TERRESTRIAL BIODIVERSITY ASSESSMENT: THE PROPOSED ESTABLISHMENT OF AN ELECTRICAL POWERLINE FROM THE NATIONAL GRID TO THE DEHOOP HOUSING SUBSTATION

Attention:

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APPOINTMENT OF SPECIALIST

I, Jacques van Rensburg, Director of Nature Works Environmental Consultancy, was appointed by Ace Environmental Solutions to provide specialist biodiversity consulting services for the proposed Helios tower cellular site.

DECLARATION OF INDEPENDENCE

In terms of Chapter 5 of the National Environmental Management Act of 1998, specialists involved in Impact Assessment processes must declare their independence and include an abbreviated Curriculum Vitae.

I, Jacques van Rensburg, hereby declare that I am financially and otherwise independent of the client and their consultants, and have no interest, be it business, financial or personal, in the proposed activities. All opinions expressed in this document are my own.

I declare that I am confident in the results of this study, and the conclusions drawn from it.

Mr. Jacques Jansen van Rensburg

January 2024

CONDITIONS RELATING TO THIS REPORT

The methodology, findings, results, conclusions, and recommendations in this report are based on my best scientific and professional knowledge. I reserve the right to modify aspects of the report, including the recommendations and conclusions, should additional relevant information become available. This report may not be altered or added to without the prior written consent of the author. Any recommendations, statements or conclusions drawn from, or based on this report, must cite this report and should not be taken out of context, and may not change, alter or distort the intended meaning of the original in any way. If these extracts or summaries form part of a main report relating to this study or investigation, this report must be included in its entirety as an appendix, or as a separate section to the main report.

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- Ecologist with 15 years' experience in the field of Environmental Management and Ecological Surveys.

Table of Contents

1. Introduction 6
1.1 Scope of Work 7
1.2 Assumptions and Limitations 7
2 Methods 8
2.1 Desktop Assessment 8
2.1.1 Ecologically Important Landscape Features 8
2.2 Desktop Flora Assessment 9
Swartland Shale Renosterveld: 9
Swartland Alluvium Fynbos 10
Swartland Granite Renosterveld 10
2.3 Western Cape Biodiversity Plan 11
2.3.1 Terrestrial Critical Biodiversity Areas (CBAs) 11
2.4 Hydrological context 13
3 Habitat Condition of the Study Area 13
3.1 Project Area of Influence 13
3.1 Site Habitat Condition 15
3.2 Current Habitat Condition 17
3.2.1 Degraded Watercourse 17
3.2.2 Highly Degraded Habitat 18
3.2.3 Transformed Habitats 20
3.2.5 Summary of the habitat conditions of the areas surrounding the impacted site 20
4 Sensitivity Assessment 21
4.1 Site Conservation Importance (CI) 22
4.2 Sites Functional Integrity (FI) 22
4.3 Site Receptor Resilience (RR) 22
4.4 Site Ecological Importance 22
5 Impact Assessment 27
5.1 Direct Impacts (Construction Phase) 27

5.1.1 Loss of highly degraded and transformed habitat due to development of the 132kV line 27
5.1.2 Loss of degraded watercourse habitat due to the development of the 132kV line 28
5.2 Operation Phase Impacts 29
5.2.1 Continued encroachment of disturbed areas by Invasive Alien Plants (IAPs) 29
5.1 No-Go Alternative 30
6 Conclusion and Recommendations 31
7 References 32
Appendix 1: Convention for Assigning Significance Ratings to Impacts 34

1. Introduction

It is proposed to establish a new powerline and associated infrastructure, connecting it from the national grid to the remainder of Farm No. 1113 at the De Hoop housing substation on the remaining portion of Farm Olyphants Fontyn No. 766, within the Swartland Local Municipality. The electricity powerline is expected to be approximately 4.9 km in length and will have a capacity of around 132kV.

The new electrical powerline will traverse Farm RE/1113, Erf 373, Erf 12496, and Farm RE/15/766 in the Swartland Local Municipality (refer to Figure 1). The screening tool report generated on December 3, 2023, identified the terrestrial biodiversity theme as having very high sensitivity. Consequently, Nature Works Environmental Consultancy has been tasked with conducting the Terrestrial Biodiversity Impact Assessment report to determine the significance of the proposed development's impact.

The objective of this report is to assess the environmental sensitivities associated with the proposed development footprint and provide insights into its potential impact from a botanical perspective. The assessment aims to offer an understanding of the ecological context and the significance of the proposed development's impact. By doing so, this report seeks to facilitate an informed decision-making process.

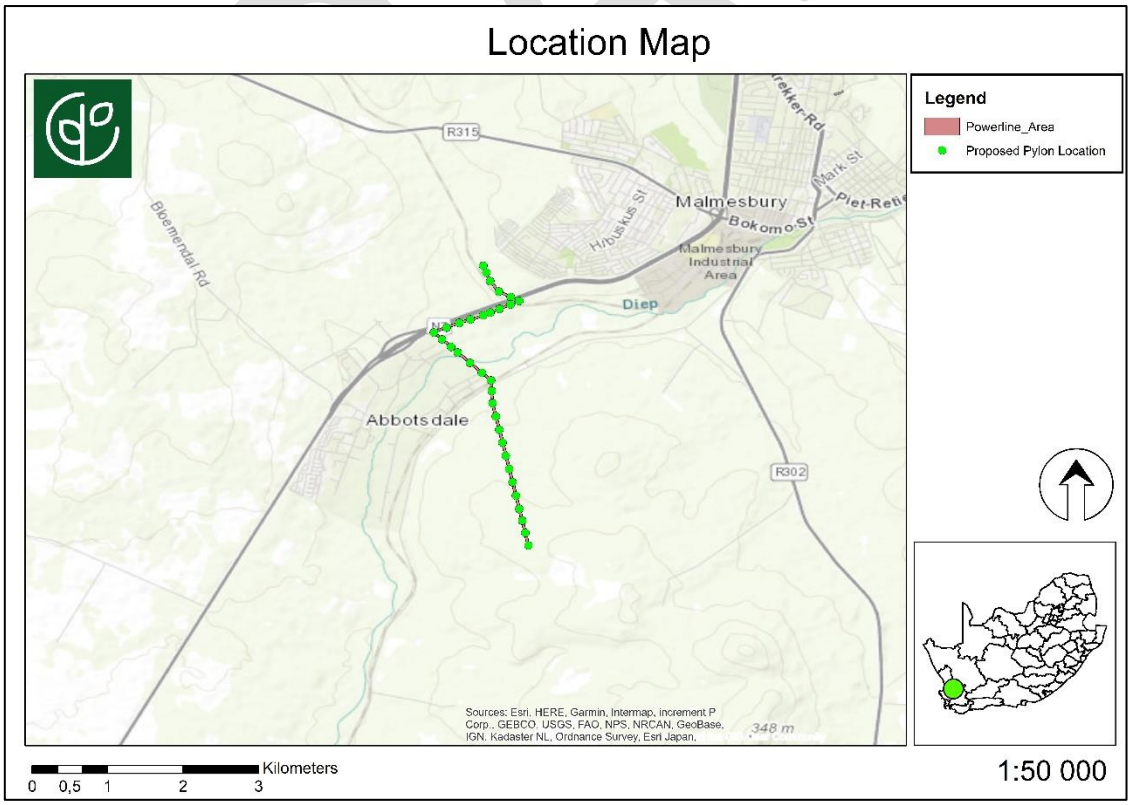


Figure 1: Locality map (scale 1:50 000).

1.1 Scope of Work

The principal aim of the assessment was to provide information to guide the risk assessment of the proposed development on the flora and fauna communities of the ecosystems associated with the PAOI. The scope of work for the assessment comprises the following:

- Desktop assessment to identify ecologically important geographical features within the proposed 132 kV overhead powerline area and the surrounding landscape.
- Desktop assessment to compile an expected species list and identify possible threatened flora and fauna species occurring within the proposed development area.
- Field survey to ascertain the species composition of the present flora and fauna community within the proposed development area.
- Delineate and map the habitats and their respective sensitivities occurring within the proposed development area.
- Identify how the proposed development impacts the flora and fauna community and evaluate the level of risk associated with these potential impacts.
- Prescribe mitigation measures and provide recommendations for identified risks.
- These steps aim to comprehensively assess and address the potential ecological impacts of the proposed development on the surrounding environment.

