni WEFs. Depending on the economic viability of the Emoyeni WEFs, the length of the operation phase may be extended beyond a 20 year period.

» ***Decommissioning*** –At the end of the project's life, decommissioning will include site preparation, disassembling of the components, clearance of the relevant infrastructure within the grid connection infrastructure corridor, and rehabilitation.

Environmental issues associated with pre-construction, construction and decommissioning activities may include, among others, threats to biodiversity and ecological processes, including habitat alteration and impacts to fauna and flora, impacts to sites of heritage value, soil erosion and contamination of water and soils associated with spillages of hazardous materials and inappropriate storage, handling and disposal of waste. Impacts associated with decommissioning are expected to be similar to those associated with construction activities. However, in some instances some specialists have identified and assessed specific decommissioning impacts associated with the project, these impacts are assessed as separate impact tables where relevant below.

6.1 Legal Requirements as per the EIA Regulations, 2014 (as amended), for the undertaking of a Basic Assessment Report

This section of the BA Report includes the following information required in terms of Appendix 1:

Table 6.1 Content of the BA Report:

Requirement	Relevant Section
3(h)(v) the impacts and risks identified including the nature, significance, consequence, extent, duration and probability of the impacts, including the degree to which these impacts (aa) can be reversed, (bb) may cause irreplaceable loss of resources, and (cc) can be avoided, managed or mitigated.	The impacts and risks associated with the development of the grid connection infrastructure including the nature, significance, consequence, extent, duration and probability of the impacts and the degree to which the impact can be reversed and cause an irreplaceable loss of resources are included in **sections 6.2.,6.3., 6.4., 6.5., 6.6**.
3(h)(vii) positive and negative impacts that the proposed activity and alternatives will have on the environment and on the community that may be affected focusing on the geographical, physical, biological, social, economic, heritage and cultural aspects	The positive and negative impacts associated with the development of the 132kV Grid Connection Infrastructure, Associated Access Tracks & Water Course Crossings within a 400m wide development corridor including the access road to the Ishwati switching station are included in **sections 6.2.,6.3., 6.4., 6.5., 6.6**.
3(h)(viii) the possible mitigation measures that could be applied and the level of residual risk.	The mitigation measures that can be applied to the impacts associated with the 132kV Grid Connection Infrastructure, Associated Access Tracks & Water Course Crossings within a 400m wide development corridor including the access road to the Ishwati switching station are included in **sections 6.2.,6.3., 6.4., 6.5. 6.6**.
3(i) a full description of the process undertaken to identify, assess and rank the impacts the activity will impose on the preferred location through the life of the activity, including (i) a description of all environmental issues and risks that were identified during the environmental impact assessment process and (ii) an assessment of the significance of each issue and risk and an indication of the extent to which the issue and risk could be avoided or addressed by the adoption of mitigation measures.	A description of all environmental impacts identified for the 132kV Grid Connection Infrastructure, Associated Access Tracks & Water Ccourse Crossings within a 400m wide development corridor including the access road to the Ishwati switching station during the BA process, and the extent to which the impact significance can be reduced through the implementation of the recommended mitigation measures provided by the specialists are included in **sections 6.2.,6.3., 6.4., 6.5., 6.6**.
3(j) an assessment of each identified potentially significant impact and risk, including (i) cumulative impacts, (ii) the nature, significance and consequences of the impact and risk, (iii) the extent and duration of the impact and risk, (iv) the probability of the impact and risk occurring, (v) the degree to which the impact and risk can be reversed, (vi) the degree to which the impact and risk may cause irreplaceable loss of resources and, (vii) the degree to which the impact and risk can be avoided, managed or mitigated.	An assessment of each impact associated with the development of 132kV Grid Connection Infrastructure, Associated Access Tracks & Water Ccourse Crossings within a 400m wide development corridor including the access road to the Ishwati switching station , including the nature and significance, the extent and duration, the probability, the reversibility, and the potential loss of irreplaceable resources, as well as the degree to which the significance of the impacts can be mitigated are included in **sections 6.2.,6.3., 6.4., 6.5., 6.6.**

Requirement	Relevant Section
3(m) based on the assessment, and where applicable, impact management measures from specialist reports, the recording of the proposed impact management outcomes for the development for inclusion in the EMPr.	Mitigation measures recommended by the various specialists for the reduction of the impact significance are included in **sections 6.2.,6.3., 6.4., 6.5., 6.6**.

6.2 Assessment of Impacts on Ecology (Fauna and Flora)

The development and operation of the 132kV Grid Connection Infrastructure, Associated Access Tracks & Water Ccourse Crossings within a 400m wide development corridor and the access road to the Ishwati switching station for the Emoyeni Wind Energy Facilities will have an impact on the ecological resources identified within the development area. These resources include vegetation, protected and listed plant species; fauna; habitat; conservation and broad-scale ecological processes.

A summary of the ecological impacts identified and the significance thereof for the proposed development are included below. Refer to Appendix D for more detail.

6.2.1. Results of the Ecological Impact Assessment

Anthropogenic activities drive habitat destruction causing displacement of fauna and flora and possibly direct mortality. Land clearing destroys local wildlife habitat and can lead to the loss of local breeding grounds, nesting sites and wildlife movement corridors such as rivers, streams and drainage lines, or other locally important features. The removal of natural vegetation may reduce the habitat available for fauna species and may reduce animal populations and species compositions within the area.

Potential impacts were evaluated against the data captured during the desktop and field assessment to identify relevance to the project area. The relevant impacts associated with the proposed construction and operation of the development were then subjected to a prescribed impact assessment method. Impacts were assessed in terms of the construction and operational phases. The operational phase refers to that phase of the project where the construction has been completed. The development is set to be long lasting, and a closure phase was not assessed for that reason. Mitigation measures were only applied to impacts deemed relevant based on the impact analysis.

6.2.2. Description of Ecological Impacts

Considering the anthropogenic activities and influences within the landscape, several negative impacts to biodiversity were expected to occur within the assessment area. These include:

- Loss of rocky outcrop (and dolerite outcrop) habitat;
- Loss of wash (wetland) and riparian areas
- Degradation of surrounding highly sensitvity habitats
- Encroachment of alien invasive species In disturbed areas
- Direct mortality of fauna
- Emigration of fauna

Without mitigation, the current proposed layout of the activity may result in the irreplaceable loss of;

- A part of a Critical Biodiversity Area (CBA);
- Protected plant species.

Impacts were assessed for the following activities:

1) Construction Phase
    a. Switching stations
    b. Powerline
        i. Preferred alternative
        ii. Alternative 1
        iii. Alternative 2

2) Operational Phase
    a. Switching stations
    b. Powerline
        i. Preferred alternative
        ii. Alternative 1
        iii. Alternative 2

6.2.3. Assessment of Potential Impacts

Construction Phase Impacts

Impacts to biodiversity associated with the proposed construction phase: Loss of vegetation within the development footprint (132 kV line and switching stations, access tracks).

Nature: *Loss of vegetation within the development footprint* *Destruction, further loss and fragmentation of the habitats, ecosystems and vegetation community, including protected species.*		
	Without mitigation	**With mitigation**
Extent	High (4)	High (4)
Duration	Permanent (5)	Long-term (4)
Magnitude	Moderate (6)	Low (4)
Probability	Definite (5)	Probable (3)
Significance	***High***	***Medium***
Status (positive or negative)	Negative	Negative
Reversibility	Low	Low
Irreplaceable loss of resources?	Yes	No
Can impacts be mitigated?	Yes	
Mitigation: » See Biodiversity Management Outcomes as per the Terrestrial Ecology report.		
Residual Impacts: » The loss of currently intact vegetation is an unavoidable consequence of the project and cannot be entirely mitigated. The residual impact would however be low.		

Impacts to biodiversity associated with the proposed construction phase: Loss of vegetation within the development footprint (Preferred alternative).

Nature: *Loss of vegetation within the development footprint* *Destruction, further loss and fragmentation of the habitats, ecosystems and vegetation community, including protected species.*		
	Without mitigation	**With mitigation**

Extent	High (4)	High (4)
Duration	Permanent (5)	Long-term (4)
Magnitude	Moderate (6)	Low (4)
Probability	Definite (5)	Probable (3)
Significance	***High***	***Medium***
Status (positive or negative)	Negative	Negative
Reversibility	Low	Low
Irreplaceable loss of resources?	Yes	No
Can impacts be mitigated?	Yes	
Mitigation: » See Biodiversity Management Outcomes as per the Terrestrial Ecology report.		
Residual Impacts: » The loss of currently intact vegetation is an unavoidable consequence of the project and cannot be entirely mitigated. The residual impact would however be low.		

Impacts to biodiversity associated with the proposed construction phase: Loss of vegetation within the development footprint (Alternative 1).

Nature: Loss of vegetation within the development footprint Destruction, further loss and fragmentation of the habitats, ecosystems and vegetation community, including protected species.		
	Without mitigation	**With mitigation**
Extent	High (4)	High (4)
Duration	Permanent (5)	Long term (4)
Magnitude	Moderate (6)	Low (4)
Probability	Definite (5)	Probable
Significance	***High***	***Medium***
Status (positive or negative)	Negative	Negative
Reversibility	Low	Low
Irreplaceable loss of resources?	Yes	No
Can impacts be mitigated?	Yes	
Mitigation: » See Biodiversity Management Outcomes as per the Terrestrial Ecology report.		
Residual Impacts: » The loss of currently intact vegetation is an unavoidable consequence of the project and cannot be entirely mitigated. The residual impact would however be low.		

Impacts to biodiversity associated with the proposed construction phase: Loss of vegetation within the development footprint (Alternative 2).

Nature: Loss of vegetation within the development footprint Destruction, further loss and fragmentation of the habitats, ecosystems and vegetation community, including protected species.		
	Without mitigation	**With mitigation**
Extent	High (4)	High (4)
Duration	Permanent (5)	Long-term (4)
Magnitude	Moderate (6)	Low (4)

Probability	Definite (5)	Probable (3)
Significance	***High***	***Medium***
Status (positive or negative)	Negative	Negative
Reversibility	Low	Low
Irreplaceable loss of resources?	Yes	No
Can impacts be mitigated?	Yes	
Mitigation: » See Biodiversity Management Outcomes as per the Terrestrial Ecology report.		
Residual Impacts: » The loss of currently intact vegetation is an unavoidable consequence of the project and cannot be entirely mitigated. The residual impact would however be low.		

Impacts to biodiversity associated with the proposed construction phase: Introduction of alien species, especially plants (Construction of all infrastructure, all options).

Nature: Introduction of alien species, especially plants Degradation and loss of surrounding natural vegetation arising from construction activities.		
	Without mitigation	**With mitigation**
Extent	High (4)	Low (2)
Duration	Long term (4)	Short-term (2)
Magnitude	Low (4)	Minor (2)
Probability	Probable (3)	Probable (3)
Significance	***Medium***	***Low***
Status (positive or negative)	Negative	Negative
Reversibility	Low	Low
Irreplaceable loss of resources?	Yes	No
Can impacts be mitigated?	Yes	
Mitigation: » See Biodiversity Management Outcomes as per the Terrestrial Ecology report.		
Residual Impacts: » Long-term broad scale AIP infestation if not mitigated.		

Impacts to biodiversity associated with the proposed construction phase: Destruction of Protected Plant Species (Construction of 132 kV line and switching stations, access tracks)

Nature: Destruction of protected plant species Loss of protected plant species, these are mainly provincially protected species		
	Without mitigation	**With mitigation**
Extent	High (4)	Moderate (3)
Duration	Permanent (5)	Moderate-term (3)
Magnitude	High (8)	Low (4)
Probability	High probable (4)	Probable (3)
Significance	***High***	***Medium***
Status (positive or negative)	Negative	Negative
Reversibility	Low	Low

Irreplaceable loss of resources?	Yes	No
Can impacts be mitigated?	Yes	
Mitigation: » See Biodiversity Management Outcomes as per the Terrestrial Ecology report.		
Residual Impacts: » The loss of some of the protected species are unavoidable.		

Impacts to biodiversity associated with the proposed construction phase: Destruction of Protected Plant Species (Preferred alternative)

Nature: Destruction of protected plant species Loss of protected plant species, these are mainly provincially protected species		
	Without mitigation	**With mitigation**
Extent	High (4)	Moderate (3)
Duration	Permanent (5)	Moderate-term (3)
Magnitude	High (8)	Low (4)
Probability	High probable (4)	Probable (3)
Significance	***High***	***Medium***
Status (positive or negative)	Negative	Negative
Reversibility	Low	Low
Irreplaceable loss of resources?	Yes	No
Can impacts be mitigated?	Yes	
Mitigation: » See Biodiversity Management Outcomes as per the Terrestrial Ecology report.		
Residual Impacts: » The loss of some of the protected species are unavoidable.		

Impacts to biodiversity associated with the proposed construction phase: Destruction of Protected Plant Species (Alternative 1)

Nature: Destruction of protected plant species Loss of protected plant species, these are mainly provincially protected species		
	Without mitigation	**With mitigation**
Extent	High (4)	Moderate (3)
Duration	Permanent (5)	Moderate-term (3)
Magnitude	High (8)	Low (4)
Probability	High probable (4)	Probable (3)
Significance	***High***	***Medium***
Status (positive or negative)	Negative	Negative
Reversibility	Low	Low
Irreplaceable loss of resources?	Yes	No
Can impacts be mitigated?	Yes	
Mitigation: » See Biodiversity Management Outcomes as per the Terrestrial Ecology report.		
Residual Impacts: » The loss of some of the protected species are unavoidable.		

Impacts to biodiversity associated with the proposed construction phase: Destruction of Protected Plant Species (Alternative 2)

Nature: Destruction of protected plant species Loss of protected plant species, these are mainly provincially protected species		
	Without mitigation	**With mitigation**
Extent	High (4)	Moderate (3)
Duration	Permanent (5)	Moderate-term (3)
Magnitude	High (8)	Low (4)
Probability	High probable (4)	Probable (3)
Significance	***High***	***Medium***
Status (positive or negative)	Negative	Negative
Reversibility	Low	Low
Irreplaceable loss of resources?	Yes	No
Can impacts be mitigated?	Yes	
Mitigation: » See Biodiversity Management Outcomes as per the Terrestrial Ecology report.		
Residual Impacts: » The loss of some of the protected species are unavoidable.		

Impacts to biodiversity associated with the proposed construction phase: Displacement of faunal community (Construction of all infrastructure, all alternatives)

Nature: Displacement of faunal communities due to habitat loss, direct mortalities and disturbance Construction activity may lead to direct mortality of fauna due to earthworks, vehicle collisions, accidental hazardous chemical spills and persecution. Disturbance due to dust and noise pollution and vibration may disrupt behaviour.		
	Without mitigation	**With mitigation**
Extent	High (4)	Moderate (3)
Duration	Moderate term (3)	Short-term (2)
Magnitude	Moderate (6)	Low (4)
Probability	High probable (4)	Probable (3)
Significance	***Medium***	***Low***
Status (positive or negative)	Negative	Negative
Reversibility	Low	Low
Irreplaceable loss of resources?	Yes	No
Can impacts be mitigated?	Yes, to some extent. Noise and disturbance cannot be well mitigated. Impacts on fauna due to human presence, such as vehicle collisions, poaching, and persecution can be mitigated.	
Mitigation: » See Biodiversity Management Outcomes as per the Terrestrial Ecology report.		
Residual Impacts: » It is probable that some individuals of susceptible species will be lost to construction-related activities despite mitigation. However, this is not likely to impact the viability of the local population of any fauna species		

Operational Phase

It is anticipated that daily activities associated with the operation phase may lead to further spread the AIP, as well as the deterioration of the habitats due to the increase of dust and edge effect impacts. Dust reduces the ability of plants to photosynthesize and thus leads to degradation/retrogression of the veld. Moving maintenance vehicles do not only cause sensory disturbances to fauna, affecting their life cycles and movement, but may lead to direct mortalities due to collisions.

The following potential impacts were considered:

- Continued fragmentation and degradation of habitats and ecosystems;
- Spread of alien and/or invasive species;
- Ongoing displacement and direct mortalities of faunal community (including SCC) due to disturbance (road collisions, collisions with substation, noise, light, dust, vibration);

Impacts to biodiversity associated with the proposed operational phase: Continued fragmentation and degradation of habitats and ecosystems (Operation of all infrastructure, all options).

Nature: Continued fragmentation and degradation of habitats and ecosystems Disturbance created during the construction phase will leave the project area vulnerable to erosion and AIP encroachment		
	Without mitigation	**With mitigation**
Extent	High (4)	Moderate (3)
Duration	Permanent (5)	Moderate-term (3)
Magnitude	High (8)	Low (4)
Probability	High probable (4)	Improbable (2)
Significance	***High***	***Low***
Status (positive or negative)	Negative	Negative
Reversibility	Low	Low
Irreplaceable loss of resources?	Yes	No
Can impacts be mitigated?	Yes, with proper management and avoidance, this impact can be mitigated to a low level	
Mitigation: » See Biodiversity Management Outcomes as per the Terrestrial Ecology report.		
Residual Impacts: » There is still some potential for erosion and AIP encroachment even with the implementation of control measures. Impacts will however be low with the implementation of control measures.		

Impacts to biodiversity associated with the proposed operational phase: Spread of alien and/or invasive species (Operation of all infrastructure, all options).

Nature: Spread of alien and/or invasive species Degradation and loss of surrounding natural vegetation		
	Without mitigation	**With mitigation**
Extent	High (4)	Low (2)
Duration	Long term (4)	Short-term (2)
Magnitude	Moderate (6)	Minor (2)

Probability	High probable (4)	Improbable (2)
Significance	***Medium***	***Low***
Status (positive or negative)	Negative	Negative
Reversibility	Low	Low
Irreplaceable loss of resources?	Yes	No
Can impacts be mitigated?	Yes	
Mitigation: » See Biodiversity Management Outcomes as per the Terrestrial Ecology report.		
Residual Impacts: » Long term broad scale AIP infestation if not mitigated..		

Impacts to biodiversity associated with the proposed operational phase: Ongoing displacement and direct mortalities of faunal community (Operation of switching stations and 132 kV line)

Nature: Ongoing displacement and direct mortalities of faunal community (including SCC) due to disturbance (road collisions, collisions with infrastructure, noise, light, dust, vibration) The operation and maintenance of the proposed development may lead to disturbance or persecution of fauna in the vicinity of the development.		
	Without mitigation	**With mitigation**
Extent	High (4)	Low (2)
Duration	Long term (4)	Short-term (2)
Magnitude	High (8)	Low (4)
Probability	High probable (4)	Improbable (2)
Significance	***High***	***Low***
Status (positive or negative)	Negative	Negative
Reversibility	Low	Low
Irreplaceable loss of resources?	Yes	No
Can impacts be mitigated?	Yes	
Mitigation: » See Biodiversity Management Outcomes as per the Terrestrial Ecology report.		
Residual Impacts: » Disturbance from maintenance activities will occur albeit at a low and infrequent level. » Less migratory species will be found in the area. » Road killings are still a possibility. » Migratory routes of fauna may change, fauna and flora species composition may change		

Impacts to biodiversity associated with the proposed operational phase: Ongoing displacement and direct mortalities of faunal community (Operation of switching stations and 132 kV line)

Nature: Ongoing displacement and direct mortalities of faunal community (including SCC) due to disturbance (road collisions, collisions with infrastructure, noise, light, dust, vibration) The operation and maintenance of the proposed development may lead to disturbance or persecution of fauna in the vicinity of the development.		
	Without mitigation	**With mitigation**
Extent	High (4)	Low (2)
Duration	Long term (4)	Short-term (2)

Magnitude	High (8)	Low (4)
Probability	High probable (4)	Improbable (2)
Significance	***High***	***Low***
Status (positive or negative)	Negative	Negative
Reversibility	Low	Low
Irreplaceable loss of resources?	Yes	No
Can impacts be mitigated?	Yes	
Mitigation: » See Biodiversity Management Outcomes as per the Terrestrial Ecology report.		
Residual Impacts: » Disturbance from maintenance activities will occur albeit at a low and infrequent level. » Less migratory species will be found in the area. » Road killings are still a possibility. » Migratory routes of fauna may change, fauna and flora species composition may change		

6.2.4. Implications for Project Implementation

Based on the habitat present, there is a high likelihood of select SCC occurring within the assessment area. Several plant Species of Conservation Concern that are provincially protected were recorded from the study area. Permits will be required for the trimming, removal or relocation of any such species from the provincial authorities.

The ecosystems on site were still natural to largely natural based on the diversity of species recorded, and the habitat physiognomy. The current natural ecosystems provide important ecosystem services including water regulation and pollination. However, certain areas are degraded due to overgrazing and erosion were still nevertheless functional. The findings of the field survey are therefore congruent with the screening tool.

Areas of rocky outcrops delineated as assigned an SEI of "Very High" sensitivity are considered no go areas and may be used for construction only if no other alternative is possible and construction in these areas is unavoidable. Where possible these areas should be spanned by overheard powerlines but no construction infrastructure is to be placed in these areas, including access tracks. Personnel are not to use these areas for any reason (to prevent additional erosion, loss of fauna and flora etc.).

Based on the provided options for the proposed 132kV line:

1) Preferred alternative
2) Alternative 1
3) Alternative 2

The option with the least impacts is the preferred alternative, or alternative 2, although only marginally as they traverse slightly less high SEI areas than alternative 1. As many of the Very High SEI areas should be avoided as possible. The preferred alternative is therefore considered the most acceptable option.

The main impacts expected from the proposed activity are the loss of CBA areas, degradation and further fragmentation of surrounding natural habitats, the direct mortality of fauna and avifauna species and the emigration of fauna SCC due to disturbance.

