Enertrag South Africa (Pty) Ltd

Hendrina North 132kV Powerline and a Substation near Hendrina, Mpumalanga Province

Visual Impact Assessment

DFFE Reference: TBC
Report Prepared by: Kelly Armstrong and Chris Dalgliesh
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Enertrag South Africa (Pty) Ltd

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EXECUTIVE SUMMARY

Enertrag South Africa (Pty) Ltd proposes to develop a 132 kV powerline and substation to evacuate power produced at the Hendrina North WEF to the Hendrina Power Station, near Hendrina, Mpumalanga. Two powerline alignment alternatives have been assessed, traversing 17 farms in the Steve Tshwete Local Municipality. The proposed substation will have a footprint of up to 3 ha.

SRK Consulting (South Africa) (Pty) Ltd has been appointed by SiVEST (SA) (Pty) Ltd (SiVEST) to undertake the Visual Impact Assessment to inform the Environmental Impact Assessment process required in terms of the National Environmental Management Act 107 of 1998, conducted by SiVEST.

The visual quality is defined by the agricultural, mining and industrial activity as well as infrastructure. The naturally undulating landscape is interrupted by powerlines, Hendrina Power Station, Afgri grain silo and the Optimum Coal Mine tailings dam. The sense of place of the surrounding area is strongly influenced by the surrounding land use, which can generally be described as a rural agricultural area, albeit within a region blighted by development mostly associated with coal-fired power generation. The sense of place is not particularly distinct from the rest of the wider region and is not overly memorable.

Impacts of the 132 kV powerline and substation will be associated with visual intrusion and visual quality and have been assessed in this report.

Construction (and decommissioning) activities associated with the 132 kV powerline and substation are anticipated to be visually intrusive. The impact is assessed to be of *low* significance with and without the implementation of mitigation.

During the operational phase, the 132 kV powerline and substation will alter the sense of place and be visually intrusive. These impacts are assessed to be of *medium* significance with and without the implementation of mitigation. The visual impact of nightglow is anticipated to be of *medium* significance and with the implementation of mitigation is reduced to *low*.

The comparative assessment of Powerline Alternative 1 and 2 indicates that Powerline Alternative 2 is the preferred powerline alignment from a visual perspective as it minimises additional visual intrusion and clutter.

Key mitigation measures include:

- Limit vegetation clearance and the construction / decommissioning footprint, including access road footprints, to what is absolutely essential;
- Consolidate the footprint of the construction camp to a functional minimum;
- Avoid excavation, handling and transport of materials which may generate dust under very windy conditions;

- Keep stockpiled aggregates and sand covered to minimise dust generation;
- Keep construction site tidy;
- Do not install or affix lights on pylons;
- Fence the perimeter of the site with a green or black fencing;
- Ensure that the roof colour of the proposed buildings blends into the landscape;
- Reduce the height of lighting masts to a workable minimum; and
- Direct lighting inwards and downwards to limit light pollution.

Five other power stations are located within a 35 km radius of the proposed Hendrina Powerline. Powerlines radiate from each of these power stations, forming a dense network of large- and small-scale powerlines, affecting visual quality and sense of place in this transitional landscape. The proposed powerline and substation associated with this project will add to these accumulating impacts. Therefore the cumulative impact of the 132 kV powerline and substation is assessed to be of medium significance with and without the implementation of mitigation.

The proposed project comprises the development of a substation and 132 kV powerline, further altering the visual landscape of the project area. This project is moderately congruent with and marginally affects the integrity of the landscape, as five power stations and the associated highly concentrated network of powerlines exist within the project area and the wider region. Due to the high vertical profile of the pylons, the VAC of the project area is low; however the undulating topography is expected to increase the VAC to a degree. The substation will be screened by the topography to a limited degree and less so by the vegetation.

Based on the assessment and the assumption that the mitigation measures will be implemented, the specialist is of the opinion that the visual impacts of the project (Powerline Alternative 1 and 2) are both acceptable, and there is no reason not to authorise the project. Powerline Alternative 2 is the preferred alternative from a visual perspective.