1.2 Assumptions and Limitations

The following assumptions and limitations are applicable to this assessment:

- A single-season field survey was undertaken.
- This assessment has not evaluated any temporal trends for the project.
- The habitats and SEI delineations are based on field assessment information in the 50 m corridor.
- The delineation of water resources was completed at a desktop level only.
- While every effort was made to cover as much of the site as possible, it is possible that some flora and fauna species present on site were not recorded during the field survey, especially secretive or rare species.
- The GPS used in the assessment has an accuracy of 5 m, and consequently, any spatial features may be offset by 5 m.

These considerations should be taken into account when interpreting the results of the assessment, as they reflect the specific conditions and constraints under which the study was conducted.

2 Methods

This section details the methods used in the assessment and is divided into the desktop and field components.

2.1 Desktop Assessment

The desktop assessment was primarily conducted using a Geographic Information System (GIS) to access the latest available spatial datasets for developing digital cartographs and species lists.

2.1.1 Ecologically Important Landscape Features

The following sources have been used to inform this study:

- Site boundaries: The property boundaries have been downloaded from the Cape Farm Mapper Website (https://gis.elsenburg.com/apps/cfm/).
- Vegetation Types: Based on The Vegetation of South Africa, Lesotho, and Swaziland (VEGMAP) (Mucina & Rutherford, 2006). The South African National Biodiversity Institute (SANBI) has updated the mapping for the VEGMAP (2018), and these latest shapefiles have been used where appropriate. Where fine scale vegetation maps are available these are also used (e.g., C.A.P.E. Fine Scale Integrated Vegetation Map (2007)).
- Ecosystem threat status: Informed by the List of Threatened Terrestrial Ecosystems (Government Gazette, 2011) and CapeNature's (2014) updated ecosystem status based on criterion A1 only (irreversible loss of habitat). An update of the ecosystem threat status has been produced as part of the Western Cape Biodiversity Spatial Plan (CapeNature, 2016) and is used as the most up to date information on ecosystem threat status in the Western Cape.
- Biodiversity planning: The Western Cape Biodiversity Spatial Planning GIS layer was obtained from SANBGIS, the layer is important for determining the conservation importance of the designated habitat. Ground-truthing is an essential component in terms of determining the habitat condition.
- Important species: The presence or absence of threatened (i.e., species of conservation concern) and ecologically important species informs the ecological condition and sensitivity of the site. The latest conservation status of species is checked on the Red List of South African Plants (Raimondo et al. 2009) via the website (www.redlist.sanbi.org).
- Previous studies: Previous botanical studies in the region of the study area provide additional information that can support the findings of the once-off nature of a typical impact assessment report.

2.2 Desktop Flora Assessment

According to the Vegetation Map of South Africa, Lesotho and Swaziland (SANBI, 2018) (VEGMAP), the vegetation type occurring in the study area and surrounds is Swartland Shale Renosterveld, Swartland Alluvium Fynbos and Swartland Granite Renosterveld (Figure 2).

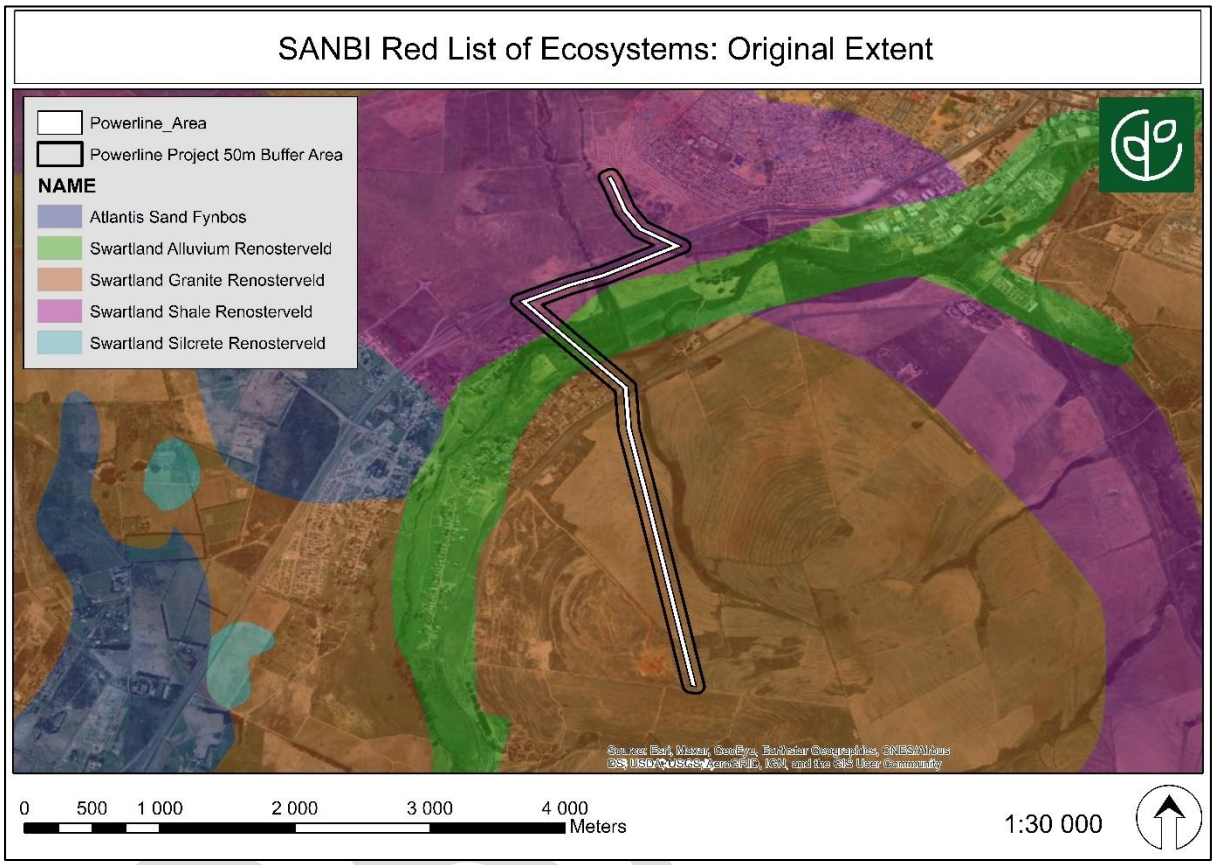


Figure 2: Vegetation types within the impacted area and immediate surrounds.

Swartland Shale Renosterveld:

The Swartland Shale Renosterveld, coded as FRs9, is a Fynbos biome ecosystem located within the West Coast Renosterveld bioregion. According to the IUCN Red List of Ecosystems (RLE) version 1.1, it has been assessed as **Critically Endangered**, triggered by extensive spatial declines of approximately 90% since 1750.

The ecosystem, primarily situated in the Western Cape province of South Africa, spans large areas of the Swartland and the Boland on the West Coast lowlands. It features moderately undulating plains and valleys supporting low to moderately tall leptophyllous shrubland, along with low, open shrubland dominated by renosterbos. Disturbed areas are dominated by *Athanasia trifurcate* and *Otholobium hirtum*. Patches of *Cynodon dactylon* 'grazing lawns' also occur in abundance.

Endemic to South Africa, the historical extent of this ecosystem was 4963.74 km², but it has dwindled to a mere 10% of its original coverage. Despite its critical status, the Swartland Shale Renosterveld is not currently protected according to the National Biodiversity Assessment 2018.

The primary threats to this ecosystem are driven by human activities, particularly agriculture, which has led to the loss of natural habitat covering approximately 296.62 km² in the last 28 years (1990-2018). Croplands now cover 3861 km², and old fields cover an additional 429.42 km². Urban development has further transformed the landscape, with built areas covering 95.67 km² and artificial water bodies covering 36.82 km². Threats from alien invasive species, overgrazing, and altered fire regimes have also been identified.