Considering the above-mentioned information, the proposed development will result in the in the destruction of some functional habitats. It is the opinion of the specialist that the proposed activities can go ahead provided areas of high to very high SEI are avoided as far as practicable, and control

of introduced alien invasive plants, as well as erosion mitigation is implemented. All Biodiversity Management Objectives provided in the Terrestrial Ecology Report (**Appendix D)** and mitigation measures provided in other supporting specialist reports must be implemented. It is the specialists opinion that the placement of infrastructure anywhere within the assessed corridors is considered acceptable, subject to the mitigation measures specified in this report and subject to the minimisation of the disturbance within high SEI areas as far as possible. Additionally, it is also recommended that the substation access road should avoid crossing the EN river and riparian zone as far as possible. It would be preferable to construct the access road follow the already existing section of farm road that already crosses the river, to minimise further habitat fragmentation.

6.3 Assessment of Impacts on Avifauna

6.3.1. Results of the Avifauna Impact Assessment

During the field assessment 99 bird species were recorded of these eight of the species recorded were Species of Conservation Concern (SCCs) on a national or international scale. Blue Crane (*Grus paradisea*), Karoo Korhaan (*Eupodotis vigorsii*), Kori Bustard (*Ardeotis kori),* Ludwigs Bustard (*Neotis ludwigii*), Martial Eagle (*Polemaetus bellicosus),* Secretary bird (*Sagittarius serpentarius*), Verreauxs Eagle (*Aquila verreauxii*), and Lanner Falcon (*Falco biarmicus*) were the SCCs recorded. One nest of a Verreauxs Eagle was found close to the Gamma substation in an existing 400kV powerline, while an additional two nests' locations were provided by local farmers. The high number of SCCs present increases the overall sensitivity of the area and is the reason for the powerline corridor mainly being made up of Very-High and High sensitivity areas. The straight approach (from the east) of the powerline at the Gamma station is the preferred, the southern approach is acceptable should all the mitigations be implemented.

The principle impacts of the operational phase are electrocution and collisions due to the powerlines. The impact of electrocutions were rated as High pre-mitigations and Low post- mitigations, while the collisions were rated as High pre-mitigations but were still high even after the implementation of mitigations. Mitigations in this instance would be the installation of bird diverters. The reason for the High post mitigation rating is because of the high number and density of SCCs recorded in the area. The development falls in a previously authorised WEF PAOI along with previously authorised powerlines. Therefore, even though the project intersects some areas of very high sensitivity it is not regarded as a fatal flaw based on the previous assessments and their findings and recommendations.

6.3.2. Description of Avifaunal Impacts

The following potential main impacts on avifauna were considered for the construction phase of the proposed development. This phase refers to the period during construction when the proposed features are constructed; and is considered to have the largest direct impact on biodiversity. The following potential impacts to terrestrial biodiversity were considered:

- Displacement of avifauna communities due to habitat loss, direct mortalities and disturbance (road collisions, noise, dust, vibration and poaching);
- Collection of eggs, nest destruction and poaching
- Collisions with powerlines and connection lines and fences; and
- Electrocution by powerline.

It is anticipated that daily activities associated with the operation phase will lead to the deterioration of the habitats due to the increase of dust and edge effect impacts. Moving maintenance vehicles do not only cause sensory disturbances to fauna, affecting their life cycles and movement, but may lead to direct mortalities due to collisions.

- The following potential impacts were considered:
- Continued fragmentation and degradation of habitats and ecosystems;
- Spread of alien and/or invasive species;

- Ongoing displacement and direct mortalities of faunal community (including SCC) due to disturbance (road collisions, collisions with substation, noise, light, dust, vibration);
- Collisions with powerlines and connection lines and fences; and
- Electrocution by powerline.

6.3.3. Assessment of Potential Impacts

Construction Phase Impacts

Impacts to biodiversity associated with the proposed construction phase: Displacement of faunal community (Construction of all infrastructure, all alternatives)

Nature: *Displacement of avifauna communities due to habitat loss, direct mortalities and disturbance* Construction activity may lead to direct mortality of fauna due to earthworks, vehicle collisions, accidental hazardous chemical spills and persecution. Disturbance due to dust and noise pollution and vibration may disrupt behaviour.		
	Without mitigation	**With mitigation**
Extent	High (4)	Moderate (3)
Duration	Moderate term (3)	Short term (2)
Magnitude	Moderate (6)	Low (4)
Probability	Highly probable (4)	Probable (3)
Significance	**Medium**	**Low**
Status (positive or negative)	Negative	Negative
Reversibility	Low	Low
Irreplaceable loss of resources?	Yes	No
Can impacts be mitigated?	Yes, to some extent. Noise and disturbance cannot be well mitigated. Impacts on fauna due to human presence, such as vehicle collisions, poaching, and persecution can be mitigated.	
Mitigation: » See Biodiversity Management Outcomes as per the Terrestrial Ecology report.		
Residual Impacts: » It is probable that some individuals of susceptible species will be lost to construction-related activities despite mitigation. However, this is not likely to impact the viability of the local population of any fauna species.		

Impacts to avifauna associated with the proposed construction phase: Collection of eggs, nest destruction and poaching (Construction of all infrastructure, all options).

Nature: Poaching Collection of eggs, nest destruction and poaching		
	Without mitigation	**With mitigation**
Extent	High (4)	Low (2)
Duration	Long term (3)	Short term (2)
Magnitude	Moderate (6)	Low (4)
Probability	Highly probable (4)	Improbable)2)
Significance	**Medium**	**Low**
Status (positive or negative)	Negative	Negative
Reversibility	Low	Low

Irreplaceable loss of resources?	Yes	No
Can impacts be mitigated?	Yes	

Mitigation:

- All personnel should undergo environmental induction with regards to avifauna and in particular awareness about not harming, collecting or hunting terrestrial species (e.g. guineafowl, francolin), and owls, which are often pFersecuted out of superstition.
- Signs must be put up stating that should any person be found poaching any species they will be fined and/or subject to strict disciplinary action.
- Construction must take place in the winter months as far as possible. If this is not possible then an area of 500m surrounding the Black Eagle nest must be avoided and development in this area should be restricted to the winter months.

Residual Impacts:

- There is a possibility that the eggs to be poached could be that of an SCC with decreasing numbers

Operation Phase Impacts

Impacts to biodiversity associated with the proposed operational phase: Ongoing displacement and direct mortalities of faunal community (Operation of switching stations and 132 kV line)

Nature: Ongoing displacement and direct mortalities of faunal community (including SCC) due to disturbance (road collisions, collisions with infrastructure, noise, light, dust, vibration)
The operation and maintenance of the proposed development may lead to disturbance or persecution of fauna in the vicinity of the development.

	Without mitigation	**With mitigation**
Extent	High (4)	Low (2)
Duration	Long term (4)	Short term (4)
Magnitude	High (8)	Low (4)
Probability	Highly probable (4)	Improbable (2)
Significance	**High**	**Low**
Status (positive or negative)	Negative	Negative
Reversibility	Low	Low
Irreplaceable loss of resources?	Yes	No
Can impacts be mitigated?	Yes	

Mitigation:

- See Biodiversity Management Outcomes as per the Terrestrial Ecology report.

Residual Impacts:

- Disturbance from maintenance activities will occur albeit at a low and infrequent level.
- Less migratory species will be found in the area.
- Road killings are still a possibility.
- Migratory routes of fauna may change, fauna and flora species composition may change.

Impacts to biodiversity associated with the proposed operational phase: Collisions with powerlines, connection lines and fences (all alternatives).

Nature: *Collisions with powerlines and connection lines*
The powerlines and connections create a collision risk to avifauna.

	Without mitigation	**With mitigation**
Extent	High (4)	High (4)
Duration	Permanent (5)	Long term (4)
Magnitude	Very high (10)	High (8)

Probability	Highly probable (4)	Highly Probable (4)
Significance	**High**	**High**
Status (positive or negative)	Negative	Negative
Reversibility	None	None
Irreplaceable loss of resources?	Yes	No
Can impacts be mitigated?	Yes	

Mitigation:

» Infrastructure should be consolidated where possible in order to minimise the amount of ground and air space used. The preferred option would be the direct approach to the Gamma MTS (i.e from the east). Should this not be possible the 132kV powerline should be routed as close as possible to the existing 400kV OHLs near Gamma MTS (should the 132kV OHL run parallel to the 400kV OHLs), and should traverse the existing 400 kV OHLs as close to perpendicular as is feasible, to limit the length of the 132kV span between the existing 400kV OHLs.

» Powerlines must be marked with industry standard (at the time of construction) bird flight diverters, this must be done for the extent of the line at 5 m intervals

» The design of the proposed line must be as per Birdlife specifications and Eskom Guidelines.

Residual Impacts:

» Some collisions of avifauna might still occur regardless of mitigation.

Impacts to biodiversity associated with the proposed operational phase: Electrocution by Powerline (all alternatives)

Nature: Electrocution by powerline

	Without mitigation	**With mitigation**
Extent	High (4)	High (4)
Duration	Long term (4)	Long term (4)
Magnitude	High (8)	Moderate (6)
Probability	Highly probable (4)	Improbable (2)
Significance	**High**	**Low**
Status (positive or negative)	Negative	Negative
Reversibility	Low	Low
Irreplaceable loss of resources?	Yes	No
Can impacts be mitigated?	Yes	

Mitigation:

» Ensure that monitoring is sufficiently frequent (preferably monthly for the first year, followed by quarterly thereafter for a further year) to detect electrocutions reliably and that any areas on the powerline along which electrocutions of birds occurred are repaired as soon as possible.

» During the first year of operation, quarterly reports summarizing interim findings should be complied by the owner of the powerlines and submitted to BirdLife South Africa. If the findings indicate that electrocutions have not occurred or are minimal with no red-listed species, an annual report can be submitted.

» Any carcasses found beneath power lines should be reported to the Eskom / EWT Incident Reporting Hotline (0860 111 535, email wep@ewt.org.za)

» The design of the proposed grid connection infrastructure must be of a type or similar structure as endorsed by the Eskom-EWT Strategic Partnership on Birds and Energy, considering the mitigation guidelines recommended by Birdlife South Africa.

» Infrastructure should be consolidated where possible/practical in order to minimise the amount of ground and air space used.

» Birdlife Verreauxs Eagle and Windfarm guidelines (2017) must be followed to the extent applicable to the grid connection and related infrastructure.

Residual Impacts:

» Electrocutions might still occur regardless of mitigations.

6.3.4. Implication of Project Implementation

During the field assessment 99 bird species were recorded of these eight of the species recorded were SCCs on a national or international scale. Blue Crane (Grus paradisea), Karoo Korhaan (Eupodotis vigorsii), Kori Bustard (Ardeotis kori), Ludwigs Bustard (Neotis ludwigii), Martial Eagle (Polemaetus bellicosus), Secretary bird (Sagittarius serpentarius), Verreauxs Eagle (Aquila verreauxii), and Lanner Falcon (Falco biarmicus) were the SCCs recorded. One nest of a Verreauxs Eagle was found close to the Gamma substation in an existing 400kV powerline, while an additional two nests' locations were provided by local farmers. The high number of SCCs present increases the overall sensitivity of the area and is the reason for the powerline corridor mainly being made up of Very-High and High sensitivity areas. The straight approach of the powerline at the Gamma station is the preferred option, the southern approach is acceptable should all the mitigations be implemented.

The principle impacts of the operational phase are electrocution and collisions due to the powerlines. The impact of electrocutions were rated as High pre-mitigations and Low post- mitigations, while the collisions were rated as High pre-mitigations but were still high even after the implementation of mitigations. Mitigations in this instance would be the installation of bird diverters. The reason for the High post mitigation rating is because of the high number and density of SCCs recorded in the area. The development falls in a previously authorised WEF PAOI along with previously authorised powerlines. Therefore, even though the project intersects with some areas of very high sensitivity it is not regarded as a fatal flaw based on the previous assessments and their findings and recommendations.

Should the development be authorised avifaunal SCC monitoring must be done to determine the effect of the development on these species, this would also allow for more available data for future projects.

- Monitoring must be done for 2 consecutive years during or after construction depending on the total length of construction. Based on the results, monitoring can then be ceased or must continue based on the recommendations of the assessment. Monitoring must include the walking of the lines monthly for the first year, followed by quarterly thereafter for a further year to determine the bird strikes present. Monitoring must be conducted as per the guidelines specified in the Species Protocols (2020). The information obtained from the monitoring must be shared with the large terrestrial birds programme of Birdlife (https://www.birdlife.org.za/what-we-do/landscape-conservation/meet-the-team/). Any carcasses found beneath power lines should be reported to the Eskom / EWT Incident Reporting Hotline (0860 111 535, email wep@ewt.org.za)

The proposed development will result in the in the destruction of some functional habitats. It is the opinion of the specialist that the proposed activities can go ahead provided areas of high to very high SEI are avoided as far as practicable, and control of introduced alien invasive plants, as well as erosion mitigation is implemented. All Biodiversity Management Objectives provided in the Terrestrial Ecology & Avifauna Report (Appendix D) and mitigation measures provided in other supporting specialist reports must be implemented It is the opinion of the specialist that the development corridor (all alternatives) and associated access roads can proceed provided that the mitigation measure and recommendation as per the Terrestrial Ecology and Avifauna Report are included in the EMPr and implemented for the proposed development.

6.4 Assessment of Impacts on Aquatic Resources

6.4.1. Results of the Aquatic Resources Impact Assessment

A variety of risks have been identified for the proposed project for both the construction and operational phase. These include small scale drainage patterns change; isolated removal of embankment vegetation areas for select roads; operation of equipment and machinery outside riparian areas; soil and building material stockpile management; domestic and industrial waste; storage of chemicals, mixes and fuel and final landscaping and post-construction rehabilitation for the construction phase of the project as well as alteration of surface drainage and runoff; storm water management; operation of transmission line and substation; establishment of alien plants on disturbed areas and conducting maintenance for the operational phase

of the project. The impacts however are largely mitigated by the transmission line only crossing the watercourses by means of multiple pylon structures (towers) with towers, substations and laydown yards outside of delineated riparian areas and associated buffers. As a result, all identified risks for both the construction phase and the operational phase are considered low.

6.4.2. Description of Aquatic Impacts

Construction and Operational Phases

The impact assessment indicates a medium significance of impact for the access roads and road crossing points without mitigation measures. The implementation of mitigation measures reduces the significance of impacts is reduced to low. The significance of impacts to the substation are considered medium without mitigation measures and low with the implementation of adequate stormwater infrastructure. The increase in hard surfaces poses a risk of erosion due to sheet runoff during high rainfall events. The significance of the transmission lines is reduced from medium to low with the implementation of adequate mitigation measures, which includes the placement of the pylon structures outside of the riparian zone buffers. This will reduce the extent, magnitude and potential long term impacts to the water resources.

6.4.3. Assessment of Potential Impacts

Nature: Impacts to freshwater resources due to construction and operation of access roads and watercourse crossings.		
	Without mitigation	**With mitigation**
Extent	Moderate (3)	Low (2)
Duration	Permanent (5)	Long term (4)
Magnitude	Moderate (6)	Minor (6)
Probability	Highly probable (4)	Probable (3)
Significance	**Medium**	**Low**
Status (positive or negative)	Negative	Negative
Reversibility	Low	Low
Irreplaceable loss of resources?	Yes	Yes
Can impacts be mitigated?	Yes	
Mitigation: » The footprint area of the crossing point must be kept to a minimum. The designated area should be demarcated to avoid unnecessary disturbances and encroachment into adjacent areas; » Portions of the entry/exit road for the crossings must include a coarse rock layer that has been specifically incorporated to increase the porosity and permeability to accommodate flooding; » The crossing points should accommodate the 1:100yr flood events; and » The crossings must be aligned along the existing routes of disturbance i.e. where river bed and banks have already been modified. » Implement the genaral mitigation measures as specified below		
Residual Impacts: » Loss of riparian and instream connectivity and erosion of banks and channel during high rainfall events		

Nature: Impacts to freshwater resources due to construction and operation of substations/switching stations		
	Without mitigation	**With mitigation**
Extent	Low (2)	Very Low (1)

Duration	Long term (4)	Long term (4)
Magnitude	Low (4)	Low (4)
Probability	Probable (4)	Improbable (2)
Significance	**Medium**	**Low**
Status (positive or negative)	Negative	Negative
Reversibility	Low	Low
Irreplaceable loss of resources?	Yes	Yes
Can impacts be mitigated?	Yes	

Mitigation:

- Considering the distance between the substations and the water resources the expects impacts to the water courses is considered low with adequate mitigations measures, particularly stormwater management.
- Implement the genaral mitigation measures as specified below

Residual Impacts:

- Alteration of surface hydrology and potential erosion of downstream systems

Nature: Impacts to freshwater resources due to construction and operation of transmission lines

	Without mitigation	**With mitigation**
Extent	Moderate (3)	Low (2)
Duration	Permanent (5)	Short term (2)
Magnitude	Moderate (6)	Minor (2)
Probability	Highly probable (4)	Improbable (2)
Significance	**Medium**	**Low**
Status (positive or negative)	Negative	Negative
Reversibility	Moderate	Low
Irreplaceable loss of resources?	Yes	Yes
Can impacts be mitigated?	Yes	

Mitigation:

- The placement of pylons outside of the delineated riparian and buffer zones will negate impacts to the water courses
- Implement the genaral mitigation measures as specified below
- The footprint area of the transmission line must be kept to a minimum. The footprint area must be clearly demarcated to avoid unnecessary disturbances to adjacent areas;
- The pylon and switching station footprint areas must avoid the delineated water resources and adhere to the prescribed buffer areas;
- Service tracks and access road will require water point crossings, the impact to these crossing points need to be minimised by restricting construction activity within the delineated riparian and buffer zones;
- Vehicles and equipment required for the suspension of cables across watercourses are permitted to access the buffer areas, but may not intrude into the delineated watercourses, except at the necessary water crossing points;
- The footprint area must be aligned with the existing road/railway reserves wherever possible. Disturbed areas should be sought as the preferred alignment area;
- The locations of all pylons (towers) towers which hold the transmission line must be located outside of all delineated watercourses;
- Where feasible all access roads should use existing farm roads before new roads are constructed;
- Preferential flow paths should be identified that intersect with new roads so that silt traps and fences can be installed to avoid siltation of watercourses; and
- An appropriate stormwater management plan must be developed for all substations

Residual Impacts:

» Disturbances of soils around pylon base and potential erosion of soils during high rainfall events and subsequent sedimentation of downstream systems

General Mitigation Measures

- The construction vehicles and machinery must make use of existing access routes as much as possible, before new access tracks are establishedfor access;
- Laydown yards, camps and storage areas must be beyond the delineated watercourse extend and associated buffer zones. Where possible, the construction of the transmission line and substations must take place from the existing road servitudes and not from within the aquatic systems;
- All construction areas should be clearly demarcated;
- The contractors used for the project should have spill kits available to ensure that any fuel or oil spills are cleaned-up and discarded correctly;
- All chemicals and toxicants to be used for the construction must be stored outside any delineated aquatic buffer zoneand in a bunded area;
- All machinery and equipment should be inspected regularly for faults and possible leaks; these should be serviced off-site;
- All contractors and employees should undergo induction which is to include a component of environmental awareness. The induction is to include aspects such as the need to avoid littering, the reporting and cleaning of spills and leaks and general good "housekeeping";
- Adequate sanitary facilities and ablutions on the servitude must be provided for all personnel throughout the project area. Use of these facilities must be enforced (these facilities must be kept clean so that they are a desired alternative to the surrounding vegetation);
- All removed soil and material must not be stockpiled within the delineated watercourse buffers. Stockpiling should take place outside of the watercourse. All stockpiles must be protected from erosion, stored on flat areas where run-off will be minimised, and be surrounded by bunds;
- Any exposed earth should be rehabilitated promptly by planting suitable vegetation (vigorous indigenous grasses) to protect the exposed soil, or via the application of other suitable stabilisation/ rehabilitation measures
- As far as possible, all building materials used for the substations should be pre-fabricated and transported to site to avoid any risks of contamination to any watercourse:
- No dumping of construction material on-site may take place;
- All waste generated on-site during construction must be adequately managed. Separation and recycling of different waste materials should be supported; and
- An alien invasive plant management plan needs to be compiled and implemented post construction to control current invaded areas and prevent the growth of invasives on cleared areas.

6.4.4. Implications of Project Implementation

A variety of impacts have been identified for the proposed project for both the construction and operational phase. These include small scale drainage patterns change; isolated removal of embankment vegetation areas for select roads; operation of equipment and machinery outside riparian areas; soil and building material stockpile management; domestic and industrial waste; storage of chemicals, mixes and fuel and final landscaping and post-construction rehabilitation for the construction phase of the project as well as alteration of surface drainage and runoff; storm water management; operation of transmission line and substation; establishment of alien plants on disturbed areas and conducting maintenance for the operational phase of the project. The impacts however are largely mitigated by the transmission line only crossing the watercourses by means of multiple pylon structures (towers) with towers, substations and laydown yards outside of delineated riparian areas and associated buffers. As a result, all identified risks for both the construction phase and the operational phase are considered low.

The powerline crossings, including the alternatives are considered low risk to the water courses on conditions the pylon footprint is located outside of the delineated riparian zones and the applicable buffers. Therefore, no preference is given to alternatives within the corridor. The switching stations were deemed low risk, should recommended mitigation measures be applied and the footprint remain outside of delineated water courses and stormwater management measures reduce sheet runoff during high rainfall events. Linear infrastructure including the access tracks and crossing points (including the Ishwati Sub-Station access road) were deemed low risk to the water resources should adequate mitigation measures be implemented, and that the footprint of crossing points be minimised.