NATIONAL ENVIRONMENTAL MANAGEMENT ACT, 1998 (ACT NO. 107 OF 1998) AND ENVIRONMENTAL IMPACT REGULATIONS, 2014 (AS AMENDED) - REQUIREMENTS FOR SPECIALIST REPORTS (APPENDIX 6)

Regulation GNR 326 of 4 December 2014, as amended 7 April 2017, Appendix 6	**Section of Report**
1. (1) A specialist report prepared in terms of these Regulations must contain- a) details of- i. the specialist who prepared the report; and ii. the expertise of that specialist to compile a specialist report including a curriculum vitae;	1.3
b) a declaration that the specialist is independent in a form as may be specified by the competent authority;	Page 6
c) an indication of the scope of, and the purpose for which, the report was prepared;	13
(cA) an indication of the quality and age of base data used for the specialist report;	1.4.3
(cB) a description of existing impacts on the site, cumulative impacts of the proposed development and levels of acceptable change;	5 and 6
d) the date and season of the site investigation and the relevance of the season to the outcome of the assessment;	1.4.3
e) a description of the methodology adopted in preparing the report or carrying out the specialised process inclusive of equipment and modelling used;	1.4
f) details of an assessment of the specific identified sensitivity of the site related to the proposed activity or activities and its associated structures and infrastructure, inclusive of a site plan identifying site alternatives;	6 and 7
g) an identification of any areas to be avoided, including buffers;	7
h) a map superimposing the activity including the associated structures and infrastructure on the environmental sensitivities of the site including areas to be avoided, including buffers;	N/A
i) a description of any assumptions made and any uncertainties or gaps in knowledge;	2
j) a description of the findings and potential implications of such findings on the impact of the proposed activity, (including identified alternatives on the environment) or activities;	7, 8 and 9

Regulation GNR 326 of 4 December 2014, as amended 7 April 2017, Appendix 6	**Section of Report**
k) any mitigation measures for inclusion in the EMPr;	7.6
l) any conditions for inclusion in the environmental authorisation;	7.6
m) any monitoring requirements for inclusion in the EMPr or environmental authorisation;	7.6
n) a reasoned opinion- i. (as to) whether the proposed activity, activities or portions thereof should be authorised; (iA) regarding the acceptability of the proposed activity or activities; and ii. if the opinion is that the proposed activity, activities or portions thereof should be authorised, any avoidance, management and mitigation measures that should be included in the EMPr, and where applicable, the closure plan;	9.1
o) a description of any consultation process that was undertaken during the course of preparing the specialist report;	N/A
p) a summary and copies of any comments received during any consultation process and where applicable all responses thereto; and	N/A
q) any other information requested by the competent authority.	N/A
2) Where a government notice *gazetted* by the Minister provides for any protocol or minimum information requirement to be applied to a specialist report, the requirements as indicated in such notice will apply.	N/A

environmental affairs
Department:
Environmental Affairs
REPUBLIC OF SOUTH AFRICA

DETAILS OF THE SPECIALIST, DECLARATION OF INTEREST AND UNDERTAKING UNDER OATH

	(For official use only)
File Reference Number:	
NEAS Reference Number:	DEA/EIA/
Date Received:	

Application for authorisation in terms of the National Environmental Management Act, Act No. 107 of 1998, as amended and the Environmental Impact Assessment (EIA) Regulations, 2014, as amended (the Regulations)

PROJECT TITLE

Hendrina 132 kV Powerline and Substation near Hendrina, Mpumalanga Province

Kindly note the following:

1. This form must always be used for applications that must be subjected to Basic Assessment or Scoping & Environmental Impact Reporting where this Department is the Competent Authority.
2. This form is current as of 01 September 2018. It is the responsibility of the Applicant / Environmental Assessment Practitioner (EAP) to ascertain whether subsequent versions of the form have been published or produced by the Competent Authority. The latest available Departmental templates are available at https://www.environment.gov.za/documents/forms.
3. A copy of this form containing original signatures must be appended to all Draft and Final Reports submitted to the department for consideration.
4. All documentation delivered to the physical address contained in this form must be delivered during the official Departmental Officer Hours which is visible on the Departmental gate.
5. All EIA related documents (includes application forms, reports or any EIA related submissions) that are faxed; emailed; delivered to Security or placed in the Departmental Tender Box will not be accepted, only hardcopy submissions are accepted.