Swartland Alluvium Fynbos

The Swartland Alluvium Renosterveld, identified by the code FRa2, is situated within the Fynbos biome and falls under the West Coast Renosterveld bioregion. As per the IUCN Red List of Ecosystems (RLE) version 1.1, this ecosystem has been designated as **Vulnerable**, triggered by a significant spatial decline of approximately 55% since 1750.

Located in narrow belts in the southern Swartland, spanning areas encompassed by Klipheuwel, Malmesbury, Moorreesburg, and Darling along the Groen and Diep Rivers, this ecosystem comprises riverine plains and bottomlands characterized by open, low, short cupressoid, and low to moderately tall, grassy shrubland, dominated by renosterbos.

Endemic to South Africa and primarily distributed in the Western Cape province, the historical extent of this ecosystem was 63.04 km², with a remaining natural extent of 58%. Unfortunately, it is currently not afforded protection according to the National Biodiversity Assessment 2018.

Swartland Granite Renosterveld

The Swartland Granite Renosterveld, identified by the code FRg2 and located within the Fynbos biome in the West Coast Renosterveld bioregion, has been classified as Endangered according to the IUCN Red List of Ecosystems (RLE) version 1.1. The trigger criteria include A2b, A3, B1(i), and B1(iii), indicating observed rates of habitat loss, extensive spatial declines, and evidence of ongoing biotic disruption.

This ecosystem is characterized by its largest patch centered on Darling, extending from Ratelberg in the north to Dassenberg near Mamre and Pella. Other patches are centered on Malmesbury, from Darmstadt in the north to the lower slopes of the Perdeberg, east of Wellington from Micha to Valencia, and the lower surrounds of Paarl Mountain, Joostenberg, Muldersvlei, Bottelaryberg, Papegaaiberg (Stellenbosch West), to Firgrove and northern Somerset West. The terrain consists of moderate foot slopes and undulating plains supporting

a mosaic of grasslands/herblands and medium-dense, microphyllous shrublands dominated by renosterbos. Groups of small trees and tall shrubs are associated with heuweltjies and rock outcrops. The boundary with FFg 2 Boland Granite Fynbos is diffuse and patchy.

Endemic to South Africa and primarily distributed in the Western Cape province, the historical extent of this ecosystem was 951.31 km², with a remaining natural extent of only 17%. Unfortunately, it is currently not afforded protection according to the National Biodiversity Assessment 2018.

The primary threatening processes affecting Swartland Granite Renosterveld are linked to agriculture, with a loss of approximately 72.14 km² of natural habitat in the last 28 years (1990-2018). Agriculture activities, particularly vineyards, olive orchards, and pastures, have driven spatial declines, covering 559.18 km² with croplands and an additional 134.85 km² designated as old fields. Artificial water bodies cover 11.35 km² of Swartland Granite Renosterveld. Threatened plant species data indicate that alien invasive species, overgrazing, and altered fire regimes are significant pressures.

2.3 Western Cape Biodiversity Plan

2.3.1 Terrestrial Critical Biodiversity Areas (CBAs)

The Western Cape Biodiversity Spatial Plan (WCBSP; Pool-Stanvliet *et al*., 2017) employs a systematic biodiversity planning approach to identify priority areas and ecological infrastructure within the province. The WCBSP serves as a spatial tool, comprising a map of priority areas, along with contextual information and land use guidelines, thereby providing valuable biodiversity information for land use and development planning, environmental assessment and regulation, as well as natural resource management (Pool-Stanvliet et al., 2017).

The WCBSP Map encompasses biodiversity importance in the terrestrial and freshwater realms, as well as significant coastal and estuarine habitats. This Biodiversity Spatial Plan is structured according to five primary biodiversity priority categories, as outlined in SANBI's Technical Guidelines for biodiversity maps, namely: Protected Areas (PA), Critical Biodiversity Areas (CBA), Ecological Support Areas (ESA), Other Natural Areas (ONA), and Severely Modified or No Natural Remaining (NNR). The map delineates CBAs and ESAs, which require safeguarding to ensure the continued existence and functioning of species and ecosystems, including the delivery of ecosystem services (Pool-Stanvliet et al., 2017).

According to the WCBSP, the development on the site directly impacts CBA1: Aquatic, CBA1: Terrestrial, CBA2: Terrestrial, ESA1: Aquatic, ESA2: Watercourse (Figure 3).

CBA1 is defined as areas in a natural condition that are necessary to meet biodiversity targets for species, ecosystems, or ecological processes and infrastructure. The objectives are to maintain the habitat in a natural or near-natural state with no further loss of natural habitat. Degraded areas should be rehabilitated, and only low-impact, biodiversity-sensitive land uses are considered appropriate.

CBA2 is defined as areas in a degraded or secondary condition that are required to meet biodiversity targets for species, ecosystems, or ecological processes and infrastructure. The objectives are to maintain these areas in a natural or near-natural state with no further loss of habitat. Degraded areas should be rehabilitated, and only low-impact, biodiversity-sensitive land uses are considered appropriate.

ESA is defined as areas that are not essential for meeting biodiversity targets but play a crucial role in supporting the functioning of PAs or CBAs, often being vital for delivering ecosystem services. The objective is to restore and/or manage them to minimize the impact on ecological processes and ecological infrastructure functioning, particularly soil and water-related services, and to allow for faunal movement.

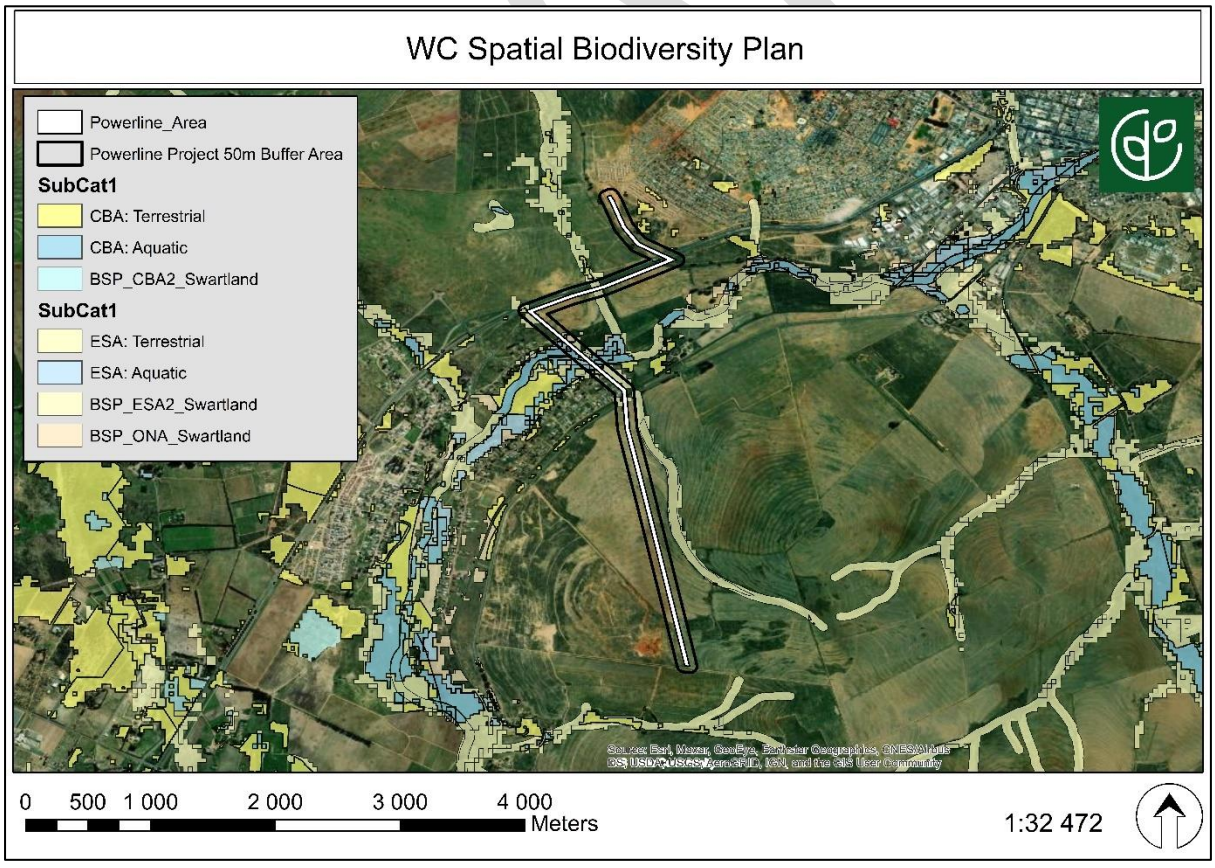


Figure 3: Western Cape Spatial Biodiversity Plan indicating the spatial distribution of WCSBP in relation to the proposed 132kV overhead powerline.