It is the opinion of the specialist that after a consideration of the current sensitivity of the assessed systems, which was calculated at "High" according to the site ecological importance as well as the potential risks which may result from the powerline routes, that the 400 m corridor along with the 1.91 km^2 extended corridor be approved as the development of the grid connection infrastructure within the assessed corridors are acceptable regardless of whether the 132kV powerline connects to the south face or eastern face of the Gamma Substation yard, provided all delineated no-go areas are avoided with the exception of the watercourse crossing points for the access tracks (including Ishwati SS access road) and that the recommended mitigations are applied. Therefore the project poses no fatal flaws and the project qualifies for authorisation under the provisions of the General Authorisation provided that the mitigation measures held within are adhered to. No additional walk throughs for the aquatic specialist assessment are required along the proposed corridor.

6.5 Assessment of Impacts on Agricultural Potential and Soils

6.5.1. Results of Agricultural and Soils Impact Assessment

As per the results obtained from the National Web based Environmental Screening Tool, the proposed development is located within a "Low" sensitivity land capability area. The protocols for minimum requirements (DEA, 2020) stipulates that in the event that a proposed development is located within "Low" or "Medium" sensitivities, an agricultural compliance statement will be sufficient. It is worth noting that according to these protocols, a site inspection will still need to be conducted to determine the accuracy of these sensitivities. After acquiring baseline information pertaining to soil resources within the 50 m regulated areas, it is the specialist's opinion that the soil forms and associated land capabilities concur with the sensitivities stated by the screening tool. Therefore, only an agricultural compliance statement has been compiled.

6.5.2. Description of Agricultural and Soils Impacts

The baseline findings and the sensitivities as per the Department of Agriculture, Forestry and Fisheries (DAFF, 2017) national raster file concur with one another. Sensitivities in all the combined substations, powerline , access tracks and the proposed alternatives are classified in the same category. Hence, any of the various sections in the powerline grid can be presented to illustrate the sensitivities. It therefore is the specialist's opinion that the land capability and land potential of the resources in the regulated area is characterised by "Low" to "Moderate" sensitivities, which conforms to the requirements of an agricultural compliance statement only. The DEA screening tool, (2022) shows that some of the available crop fields within the assessment area between the Khangela to Ishwati switching station are categorised as high sensitivity. Hence, it is recommended that the crop fields be regarded as no-go areas for substations, pylons and service tracks (unless agreed otherwise with the land owners). The powerline may however span these areas without any effects on the crop fields. The assessment of the access road to the Ishwati switching station revealed that the assessment site did not consist of high clay content soil and was mainly dominated very shallow soils with restrictive hard layers and therefore will not be segregation of any high production agricultural land.

Mitigation Measures

Earthworks will expose and mobilise earth materials which could result in compaction and/or erosion during construction. Further to this, machinery, vehicles and equipment on site, use of chemicals and concrete mixes can also result in soil resource contamination through leaks, spillages or breakages. Prescribed mitigation measures during the operational phase for the switching substations and spans will be easily managed by best

"housekeeping" and soil erosion management practices. The effective management of storm drains can also reduce soil losses and soil disturbance and should only occur where necessarily required.

6.5.3. Implications of Project Implementation

The most sensitive soil forms identified within the assessment area is the Oakleaf and Quaggafontein soil forms. The land capability sensitivities (DAFF, 2017) indicate land capabilities with "Low" and "Moderate" sensitivities, which correlates with the findings from the baseline findings.

The assessment area is not associated with any arable soils, due to the type of soil as well as the climate, which in itself limits crop production significantly. The harsh climatic conditions are associated with low annual rainfall and high evapotranspiration potential demands of the area. The land capabilities associated with the regulated area are only suitable for grazing and wildlife farming, which corresponds with the current land use.

It is the specialist's opinion that the proposed grid connection and associated infrastructure will have no impacts on the agricultural production ability of the land. Additionally, the proposed activities will not result in the segregation of any high production agricultural land. The development within the 400 m corridor beyond the required 50 m recommended assessment buffer for soils also has no effects on the agricultural potential of the land. Some of the field crop boundaries between the Khangela to Ishwati substations were identified as "high sensitivity", and these areas should be treated as no-go areas for substations, pylons and access/service tracks (unless agreed otherwise with the landowner). The powerline may however span these crop fields. Therefore, the proposed development may be favourably considered. The assessed corridors including the 400 m development corridor and the 1.91 km^2 extended corridor, 300m substation assessment areas and access roads will not have any impact on the agricultural potential of the land. Therefore, the proposed development may be favourably considered.

6.6 Assessment of Impacts on Heritage (including archaeological and palaeontological resources)

6.6.1. Results of the Heritage and Palaeontological Impact Assessment

Archaeology and Built Environment

The pre-construction and construction phase of the proposed development will entail extensive surface clearance as well as excavations into the superficial sediment cover and underlying bedrock (e.g. for powerlines, new access roads, on-site substations). The possible pre-construction impacts calculated on the tangible cultural heritage resources is overall MODERATE NEGATIVE rating but with the implementation of the recommended buffers and management guidelines will be reduced to a LOW NEGATIVE impact.

The following general observations will apply for the impact assessment undertaken in this report:

- Heritage sites assessed to have a low heritage significance are not included in these impact risk assessment calculations. The reason for this is that sites of low significance will not require mitigation. These sites are the stone tool surface scatters (PL_01, PL_03, PL_04, PL_07, PL_09) and the structures (PL_02, PL_05, PL_08, PL_10).
- One rock art site (PL_11) was located more than 2km away from the proposed development. As a result, no impact is expected from the proposed development on this site. This means that no impact assessment will be undertaken for the site.
- No heritage resources were identified within the switching station assessment areas.

- It is necessary to realise that the heritage resources located during the fieldwork do not necessarily represent all the possible heritage resources present within the area. Various factors account for this, including the size of the study area and the subterranean nature of some heritage sites. The impact assessment conducted for heritage sites assumes the possibility of finding heritage resources during the project life and has been conducted as such

Palaeontology

An overall medium palaeontological sensitivity is allocated to the development footprint. It is therefore considered that the proposed development will not lead to detrimental impacts on the palaeontological reserves of the area (if mitigations measures are followed) and construction of the development may be authorised to its whole extent.

6.6.2. Description of Heritage Impacts (Including Archaeology and Palaeontology)

6.6.3. Assessment of Potential Impacts

Assessment of the Impact of the Proposed 132kV powerline on the identified Historical Homestead (PL_06)

Nature: Damage to one historical farmstead (PL_06) which is located within the proposed grid corridor area. The site is of high heritage significance and is rated as IIIA.		
Extent	Regional (3)	Local (1)
Duration	Permanent (5)	Permanent (5)
Magnitude	Moderate (6)	Low (2)
Probability	Highly Probable (4)	Improbable (2)
Significance	***Medium (56)***	***Low (18)***
Status	Negative	Negative
Reversibility	Very Low (irreversible)	Very Low (irreversible)
Irreplaceable loss of resources?	Yes (Complete loss of resources)	Yes
Can impacts be mitigated?	Yes	
Mitigation: » It is recommended that the respective no-go-buffer-zones are kept to the closest proposed powerline infrastructure: • The burial grounds and informal graves should be demarcated with a 50-meter buffer zone and should be avoided and left in situ, • Implement a 30-meter buffer around the midden. • Implement a 30-meter buffer around the surface scatter. • Implement a 30-meter buffer around all structures (incl. the original farmhouse and kraals). » In terms of general conservation of the historical farmstead, the placement of pylon infrastructure in the above-mentioned buffers should be avoided (to the extent technically feasible) or minimised. » If development occurs within any of the recommended buffers for structures at PL_06, the site will need to be satisfactorily studied and recorded before impact occurs. Recording of the structure i.e. (a) map indicating the position and footprint of the structure (b) photographic recording of the structure (c) measured drawings of the floor plans of the structure. » If the site is going to be impacted directly and the graves need to be removed a grave relocation process for these sites is recommended as a mitigation and management measure. This will involve the necessary social consultation and public participation process before grave relocation permits can be applied for with the HWC under the NHRA and National Health Act regulations		
Residual Impacts: » Considering the nature of the site identified in the present study, the residual risk will be moderate and possibly permanent.		

Assessment of the Impact of the Proposed 132kV powerline on the Rock Engravings (K002 and K003)

Nature: Damage to rock engravings (K002 and K003) which are located within the proposed grid corridor area. The sites are of medium-low heritage significance and are rated as IIIB/IIIC.		
Extent	Local (1)	Site (1)
Duration	Permanent (5)	Permanent (5)
Magnitude	Low (4)	Minor (1)
Probability	Probable (3)	Improbable (2)
Significance	***Medium (33)***	***Low (16)***

Status	Negative	Negative
Reversibility	Low	Low
Irreplaceable loss of resources?	Yes (Complete loss of resources)	Yes
Can impacts be mitigated?	Yes	
Mitigation: » The sites should be demarcated with a 20-meter buffer and should be avoided if any construction is to happen close to it. » If the engravings cannot be avoided, then they should be photographed and traced as necessary to produce a clear record.		
Residual Impacts: » Considering the nature of the site identified in the present study, the residual risk will be moderate and possibly permanent.		

Palaeontological Impacts

Assessment of the Impact of the Proposed 132kV powerline on Palaeontological Resources (After Butler, 2022)

Nature: The general palaeontological sensitivity of the geological formations is rated as very high. Thus the chance of discovering fossils during construction activities is rated as very probable.		
Extent	Local (2)	Local (2)
Duration	Permanent (5)	Permanent (3)
Magnitude	Very high (10)	Very high (10)
Probability	Probable (3)	Probable (3)
Significance	**Medium (51)**	**Medium (45)**
Status	Negative	Negative
Reversibility	Low	Low
Irreplaceable loss of resources?	Yes	No
Can impacts be mitigated?	Yes	
Mitigation: » The ECO for this project must be informed that sediments of the Adelaide Subgroup (Beaufort Group, Karoo Supergroup) have a Very High Palaeontological Sensitivity. » Training of accountable supervisory personnel by a qualified palaeontologist in the recognition of fossil heritage is very important and necessary. » If Palaeontological Heritage is uncovered during surface clearing and excavations the Chance find Protocol attached should be implemented immediately. Fossil discoveries ought to be protected and the ECO/site manager must report to » South African Heritage Resources Agency (SAHRA) (Contact details: SAHRA, 111 Harrington Street, Cape Town. PO Box 4637, Cape Town 8000, South Africa. Tel: 021 462 4502. Fax: +27 (0)21 462 4509. Web: www.sahra.org.za) so that mitigation (recording and collection) can be carried out. » Before any fossil material can be collected from the development site the specialist involved would need to apply for a collection permit from SAHRA. Fossil material must be housed in an official collection (museum or university), while all reports and fieldwork should meet the minimum standards for palaeontological impact studies proposed by SAHRA (2012). » These recommendations should be incorporated into the Environmental Management Programme for the proposed development.		
Residual Impacts:		

Thus, an overall medium palaeontological sensitivity is allocated to the development footprint. It is therefore considered that the proposed development will not lead to detrimental impacts on the palaeontological reserves of the area and construction of the development may be authorised to its whole extent.

6.6.4. Implications of Project Implementation

The pre-construction and construction phase of the proposed development will entail extensive surface clearance as well as excavations into the superficial sediment cover and underlying bedrock (e.g. for powerlines, new access roads, on-site substations). The possible pre-construction impacts calculated on the tangible cultural heritage resources is overall MODERATE NEGATIVE rating but with the implementation of the recommended buffers and management guidelines will be reduced to a LOW NEGATIVE impact.

An overall medium palaeontological sensitivity is allocated to the development footprint. Three powerline alternatives (i.e., Preferred Alternative, Alternative 1 and Alternative 2) as well as an extended development corridor enabling the 132kV powerline to connect either to the south face of the Gamma substation yard or approach from the east) is considered for the development. From a Palaeontological view there is no preference between these alternatives. The development will thus not lead to detrimental impacts on the palaeontological reserves of the area (if mitigations measures are followed) and construction of the development may be authorised to its whole extent.

If heritage resources are discovered during site clearance, construction activities that may impact the find must stop in the vicinity, and a qualified archaeologist/palaeontologist (as appropriate) must be appointed to evaluate and make recommendations on mitigation measures.

It is the specialists opinion that overall impact of the grid connection infrastructure (within the 400m wide assessment corridor) and access road to the Ishwati switching station on heritage resources is Low. Provided that the delineated no-go areas are avoided, and the recommended mitigations are applied, the impact would be acceptably Low or could be totally mitigated to the degree that the project could be approved from a heritage perspective. The management and mitigation measures as described in Section 10 of this report have been developed to minimise the project impact on heritage resources.

Owing to the location of the historical farmstead (PL_06) within the proposed 400m wide grid corridor, the "Preferred" and "Alternative 1" powerline routes are less preferred. If possible, "Alternative 2" should be considered from a heritage perspective. However, all three alternatives are acceptable subject to the recommended mitigation. Therefore, the proposed development can be placed anywhere within the assessed corridors, provided that the delineated no-go areas are avoided, and the recommended mitigations are applied. As such, the project could be approved from a heritage perspective.

6.7 Assessment of Visual Impacts

6.7.1 Results of Visual Impact Assessment

The visual assessment of the proposed New 132kv Grid Connection and Associated Infrastructure within the 400m wide assessment corridor indicates that the construction and operation of the proposed infrastructure will have a visual effect on both the rural landscape and on sensitive receptors in the study area. The proposed infrastructure will be visible within an area that is generally characterised by low growing shrubland and wide-open undeveloped spaces. The infrastructure would thus be highly visible and impossible to hide within an area that incorporates potentially various sensitive visual receptors that may consider visual exposure to this type of infrastructure to be intrusive. As access roads and servitudes have no elevation or height, the visual impact of this associated infrastructure will be absorbed by the visual impact of the primary infrastructure.

The low occurrence of such sensitive visual receptors within this environment, specifically in close proximity to the proposed infrastructure as well as the presence of existing high voltage overhead powerlines, is of relevance however, and has affected the significance rating of the anticipated visual

impacts. Overall, the post mitigation significance of the visual impacts for all the alternatives is predominately moderate to low. A high significance rating is anticipated for users travelling along the secondary roads and residents of dwellings within 0.5 km from the proposed infrastructure. However, due to the low number/ density of homesteads/dwellings within the study area and the fact that observers travelling along the secondary road will only experience a visual intrusion for a short period of time, this impact is anticipated to be greatly reduced.

6.7.2 Description of Visual Impacts

In light of the results and findings of the Visual Impact Assessment undertaken for the proposed New 132kv Grid Connection and Associated Infrastructure, it is acknowledged that the receiving environment will be visually transformed for the entire operational lifespan of the facility.

The following is a summary of the impacts assessed:

- The potential visual impact of the facility on sensitive visual receptors within 0.5km (residents of homesteads/dwellings and users of the secondary roads), in close proximity to the proposed facility is likely to be high.
- The possible visual impact of the facility on the residents homesteads and users of secondary road on the periphery of the 0.5km offset and within the region beyond is likely to be of moderate significance.
- The potential visual impact of the associated infrastructure on residents of homesteads/dwellings and users of the secondary road within close proximity of the proposed facility is likely to be of moderate significance and may be mitigated to low should the possible best practice mitigation measures be implemented.
- The potential visual impact of construction on sensitive visual receptors in close proximity to the facility is likely to be of moderate significance before mitigation and low post mitigation.
- The anticipated visual impact of operational lighting at night on sensitive visual receptors within the study area is likely to be of moderate significance and may be mitigated to low should the possible best practice mitigation measures be implemented.
- The potential visual impact of the proposed development on the visual quality of the landscape and sense of place of the region is likely to be of moderate significance both before and after mitigation.
- The potential cumulative visual impact on sensitive visual receptors within the region is likely to be of moderate significance.

6.7.3 Assessment of Potential Impacts

Construction and Operational Phase

Impact table summarising the significance of sensitive visual receptors in close proximity to the proposed infrastructure

Nature : Potential visual impact on users of secondary roads and residents of Hartebeesfontein in close proximity to the proposed infrastructure (All Alternatives)		
	Without mitigation	***With mitigation***
Extent	High (4)	High (4)
Duration	Long term (4)	Long term (4)
Magnitude	Very High (10)	Very High (10)
Probability	Highly Probable (4)	Highly Probable (4)
Significance	***High (72)***	***High (72)***
Status (positive or negative)	Negative	Negative
Reversibility	Recoverable (3)	Recoverable (3)
Irreplaceable loss of resources?	No	No
Can impacts be mitigated?	No	

Mitigation:

Planning:

- Respond to the natural environment during the planning of buildings and infrastructure.
- Consolidate development as far as possible and make use of already disturbed sites rather than pristine areas.
- Minimize disturbance to only that strictly required to enable the development, retain natural vegetation as far as possible and rehabilitate areas disturbed by the development
- Wherever possible, use materials, coatings, or paints that have little or no reflectivity.
- Commercial messages, symbols and/logos are not permitted on structures.

Construction:

- Ensure that vegetation is not unnecessarily removed during the construction period.
- Reduce the construction period through careful logistical planning and productive implementation of resources.
- Plan the placement of lay-down areas and temporary construction equipment camps in order to minimise vegetation clearing (i.e., in already disturbed areas) wherever possible.
- Restrict the activities and movement of construction workers and vehicles to the immediate construction site and existing access roads.
- Ensure that rubble, litter, and disused construction materials are appropriately stored (if not removed daily) and then disposed regularly at licensed waste facilities.
- Reduce and control construction dust using approved dust suppression techniques as and when required (i.e., whenever dust becomes apparent).
- Restrict construction activities to daylight hours whenever possible in order to reduce lighting impacts.
- Rehabilitate all disturbed areas immediately after the completion of construction works.

Residual impacts:

The visual impact will be removed after decomissioning, provided the power line infrastructure is removed. Failing this, the visual impact will remain

Impact table summarising the significance of visual impacts on sensitive receptors in the region

Nature : Potential visual impact on users of secondary roads and residents of homesteads on the periphery of the 0.5km offset and within the region beyond (All Alternatives)		
	Without mitigation	***With mitigation***
Extent	Low (2)	Low (2)
Duration	Long term (4)	Long term (4)
Magnitude	Moderate (6)	Moderate (6)
Probability	Probable (3)	Probable (3)
Significance	***Medium (36)***	***Medium (36)***
Status (positive, neutral or negative)	Negative	Negative
Reversibility	Recoverable (3)	Recoverable (3)
Irreplaceable loss of resources?	No	No
Can impacts be mitigated?	No	

Mitigation / Management:

Planning:

- Respond to the natural environment during the planning of buildings and infrastructure.
- Consolidate development as far as possible and make use of already disturbed sites rather than pristine areas.
- Minimize disturbance to only that strictly required to enable the development, retain natural vegetation as far as possible and rehabilitate areas disturbed by the development
- Wherever possible, use materials, coatings, or paints that have little or no reflectivity.
- Commercial messages, symbols and/logos are not permitted on structures.

Operations:

- Retain / re-establish and maintain natural vegetation in all areas outside of the development footprint.
- Maintain the general appearance of the facility as a whole.
- Monitor rehabilitated areas, and implement remedial action as and when required.

Decommissioning:

- Remove infrastructure not required for the post-decommissioning use of the site.
- Rehabilitate all areas. Consult an ecologist regarding rehabilitation specifications.
- Monitor rehabilitated areas post-decommissioning and implement remedial actions.

Residual impacts:

The visual impact will be removed after decommissioning, provided the facility and ancillary infrastructure is removed. Failing this, the visual impact will remain.

Impact table summarising the significance of the visual impacts of associated infrastructure on sensitive receptors in close proximity

Nature : Potential visual impact of the associated infrastructure located on site on residents of farm and homesteads and users of the secondary road within close proximity to the proposed facility (within the 0.5 Km offset) (All Alternatives)- The height of the proposed new collector substations (switching stations) will not exceed two storeys (i.e. 6m), as access roads and servitudes have no elevation or height, the visual impact of this associated infrastructure will be absorbed by the visual impact of the primary infrastructure, therefore the visual exposure of this component will fall within the view sheds generated for the power line infrastructure (which is not expected to exceed 45m).

	Without mitigation	***With mitigation***
Extent	High (4)	High (4)
Duration	Long term (4)	Long term (4)
Magnitude	Very high (10)	Moderate (6)
Probability	Probable (3)	Improbable (2)
Significance	***Medium (54)***	***Low (28)***
Status (positive, neutral or negative)	Negative	Negative
Reversibility	Recoverable (3)	Recoverable (3)
Irreplaceable loss of resources?	No	No
Can impacts be mitigated?	Yes	

Mitigation:

Site development & Operation:

- The extent possible, implement measures to avoid or minimise disturbance to large trees, natural features and noteworthy natural vegetation in all areas outside of the activity footprint.
- Consolidate development as far as possible and make use of already disturbed sites rather than pristine areas.
- Minimize disturbance to only that strictly required to enable the development, retain natural vegetation as far as possible and rehabilitate areas disturbed by the development
- Plan ancillary infrastructure in such a way and in such a location that clearing of vegetation is minimised. Consolidate existing infrastructure as much as possible, and make use of already disturbed areas rather than pristine sites wherever possible.
- Use existing roads wherever possible. Where new roads are required these should be planned carefully, taking due cognisance of the local topography. All efforts should be employed to try and align roads along the landscape contours wherever possible. Construction of roads should be undertaken properly, with adequate drainage structures in place to forego potential erosion problems.
- Keeping infrastructure at minimum heights.
- Introducing landscaping measures such as vegetating berms.
- Avoid the use of highly reflective material.
- Maintain the general appearance of the site as a whole.