Departmental Details

Postal address:
Department of Environmental Affairs
Attention: Chief Director: Integrated Environmental Authorisations
Private Bag X447
Pretoria
0001

Physical address:
Department of Environmental Affairs
Attention: Chief Director: Integrated Environmental Authorisations
Environment House
473 Steve Biko Road
Arcadia

Queries must be directed to the Directorate: Coordination, Strategic Planning and Support at:
Email: EIAAdmin@environment.gov.za

1. SPECIALIST INFORMATION

Specialist Company Name:	SRK Consulting (South Africa) (Pty) Ltd			
B-BBEE	Contribution level (indicate 1 to 8 or non-compliant)	1	Percentage Procurement recognition	125%
Specialist name:	Kelly Armstrong			
Specialist Qualifications:	BSocSc (Hons) Environmental Science			
Professional affiliation/registration:	N/A			
Physical address:	183 Main Road, Albion Spring Close, Rondebosch, 7700			
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Postal code:	7700	Cell:	076 114 9254	
Telephone:	021 659 3060	Fax:	086 530 7003	
E-mail:	karmstrong@srk.co.za			

2. DECLARATION BY THE SPECIALIST

I, ____Kelly Armstrong_____, declare that –

- I act as the independent specialist in this application;
- I will perform the work relating to the application in an objective manner, even if this results in views and findings that are not favourable to the applicant;
- I declare that there are no circumstances that may compromise my objectivity in performing such work;
- I have expertise in conducting the specialist report relevant to this application, including knowledge of the Act, Regulations and any guidelines that have relevance to the proposed activity;
- I will comply with the Act, Regulations and all other applicable legislation;
- I have no, and will not engage in, conflicting interests in the undertaking of the activity;
- I undertake to disclose to the applicant and the competent authority all material information in my possession that reasonably has or may have the potential of influencing - any decision to be taken with respect to the application by the competent authority; and - the objectivity of any report, plan or document to be prepared by myself for submission to the competent authority;
- all the particulars furnished by me in this form are true and correct; and
- I realise that a false declaration is an offence in terms of regulation 48 and is punishable in terms of section 24F of the Act.

Signature of the Specialist

SRK Consulting (South Africa) (Pty) Ltd

Name of Company:

Date:

3. UNDERTAKING UNDER OATH/ AFFIRMATION

I, _____ Kelly Armstrong _____, swear under oath / affirm that all the information submitted or to be submitted for the purposes of this application is true and correct.

Signature of the Specialist

SRK Consulting (South Africa) (Pty) Ltd

Name of Company

Date

Signature of the Commissioner of Oaths

Date

Enertrag South Africa (Pty) Ltd

Hendrina North 132kV Powerline and a Substation near Hendrina, Mpumalanga Province

Visual Impact Assessment

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Glossary of Terms

This list contains definitions of symbols, units, abbreviations, and terminology that may be unfamiliar to the reader.

Landscape Integrity	The compatibility of the development/visual intrusion with the existing landscape.
Sense of Place	The identity of a place related to uniqueness and/or distinctiveness. Sometimes referred to as genius loci meaning 'spirit of the place'.
Viewshed	The topographically defined area from which the project could be visible.
Visibility	The area from which the project components would actually be visible and which depends upon topography, vegetation cover, built structures and distance.
Visual Absorption Capacity	The potential for the area to conceal the proposed development.
Visual Character	The elements that make up the landscape including geology, vegetation and land-use of the area.
Visual Exposure	The zone of visual influence or viewshed. Visual exposure tends to diminish exponentially with distance.
Visual Impact	A change to the existing visual, aesthetic or scenic environment, either adverse or beneficial, that is directly or indirectly due to the development of the project and its associated activities.
Visual Intrusion	The effect of the artificial insertion (construction) of an object into a landscape, typically – but not always - reducing the visual quality of the environment, and sense of place.
Visual Quality	The experience of the environment with its particular natural and cultural attributes.
Visual Receptors	Potential viewers (individuals or communities) who are subjected to the visual influence of a project.

List of Abbreviations

BA	Basic Assessment
Enertrag	Enertrag South Africa (Pty) Ltd
EIA	Environmental Impact Assessment
EMPr	Environmental Management Programme
mamsl	Metres Above Mean Sea Level
NEMA	National Environmental Management Act 107 of 1998
SiVEST	SiVEST (SA) (Pty) Ltd
SRK	SRK Consulting (South Africa) (Pty) Ltd
ToR	Terms of Reference
VAC	Visual Absorption Capacity
VIA	Visual Impact Assessment
VP	Viewpoint
WEF	Wind Energy Facility

Enertrag South Africa (Pty) Ltd

Hendrina North 132kV Powerline and a Substation near Hendrina, Mpumalanga Province