2.4 Hydrological context

The proposed 132kV overhead power line overlaps a non-perennial river and the Diep River, as well as Critical Biotic Area (CBA) and Ecologically Sensitive Area (ESA) aquatic habitats.

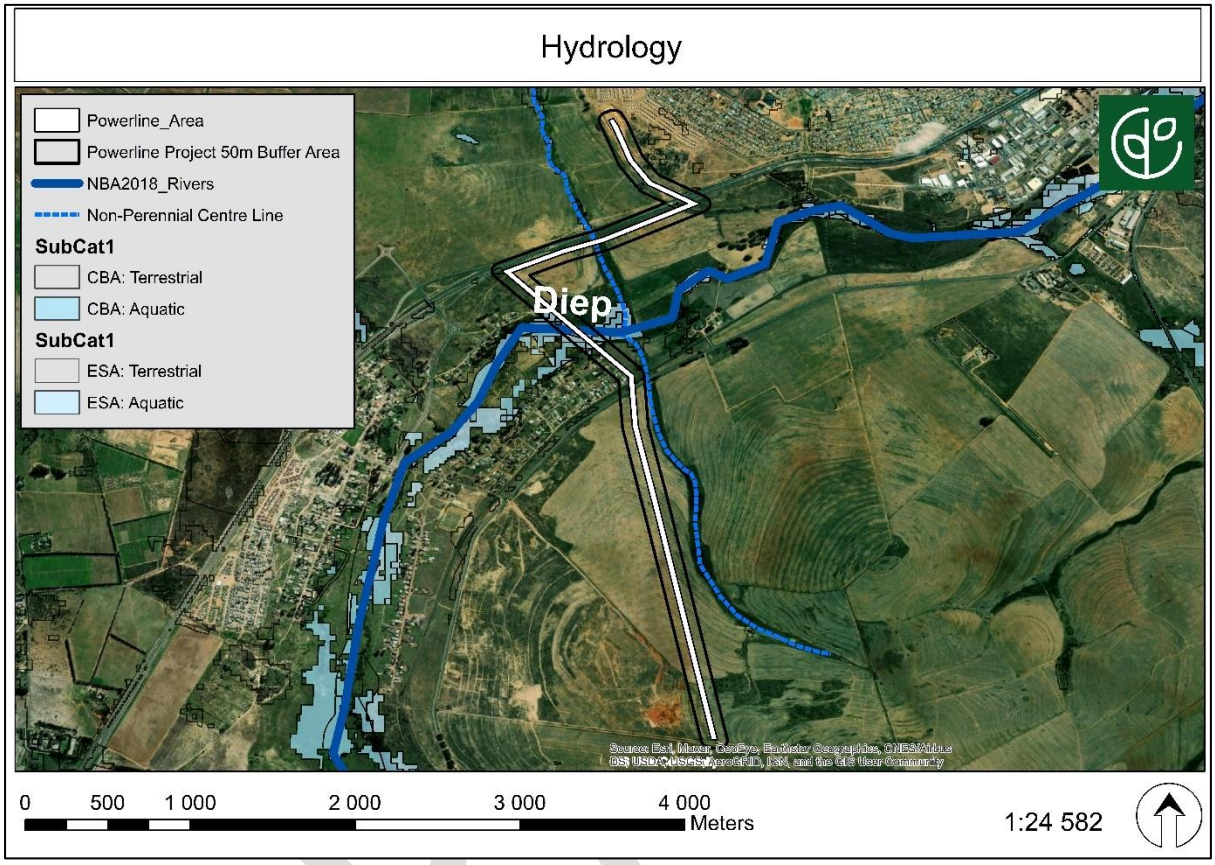


Figure 4: Map illustrating the Hydrological features in proximity to the proposed 132kV overhead powerline.

3 Habitat Condition of the Study Area

3.1 Project Area of Influence

The Project Area of Influence (PAOI) buffer of 50m was defined and assessed during the site assessment (Figure 5). The 50m buffer area was considered sufficient owing to the surrounding transformed agricultural landscape.

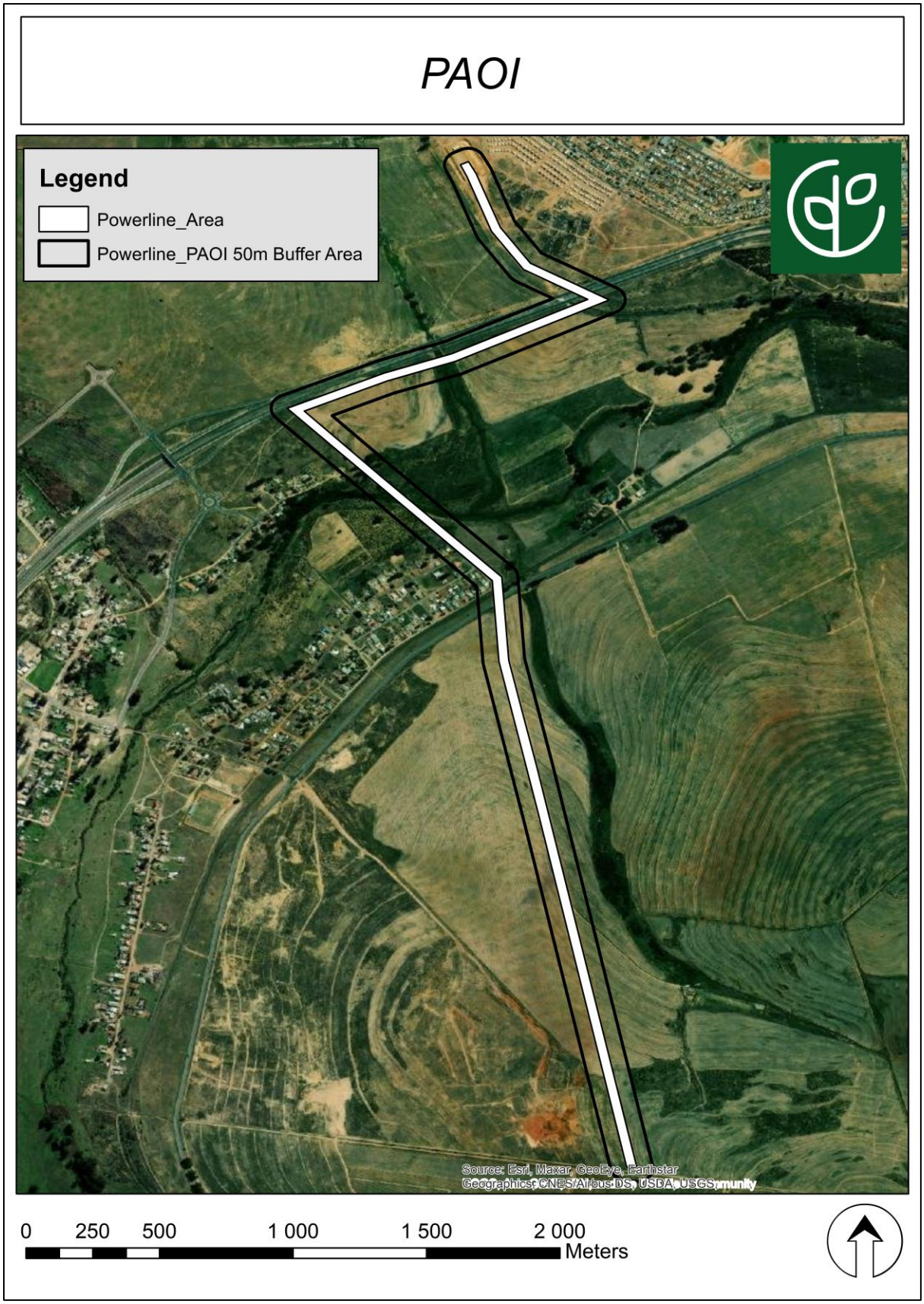


Figure 5: Map illustrating the PAOI.