Lighting

- Lighting should be kept to a minimum wherever possible.
- Install light fixtures that provide precisely directed illumination to reduce light "spillage" beyond the immediate surrounds of the activity – this is especially relevant where the edge of the activity is exposed to residential properties.
- Wherever possible, lights should be directed downwards to avoid illuminating the sky.
- Avoid high pole top security lighting along the periphery of the site and use only lights that are activated on movement.

Construction:

- Rehabilitate all construction areas, when no longer required.
- Keep vegetation clearing to a minimum.

Operations:

- Retain / re-establish and maintain natural vegetation in all areas outside of the development footprint as far as possible.
- Maintain the general appearance of the facility as a whole.
- Monitor rehabilitated areas, and implement remedial action as and when required.

Decommissioning:

- Remove infrastructure not required for the post-decommissioning use of the site.
- Rehabilitate all areas as per the rehabilitation plan undertaken. Consult an ecologist regarding rehabilitation specifications.
- Monitor rehabilitated areas post-decommissioning and implement remedial actions as required..

Residual impacts:

The visual impact will be removed after decommissioning, provided the facility and ancillary infrastructure is removed. Failing this, the visual impact will remain.

Impact table summarizing the significance of visual impacts of construction on visual receptors in close proximity

Nature : Visual impact of construction on sensitive visual receptors in close proximity to the proposed infrastructure (All Alternatives)		
	Without mitigation	***With mitigation***
Extent	High (4)	High (4)
Duration	Short term (1)	Short term (1)
Magnitude	Very high (10)	Low (4)
Probability	Probable (3)	Improbable (2)

Significance	***Medium (45)***	***Low (18)***
Status (positive, neutral or negative)	Negative	Negative
Reversibility	Recoverable (3)	Recoverable (3)
Irreplaceable loss of resources?	No	No
Can impacts be mitigated?	Yes	

Mitigation:

Lighting

- Lighting should be kept to a minimum wherever possible.
- Install light fixtures that provide precisely directed illumination to reduce light "spillage" beyond the immediate surrounds of the activity – this is especially relevant where the edge of the activity is exposed to residential properties.
- Wherever possible, lights should be directed downwards to avoid illuminating the sky.
- Avoid high pole top security lighting along the periphery of the site and use only lights that are activated on movement.

Construction:

- Keep vegetation removal to a minimum where possible.
- If possible keep the construction period to a minimum.
- Plan the placement of lay-down areas and temporary construction equipment camps in order to minimise vegetation clearing (i.e. in already disturbed areas) wherever possible.
- Restrict the activities and movement of construction workers and vehicles to the immediate construction site and existing access roads.
- Ensure that rubble, litter, and disused construction materials are appropriately stored and then disposed regularly at licensed waste facilities.
- Employ dust suppression techniques as and when required (i.e. whenever dust becomes apparent).
- Restrict construction activities to daylight hours whenever possible in order to reduce lighting impacts.
- Rehabilitate all disturbed areas as per the rehabilitation plan and schedule.

Decommissioning:

- Remove infrastructure not required for the post-decommissioning use of the site.
- Rehabilitate all areas as per the rehabilitation plan undertaken. Consult an ecologist regarding rehabilitation specifications.
- Monitor rehabilitated areas post-decommissioning and implement remedial actions as required.

Residual impacts:

The visual impact will be removed after decommissioning, provided the facility and ancillary infrastructure is removed. Failing this, the visual impact will remain

Impact table summarizing the significance of operational lighting at night on visual receptors within the region

Nature : Visual impact of lighting at night on sensitive visual receptors in close proximity to the proposed facility (All Alternatives)

	Without mitigation	***With mitigation***
Extent	High (4)	High (4)
Duration	Long term (4)	Long term (4)
Magnitude	High (8)	Low (4)
Probability	Probable (3)	Improbable (2)
Significance	***Medium (48)***	***Low (24)***
Status (positive, neutral or negative)	Negative	Negative
Reversibility	Recoverable (3)	Recoverable (3)

Irreplaceable loss of resources?	No	No
Can impacts be mitigated?	Yes	

Mitigation:

Planning & operation:

- Shield the sources of light by physical barriers (walls, vegetation, or the structure/light fitting itself) to the extent possible
- Limit mounting heights of lighting fixtures, or alternatively use foot-lights or bollard level lights.
- Make use of minimum lumen or wattage in fixtures.
- Make use of down-lighters, or shielded fixtures.
- Make use of Low-Pressure Sodium lighting or other types of low impact lighting.
- Where possible, make use of motion detectors on security lighting. This will allow the site to remain in relative darkness, until lighting is required for security or maintenance purposes

Residual impacts:

The visual impact will be removed after decommissioning, provided the facility and ancillary infrastructure is removed. Failing this, the visual impact will remain.

Impact table summarizing the significance of visual impacts on landscape character and sense of place within the region

Nature : Visual impact of the proposed development on the visual quality of the landscape and sense of place of the region (All Alternatives)		
	Without mitigation	***With mitigation***
Extent	Low (2)	Low (2)
Duration	Long term (4)	Long term (4)
Magnitude	High (8)	Low (4)
Probability	Probable (3)	Improbable (2)
Significance	***Medium (42)***	***Moderate (42)***
Status (positive, neutral or negative)	Negative	Negative
Reversibility	Recoverable (3)	Recoverable (3)
Irreplaceable loss of resources?	No	No
Can impacts be mitigated?	No	

Mitigation:

Planning:

- Respond to the natural environment during the planning of buildings and infrastructure.
- Consolidate development and make use of already disturbed sites rather than pristine areas.
- Restrict vegetation clearing/disturbance to the minimum strictly required to enable the development.
- Visually break up large bulky buildings into smaller, subtler, less prominent shapes and planes.
- Retain / re-establish and maintain natural vegetation in all areas outside of the development footprint as far as possible.
- Plan ancillary infrastructure in such a way and in such a location that clearing of vegetation is minimised.
- Use existing roads wherever possible. Where new roads are required to be constructed, these should be planned carefully, taking due cognisance of the local topography. Roads should be laid out along the contour wherever possible, and should never traverse slopes at 90 degrees. Construction of roads should be undertaken properly, with adequate drainage structures in place to forego potential erosion problems.
- Wherever possible, use materials, coatings, or paints that have little or no reflectivity.
- Commercial messages, symbols and/logos are not permitted on structures.

Construction:

- Rehabilitate all construction areas.
- Ensure that vegetation is not cleared unnecessarily to make way for infrastructure.

Operations:

- Maintain the general appearance of the facility as a whole.
- Monitor rehabilitated areas, and implement remedial action as and when required.

Decommissioning:

- Remove infrastructure not required for the post-decommissioning use of the site
- Rehabilitate all areas. Consult and ecologist regarding rehabilitation specifications
- Monitor rehabilitated areas post decommissioning and implement remedial actions

Residual impacts:

The visual impact will be removed after decommissioning, provided the facility and ancillary infrastructure is removed. Failing this, the visual impact will remain

6.7.4. Implications of Project Implementation

The visual assessment of the proposed New 132kV Grid Connection and Associated Infrastructure within the 400m wide assessment corridor indicates that the construction and operation of the proposed infrastructure will have a visual effect on both the rural landscape and on sensitive receptors in the study area.

The proposed infrastructure will be visible within an area that is generally characterised by low growing shrubland and wide-open undeveloped spaces. The infrastructure would thus be highly visible and impossible to hide within an area that incorporates potentially various sensitive visual receptors that may consider visual exposure to this type of infrastructure to be intrusive.

The low occurrence of such sensitive visual receptors within this environment, specifically in close proximity to the proposed infrastructure as well as the presence of existing high voltage overhead powerlines, is of relevance however, and has affected the significance rating of the anticipated visual impacts.

Overall, the post mitigation significance of the visual impacts for all the alternatives is predominately moderate to low. A high significance rating is anticipated for users travelling along the secondary roads and residents of dwellings within 0.5 km from the proposed infrastructure. However, due to the low number/ density of homesteads/dwellings within the study area and the fact that observers travelling along the secondary road will only

be a visual intrusion for a short period of time, this impact is anticipated to be greatly reduced. Notwithstanding the above, there are not many options as to the mitigation of the visual impact of the proposed infrastructure. No amount of vegetation screening or landscaping would be able to hide structures of these dimensions, especially within this receiving environment.

The visual impacts are not considered to be fatal flaws for a development of this nature particularly due to the remote location of the study area and very low density of visual receptors. While all three (3) of the alternatives have been found to have a similar impact and therefore considered acceptable, it is recommended that the Preferred Alternative for the proposed development of 132 kV overhead powerlines, three (3) 132 kV on-site substations (switching stations), new access tracks and watercourse crossing points associated with the authorized Umsinde Emoyeni and Khangela Emoyeni Wind Energy Facilities, as per the assessed layout (i.e. placement anywhere within the assessment corridor) be supported from a visual perspective, subject to the implementation of the suggested best practice mitigation measures provided in this report.

6.8 Assessment of the 'Do Nothing' Alternative

The "do-nothing" alternative (i.e. no go alternative) is the option of not constructing the grid connection infrastructure for the Emoyeni Wind Energy Facilities. This means that the status quo of the environment would remain unchanged and no additional impacts would occur other than those associated with the Umsinde and Khangela WEFs and already authorised associated infrastructure. As the current authorised grid connection infrastructure is no longer deemed viable by Eskom, the implementation of the 'do-nothing' alternative will however result in the authorised Emoyeni Wind Energy Facilities being unable to evacuate electricity generated to the National Grid and render the development of the WEF and the operation thereof not technically feasible. The Umsinde and Khangela WEFs have been selected as preferred bidders with private offtakers, and the Umsinde WEF has been registered as a Strategic Integrated Project (SIP). Should the proposed grid connection infrastructure not be developed, these preferred bidder and registered SIP projects will not be able to supply renewable energy to these private offtakers. This will result in the loss of the opportunity to develop both the Umsinde and Khangela Wind Energy Facilities, which could have impacts at a national scale.

In addition, the Northern and Western Capes Province will not benefit from additional generated power from a renewable source being evacuated through the proposed grid infrastructure directly into the Province's grid. There will also be a potential loss for development of renewable energy which is detailed in the local, regional and national policies to be of great importance for economic development (refer to section 4). Therefore, from a regional perspective, the 'do-nothing' alternative is not preferred as there is a perceived loss of benefits for the regional area.

This would result in negative impacts at a local, regional and national scale from a socio-economic and economic perspective and is not considered desirable. The negative impacts of the "Do Nothing" alternative is considered to outweigh the positive impacts of this alternative. The 'Do nothing' alternative is, therefore, not a preferred alternative.

SECTION 7: ASSESSMENT OF POTENTIAL CUMULATIVE IMPACTS

As identified and assessed in section 6, the development of the various supporting infrastructure may have impacts on natural resources, the social environment and on the people living in the area surrounding the project. The preceding impact assessment section has reported on the assessment of the impacts associated with the proposed infrastructure development in isolation. This section assesses the potential for the impacts associated with proposed development to become more significant when considered in combination with the other known or proposed similar projects within the area.

The proposed grid infrastructure development is located mostly within the Beaufort West REDZ and partially within the Central Transmission Corridor. The location of the proposed development is in close proximity to a number of other proposed, approved, and operational power lines and renewable energy developments within the area.

7.1 Legal Requirements as per the EIA Regulations, 2014 (as amended), for the undertaking of a Basic Assessment Report

This section of the Basic Assessment Report includes the following information required in terms of Appendix I: Content of Basic Assessment Reports:

Requirement	Relevant Section
3(j)(i) an assessment of each identified potentially significant impact and risk, including cumulative impacts.	The cumulative impacts associated with the development of the various supporting infrastructure are included and assessed within this section.

7.2 Approach taken to Assess Cumulative Impacts

The cumulative impacts of the proposed supporting infrastructure have been assessed through the consideration of other industrial type infrastructure which have resulted in vertical and/or horizontal disturbance within the landscape surrounding the proposed project within a 30km radius.

It is important to explore the potential for cumulative impacts as this will lead to a better understanding of these impacts and the potential for mitigation that may be required. The scale at which the cumulative impacts are assessed is important. For the development of the proposed infrastructure, the existing infrastructure and transformation in the directly surrounding areas will be considered which includes the following (refer to **Figure 7.1 and Table 7.1**):

- Umsinde Emoyeni WEF
- Khangela Emoyeni WEF
- Ishwati Emoyeni WEF
- Poortjie West WEF
- Modderfontein PV
- Victoria West WEF

The above projects have received environmental authorisation but have not yet commenced construction.

Table 7.1: Grid connection developments located within the surrounding area of the proposed new grid connection infrastructure.

Project Name	Project Status
400kV Droerivier- Hydra No.1 Powerline	Existing
400kV Droerivier - Hydra No.2 Powerline	Existing

400kV Droerivier - Hydra No.3 Powerline	Existing
765KV Gamma- Kappa Powerline	Existing
132kV Umsinde Emoyeni Powerline	Authorised
132kV Khangela Emoyeni Powerline	Authorised

The cumulative impacts of the other known existing grid infrastructure, renewable energy developments and the proposed supporting infrastructure are qualitatively assessed in this section and have been considered within the specialist studies (refer to **Appendices D - I**). The following potential impacts are considered for assessment:

- Cumulative impacts on ecological processes;
- Cumulative impacts on avifauna;
- Cumulative impacts on aquatic resources; and
- Cumulative impacts on soils and agricultural potential.
- Cumulative impacts on heritages resources
- Cumulative impacts of visual aspects

Based on the findings of specialist studies cumulative impacts were not assessed for the following impacts:

- Soil and Agricultural Potential: The assessment area is not associated with any arable soils, due to the type of soil as well as the climate, which in itself limits crop production significantly. The harsh climatic conditions are associated with low annual rainfall and high evapotranspiration potential demands of the area. The land capabilities associated with the regulated area are only suitable for grazing and wildlife farming, which corresponds with the current land use. Therefore no cumulative Impacts are associated with soil and agricultural potential.

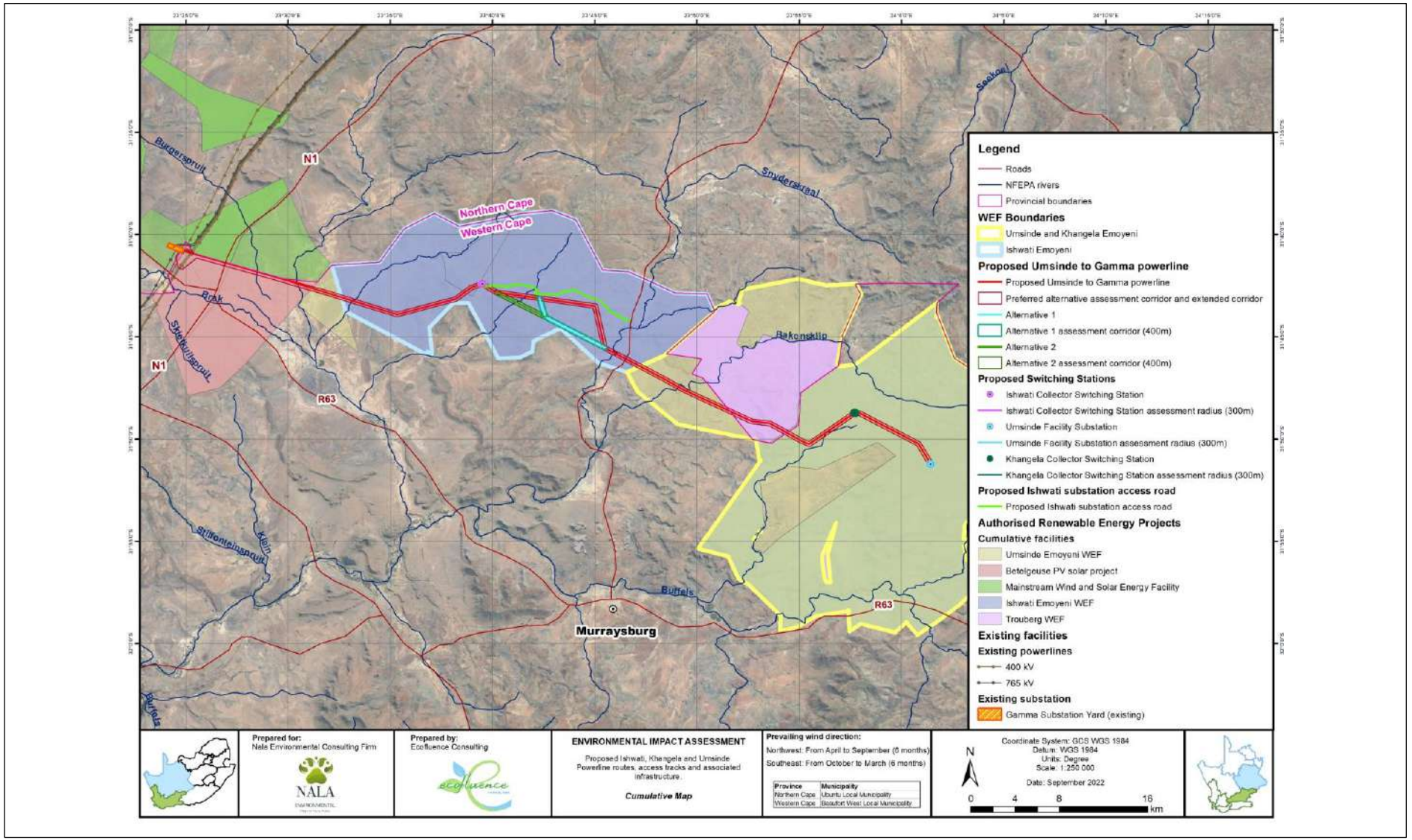


Figure 7.1: Identified renewable energy developments and grid connection infrastructure located within the surrounding areas of the Emoyeni WEFs considered as part of the cumulative impact assessment

7.3 Cumulative impacts on Ecology and Avifauna

Cumulative impacts are assessed in context of the extent of the proposed project area; other developments in the area; and general habitat loss and transformation resulting from other activities in the area (all activities, as required for assessment of cumulative impacts including surrounding wind energy facilities, powerlines and associated infrastructure in the region).

The impacts of projects are often assessed by comparing the post-project situation to a pre-existing baseline. Where projects can be considered in isolation this provides a good method of assessing a project's impact. However, in areas where baselines have already been affected, or where future development will continue to add to the impacts in an area or region, it is appropriate to consider the cumulative effects of development. This is similar to the concept of shifting baselines, which describes how the environmental baseline at a point in time may represent a significant change from the original state of the system. This section describes the potential impacts of the project that are cumulative for fauna and flora. Localised cumulative impacts include the cumulative effects from operations that are close enough to potentially cause additive effects on the environment or sensitive receivers, dust deposition, noise and vibration, disruption of corridors or habitat, groundwater drawdown, groundwater and surface water quality, and transport.

Cumulative Impacts to biodiversity associated with the proposed project

Nature: *The development of the proposed infrastructure will contribute to cumulative habitat loss, thereby impacting ecological processes in the region.*		
	Overall impact of the proposed project considered in isolation	**Cumulative impact of the project and other projects within the area**
Extent	Moderate (3)	Moderate (3)
Duration	Short term (2)	Long term (4)
Magnitude	Low (4)	Moderate (6)
Probability	Improbable (2)	Definite (5)
Significance	***Low (27)***	***High (65)***
Status (positive or negative)	Negative	Negative
Reversibility	Moderate	Moderate
Irreplaceable loss of resources?	Yes	Yes
Can impacts be mitigated?	Yes	
Mitigation: » Should the vegetation be removed, the Impact cannot be mitigated		
Residual: » Less migratory species will be found in the area. » Road killings are still a possibility. » Migratory routes of fauna will change. » Fauna and flora species composition may change.		

7.4 Cumulative Impacts on Avifauna

Cumulative impacts on avifauna have been identified for the proposed grid connection infrastructure development. From an avifauna perspective, the cumulative impacts associated with the proposed development area is of low significance in isolation but of medium significance due to the existing grid infrastructure.

Cumulative Impacts to avifauna associated with the proposed project

Nature: *The development of the proposed infrastructure will contribute to cumulative habitat loss for avifauna, thereby impacting ecological processes in the region.*		
	Overall impact of the proposed project considered in isolation	**Cumulative impact of the project and other projects within the area**
Extent	Moderate (3)	Moderate (3)
Duration	Short term (2)	Short-Term (2)
Magnitude	Low (4)	Moderate (4)
Probability	Improbable (2)	Probable (3)
Significance	***Low (27)***	***Medium (33)***
Status (positive or negative)	Negative	Negative
Reversibility	Moderate	Moderate
Irreplaceable loss of resources?	Yes	Yes
Can impacts be mitigated?	Yes	
Mitigation: » Should the vegetation be removed, the Impact cannot be mitigated		
Residual: » Less migratory species will be found in the area. » Road killings are still a possibility. » Migratory routes of fauna will change. » Avifauna SCC's will be influenced		

7.5 Cumulative Impacts of Visual Aspects

There are already existing high voltage power lines that traverse the study area from south to north and feed into the existing substations. The addition of the proposed new grid connection and associated infrastructure will result in an increase in this type of infrastructure within the region and could result in a cumulative visual impact.

The table below illustrates the assessment of the anticipated cumulative visual impact of infrastructure on sensitive visual receptors within the region. Visual impacts are likely to be of moderate significance with no mitigation possible.