Visual Impact Assessment

1. INTRODUCTION

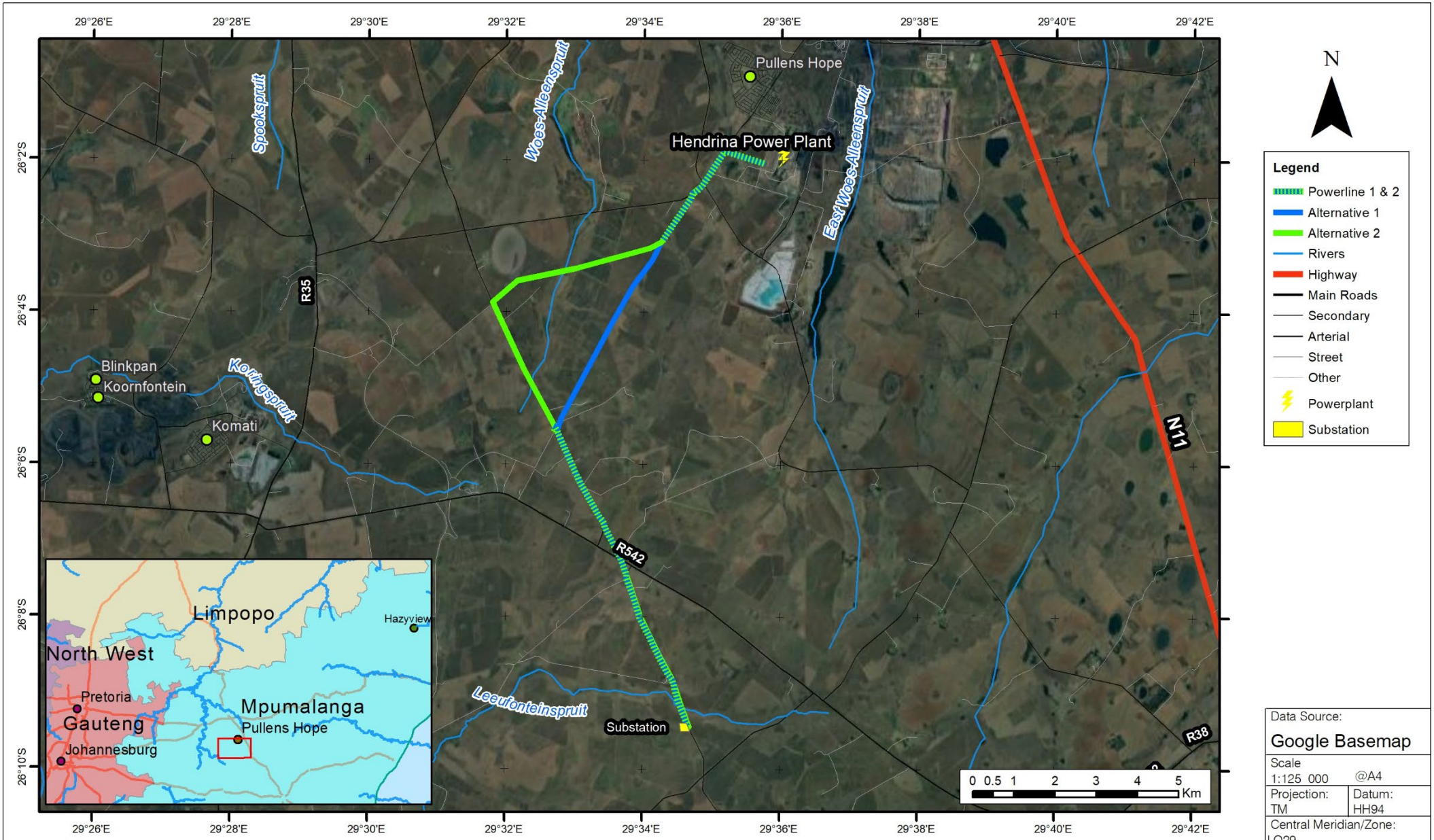
Enertrag South Africa (Pty) Ltd (Enertrag) proposes to develop a 132 kV powerline and substation to evacuate power produced at the Hendrina North Wind Energy Facility[1] (WEF) to the Hendrina Power Station, near Hendrina, Mpumalanga Province (the project - Figure 1-1). The powerline will have a maximum length of 21 km and will traverse a number of farms in the Steve Tshwete Local Municipality. The proposed substation will be located on Portion 3 of Farm 185IS Hartebeestkuil and will have a footprint of up to 3 ha (Figure 1-1).

SRK Consulting (South Africa) (Pty) Ltd (SRK) has been appointed by SiVEST (SA) (Pty) Ltd (SiVEST), on behalf of Enertrag, to undertake the Visual Impact Assessment (VIA) to inform the required Basic Assessment (BA) process required in terms of the National Environmental Management Act 107 of 1998 (NEMA) and the Environmental Impact Assessment (EIA) Regulations, 2014 as amended and conducted by SiVEST.