3.1 Site Habitat Condition

The current surrounding vegetation condition on the site is described below according to habitat categories provided in Table 1. The habitats mapped by the author are represented in Figure 6.

Table 1: A description of the various habitat condition classes.

Habitat condition	Description
Intact vegetation	A true representation of the original vegetation type in terms of structure and species makeup. Minimal soil disturbance. Unlikely to have ever been ploughed. Disturbance may be evident.
Semi-intact	Closely resembles the original vegetation type in terms of structure and species makeup but has undergone some form of current or historical disturbance. Restoration potential is high.
Degraded	Only a few species representative of the original vegetation type are present. The vegetation has undergone heavy disturbance. Restoration potential is either low or moderate.
Highly degraded	The original vegetation is usually absent and has been removed in the past. Only a few remnants or pioneer species are present. Soils usually ploughed in the past. Restoration potential is very low.
Transformed	No remnant species exist anymore. The landscape is altered irreversibly with no restoration potential. Examples include cultivated farmland and the built environment.

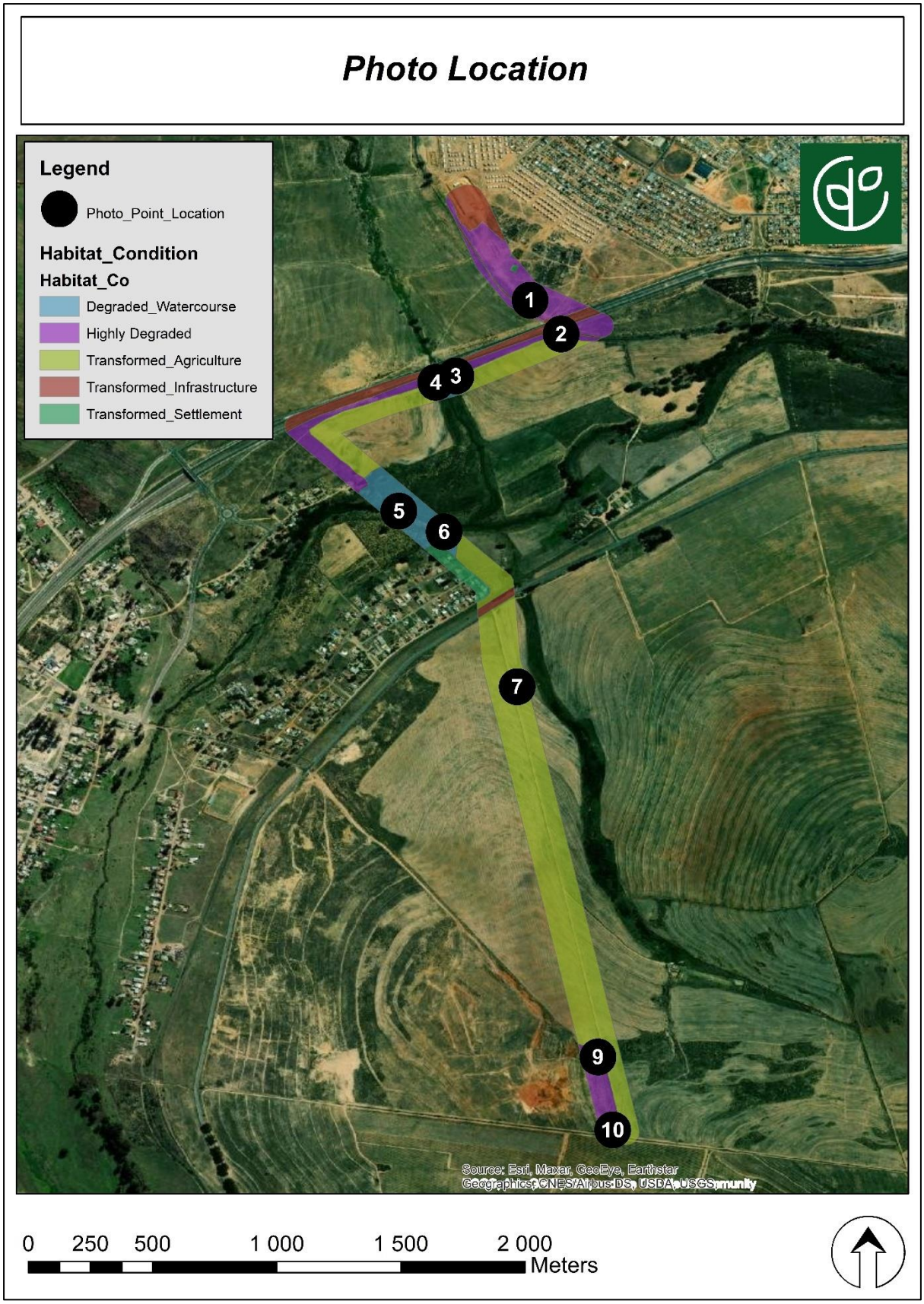


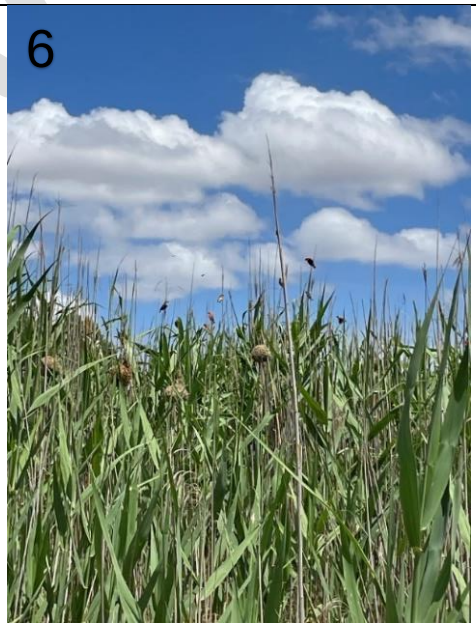
Figure 6: Map illustrating the observed habitat conditions and photo locations.

3.2 Current Habitat Condition

During the site assessment, three main habitat conditions were observed, namely Degraded, Highly Degraded, and Transformed. The following sections attempt to accurately describe the historical human-induced impacts, observed species, habitat condition and the restoration potential of the PAOI. Refer to figure 6 for photo locations in relation to the proposed powerline.

3.2.1 Degraded Watercourse

Table 2: Description of the degraded watercourse observed during the site assessment within the PAOI.

Degraded Watercourse	
	
	
General Site Description: The watercourse consists of a non-perennial drainage line that feeds the Diep River to the south of Photo Location 3 and 4. The habitat surrounding the watercourse has been altered due to agricultural development, and	

the watercourse itself is densely packed with *Phragmites australis* (Common Reed), forming an almost uniform monoculture within the stream bed.

The Diep River system, as observed in Photos 5 and 6, is similarly densely occupied with Phragmites. Although Phragmites dominates the entire observation area within the watercourses, hindering the establishment of a diverse freshwater system in terms of botanical features, it nevertheless provides an ideal habitat for *Euplectes orix* (Southern Red Bishops), as observed in Photo 6.

Species Observed: *Lyceum ferocissimum (LC), Arctotheca calendula (LC), Athanasia trifurcate (LC), Glebionis coronaria (LC), Raphanus raphanistrum (LC), Onocosiphon suffruticosusn (LC), Phragmites australis (LC), Ornithogalum thyrsoides (LC), Isolepis antarctica (LC), I. trachysperma (LC), Juncus capensis (LC),* and *Pycreus polystachyos (LC) Plantago major (Naturalised species).* No Species of Conservation Concern (SCC) were observed during the site assessment.

3.2.2 Highly Degraded Habitat

Table 3: Description of the highly degraded habitat observed during the site assessment within the PAOI.