Impact table summarizing the potential cumulative visual impact on sensitive visual receptors within the region

Nature : Potential cumulative visual impact of infrastructure on visual receptors within the region (All Alternatives)		
	Overall impact considered in isolation (with mitigation)	***Cumulative impact of the project and other projects within the area (with mitigation)***
Extent	Low (2)	Low (2)
Duration	Long term (4)	Long term (4)
Magnitude	Moderate (6)	Moderate (6)
Probability	Probable (3)	Probable (3)
Significance	***Medium (36)***	***Medium (36)***
Status (positive, neutral or negative)	Negative	Negative
Reversibility	Recoverable (3)	Recoverable (3)
Irreplaceable loss of resources?	No	No
Can impacts be mitigated?	No	

Generic best practise mitigation/management measures:

Planning:

- Respond to the natural environment during the planning of buildings and infrastructure.
- Consolidate development and make use of already disturbed sites rather than pristine areas.
- Minimize disturbance to only that strictly required to enable the development, retain natural vegetation as far as possible and rehabilitate areas disturbed by the development
- Visually break up large bulky buildings into smaller, subtler, less prominent shapes and planes.
- Plan ancillary infrastructure in such a way and in such a location that clearing of vegetation is minimised.
- Use existing roads wherever possible. Where new roads are required to be constructed, these should be planned carefully, taking due cognisance of the local topography. Roads should be laid out along the contour wherever possible, and should never traverse slopes at 90 degrees. Construction of roads should be undertaken properly, with adequate drainage structures in place to forego potential erosion problems.
- Wherever possible, use materials, coatings, or paints that have little or no reflectivity.
- Commercial messages, symbols and/logos are not permitted on structures.

Construction:

- Rehabilitate all construction areas.
- Ensure that vegetation is not cleared unnecessarily to make way for infrastructure.

Operations:

- Maintain the general appearance of the facility as a whole.
- Monitor rehabilitated areas, and implement remedial action as and when required.

Decommissioning:

- Remove infrastructure not required for the post-decommissioning use of the site.
- Rehabilitate all areas. Consult an ecologist regarding rehabilitation specifications.
- Monitor rehabilitated areas post-decommissioning and implement remedial actions.

Residual impacts:
The visual impact will be removed after decommissioning, provided the facility and ancillary infrastructure is removed. Failing this, the visual impact will remain..

7.6 Cumulative Impacts on Heritage Resources

This section evaluates the possible cumulative impacts (IC) on heritage resources with the addition of the proposed 132kV powerline grid connection infrastructure.

The following must be considered in the analysis of the cumulative effect of development on heritage resources:

- Fixed datum or dataset: There is no comprehensive heritage data set for the Beaufort West region and thus we cannot quantify how much of a specific cultural heritage element is present in the region. The region has never been covered by a heritage resources study that can account for all heritage resources. Further to this none of the heritage studies conducted can with certainty state that all heritage resources within the study area has been identified and evaluated;
- Defined thresholds: The value judgement on the significance of a heritage site will vary from individual to individual and between interest groups. Thus, implicating that heritage resources' significance can and does change over time. And so, will the tipping threshold for impacts on a certain type of heritage resource;
- Threshold crossing: In the absence of a comprehensive dataset or heritage inventory of the entire region we will never be able to quantify or set a threshold to determine at what stage the impact from developments on heritage resources has reached or is reaching the danger level or excludes the new development on this basis. (Godwin, 2011)

With regards to the heritage resources, in most cases given a low-medium heritage significance on a local scale and in the majority of the cases were recommended as being easily mitigated or avoidable. While the graves sites in all cases given a high heritage significance on a local scale and in the majority of the cases were recommended as being no-go areas or extensive mitigation required.

Nature: The extent that the addition of this project will have on the overall impact of developments in the region on heritage resources. Cumulative impacts to heritage resources would occur during the construction and operation phase when the ground surface is cleared for the power pylons and service roads are excavated		
	Overall impact of the proposed project considered in isolation	**Cumulative impact of the project and other projects in the area**
Extent	Low (1)	High (3)
Duration	Long term (4)	Long term (4)
Magnitude	Low (4)	Moderate (6)
Probability	Unlikely (2)	Unlikely (2)
Significance	**Low (18)**	**Low (26)**
Status	Negative	Negative
Reversibility	Low	Low
Irreplaceable loss of resources?	Yes	Yes
Can impacts be mitigated?	No, the majority of proposed electrical infrastructure is far too large to screen.	
Mitigation: » It can clearly be noted that the area in general is abundant with Stone Age and historical remains. However, until a regional detailed study is commissioned by HWC or SAHRA, no further mitigations measures can be proposed other than those already recommended for the site-specific mitigation of sites in this report.		
Residual impacts: Considering the nature of the site identified in the present study, the residual risk will be moderate		

7.7 Cumulative Impacts on Palaeontological Resources

Nature: The general palaeontological sensitivity of the geological formations is rated as very high. Thus the chance of discovering fossils during construction activities is rated as very probable.		
	Overall impact of the proposed project considered in isolation	**Cumulative impact of the project and other projects in the area**
Extent	Local (2)	Local (2)
Duration	Permanent (5)	Permanent (3)
Magnitude	Very high (10)	Very high (10)
Probability	Probable (3)	Probable (3)
Significance	**Medium (51)**	**Medium (51)**
Status	Negative	Negative
Reversibility	Low	Low
Irreplaceable loss of resources?	Yes	No
Can impacts be mitigated?	Yes	
Mitigation: » The ECO for this project must be informed that sediments of the Adelaide Subgroup (Beaufort Group, Karoo Supergroup) have a **Very High Palaeontological Sensitivity**. » **Training of accountable supervisory personnel** by a qualified palaeontologist in the recognition of fossil heritage is very important and necessary.		

» If Palaeontological Heritage is uncovered during surface clearing and excavations the **Chance find Protocol** attached should be implemented immediately. Fossil discoveries ought to be protected and the ECO/site manager must report to » South African Heritage Resources Agency (SAHRA) (Contact details: SAHRA, 111 Harrington Street, Cape Town. PO Box 4637, Cape Town 8000, South Africa. Tel: 021 462 4502. Fax: +27 (0)21 462 4509. Web: www.sahra.org.za) so that mitigation (recording and collection) can be carried out. » Before any fossil material can be collected from the development site the specialist involved would need to apply for a collection permit from SAHRA. Fossil material must be housed in an official collection (museum or university), while all reports and fieldwork should meet the minimum standards for palaeontological impact studies proposed by SAHRA (2012). » These recommendations should be incorporated into the Environmental Management Plan for the proposed development.
Residual impacts: Thus, an overall medium palaeontological sensitivity is allocated to the development footprint. It is therefore considered that the proposed development will not lead to detrimental impacts on the palaeontological reserves of the area and construction of the development may be authorised to its whole extent.

7.8 Cumulative Impacts on Freshwater (Aquatic Resources)

Nature: The development of the proposed infrastructure will contribute to cumulative habitat loss, habitat fragmentation at crossing points thereby impacting ecological processes in the region. Increases surface runoff from has the potential to increase water quality perturbations within the catchment.		
	Overall impact of the proposed project considered in isolation	**Cumulative impact of the project and other projects in the area**
Extent	Low (2)	Low (2)
Duration	Long Term (4)	Permanent (5)
Magnitude	Low (4)	Low (4)
Probability	High probable (4)	Definite (5)
Significance	**Medium**	**Medium**
Status	Negative	Negative
Reversibility	Low	Low
Irreplaceable loss of resources?	Yes	No
Can impacts be mitigated?	Yes	
Mitigation: » Refer to section 9.3 of the Aquatic Impact Assessment for general and specific mitigation measures to be implemented for the development.		
Residual impacts: Will result in the loss of: ▪ Less migratory species will be found in the area. ▪ Instream sedimentation ▪ Erosion ▪ Instream and riparian habitat fragmentation		

7.9 Conclusion regarding Cumulative Impacts

The assessment of the cumulative impacts was undertaken through the consideration of the grid connection infrastructure establishment in isolation and compared to the cumulative impacts of the proposed infrastructure and other similar developments surrounding the assessed footprint.

Cumulative impacts are expected to occur with the development of the infrastructure throughout all phases of the project life cycle and within the terrestrial, avifauna, aquatic, palaeontological, heritage and visual aspects of study considered as part of this BA Report. The main aim for the assessment of cumulative impacts considering the new grid connection infrastructure for the Umsinde and Khangela WEF's is to determine whether the cumulative impact will be acceptable within the landscape proposed for the development, and whether the cumulative loss, from an environmental and social perspective, will be acceptable without whole-scale change.

The significance of the cumulative impacts associated with the development of the 132kV grid connection infrastructure and associated access tracks and watercourse crossings are predominately medium.

A summary of the cumulative impacts is included in **Table 7.2** below.

Table 7.2: Summary of the cumulative impact significance for the grid connection infrastructure proposed for the Emoyeni WEFs.

Specialist assessment	Overall significance of impact of the proposed project considered in isolation	Cumulative significance of impact of the project and other projects in the area
Ecology	Low	High
Avifauna	Low	Medium
Visual	Medium	Medium
Heritage	Low	Low
Palaeontological	Medium	Medium
Aquatic	Medium	Medium

The following can be summarised and concluded regarding the cumulative impacts for the proposed grid connection infrastructure:

- **Ecological processes:** Long-term cumulative impacts due to extensive wind farm footprints (i.e. the proposed Umsinde, Khangela and Ishwati Emoyeni WEFs) , associated roads, power lines and switching stations can lead to habitat loss. Cumulative impacts are expected to be of high significance, however it is noted that the proposed 132kV switching stations , due to its extent/size proposed location outside of any sensitive habitats and features, the construction and operation of the on-site switching stations, 132kV Power lines and associated access tracks and watercourse crossings is expected to have a very limited contribution to the cumulative impacts of the area, due to their extent and the nature of such linear developments, is also expected to have a limited contribution to the cumulative impacts of the area as a result of the proposed wind energy facilities.

- **Avifauna:** The pre-mitigation cumulative impact of habitat loss associated the 400m wide development corridor and associated infrastructure in the proposed is considered low In Isolation and of medium significance due to the existing grid infrastructure in the vicinity of the proposed development. , due to the small size of the footprint, and the ample availability of similar habitat within the surrounding area and beyond. The proposed mitigation measure and avifaunal monitoring are imperative and are to be implemented in order to mitigate impacts.

- **Aquatic resources:** From the above assessment of the potential cumulative impacts, it is clear that this development in combination with the other current renewable energy developments within the area will not have a significant and detrimental impact on the regions drainage character, including important hydrological drivers and the functionality of the areas drainage features, especially the important and larger drainage features. As such this development is regarded as acceptable in terms of its low contribution to potential cumulative impacts.

- **Agricultural Potential and Soils:** The assessment area is not associated with any arable soils, due to the type of soil as well as the climate, which in itself limits crop production significantly. The harsh climatic conditions are associated with low annual rainfall and high

evapotranspiration potential demands of the area. The land capabilities associated with the regulated area are only suitable for grazing and wildlife farming, which corresponds with the current land use. Therefore no cumulative Impacts are associated with soil and agricultural potential.

- **Visual:** The construction of the grid connection infrastructure for the Emoyeni WEFs may increase the cumulative visual impact of industrial type infrastructure within the region. The anticipated cumulative visual impact of the proposed grid connection infrastructure is expected to be of medium significance. This is considered to be acceptable from a visual impact perspective.

- **Heritage:** Cumulative impacts are likely to occur due to the quantity of electrical infrastructure planned for the area. With regards to the heritage resources, in most cases given a low-medium heritage significance on a local scale and in the majority of the cases were recommended as being easily mitigated or avoidable. While the graves sites in all cases given a high heritage significance on a local scale and in the majority of the cases were recommended as being no-go areas or extensive mitigation required. With all proposed electrical facilities and infrastructure developed there will be a significant change to the landscape and it will be strongly dominated by this new land use. Given the site's location within a REDZ, this use is considered acceptable. Although the cumulative impacts to the landscape will be at least of medium significance, the present project's contribution will be small.

- **Palaeontology:** Thus, an overall medium palaeontological sensitivity is allocated to the development footprint. It is therefore considered that the proposed development will not lead to detrimental impacts on the palaeontological reserves of the area and construction of the development may be authorised to its whole extent.

- **Aquatic :**. Cumulative impacts within the catchment are associated with a increase in hard surfaces and sheet runoff during high rainfall events. Additionally, the crossing points has the potential to result in riparian and instream habitat fragmentation. The increase in foot traffic, vehicles and heavy machinery may result in increases in solid waste at crossing points (litter), spills and leaks contaminating surface water, and erosion due to disturbances to habitat at crossing points where erosion potential may be high during flooding events and resulting in downstream sedimentation. The implementation of adequate mitigation measures can reduce these risks and ongoing management plans need to be adaptable and to cater for impacts within the catchment.

Based on the specialist cumulative assessments and findings for the development of the proposed grid connection infrastructure, it can be concluded that the project cumulative impacts will be of predominantly low-medium significance. The contribution of the proposed grid infrastructure development to the cumulative impact is expected to be of medium significance as a result of the proposed number powerlines and authorised projects in the area. However, due to impacts associated with sensitive ecological, avifaunal. aquatic features and heritage/palaeontological resources all specialist mitigation and recommendations are essential and must be implemented.

SECTION 8: CONCLUSIONS AND RECOMMENDATIONS

Eskom Holdings SOC Limited is proposing establishment of the 132kV Grid Connection Infrastructure, associated Access Tracks & Water Course crossings within a 400m wide development corridor associated with the authorised Umsinde, Khangela and Ishwati Emoyeni Wind Energy Facilities located in the Beaufort West & Ubuntu Local Municipalities, and Central Karoo And Pixely Ka Seme District Municipalities, Northern And Western Cape Province. The grid connection infrastructure will evacuate electricity to the National Grid. The infrastructure and key components considered as part of this Basic Assessment process includes:

- A 132kV collector substation (switching station) within the authorised Umsinde Emoyeni WEF site (adjacent to the authorised WEF facility substation) with a footprint of approximately 100m X 80m (~0.8ha) to be located within an assessment footprint that encompasses a 300m radius.
- A 132kV collector substation (switching station) within the authorised Khangela Emoyeni WEF site (adjacent to the authorised WEF facility substation) with a footprint of approximately 100m X 80m (~0.8ha) to be located within an assessment footprint that encompasses a 300m radius.
- A 132kV collector substation (switching station) within the authorised Ishwati Emoyeni WEF site (adjacent to the authorised WEF facility substation) with a footprint of approximately 120m X 100m (~1.2 ha) with an assessment footprint that encompasses a 300m radius. The establishment of a 132kV powerline within a 400m wide corridor that will extend from the Khangela switching station to the Ishwati switching station (~36km), and then onward for ~25km to the Eskom Gamma Substation. In addition, a further length of 132kV powerline (within a 400m wide corridor) will extend from the Umsinde switching station to the Khangela switching station for ~8km OR it may connect directly into the Khangela-Ishwati powerline at the Khangela switching station. An extended powerline development corridor of approximately 1.91 km^2 has been assessed in the vicinity of the Gamma Substation, that will enable the 132kV powerline to connect to either the south face of the Gamma Substation yard or approach from the east, depending on the available connection point at the time of connection. The 132kV Powerline from Umsinde to Khangela, and from Khangela to Ishwati and onward to Gamma Substation will be a single- or double-circuit overhead powerline, with a single set of pylons structures with a maximum height of 35m. Access/service tracks (jeep track) up to 7m wide and associated watercourse crossings will be associated with the powerline, and will be located within the assessed powerline corridor.
- The establishment of a new access road approximately 14km long from the existing public road from Richmond to the Ishwati switching station site. The proposed new access road will be unsealed and up to 12m wide during construction , but will be reduced to a maximum of 6 m width during operation.

It must be noted that the proposed switching stations are located within the authorised Umsinde, Khangela and Ishwati Wind Energy Facility footprints (however, yet to be constructed).

The grid connection infrastructure is considered as essential infrastructure to the authorised Emoyeni Wind Energy Facilities in order to enable the operation of the facilities within the project site which has been authorised for the development. The proposed grid connection infrastructure will be partially developed within the authorised WEF footprints. The greater part of the proposed 400m wide development corridor and associated infrastructure is located within the Beaufort Renewable Energy Development Zone (REDZ), and within the a part of the central corridor of the Strategic Transmission Corridors.

Specialist studies undertaken in support of this application were required to be in accordance with the recently promulgated Specialist Protocols. The properties affected by the development are as follows:

Within the Murraysburg Division, Western Cape:

- Portion 1 of Farm Klein Driefontein 152
- Remainder of Farm De Hoop No. 30;
- Portion 2 of Farm De Hoop No. 30
- Remainder of Farm Swavel Kranse No. 28

- Portion 2 of Farm Swavel Kranse 28
- Portion 4 (a Portion of Portion 1) of Farm Driefontein No. 26
- Portion 1 of the Farm Klipplaat No. 109
- Remainder Klipplaat No. 109
- The Farm Rietpoort No. 9
- Remainder of Farm Driefontein No. 8
- Portion 3 of Farm Badfontein No. 10 (powerline alternative 1 route)
- Remainder & Portion 2 of Farm Leeuwenfontein No. 6
- Portion 4 (a portion of portion 1) of Farm Allemansfontein No.7
- Portion 2 (a portion of portion 1) of Farm Allemansfontein No.7
- The Farm Klein Los Kop No.5
- Remainder of the Farm Schietkuil No.3

Within the Richmond Division, Northern Cape:

- Portion 6 of Farm Klipplaat No. 109
- Portion 4 (a Portion of Portion 2) of Farm Klipplaat No. 109
- Portion 1 of the Farm Uitvlugtfontein No. 265

A summary of the recommendations and conclusions for the proposed development as determined through the BA process is provided in this section.

8.1 Legal Requirements as per the EIA Regulations, 2014 (as amended), for the undertaking of a Basic Assessment Report

This section of the BA Report includes the following information required in terms of Appendix 1:

Table 8.1 Content of the BA Report:

Requirement	Relevant Section
3(k) where applicable, a summary of the findings and impact management measures identified in any specialist report complying with Appendix 6 to these Regulations and an indication as to how these findings and recommendations have been included in the final report	A summary of the findings of the specialist studies undertaken for the grid connection infrastructure establishment has been included in section 8.2.
3(l) an environmental impact statement which contains (i) a summary of the key findings of the environmental impact assessment, (ii) a map at an appropriate scale which superimposes the proposed activity and its associated structures and infrastructure on the environmental sensitivities of the preferred site indicating any areas that should be avoided, including buffers and (iii) a summary of the positive and negative impacts and risks of the proposed activity and identified alternatives.	An environmental impact statement containing the key findings of the environmental impacts has been included as section 8.5. Sensitive environmental features located within the 400m wide development corridor, overlain with the proposed development footprint have been identified and are shown in Figure 8.1. A summary of the positive and negative impacts associated with the grid connection infrastructure has been included in section 8.5.
h (xi) a concluding statement indicating the preferred alternatives, including preferred location of the activity.	A concluding statement indicating the preferred alternatives and the preferred location of the activity is included in section 8.6.
3(n) any aspects which were conditional to the findings of the assessment either by the EAP or specialist which are to be included as conditions of authorisation.	All conditions required to be included in the Environmental Authorisation of the grid connection infrastructure have been included in section 8.7.

3(p) a reasoned opinion as to whether the proposed activity should or should not be authorised, and if the opinion is that it should be authorised, any conditions that should be made in respect of that authorisation.	A reasoned opinion as to whether the grid connection infrastructure should be authorised has been included in section 8.7.

8.2 Evaluation of the supporting infrastructure establishment

The preceding sections of this BA Report together with the specialist studies contained within **Appendices D-H** provide a detailed assessment of the potential impacts that may result from the development of the 400m wide development corridor and associated infrastructure to support the Emoyeni Wind Energy Facilities. This particular section concludes the environmental assessment of the project by providing a summary of the results and conclusions of the assessment. In doing so, it draws on the information gathered as part of the BA process, the knowledge gained by the environmental specialists and the Environmental Assessment Practitioner (EAP) and presents a combined and informed opinion of the environmental impacts associated with the development.

No environmental fatal flaws were identified in the detailed specialist studies conducted. Impacts were identified as predominantly medium with the implementation of mitigation measures that are key in the avoidance of sensitive features, such as flora and fauna of concern, sensitive riparian habitats, and the installation of anti-collision bird devices and monitoring.

Impacts identified to be associated with the proposed project and assessed within this report include:

- Impacts on ecology (including flora, fauna).
- Impacts on aquatic resources.
- Impacts on avifauna.
- Impacts on heritage resources, including archaeology and palaeontology.
- Impacts on agricultural potential and soils
- Impact on visual aspects.

8.2.1. Impacts on Ecology

The impacts of the proposed establishment of 132kV Grid Connection , Associated Access Tracks & Water Course Crossings within a 400m wide development corridor and access road to the Ishwati switching station as a result of loss and fragmentation of habitats, ecosystems and vegetation, introduction of alien species, destruction of plant species and displacement of faunal communities, direct mortalities and poaching the significance of impacts are considered be medium to high prior to the implementation of mitigation measures and of medium-low significance with the implementation of mitigation measures. The ecosystems on site were still natural to largely natural based on the diversity of species recorded, and the habitat physiognomy. The current natural ecosystems provide important ecosystem services including water regulation and pollination. However, certain areas are degraded due to overgrazing and erosion were still nevertheless functional. Areas of rocky outcrops delineated as assigned a Site Ecological Importance (SEI) of "Very High" sensitivity are considered no go areas and may be used for construction only if no other alternative is possible and construction in these areas is unavoidable. Where possible these areas should be spanned by overheard powerlines. Where it is not feasible or practicable to span the Very High SEI areas completely, then the minimum possible number of pylons with the smallest possible footprint must be utilised and the disturbance footprint must be strictly controlled. A service track (jeep track) is permissible in Very High SEI areas only to the extent required to establish and maintain the powerline, and only if no other access options are available in areas of lower sensitivity. Personnel are not to use these areas for any other reason (to prevent additional erosion, loss of fauna and flora etc). The option with the least impacts is the preferred alternative, or alternative 2, although only marginally as they traverse slightly less high SEI areas than alternative 1. As many of the Very High SEI areas should be avoided as possible. The preferred alternative is therefore considered the most acceptable option. Placement of infrastructure anywhere within the assessed corridors is considered acceptable, subject to the mitigation measures specified in this report and subject to the minimisation of the disturbance within high SEI areas as far as possible. Additionally, it is also recommended that the substation access road should avoid crossing the EN river and riparian zone as far as possible. It would be preferable to construct the access road follow the already existing section of farm road that already crosses the river, to minimise further habitat fragmentation. Considering the above-mentioned information, the proposed

development will result in the in the destruction of some functional habitats. It is the opinion of the specialist that the proposed activities can go ahead provided areas of high to very high SEI are avoided as far as practicable, and control of introduced alien invasive plants, as well as erosion mitigation is implemented.

8.2.2. Impacts on Avifauna

Displacement of avifauna , habitat loss, along with collisions and electrocutions are regarded as the greatest impact associated with the proposed grid connection infrastructure for the Emoyeni Wind Energy Facilities. The significance of impacts was determined to be of medium to high significance pre-mitigation and of high-low significance post mitigation. During the field assessment 99 bird species were recorded of these eight of the species recorded were SCCs on a national or international scale. Blue Crane (*Grus paradisea*), Karoo Korhaan (*Eupodotis vigorsii*), Kori Bustard (*Ardeotis kori*), Ludwigs Bustard (*Neotis ludwigii*), Martial Eagle (*Polemaetus bellicosus*), Secretary bird (*Sagittarius serpentarius*), Verreauxs Eagle (*Aquila verreauxii*), and Lanner Falcon (*Falco biarmicus*) were the SCCs recorded. One nest of a Verreauxs Eagle was found close to the Gamma substation in an existing 400kV powerline, while an additional two nests' locations were provided by local farmers (these areas could not be accessed to confirm the nests).

The high number of SCCs present increases the overall sensitivity of the area and is the reason for the powerline corridor mainly being made up of Very-High and High sensitivity areas. The straight approach of the powerline at the Gamma station (from the east) is preferred , the southern approach is acceptable should all the mitigations be implemented depending on the available connection point at the time of the connection . The principle impacts of the operational phase are electrocution and collisions due to the powerlines. The impact of electrocutions were rated as High pre-mitigations and Low post- mitigations, while the collisions were rated as High pre-mitigations but were still high even after the implementation of mitigations. Mitigations in this instance would be the installation of bird diverters. The reason for the High post mitigation rating is because of the high number and density of SCCs recorded in the area. The development falls in a previously authorised WEF PAOI along with previously authorised powerlines. Therefore, even though the project intersects some areas of high sensitivity it is not regarded as a fatal flaw based on the previous assessments and their findings and recommendations. Considering the above-mentioned information, the proposed development will result in the in the destruction of some functional habitats. It is the opinion of the specialist that the proposed activities can go ahead provided areas of high to very high SEI are avoided as far as practicable and all recommendations as specified by the specialist report are implemented for the project.

8.2.3. Impacts on Aquatic Resources

A variety of risks have been identified for the proposed project for both the construction and operational phase. These include small scale drainage patterns change; isolated removal of embankment vegetation areas for select roads; operation of equipment and machinery outside riparian areas; soil and building material stockpile management; domestic and industrial waste; storage of chemicals, mixes and fuel and final landscaping and post-construction rehabilitation for the construction phase of the project as well as alteration of surface drainage and runoff; storm water management; operation of transmission line and substation; establishment of alien plants on disturbed areas and conducting maintenance for the operational phase of the project. The impacts however are largely mitigated by the transmission line only crossing the watercourses by means of multiple pylon structures (towers) with towers, substations and laydown yards outside of delineated riparian areas and associated buffers. As a result, all identified risks for both the construction phase and the operational phase are considered low. It is the opinion of the specialists that after a consideration of the current sensitivity of the assessed systems, which was calculated at "High' according to the site ecological importance as well as the potential risks which may result from the powerline routes, that the 400 m corridor along with the 1.91 km^2 extended corridor be approved as the development of the grid connection infrastructure within the assessed corridors are acceptable regardless of whether the 132kV powerline connects to the south face or eastern face of the Gamma Substation yard, provided all delineated no-go areas are avoided (with the exception of the watercourse crossings) and the recommended mitigations are applied. Therefore the project poses no fatal flaws and the project qualifies for authorisation under the provisions of the General Authorisation provided that the mitigation measures held within are adhered to. No additional walk throughs for the aquatic specialist assessment are required along the proposed corridor.

8.2.4. Assessment of Agricultural Potential and Soils Impacts

The most sensitive soil forms identified within the assessment area is the Oakleaf and Quaggafontein soil forms. The land capability sensitivities (DAFF, 2017) indicate land capabilities with "Low" and "Moderate" sensitivities. The assessment area is not associated with any arable soils, due to the type of soil as well as the climate, which in itself limits crop production significantly. The harsh climatic conditions are associated with low annual rainfall and high evapotranspiration potential demands of the area. The land capabilities associated with the regulated area are only suitable for grazing and wildlife farming. It is the specialist's opinion that the proposed grid connection and associated infrastructure will have no impacts on the agricultural production ability of the land. Additionally, the proposed activities will not result in the segregation of any high production agricultural land. The development within the 400 m corridor beyond the required 50 m recommended assessment buffer for soils also has no effects on the agricultural potential of the land. Some of the field crop boundaries between the Khangela to Ishwati substations were identified as "high sensitivity", and these areas should be treated as no-go areas for substations, pylons and access/service tracks (unless agreed otherwise with the landowner). The powerline may however span these crop fields. The assessment area associated with the access road to the Ishwati switching station is not associated with any arable soils, due to the type of soil as well as the climate, Ih in itself limits crop production significantly. It is the specialist's opinion that the proposed grid connection and associated infrastructure will have no impacts on the agricultural production ability of the land. The assessment area does not consist of high clay content soils, it is mainly dominated by very shallow soils with restrictive hard rock layers. Therefore, there will not be any results of segregation of any high production agricultural land. The assessed corridors including the 400 m development corridor and the 1.91 km2 extended corridor, 300m substation assessment areas and access road will not have any impact on the agricultural potential of the land. Therefore, the proposed development may be favourably considered.

8.2.5. Impacts on Heritage (including archaeology and palaeontology)

An overall medium palaeontological sensitivity is allocated to the development footprint. Three powerline alternatives (i.e., Preferred Alternative, Alternative 1 and Alternative 2) as well as an extended development corridor enabling the 132kV powerline to connect either to the south face of the Gamma substation yard or approach from the east) is considered for the development. From a Palaeontological view there is no preference between these alternatives. The development will thus not lead to detrimental impacts on the palaeontological reserves of the area (if mitigations measures are followed) and construction of the development may be authorised to its whole extent..

The pre-construction and construction phase of the proposed development will entail extensive surface clearance as well as excavations into the superficial sediment cover and underlying bedrock (e.g., for powerlines, new access roads, on-site substations). The possible pre-construction impacts calculated on the tangible cultural heritage resources is overall MODERATE NEGATIVE rating but with the implementation of the recommended buffers and management guidelines will be reduced to a LOW impact. Owing to the location of the historical farmstead (PL_06) within the proposed 400m grid corridor, the "Preferred" and "Alternative 1" powerline routes are less preferred. If possible, "Alternative 2" should be considered from a heritage perspective. However, all three alternatives are acceptable subject to the recommended mitigation.

Therefore, the proposed development can be placed anywhere within the assessed corridors, provided that the delineated no-go areas are avoided, and the recommended mitigations are applied. Considering the overall assessment, the impact of the proposed development would be acceptably Low or could be totally mitigated. As such it Is the specialists opinion that the project should be approved from a heritage perspective.

8.2.6. Impacts on Visual aspects

The proposed infrastructure will be visible within an area that is generally characterised by low growing shrubland and wide-open undeveloped spaces. The infrastructure would thus be highly visible and impossible to hide within an area that incorporates potentially various sensitive visual receptors that may consider visual exposure to this type of infrastructure to be intrusive. The low occurrence of such sensitive visual receptors within this environment, specifically in close proximity to the proposed infrastructure as well as the presence of existing high voltage overhead powerlines, is of relevance however, and has affected the significance rating of the anticipated visual impacts. Overall, the post mitigation significance of the visual impacts for all the alternatives is predominately moderate to low. A high significance rating is anticipated for users travelling along the secondary roads and residents of dwellings within 0.5 km from the proposed infrastructure. However, due to the low number/ density of homesteads/dwellings within the study area and the fact that observers travelling along the secondary road will only experience a visual intrusion for a short period of time,

this impact is anticipated to be greatly reduced. The visual impacts are not considered to be fatal flaws for a development of this nature particularly due to the remote location of the study area and very low density of visual receptors. While all three (3) of the alternatives have been found to have a similar impact and therefore considered acceptable, it is recommended that the Preferred Alternative for the proposed development of 132 kV overhead powerlines, three (3) 132 kV on-site substations (switching stations), new access tracks and watercourse crossing points associated with the authorized Emoyeni Wind Energy Facilities, as per the assessed layout (i.e. placement anywhere within the 400 m corridor) be supported from a visual perspective, subject to the implementation of the suggested best practice mitigation measures provided in the report.

8.2.7. Assessment of Cumulative Impacts

The grid infrastructure establishment is partially located within the authorised Umsinde, Khangela and Ishwati Wind Energy Facilities. The project site is also surrounded by several other authorised renewable energy facilities and associated grid connection infrastructure.

Based on the specialist cumulative assessments and findings regarding the development of the 400m wide grid development corridor and grid associated infrastructure for the Emoyeni Wind Energy Facilities (refer to Section 7 and specialist reports contained within Appendix D – I)and its contribution to the overall impact within the surrounding area, it can be concluded that there are no cumulative impacts or risks identified as unacceptable with the development of the 400m wide grid development corridor and grid associated infrastructure within the surrounding area. Considering all aspects, cumulative impacts associated with the infrastructure establishment have been assessed to be acceptable, with no unacceptable loss or risk expected.

No environmental fatal flaws were identified in the detailed specialist studies conducted for the grid infrastructure establishment. All impacts associated with the project establishment within the development footprint can be mitigated to acceptable levels or enhanced through the implementation of the recommended mitigation or enhancement measures.

8.3 Consideration of Alternatives

The proposed 132kV powerline placement will also determine the placement of the access roads and water crossings within the 400m wide development corridor and 1,91km^2 extended at the Gamma Substation to allow for connection of the powerline from the east or the south. Access roads will enable the transportation of construction material as well as construction teams to the construction site and facilitate maintenance activities during the operational phase along the powerline route and to the Ishwati switching station. Water Course crossings will be required wherever such crossings are required along the access roads and any alternatives of such points will be determined by the powerline alternatives. The preferred alternative has been selected based on the site sensitivities within the assessment corridor and terrain.

132kV Powerline (Preferred Alternative) within the 400m wide development corridor:

- The proposed 132kV powerline will start at Umsinde onsite switching station located within the authorised Umsinde Emoyeni WEF within a 400m wide development corridor and traverse in a north-westerly direction towards the proposed Khangela on-site switching station (located within the authorised Khangela Emoyeni WEF). The powerline then follows a south westerly direction before turning towards a generally northern westerly direction towards the proposed Ishwati onsite switching station (located within the proposed Ishwati Emoyeni WEF). (This preferred alternative route traverses towards the Ishwati onsite switching station with a pronounced bend in trajectory). From the Ishwati Emoyeni switching station the powerline traverses in the same general north-westerly direction to within an extended 1.91 km^{2}corridor to enable the connection to the existing Eskom Gamma Substation either from the east or the south.

132kV Powerline (Alternative 1) within the 400m wide development corridor :

- The proposed 132kV powerline will start at Umsinde onsite switching station located within the authorised Umsinde Emoyeni WEF within a 400m wide assessment corridor and traverse in a north-westerly direction towards the proposed Khangela on-site switching station (located within

the authorised Khangela Emoyeni WEF). The powerline then follows a south westerly direction before turning towards a generally north westerly direction towards the proposed Ishwati onsite switching station (located within the proposed Ishwati Emoyeni WEF). (This alternative 1 route traverses towards the Ishwati onsite switching station with a slightly bend in trajectory). From the Ishwati Emoyeni switching station the powerline traverses in the same general north-westerly direction to within an extended 1.91 km^2 corridor to enable the connection to the existing Eskom Gamma Substation either from the east or the south.

132kV Powerline (Alternative 2) within the 400m wide development corridor:

- The proposed 132kV powerline will start at Umsinde onsite switching station located within the authorised Umsinde Emoyeni WEF within a 400m wide assessment corridor and traverse in a north-westerly direction towards the proposed Khangela on-site switching station (located within the authorised Khangela Emoyeni WEF). The powerline then follows a south westerly direction before turning towards a generally northern western direction towards the proposed Ishwati onsite switching station (located within the proposed Ishwati Emoyeni WEF). (This alternative 2 route traverses straight north-westerly on to the Ishwati onsite switching station). From the Ishwati Emoyeni switching station the powerline traverses in the same general north-westerly direction to within an extended 1.91 km^2 corridor to enable the connection to the existing Eskom Gamma Substation either from the east or the south.

These 3 alternatives were considered as part of this BA process and fall within 400m wide development corridors. These alternatives for connecting the authorised Emoyeni WEFs to the national grid are considered to be acceptable from an environmental perspective considering the sensitive environmental features present, topographical features and mitigation measures proposed. Considering the fact that these options are acceptable from a bio-physical and social perspective, the technically preferred option will be nominated as the preferred option for the development of the 400m wide development corridor and associated infrastructure. The preferred option of the 400m wide development corridor is based on environmental sensitivities and topographical considerations.

8.4 Environmental Sensitivity Mapping

As part of the specialist investigations undertaken within the infrastructure development footprint, specific environmental features and areas were identified which will be impacted by the placement of the infrastructure. The current condition of the features identified (i.e. intact or disturbed) informed the sensitivity of the environmental features and the capacity for disturbance and change associated with the proposed development. The environmental sensitive features and areas identified within the development footprint are illustrated in **Figures 8.1 to 8.6**. The sensitive features identified specifically relate to ecological, freshwater resources, heritage and avifauna resources, and are detailed below:

- **Terrestrial Ecology:** In terms of the terrestrial site ecological sensitivity , majority of the 400m development corridor is associated with medium-high sensitivity areas associated with Karoo scrub habitats (flat) with a few very high sensitivity areas that area associated with rocky outcrops that encompass increased biodiversity and a wetland areas within the corridor. The areas delineated as rocky outcrops (very high sensitivity) are considered no-go areas for pylon placement and access tracks and may be used from construction only if no other alternative is possible during construction and construction within these areas are unavoidable, where possible these areas should be spanned by overhead powerlines. Where is it not feasible to span these very high sensitivity areas completely then the minimum possible number of pylons with the smallest footprint must be utilised. Service tracks within the corridor is only permitted in very high sensitivity areas only to establish the powerlines and maintain the powerline only if there are no other areas or lower sensitivity. The option with the least impacts is the preferred alternative, or alternative 2, although only marginally as they traverse slightly less high SEI areas than alternative 1. As many of the Very High SEI areas should be avoided as possible. The preferred alternative is therefore considered the most acceptable option. The access road to the Ishwati switching station was determined to be of very low – medium sensitivity as majority of the access road was associated with degraded and Karoo Scrub habitats. Two sections along the proposed access road were associated with very high sensitivity due to the presence of rocky outcrops associated with high biodiversity. All laydown areas, chemical toilets etc. should be restricted to "Medium" or "Low" sensitivity areas.
- **Avifauna**: Based on the criteria above, all habitats of the proposed projects were allocated a sensitivity category. It is based on these habitats and the physical recording of flight paths and nest locations that allowed the for the sensitivities to be delineated into Medium, High and Very High. Very high sensitivity areas within the corridor are associated with Rocky outcrops and wetlands including the presence of a Verreaux Eagle nest

within an existing powerline pylon located close to the Gamma substation. The straight approach of the powerline at the Gamma station is preferred, the southern approach is acceptable should all the mitigations be implemented. Should this not be possible the 132kV powerline should be routed as close as possible to the existing 400kV OHLs near Gamma MTS (should the 132kV OHL run parallel to the 400kV OHLs), and should traverse the existing 400 kV OHLs as close to perpendicular as is feasible, to limit the length of the 132kV span between the existing 400kV OHLs. The option with the least impacts is the preferred alternative, or alternative 2, although only marginally as they traverse slightly less high SEI areas than alternative 1. As many of the Very High SEI areas should be avoided as possible for pylon placement and access tracks. The preferred alternative is therefore considered the most acceptable option provided that the design of the grid lines must be of a type or similar structure as endorsed by the Eskom-EWT Strategic Partnership on Birds and Energy, considering the mitigation guidelines recommended by Birdlife South Africa (Jenkins et al., 2015) and construction must take place in the winter months as far as possible. If this is not possible then an area of 500m surrounding the Verreaux Eagle nest near the Gamma substation must be avoided and development in this area should be restricted to the winter months.

- **Aquatic**: The biodiversity theme sensitivity as indicated in the screening report (compiled by the National Web based Environmental Screening Tool) was derived to be 'Very High' mainly due to the CBA and ESA status of the area and the fact that the watercourses are either CR on E ecosystem. The completion of the aquatic assessments disputes the 'Very High' sensitivity presented by the screening report. The project area is a low/ very low probability of CR, EN, VU or Extremely Rare species with none sampled during the survey, however the resilience of these systems are medium/low as their recovery to original species composition and functionality due to modification will be slow. As a result, the calculated sensitivity rating of 'High' was assigned to the watercourses of the project area. The 400 m corridor alternatives along with the 1.91 km2 extended corridor can be approved as the development of the grid connection infrastructure within the assessed corridors are acceptable, provided all delineated no-go areas are avoided, with the exception of the watercourse crossing points for the access tracks (including Ishwati SS access road) and that the recommended mitigations are applied. Therefore, the project poses no fatal flaws and the project qualifies for authorisation under the provisions of the General Authorisation provided that the mitigation measures held within are adhered to.
- **Palaeontology:** The general palaeontological sensitivity of the geological formations is rated as very high. Thus, the chance of discovering fossils during construction activities is rated as very probable. An overall medium palaeontological sensitivity is allocated to the entire development footprint. Three powerline alternatives (i.e., Preferred Alternative, Alternative 1 and Alternative 2), access road, as well as an extended development corridor enabling the 132kV powerline to connect either to the south face of the Gamma substation yard or approach from the east) is considered for the development. From a Palaeontological view there is no preference between these alternatives. The development will thus not lead to detrimental impacts on the palaeontological reserves of the area (if mitigations measures are followed) and construction of the development may be authorised to its whole extent. All recorded fossil sites have been recorded within the sensitivity mapping with the implementation of the chance find fossil procedure to be implemented for the development.
- **Heritage:** One (1) historical farmstead (PL_06) is located on the farm Driefontein and falls within the 400m assessment corridor. It is a multi-component site which provides evidence for the presence of both Stone Age and historic peoples within the landscape. The site comprises several elements, namely: stone tool surface scatters, historic structures (incl. kraals) and middens associated with the original farmstead, a historic burial ground, informal grave sites, a farm labourers' residence and a natural spring. The site was assessed as having high heritage significance with a Grade 3A rating. Four (4) structures (PL_02, PL_05, PL_08, PL_10) were rated as having low heritage significance/no heritage significance. Two (2) sites with rock engravings (K002, K003) were rated as having medium-low heritage significance. Five (5) stone tool surface scatters (PL_01, PL_03, PL_04, PL_07, PL_09) were rated as having low heritage significance. One (1) rock art site (PL_11) was rated as having high heritage significance, however it is located a considerable distance (>2km) from the proposed development area and will therefore not be impacted upon. , One (1) small stone packed feature (PL_12) of unknown purpose and origin was rated as having low heritage significance. All recorded features have been recorded within the sensitivity mapping and only those that require mitigation and implementation of a buffer have been included within the sensitvity mapping.
- **Soil & Land Capability:** According to the National Web based Environmental Screening Tool, the proposed development is located within a "Low" sensitivity land capability area. The most sensitive soil forms identified in the project area include Vaalbos, Carolina, Dundee, Oakleaf and Quaggafontein soil forms. The above-mentioned soils have been determined to have a land capability of class "IV" as well as a climate capability level 8 given the low Mean Annual Precipitation (MAP) and the high Mean Annual Potential Evapotranspiration (MAPE) rates. The combination between the determined land capabilities and climate capabilities results in a land potential of "L6", which is defined as having very restricted potential. The sensitivity of this land potential is characterised by a "Low Sensitivity" therefore these have not been includeed within the sensivity

mapping. The available crop fields within the assessment area are categorised as high sensitivity amd recommended these crop fields be regarded as no-go areas for substations, pylons and service tracks (uness othewrwise agreed upon with landowners). These high sensitivity areas have been included as crop boundaries within the sensitivity mapping.