Highly Degraded	
	

General Site Description: The areas denoted as highly degraded were devoid of the original vegetation that characterized Swartland Granite Renosterveld, with historical topsoil disturbance evident. Only a few remnants of pioneer species are present. The disturbances have altered the soil characteristics and likely resulted in the loss of seed banks. The restoration potential of these areas is therefore low and not guaranteed.

A high density of annual alien grasses was observed with no SCC; indigenous cover and plant species richness, especially of bulbs, were absent from the observed highly degraded areas. No mammals, such as aardvark, bat-eared fox, duiker, and porcupine, indicative of an intact ecosystem, were observed and are not likely to be present due to the surrounding land use.

Species Observed: *Hordeum* spp. (Barlleys), *Avenu fatua* (Wild Oat), *Cynodon dactylon, Echium plantagineum (Paterson curse), Aizoon africanum (LC), Seriphium plumosum (LC), Ornithogalum thyrsoides (LC) Athanasia trifurcate (LC), Lobelia erinus (LC).*

3.2.3 Transformed Habitats

Table 4: Description of the transformed habitat observed during the site assessment within the PAOI.

Transformed Habitats	
	
General Site Description: As depicted in Figure 6, the transformed habitat comprises distinct features. The transformed infrastructure includes roads and ploughed areas earmarked for development. Transformed settlements encompass both formal and informal housing, while transformed agriculture zones are presently utilized for growing various grains. Notably, no remnant or pioneer species were observed in these areas.	

3.2.5 Summary of the habitat conditions of the areas surrounding the impacted site

The areas within the PAOI exhibit a range of habitat conditions, as categorised in Table 1. Figure 6 illustrates the observed habitat conditions, with a focus on Degraded, Highly Degraded, and Transformed habitats.

Degraded Watercourse

General Site Description: The watercourse is a non-perennial drainage line feeding the Diep River. Agricultural development has altered the habitat, and *Phragmites australis* (Common Reed) dominates, forming a monoculture in the stream bed.

Species Observed: The habitat hosts various plant species, including *Lyceum ferocissimum, Arctotheca calendula, Athanasia trifurcate, Glebionis coronaria, Raphanus raphanistrum, Onocosiphon suffruticosusn, Phragmites australis, Ornithogalum thyrsoides, Isolepis antarctica, I. trachysperma, Juncus capensis,* and *Pycreus polystachyos*, along with the naturalised species *Plantago major*.

Restoration Potential: Restoration potential appears moderate, as the watercourse still supports some plant diversity despite the dominance of Phragmites.

Highly Degraded

General Site Description: Highly degraded areas lack the original vegetation of Swartland Granite Renosterveld, with historical topsoil disturbance. Pioneer species are scarce, and the soil characteristics have been altered, reducing the restoration potential.

Species Observed*:* *Hordeum spp., Avenu fatua, Cynodon dactylon, Echium plantagineum, Aizoon africanum, Seriphium plumosum, Ornithogalum thyrsoides, Athanasia trifurcate*, and *Lobelia erinus* were observed. No Species of Conservation Concern (SCC) were noted.

Restoration Potential: Restoration potential is low, with the absence of indigenous cover, low plant species richness, and the presence of alien grasses. The disturbances have likely impacted seed banks.

Transformed Habitats

General Site Description: Transformed habitats include infrastructure such as roads, ploughed areas for development, formal and informal housing, and agricultural zones for grain cultivation. No remnant or pioneer species were observed.

Restoration Potential: The transformed habitats have no restoration potential, as the landscape alterations are irreversible. These areas serve different human activities, including agriculture and housing.

In summary, the habitat conditions surrounding the impacted site range from moderately degraded watercourses with some restoration potential to highly degraded areas with low restoration potential, and finally, transformed habitats with no restoration potential.

4 Sensitivity Assessment

It is essential to evaluate the Site Ecological Importance (SEI) for various receptors, such as species of conservation concern, vegetation communities, or habitat types present on the site. SEI is calculated as the sum of two key components: Biodiversity Importance (BI) and Receptor Resilience (RR). BI, in turn, is determined based on Conservation Importance (CI) and Functional Integrity (FI) criteria. CI assesses the significance of the site for supporting biodiversity features of conservation concern, including populations of IUCN-threatened and Near Threatened species, rare species, range-restricted species, globally significant species, and areas of threatened ecosystem types.

4.1 Site Conservation Importance (CI)

CI is evaluated using internationally recognised principles and criteria, including the IUCN Red List of Species, Red List of Ecosystems, and Key Biodiversity Areas. It was determined at a finer spatial scale through fieldwork data collection and desktop assessment conducted by the specialist.

4.2 Sites Functional Integrity (FI)

Functional Integrity (FI) of the receptor is assessed by considering its current ability to maintain its ecological structure and functions compared to its ideal conditions. FI criteria include connectivity to other natural areas, the degree of current persistent negative ecological impacts, and the remaining intact and functional area of the habitat.

4.3 Site Receptor Resilience (RR)

Receptor Resilience (RR) is defined as the capacity of the receptor to resist major damage from disturbances and recover to its original state with limited or no human intervention. RR assessments consider the estimated recovery time required to restore functionality to the receptor, and it is often linked to specific disturbances or impacts.

4.4 Site Ecological Importance

The ecological importance (Figure 7) of the proposed development site varies across different habitats described in section 3 and can be reviewed in table 5.

Table 5: Summary of the Terrestrial Site Ecological Importance for the proposed development.

Habitat	Conservation Importance	Functional Integrity	Biodiversity Importance	Receptor Resilience	Site Ecological Importance
Degraded Watercourse	**Medium** • > 50% of receptor contains natural habitat with potential to support SCC.	**Medium** • The watercourse creates a narrow corridor connecting larger intact habitats further east of the proposed powerline. • Past disturbances are evident, and no SCC observed. • *Phragmites australis* dominant species, forming a monoculture in the stream bed. • Moderate restoration potential.	**Medium**	**Medium** The receptor resilience of this degraded watercourse is deemed moderate, with the prevailing agricultural development standing as a continued source of habitat alteration. It is anticipated that these anthropogenic activities may persist. Consequently, the implementation of sustainable land-use practices and responsible management becomes imperative for fostering the long-term resilience of the watercourse. It is therefore unlikely that watercourse will recover > 75% of the original species composition without active restoration.	**Medium** BI = Medium RR = Medium

Habitat	Conservation Importance	Functional Integrity	Biodiversity Importance	Receptor Resilience	Site Ecological Importance
Highly Degraded Habitat	**Low** • No confirmed or highly likely populations of SCC. • No confirmed or highly likely populations of range restricted species. • < 50% of receptor contains natural habitat with limited potential to support SCC.	**Low** • Almost no habitat connectivity. But migration still possible across degraded natural habitats and a very busy road network surrounding the area.	**Low**	**High** The highly degraded areas lack the original vegetation of Swartland Granite Renosterveld, experiencing historical topsoil disturbance. Pioneer species are scarce, and soil characteristics have been altered, diminishing restoration potential. The ability to recover to its degraded state is favourable because they would not need to revert to a fully natural state.	**Very Low** BI = Low RR = High
Transformed Habitat	**Very Low** • No confirmed or highly likely populations of SCC.	**Very Low** • Several mayor negative ecological impacts.	**Very Low**	Very high Because this is a heavily transformed system, its	**Very low** BI = Very low RR =Very high

Habitat	Conservation Importance	Functional Integrity	Biodiversity Importance	Receptor Resilience	Site Ecological Importance
	• No longer representative of an Endangered ecosystem type.			ability to recover is virtually certain because it would need to recover to a transformed state.	