8.5 Environmental Costs Benefits of the Supporting Infrastructure

Environmental costs (including those to the natural environment, economic and social environment) can be anticipated at a local and site-specific level and are considered acceptable provided the mitigation measures, as outlined in the BA Report and the Generic EMPr's, are implemented and adhered to. No fatal flaws have been identified for all the alternatives identified. These environmental costs could include:

- A loss of biodiversity, flora and fauna due to the clearing of land for the construction and utilisation of land for the grid infrastructure for the Emoyeni Wind Energy Facilities - The cost of loss of biodiversity is considered to be large due to the combined footprint of the infrastructure and the partial placement of it within the authorised WEF's as well as vegetation and features considered of a high sensitivity. However, impacts can be minimised through the avoidance of sensitive features and the implementation of mitigation measures.
- Loss of avifauna habitat and loss of avifauna – The cost of the loss of habitat and the loss of avifauna species is considered to be low. Electrocutions of priority species, on the 132kV powerline network are a possibility as these are overhead powerlines. The entire study area is regarded as highly sensitive due to the regular occurrence of Red List species. However, the impact will be limited due to the ample availability of habitat in the immediate surrounding area and beyond, and the relatively small footprint of the proposed infrastructure.

Benefits of the grid infrastructure establishment include the following:

- The project will provide essential infrastructure to the authorised Emoyeni WEFs, facilitating the development thereof, ultimately realising the benefits associated with this project at a regional and national level.
- The project will facilitate the connection of the authorised WEFs to the national grid, allowing for the distribution of up to 147MW (Umsinde Emoyeni WEF) & 147MW (Ishwati Emoyeni WEF) & 147MW Khangela Emoyeni WEF) of electricity.
- The project contributes towards the Provincial and Local IDP objectives for the provision of electricity for both the Northern Cape and Western Cape Provinces.

The benefits of the grid infrastructure development are expected to occur at a national, regional and local level. If the costs to the environment can be largely limited to a site-specific level through the appropriate placement of the grid infrastructure within the 400m wide development corridors and within areas considered to be acceptable for the development, the benefits of the project are expected to outweigh the environmental costs of the development.

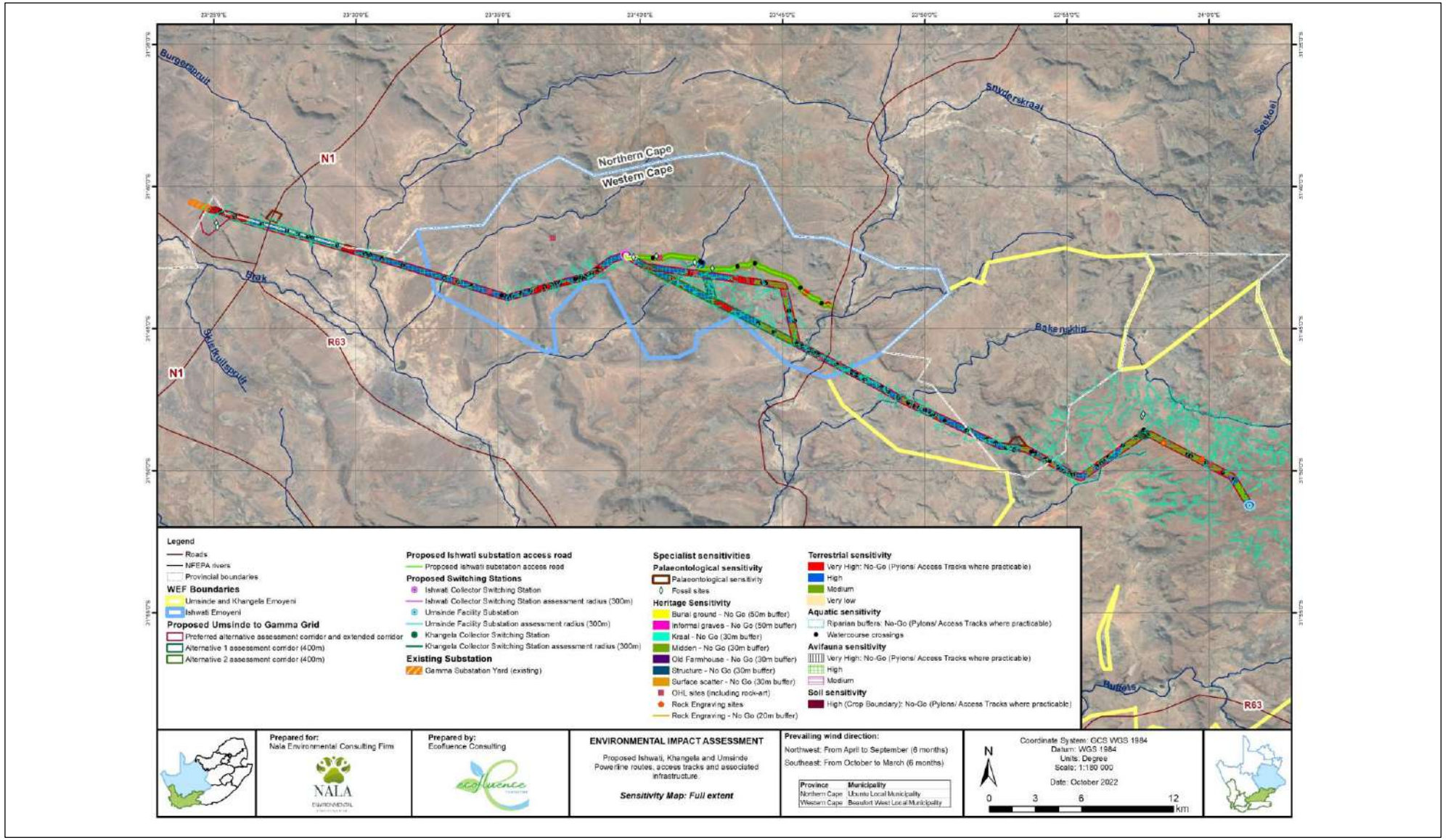


Figure 8.1: Environmental sensitivity and full layout map of the proposed infrastructure development footprint (**map is included in Appendix B**).

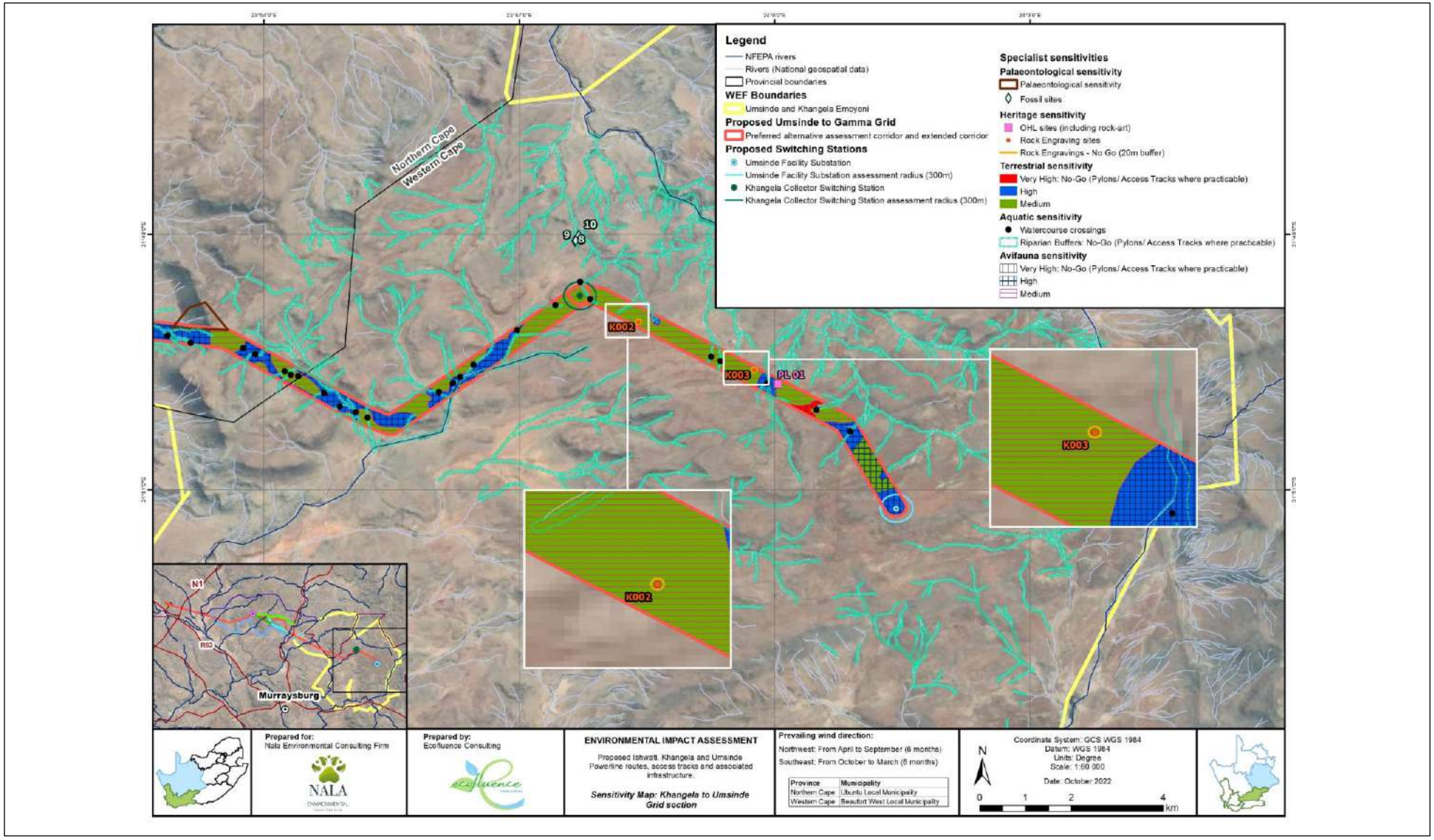


Figure 8.2: Environmental sensitivity and layout map of the proposed infrastructure development footprint from the Khangela switching station to the Umnsinde switching station (map is included in Appendix B).

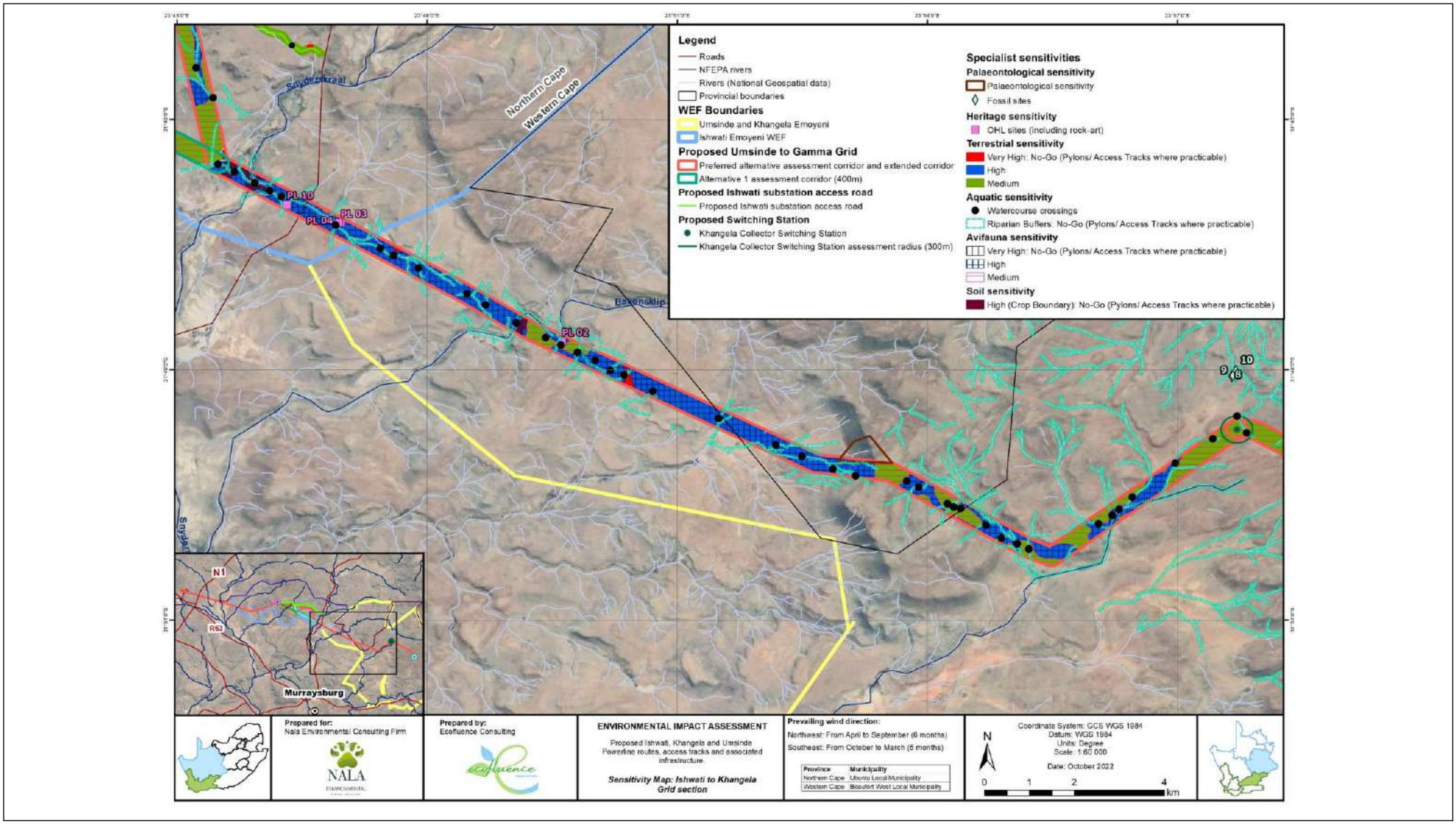


Figure 8.3: Environmental sensitivity and layout map of the proposed infrastructure development footprint from the Khangela switching station to the Umsinde switching station(map is included in Appendix B).

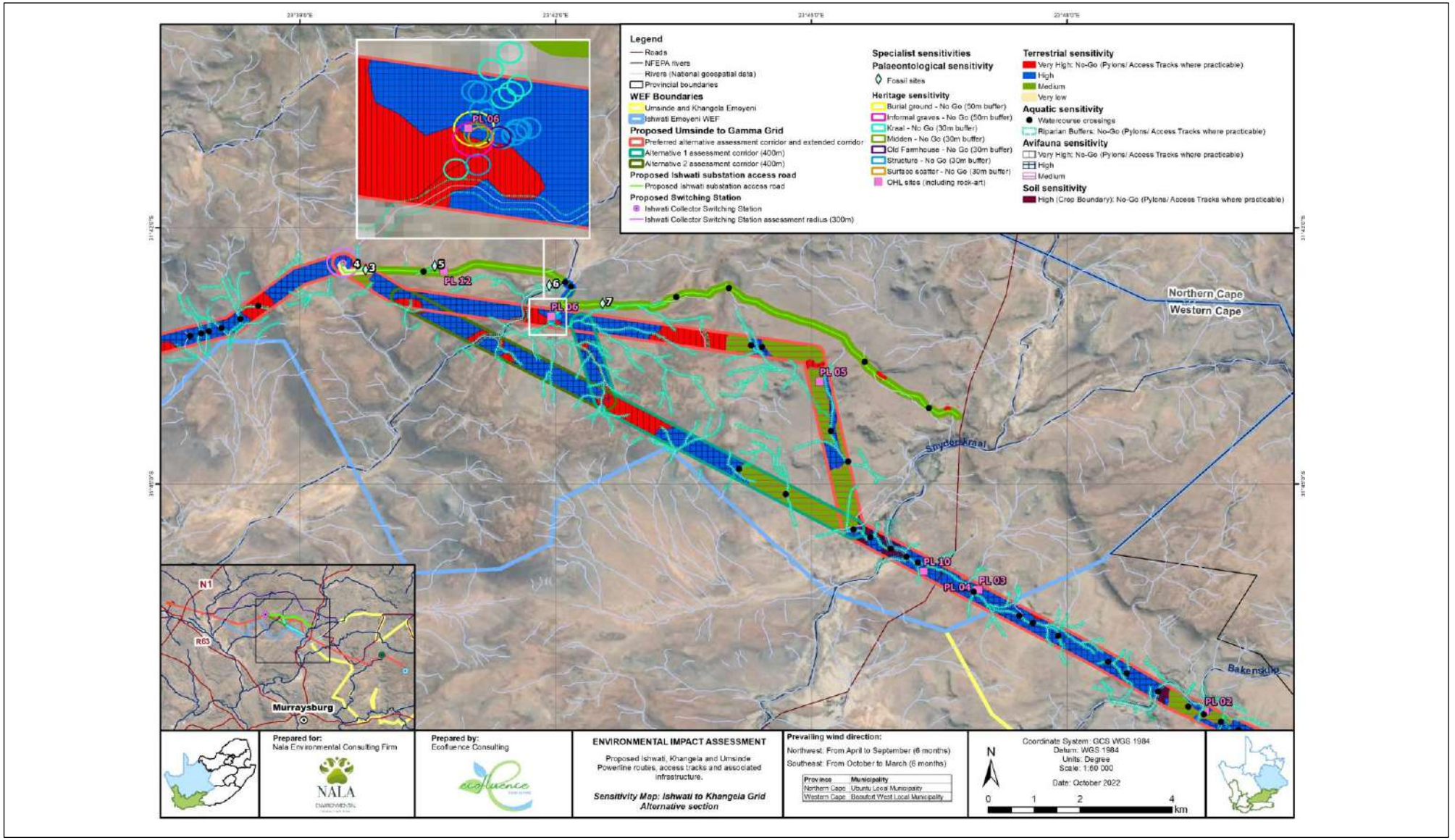


Figure 8.4: Environmental sensitivity and layout map of the proposed infrastructure development footprint from the Ishwati switching station to the Khangela switching station including the proposed corridor route alternatives (map is included in Appendix B).

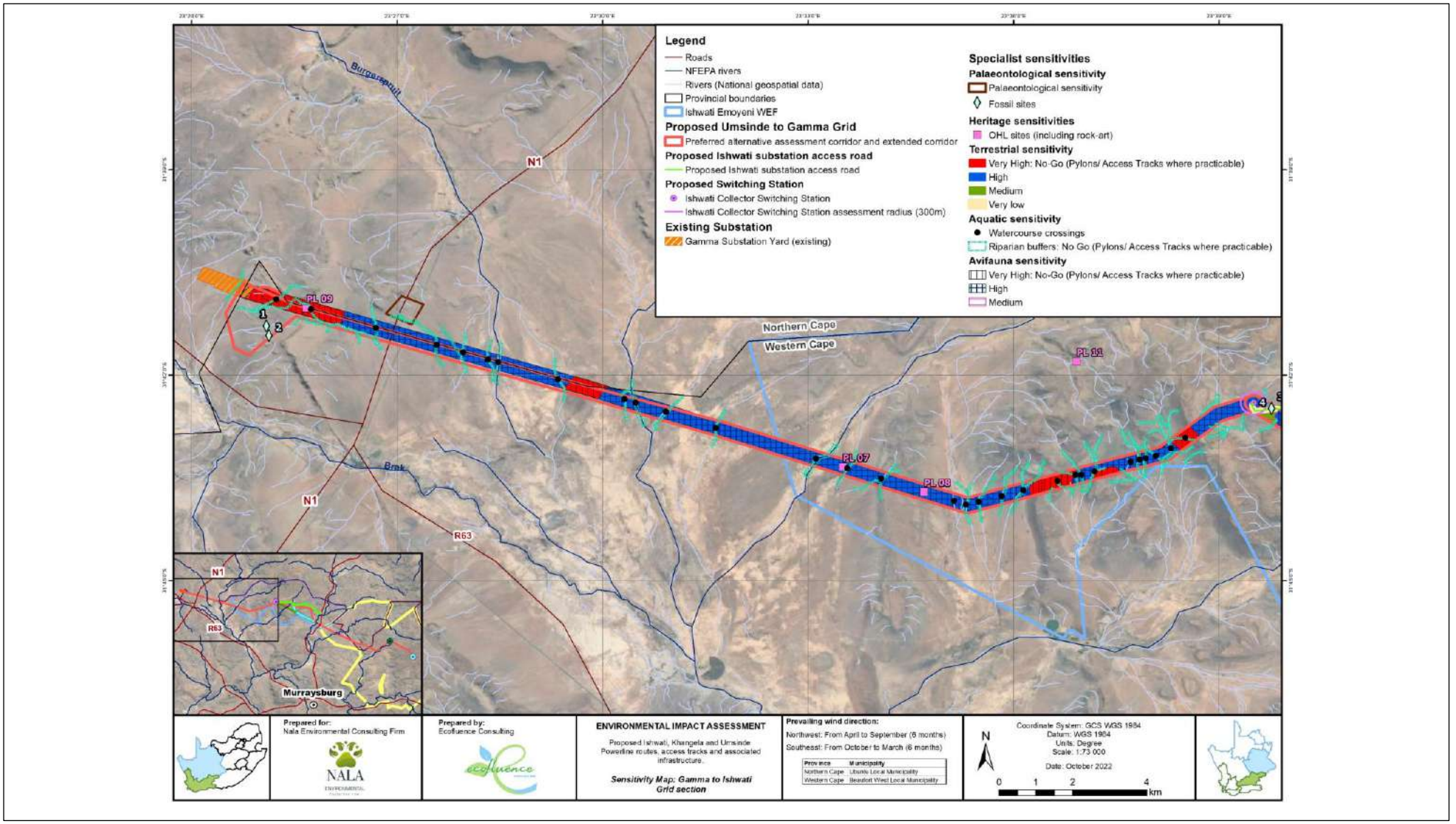


Figure 8.5: Environmental sensitivity and layout map of the proposed infrastructure development footprint from the Gamma Substation to the Ishwati switching station (map is included in Appendix B).