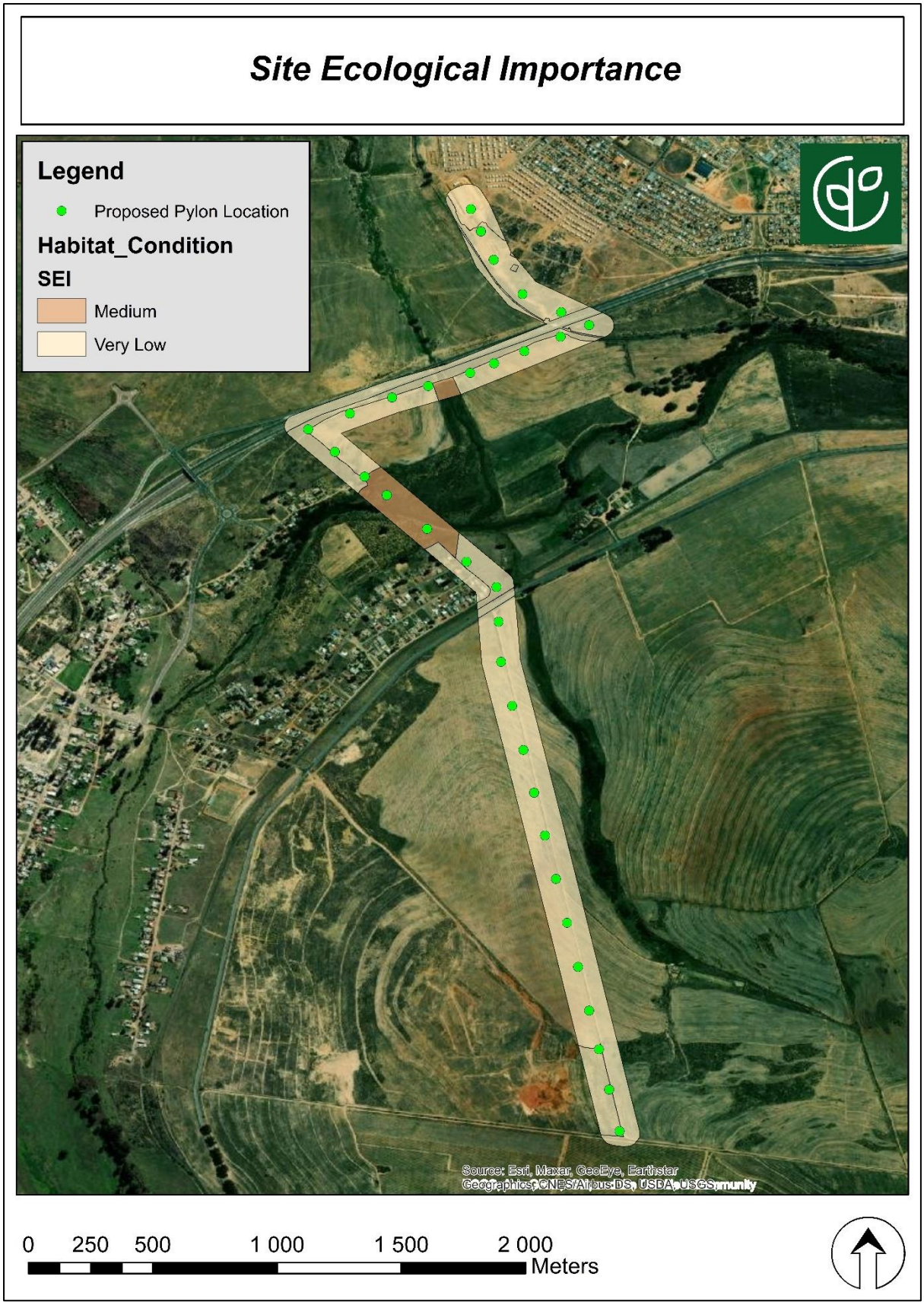


Figure 7: Map illustrating the sites ecological importance.

5 Impact Assessment

The impact assessment determines the impacts imposed on the affected environment, specifically the vegetation, ecological processes, SCC, and habitats. These are considered for the direct, indirect, and cumulative impacts. Mitigation measures are those interventions required to either reduce the impact significance rating (essential mitigation) or to ensure that the project imposes the least possible strain on the affected environment (best practice/general mitigation).

5.1 Direct Impacts (Construction Phase)

Direct impacts are those that would occur as a direct result of the clearing of the vegetation to accommodate the 132kV line and associated infrastructure. The development phase is evaluated for the following impact:

5.1.1 Loss of highly degraded and transformed habitat due to development of the 132kV line

The proposed development will lead to the loss of highly degraded and transformed habitats. The significance of the impact is considered to be low (-) (Table 6). Mitigation measures have been proposed to address any secondary impacts that may arise during the construction phase; however, it's emphasised that these measures will not alter the determined impact significance.

Table 6: Impact significance table for the loss of habitat during the construction phase.

Criteria	**Loss of Habitat**	
	Without Mitigation	**With Mitigation**
Nature	Negative (-)	Negative (-)
Extent	Site (1)	Site (1)
Magnitude	Low (1)	Low (1)
Duration	Long Term (3)	Long Term (3)
Consequence	Slightly detrimental (5)	Slightly detrimental (5)
Probability	Definite (4)	Definite (4)
Significance	**Low (-)**	**Low (-)**

Confidence	High	High
Reversibility	The potential for reversibility is high due to the already highly degraded to transformed state of the impacted site.	
Irreplaceable loss of resources	Degree of Irreplaceable Loss of Resources: ***Low***	
Cumulative Impacts	The surrounding area has been transformed due to agricultural development, and the proposed development will also not result in the loss of SCC or any remnant vegetation characterised as Swartland Shale Renosterveld and Swartland Granite Renosterveld (SANBI Red List of Ecosystems: Remnants, 2021). The cumulative impact is therefore deemed to be low.	
Proposed Mitigation Measures	• **Vegetation Clearing:** Clear vegetation only within the proposed development footprint, minimising the impact on the surrounding area. • **Erosion Control:** Implement erosion control measures to prevent soil erosion and habitat degradation. • **Noise and Vibration Control:** Use construction methods that minimize noise and vibrations to reduce disturbance to wildlife. • **Invasive Species Control:** Manage and control invasive species that may have been introduced during construction. • Utilise existing roads and access points to gain entry to the sites.	

5.1.2 Loss of degraded watercourse habitat due to the development of the 132kV line

The direct impact will be the construction of the self-supporting flange pole foundations, as outlined in the proposed layout of the double circuit suspension poles foundations (Figure 7). This construction will directly impact CBA1 and in ESA1. However, this area has experienced significant human-induced impacts, leading to the loss of key biodiversity elements characteristic of Swartland Alluvium Renosterveld.

Table 7: Impact Significance table for the loss of degraded watercourse.

Criteria	**Loss of degraded watercourse habitat**	
	Without Mitigation	**With Mitigation**
Nature	Negative (-)	Negative (-)
Extent	Site (1)	Site (1)

Magnitude	Medium (2)	Medium (2)
Duration	Long Term (3)	Long Term (3)
Consequence	Moderately detrimental (7)	Moderately detrimental (7)
Probability	Definite (4)	Definite (4)
Significance	Medium (-)	Medium (-)
Confidence	High	High
Reversibility	High. The potential for reversibility is high due to the already degraded state of the impacted site.	
Irreplaceable loss of resources	Degree of Irreplaceable Loss of Resources: ***Low***	
Cumulative Impacts	The surrounding area has been transformed due to agricultural development, and the proposed development will also not result in the loss of SCC or any remnant vegetation characterised as Swartland Alluvium Renosterveld (SANBI Red List of Ecosystems: Remnants, 2021). The cumulative impact is therefore deemed to be ***low***.	
Proposed Mitigation Measures	• **Vegetation Clearing:** Clear vegetation only within the proposed development footprint, minimising the impact on the surrounding area. • **Erosion Control:** Implement erosion control measures to prevent soil erosion and habitat degradation. • **Noise and Vibration Control:** Use construction methods that minimize noise and vibrations to reduce disturbance to wildlife. • **Invasive Species Control:** Manage and control invasive species that may have been introduced during construction. • Utilise existing roads and access points to gain entry to the sites.	

5.2 Operation Phase Impacts

The following potential impacts were considered on biodiversity during the operational phase. This phase refers to when construction has been completed and the proposed infrastructure has been built and is functional.

5.2.1 Continued encroachment of disturbed areas by Invasive Alien Plants (IAPs)

Areas disturbed during construction will create niches and opportunity for encroachment by IAPs. The significance of the IAP encroachment impact is provided in Table 8.