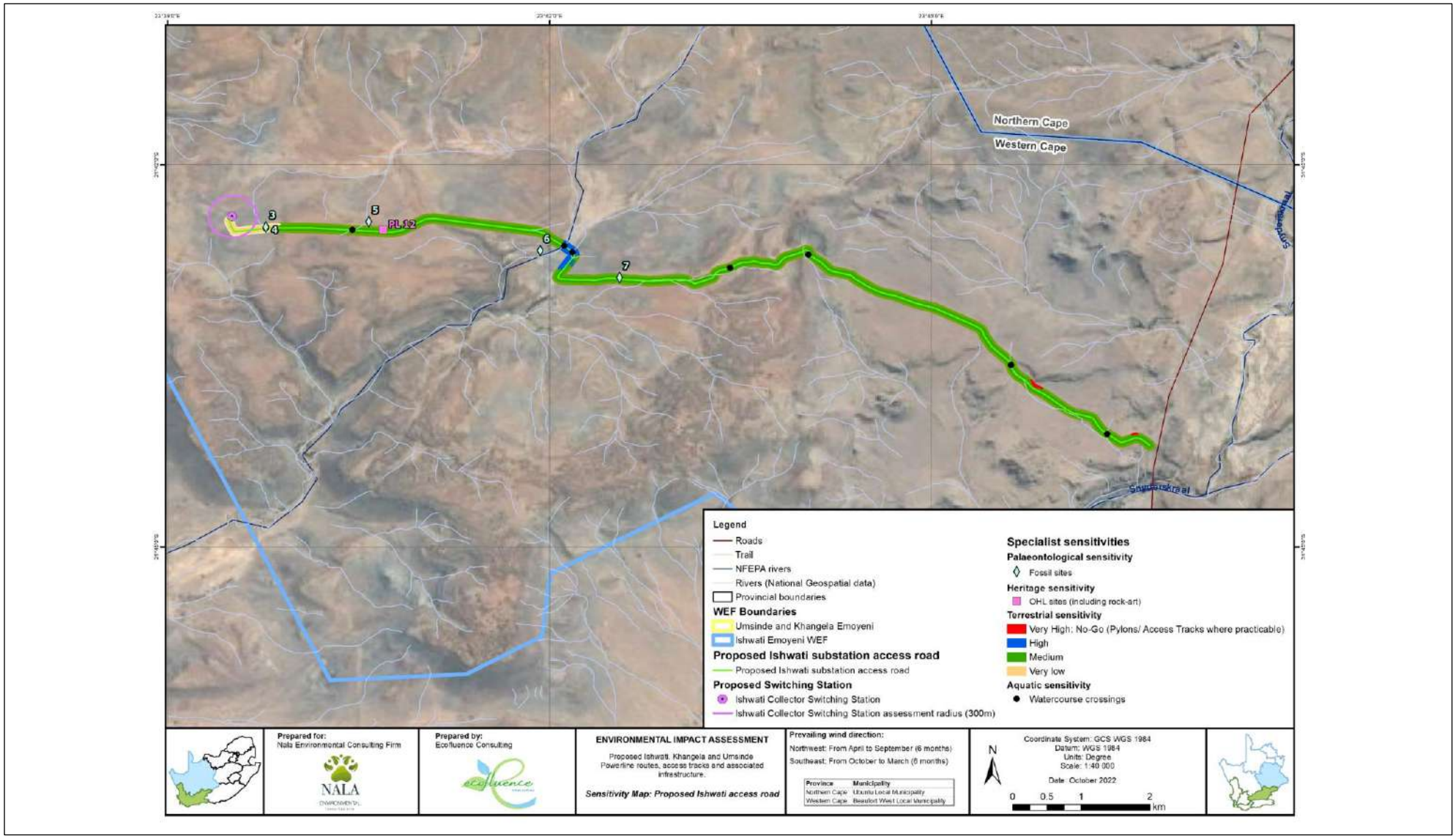


Figure 8.6: Environmental sensitivity and layout map of the proposed access road to the Ishwati switching station (map is included in Appendix B).

8.6 Overall Conclusion (Impact Statement)

The construction and operation of the 132kV grid infrastructure and associated access tracks and watercourse crossings to support the Emoyeni Wind Energy Facilities in the Beaufort West Local Municipality and the Ubuntu Local Municipality in the Western and Northern Cape Provinces has been proposed by Eskom Holdings SOC Limited. The assessment of the proposed grid connection infrastructure for the Emoyeni WEFs was undertaken by independent specialists and their findings have informed the results of this BA Report.

As a fast-emerging economy, South Africa needs to balance the need for continued economic growth with its social demands and the protection of the natural environment. South Africa is growing its energy supply to support economic expansion and in so doing, alleviates supply blockages and supply-demand deficits. It is essential that South Africa's citizens are provided with clean and modern forms of energy at an affordable price. Approximately 80% of South African electricity comes from coal-fired power stations, with Eskom being the main electricity producing company (https://www.usaid.gov/powerafrica/south-africa). The proposed grid connection infrastructure associated with the authorised Emoyeni WEFs is proposed by Eskom Holdings SOC Limited. The Umsinde & Khangela wind energy facilities have been selected as preferred bidder projects via a private offtake procurement process (i.e private power purchase).

Through specialist studies that have been undertaken for the proposed 400m wide development corridor and associated grid connection infrastructure to support the Emoyeni Wind Energy Facilities, the viability of establishing the infrastructure for the authorised WEFs has been established by Eskom Holdings SOC Limited. The positive implications of establishing the grid connection infrastructure for the authorised wind energy facilities include:

- The National electricity grid in the Northern Cap and Western Cape Provinces would benefit from the additional generated power.
- Promotion of clean, renewable energy in South Africa.
- Creation of local employment and business opportunities for the area.

The findings of the specialist studies undertaken within this BA to assess both the impacts anticipated as a result of addition of the new grid connection infrastructure to support the Emoyeni Wind Energy Facilities and conclude that:

- There are no environmental fatal flaws that should prevent the development of the proposed grid connection infrastructure and associated access tracks and watercourse crossings from proceeding, provided that the recommended mitigation and management measure are implemented, inclusive on the implementation of buffers zones and no-go areas as identified by the specialist assessments.
- The proposed switching station's located at the Umsinde Emoyeni, Khangela Emoyeni and Ishwati Emoyeni WEF's switching are considered to be acceptable from an environmental perspective, provided that the recommended mitigation and management measures including buffer areas and no-go areas are implemented.
- The proposed addition of the grid connection infrastructure which contributes to the realisation of the WEFs will represents an investment in clean, renewable energy, which, given the challenges created by climate change, represents a positive social benefit for society as a whole.
- The specialist assessments undertaken for the 400m assessment corridor and the 1,91 km2 extended corridor for the grid connection infrastructure confirmed that the grid connection infrastructure may be placed anywhere within the assessed corridor, provided that the delineated no-go areas are avoided and/or the recommended mitigation measures applied as specified within the specialist assessments and within the EMPrs.
- The significance levels of the majority of identified negative impacts can be reduced to acceptable levels by implementing the recommended mitigation measures. With reference to the information available at this stage in the project cycle, the confidence in the environmental assessment undertaken is regarded as acceptable.

Based on the studies undertaken for this project, it is concluded that the impacts associated with the facility as proposed are acceptable from an environmental perspective, subject to the implementation of the recommended mitigation measures and management actions contained in the report.

8.7 Overall Recommendation

Considering the findings of the independent specialist studies, the impacts identified, the 400m wide development corridor and associated infrastructure proposed by the proponent, as well as the potential to further minimise the impacts to acceptable levels through mitigation, it is the reasoned opinion of the Environmental Assessment Practitioner (EAP) that the development of the grid connection infrastructure is acceptable within the landscape and can reasonably be authorised. The following infrastructure should be included within the authorisation issued for the project:

- The establishment of a 132kV collector substation (switching station) within the authorised Umsinde Emoyeni WEF site (adjacent to the authorised WEF facility substation) with a footprint of approximately 100m X 80m (~0.8ha) to be located within a development footprint that encompasses a 300m radius.
- The establishment of a 132kV collector substation (switching station) within the authorised Khangela Emoyeni WEF site (adjacent to the authorised WEF facility substation) with a footprint of approximately 100m X 80m (~0.8ha) to be located within a development footprint that encompasses a 300m radius.
- The establishment of a 132kV collector substation (switching station) within the authorised Ishwati Emoyeni WEF site (adjacent to the authorised WEF facility substation) with a footprint of approximately 120m X 100m (~1.2 ha) with a development footprint that encompasses a 300m radius. The establishment of the Preferred Alternative 132kV powerline within a 400m wide corridor that will extend from the Khangela switching station to the Ishwati switching station (~36km), and then onward for ~25km to the Eskom Gamma Substation. In addition, a further length of 132kV powerline (within a 400m wide corridor) will extend from the Umsinde switching station to the Khangela switching station for ~8km OR it may connect directly into the Khangela-Ishwati powerline at the Khangela switching station. An extended powerline development corridor of approximately 1.91 km^2 has been assessed in the vicinity of the Gamma Substation, that will enable the 132kV powerline to connect to either the south face of the Gamma Substation yard or approach from the east, depending on the available connection point at the time of connection. The 132kV Powerline from Umsinde to Khangela, and from Khangela to Ishwati and onward to Gamma Substation will be a single- or double-circuit overhead powerline, with a single set of pylons structures with a maximum height of 35m. Access/service tracks (jeep track) up to 7m wide and associated watercourse crossings will be associated with the powerline, and will be located within the assessed powerline corridor.
- The establishment of a new access road approximately 14km long from the existing public road from Richmond to the Ishwati switching station site. The proposed new access road will be unsealed and up to 12m wide during construction , but will be reduced to a maximum of 6 m width during operation.

Technical Details of the Proposed Infrastructure to be included within the Environmental Authorisation

Infrastructure	Details
Double- and/or Single- circuit powerline	Proposed overhead 132kV powerline will extend from the Khangela Onsite switching station to the Ishwati switching station and then onwards to the connection point at the Eskom Gamma substation station yard. A further length of overhead 132kV powerline will extend from the Umsinde Emoyeni WEF onsite switching station to the Khangela switching station (or the Khangela-Ishwati powerline).
Power line voltage	132kV
Development corridor width	A 400m wide grid connection corridor along the 132kV routing; An extended 1.91km^2 corridor adjacent to the Gamma Substation to allow for connection of the 132kV powerline to either the east- or south-face of the Gamma Substation.
132kV Powerline ~69km in length (Preferred Alternative)	The powerline will start at Umsinde onsite switching station located within the authorised Umsinde Emoyeni WEF within a 400m wide assessment corridor and traverses in a north westerly direction towards the Khangela on-site switching station, then onwards towards the Ishwati onsite switching station, and further westwards to the Gamma Substation

Connection to the Eskom Gamma Substation	An extended powerline development corridor of approximately 1.91 km^2 has been assessed in the vicinity of the Gamma Substation, that will enable the 132kV powerline to connect to either the south face of the Gamma Substation yard or approach from the east, depending on the available connection bay available at the time of connection.
Umsinde Emoyeni switching station	132kV on site switching station with a footprint of approximately 100m x 80m (~0.8ha) with an assessment footprint that encompasses a 300m radius.
Khangela Emoyeni switching station	132kV on site switching station with a footprint of approximately 100m x 80m (~0.8ha) with an assessment footprint that encompasses a 300m radius.
Ishwati Emoyeni switching station	132kV on site switching station with a footprint of approximately 120m x 100m (~1.2ha) with an assessment footprint that encompasses a 300m radius.
Powerline servitude	up to 40m (or as required by Eskom)
Tower Height	Up to 35m
Water crossings	Water crossings may require the construction of culverts or low water drifts in order to not impact on watercourses during the construction and operation of the powerline and access tracks.
Access Roads	• Access/service tracks (jeep track) up to 7m wide will be required along the length of the whole corridor of the 132kV powerline. • The establishment of a new access road approximately 14km long from the existing public road from Richmond to the authorised Ishwati Emoyeni on-site substation site. The proposed new access road will be unsealed and up to 12m wide during construction , but will be reduced to a maximum of 6 m width during operation.

132kV Powerline Route Preferred Alternative within a 400m development corridor and gravel access track approximately 7m wide

	Preferred Alternative	
	Latitude	**Longitude**
Start (on-site substation at Umsinde Emoyeni WEF site)	31°51'13.38"S	24° 1'25.58"E
Point 2	31°50'14.37"S	24° 0'50.32"E
Point 3	31°48'43.59"S	23°57'55.92"E
Start (on-site substation at Khangela Emoyeni WEF site)	31°48'43.05"S	23°57'42.71"E
Point 4	31°50'14.63"S	23°55'28.86"E
Point 5	31°49'13.74"S	23°53'33.39"E
Point 6	31°49'7.26"S	23°52'39.52"E
Point 7	31°47'31.74"S	23°49'11.72"E

Point 8	31°45'32.28"S	23°45'29.58"E
Point 9	31°43'29.18"S	23°45'1.23"E
Point 10	31°42'48.88"S	23°40'11.59"E
Point 11 (Ishwati Collector Sub)	31°42'24.42"S	23°39'30.33"E
Point 12	31°42'34.31"S	23°38'58.91"E
Point 13	31°43'9.01"S	23°38'11.49"E
Point 14	31°43'54.78"S	23°35'20.23"E
Point 15	31°40'58.19"S	23°25'27.11"E
End (Extended 1,91km^2 development corridor to (Gamma Substation) Preferred Alternative from the east	31°40'46.22"S	23°24'46.55"E
End (Extended 1,91km^2 development corridor to Gamma Substation) Preferred Alternative from the south	31°40'56.04"S	23°24'40.11"E

Water Crossing Points along the 132kV Powerline within a 400m wide corridor and gravel access track approximately 7m wide from the Umsinde Emoyeni switching station and extended 1.91 km^2 corridor to the Gamma Substation (Preferred Alternative):

Gamma Substation to Ishwati Switching Station					
Watercourse Crossing	GPS Coordinates		Watercourse Crossing	GPS Coordinates	
	Latitude	Longitude		Latitude	Longitude
1	31° 40.895'S	23° 25.233'E	16	31° 43.839'S	23° 35.129'E
2	31° 41.036'S	23° 25.743'E	17	31° 43.889'S	23° 35.303'E
3	31° 41.303'S	23° 26.688'E	18	31° 43.853'S	23° 35.487'E
4	31° 41.551'S	23° 27.579'E	19	31° 43.738'S	23° 35.826'E
5	31° 41.647'S	23° 27.969'E	20	31° 43.660'S	23° 36.141'E
6	31° 41.776'S	23° 28.327'E	21	31° 43.518'S	23° 36.634'E
7	31° 41.815'S	23° 28.474'E	22	31° 43.458'S	23° 36.905'E
8	31° 42.067'S	23° 29.346'E	23	31° 43.453'S	23° 36.987'E
9	31° 42.354'S	23° 30.316'E	24	31° 43.389'S	23° 37.208'E
10	31° 42.405'S	23° 30.479'E	25	31° 43.261'S	23° 37.699'E
11	31° 42.538'S	23° 30.925'E	26	31° 43.238'S	23° 37.813'E
12	31° 42.772'S	23° 31.654'E	27	31° 43.229'S	23° 37.905'E

13	31° 43.233'S	23° 33.111'E	**28**	31° 43.178'S	23° 38.061'E
14	31° 43.362'S	23° 33.570'E	**29**	31° 43.082'S	23° 38.300'E
15	31° 43.536'S	23° 34.080'E	**30**	31° 42.930'S	23° 38.518'E

Ishwati Switching Station to Khangela Switching Station					
Watercourse Crossing	**GPS Coordinates**		**Watercourse Crossing**	**GPS Coordinates**	
	Latitude	**Longitude**		**Latitude**	**Longitude**
31	31° 42.866'S	23° 40.290'E	**58**	31° 47.823'S	23° 49.804'E
32	31° 43.284'S	23° 41.134'E	**59**	31° 47.901'S	23° 49.951'E
33	31° 43.688'S	23° 41.937'E	**60**	31° 48.006'S	23° 50.198'E
34	31° 42.898'S	23° 41.616'E	**61**	31° 48.066'S	23° 50.364'E
35	31° 43.027'S	23° 42.364'E	**62**	31° 48.259'S	23° 50.708'E
36	31° 44.009'S	23° 42.534'E	**63**	31° 48.621'S	23° 51.486'E
37	31° 43.178'S	23° 43.374'E	**64**	31° 48.904'S	23° 52.183'E
38	31° 43.261'S	23° 44.255'E	**65**	31° 49.041'S	23° 52.498'E
39	31° 43.293'S	23° 44.328'E	**66**	31° 49.190'S	23° 52.867'E
40	31° 44.504'S	23° 43.539'E	**67**	31° 49.215'S	23° 53.392'E
41	31° 44.270'S	23° 45.237'E	**68**	31° 49.404'S	23° 53.891'E
42	31° 44.826'S	23° 44.149'E	**69**	31° 49.442'S	23° 53.813'E
43	31° 45.124'S	23° 44.700'E	**70**	31° 49.598'S	23° 54.228'E
44	31° 44.812'S	23° 45.526'E	**71**	31° 49.640'S	23° 54.290'E
45	31° 45.537'S	23° 45.494'E	**72**	31° 49.691'S	23° 54.376'E
46	31° 45.845'S	23° 46.109'E	**73**	31° 49.860'S	23° 54.672'E
47	31° 45.739'S	23° 45.958'E	**74**	31° 50.021'S	23° 54.889'E
48	31° 45.629'S	23° 45.691'E	**75**	31° 50.088'S	23° 55.079'E
49	31° 46.235'S	23° 46.853'E	**76**	31° 50.152'S	23° 55.217'E
50	31° 46.547'S	23° 47.440'E	**77**	31° 49.854'S	23° 56.055'E
51	31° 46.717'S	23° 47.775'E	**78**	31° 49.748'S	23° 56.220'E
52	31° 46.785'S	23° 47.899'E	**79**	31° 49.677'S	23° 56.303'E
53	31° 47.088'S	23° 48.482'E	**80**	31° 49.532'S	23° 56.461'E
54	31° 47.290'S	23° 48.698'E	**81**	31° 49.124'S	23° 56.975'E
55	31° 47.414'S	23° 48.959'E	**82**	31° 48.830'S	23° 57.425'E
56	31° 47.492'S	23° 49.051'E	**83**	31° 48.558'S	23° 57.715'E
57	31° 47.708'S	23° 49.547'E	**84**	31° 48.759'S	23° 57.831'E

Khangela Switching Station to Umsinde Switching Station		
Watercourse Crossing	**GPS Coordinates**	
	Latitude	**Longitude**
83	31° 48.558'S	23° 57.715'E
84	31° 48.759'S	23° 57.831'E
85	31° 48.886'S	23° 58.233'E
86	31° 49.101'S	23° 58.643'E
87	31° 49.438'S	23° 59.251'E

88	31° 49.489'S	23° 59.362'E
89	31° 49.750'S	23° 59.910'E
90	31° 50.062'S	24° 00.493'E
91	31° 50.317'S	24° 00.890'E

Proposed New Access Road Co-ordinates to the authorised Ishwati Substation site:

	Latitude	**Longitude**
Start (off the existing unnamed gravel road)	31° 44.203'S	23° 46.714'E
Middle	31° 42.906'S	23° 42.942'E
End (Authorised Ishwati Substation site)	31° 42.407'S	23° 39.506'E

The following key conditions would be required to be included within the environmental authorisation issued for the 132kV overhead powerlines, 132kV switching stations and associated infrastructure:

- All mitigation measures detailed within this BA Report, as well as the specialist reports contained within **Appendices D** to **I**, are to be implemented.
- The EMPr's as contained within **Appendix I** to **J** of this BA Report should form part of the contract with the Contractor appointed to construct and the maintain the supporting infrastructure in order to ensure compliance with environmental specifications and management measures. The implementation of this EMPr for all life cycle phases of the supporting infrastructure is considered key in achieving the appropriate environmental management standards as detailed for this project.
- The 400m wide development corridor is authorised for the placement of the 132kV overhead power line to allow for micro-siting of pylons, access track and watercourse crossing infrastructure within the corridor provided that all buffers and no-go areas as identified in the Final Basic Assessment report and specialist assessments are implemented.
- The 1.91 km^2 extended corridor at the Gamma Substation is authorised to enable connection to the existing Gamma Substation either from the east or the south face, depending on the available connection point at the time of the connection.
- The 300m development radii footprints associated with the proposed on-site switching station for the Umsinde Emoyeni, Khangela Emoyeni and Ishwati Emoyeni Wind Energy Facilities is authorised to allow for micro-siting of each switching station within the assessed radii provided that all buffers, high sensitivity areas and no-go areas as identified in the Final Basic Assessment report and specialist assessments are implemented
- This authorisation will constitute the final design and final layout/route, access track and watercourse crossings to be located within the 400m wide development corridor, 1,91 km^2 extended corridor in the vicinity of the Gamma Substation and the placement of three (3) switching stations within the 300m development radius footprint including the access road to the Ishwati switching station, as submitted to the DFFE for review and approval with the Final Basic Assessment report.
- The necessary water use authorisation must be obtained from the Department of Water and Sanitation (DHSWS) for impacts to a watercourse prior to construction.
- The Management Plans as appended to the EMPrs submitted with the Final Basic Assessment report must be implemented.
- The authorisation should be valid for a period of 5 years from the date of issue, as the Umsinde and Khangela Wind Energy Facilities have been selected as prefer bidder projects and timeframes for which the activities will be concluded will be in line with the agreement with the private offtaker

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