Table 8: Assessment of significance of Invasive Alien Plant encroachment associated with the operational phase of the proposed development

Criteria	IAPs encroachment	
	Without Mitigation	**With Mitigation**
Nature	Negative (-)	Negative (-)
Extent	Local (2)	Local (2)
Magnitude	Medium (2)	Medium (2)
Duration	Long Term (3)	Short Term (1)
Consequence	Moderately detrimental (7)	Negligible (4)
Probability	Definite (4)	Definite (4)
Significance	Medium (-)	Very Low (-)
Confidence	High	High
Reversibility	High	High
Irreplaceable loss of resources	Medium	Low
Cumulative Impacts	**Low.** The activity is localised and might have a negligible cumulative impact.	
Proposed Mitigation Measures	• Continue and enhance efforts to control and manage invasive alien plant species in the areas surrounding the impacted area.	

5.1 No-Go Alternative

The status quo will remain. Given this variability, it is difficult to generalise the No-Go impact and infer likely future impacts. On balance, assuming the continuation of the status quo, the No-Go alternative is expected to have a neutral to low negative impact, considering the historical disturbances observed within the landscape.

6 Conclusion and Recommendations

This report outlines the terrestrial biodiversity impacts associated with the proposed establishment of an electrical powerline from the national grid to the De Hoop substation. The historical composition of the Project Area of Influence (PAOI) included Swartland Shale Renosterveld, Swartland Alluvium Fynbos, and Swartland Granite Renosterveld, each facing distinct conservation challenges. However, no intact remnants of these vegetation types were observed within the PAOI. Consequently, the habitat conditions range from moderately degraded watercourses with some restoration potential to highly degraded areas with low restoration potential and transformed habitats with no restoration potential.

The impact significance for the proposed development, leading to terrestrial habitat loss, is deemed to be low negative. Mitigation measures are proposed to address potential secondary impacts, minimising the overall ecological disturbance. The development directly affects Critical Biodiversity Areas (CBA1: Aquatic, CBA1: Terrestrial, CBA2: Terrestrial) and Ecological Support Areas (ESA1: Aquatic, ESA2: Watercourse) outlined in the Western Cape Biodiversity Spatial Plan. While crucial for biodiversity maintenance, the actual impact is limited to a relatively small portion of the Diep River degraded watercourse, resulting in a defined medium negative significance.

Recommendations:

- Vegetation Management: Restrict clearing to the proposed development footprint, ensuring minimal disturbance to existing habitats.
- Habitat Restoration: Implement targeted restoration efforts in moderately degraded watercourses to enhance biodiversity.
- Invasive Species Control: manage and control Invasive Alien Plants (IAPs) during the operational phase to prevent further encroachment. Continuous monitoring and prompt intervention are essential.

Mitigation measures, as described in this report, have the potential to reduce the overall risk to an acceptable residual level. In light of the presented information, the specialist holds the opinion that the project may be favourably considered, contingent upon the thorough implementation of all proposed mitigation measures. However, ongoing monitoring and adaptive management are emphasised to ensure the sustained health and resilience of the affected ecosystems.

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Appendix 1: Convention for Assigning Significance Ratings to Impacts

For each impact, the **nature** (positive/negative), **extent** (spatial scale), **magnitude/intensity** (intensity scale), **duration** (time scale), **consequence** (calculated numerically) and **probability** of occurrence is ranked and described. These criteria would be used to ascertain the **significance** of the impact, firstly in the case of no mitigation and then with the most effective mitigation measure(s) in place.

The tables below show the rankings of these variables and defines each of the rating categories.

Table 9: Assessment criteria for the evaluation of impacts.

CRITERIA	RANK	DESCRIPTION
Nature	**Positive (+)**	The environment will be positively affected.
	Negative (-)	The environment will be negatively affected.
Extent or spatial influence of impact	**National (4)**	Beyond provincial boundaries, but within national boundaries.
	Regional (3)	Beyond a 10 km radius of the proposed activities, but within provincial boundaries.
	Local (2)	Within a 10 km radius of the proposed activities.
	Site specific (1)	On site or within 100 m of the proposed activities.
	Zero (0)	Zero extent.
Magnitude/ intensity of impact (at the indicated spatial scale)	**High (3)**	Natural and/ or social functions and/ or processes are *severely* altered.
	Medium (2)	Natural and/ or social functions and/ or processes are *notably* altered.
	Low (1)	Natural and/ or social functions and/ or processes are *slightly* altered.
	Zero (0)	Natural and/ or social functions and/ or processes remain *unaltered.*

Duration of impact	**Long Term (3)**	More than 10 years, but impact ceases after the operational phase.
	Medium Term (2)	Between 3 – 10 years.
	Short Term (1)	Construction period (up to 3 years).
	None (0)	Zero duration.
Consequence (Nature x (Extent + Magnitude/ Intensity + Duration))	**Extremely beneficial/ detrimental (10 – 11) (+/-)**	The impact is *extremely* beneficial/ detrimental.
	Highly beneficial/ detrimental (8 – 9) (+/-)	The impact is *highly* beneficial/ detrimental.
	Moderately beneficial/ detrimental (6 – 7) (+/-)	The impact is *moderately* beneficial/ detrimental.
	Slightly beneficial/ detrimental (4 – 5) (+/-)	The impact is *slightly* beneficial/ detrimental.
	Negligibly beneficial/ detrimental (1 – 3) (+/-)	The impact is *negligibly* beneficial/ detrimental.
	Zero consequence (0) (+/-)	The impact has zero consequence.
Probability of occurrence	**Definite (4)**	Estimated at a greater than 95% chance of the impact occurring.
	Probable (3)	Estimated 50 – 95% chance of the impact occurring.
	Possible (2)	Estimated 6 – 49% chance of the impact occurring.
	Unlikely (1)	Estimated less than 5% chance of the impact occurring.
	None (0)	Estimated no chance of impact occurring.

The significance of an impact is derived by taking into account the consequence (nature of the impact and its extent, magnitude/intensity and duration) of the impact and the probability of this impact occurring through the use of the following formula:

Significance Score = Consequence x Probability

The means of arriving at a significance rating is explained in Table 4.

Table 10: Definition of significant table.

SIGNIFICANCE SCORE	SIGNIFICANCE RATINGS	
32 – 40	**High (+)**	**High (-)**
25 – 31	**Medium (+)**	**Medium (-)**
19 – 24	**Low (+)**	**Low (-)**

10 – 18	**Very-Low (+)**	**Very-Low (-)**
1 – 9	**Negligible**	

Once the significance of an impact has been determined, the confidence in the assessment of the impact, as well as the degree of reversibility of the impact and irreplaceable loss of resources would be determined using the rating systems outlined in Table 4, 5 and 6 respectively. Lastly, the cumulative impact is ranked and described as outlined in Table 7.

Table 11: Definition of confidence ratings.

CONFIDENCE RATINGS	CRITERIA
High	Wealth of information on and sound understanding of the environmental factors potentially influencing the impact.
Medium	Reasonable amount of useful information on and relatively sound understanding of the environmental factors potentially influencing the impact.
Low	Limited useful information on and understanding of the environmental factors potentially influencing this impact.

Table 12: Degree of reversibility.

REVERSABILITY OF IMPACT	CRITERIA
High	High potential for reversibility.
Medium	Medium potential for reversibility.
Low	Low potential for reversibility.
Zero	Zero potential for reversibility.

Table 13: Degree of irreplaceability.

IRREPLACEABLE LOSS OF RESOURCES	CRITERIA
High	Definite loss of irreplaceable resources.
Medium	Medium potential for loss of irreplaceable resources.
Low	Low potential for loss of irreplaceable resources.
Zero	Zero potential for loss of irreplaceable resources.

Table 14: Cumulative Impact on the environment.

CUMULATIVE IMPACTS	CRITERIA
High	The activity is one of several similar past, present or future activities in the same geographical area, and might contribute to a very significant combined impact on the geographical, physical, biological, social, economic and cultural aspects of the environment.
Medium	The activity is one of a *few* similar past, present or future activities in the same geographical area, and might contribute to a very significant combined impact on the geographical, physical, biological, social, economic and cultural aspects of the environment.
Low	The activity is localised and might have a negligible cumulative impact.
Zero	No cumulative impact on the environment.