1.1 Scope and Objectives

The primary aims of the study are to describe the visual baseline, assess the visual impacts of the project and identify effective and practicable mitigation measures. The VIA informs the BA process required in terms of NEMA and conducted by SiVEST.

[1] The Hendrina North WEF (DFFE Reference No. 14/12/16/3/3/2/2130) is subject to a separate EIA processes in terms of the NEMA EIA Regulations, as amended.



Data Source: Google Basemap

Scale 1:125 000 @A4

Projection: TM | Datum: HH94

Central Meridian/Zone: LO29

srk consulting

HENDRINA POWERLINE VIA
LOCALITY MAP

Date: 23/09/2022 | Compiled by: GROS

Project No. 590817 | Fig No. 1-1

Path: J:\Proj\590817_Hendrina_Powerline_VIA\8GIS\GISPROJ\MXD\590817_HENDRINA_POWERLINE_VIA_LOCALITY_MAP.mxd

1.2 Terms of Reference

The Terms of Reference (ToR) for the study are as follows:

- Describe the baseline visual characteristics of the study area, including landform, visual character and sense of place, and place this in a regional context;
- Identify potential impacts of the project on the visual environment through analysis and synthesis of the following factors:
    - Visual exposure;
    - Visual absorption capacity (VAC);
    - Sensitivity of viewers (visual receptors);
    - Viewing distance and visibility; and
    - Landscape integrity;
- Assess potential the impacts of the project on the visual environment and sense of place using SiVEST's impact assessment methodology (see Appendix B);
- Identify and assess the direct, indirect and cumulative impacts (pre- and post-mitigation) of the proposed project (and alternatives, if applicable) on visual resources in relation to other proposed and existing developments in the surrounding area;
- Compile a report compliant with Appendix 6 of the EIA Regulations and any relevant legislation and guidelines; and
- Recommend practicable mitigation measures to avoid and/or minimise impacts and/or optimise benefits.

1.3 Specialist Credentials

The VIA was conducted by staff listed in Table 1-1.

Table 1-1: VIA staff

Staff	Role	Qualification
Christopher Dalgliesh	Project Director	Chris Dalgliesh is a Partner and Principal Environmental Consultant with over 35 years' experience, primarily in South Africa, Southern Africa, West Africa and South America (Suriname). Chris has worked on a wide range of projects, notably in the natural resources, Oil & Gas, waste, infrastructure (including rail and ports) and industrial sectors. He has managed and regularly reviews Visual Impact Assessments. He has directed and managed numerous Environmental and Social Impact Assessments (ESIAs) and associated management plans, in accordance with international standards. He regularly provides high level review of ESIAs, frequently directs Environmental and Social Due Diligence studies for lenders, and also has a depth of experience in Strategic Environmental Assessment (SEA), State of Environment Reporting and Resource Economics. He holds a BBusSci (Hons) and M Phil (Env) and is a registered Environmental Assessment Practitioner (EAP).

Staff	Role	Qualification
Kelly Armstrong	Specialist Consultant	Kelly Armstrong is an Environmental Consultant at SRK Consulting. She has four years' experience in managing Basic Assessment, Environmental Impact Assessment and Water Use Authorisation processes and acting as an Environmental Control Officer (ECO) in the renewable energy, residential, aquaculture, marine and mining sectors. She also manages and contributes to Visual Impact Assessments for infrastructure, renewable energy and mining projects. Kelly holds a BSocSc (Hons) in Environmental and Geographical Studies from the University of Cape Town.

1.4 Assessment Methodology

Visual impacts are a function of the physical transformation of a landscape on account of the introduced object, and the experiential perceptions of viewers.

Given the subjective nature of visual issues, assessing the visual impacts of a project in absolute and objective terms is not achievable. Thus, qualitative as well as quantitative techniques are required.

In this VIA, emphasis has therefore been placed on ensuring that the methodology and rating criteria are clearly stated and transparent. The focus of the study is to determine the character and sensitivity of the visual environment, identify visual receptors and viewing corridors and identify and assess potential visual impacts and mitigation measures.

1.4.1 Approach

The approach adopted for the VIA is intended to be as accurate and thorough as possible. Analytical techniques are selected to endorse the reliability and credibility of the assessment.

The approach to and reporting of the VIA study comprises three major, phased elements (as summarised in Figure 1-2 below):

- Description of the visual context;
- Identification and discussion of the potential visual impacts; and
- Assessment of those potential impacts.

Visual impacts are assessed as one of many interrelated effects on people (i.e. the viewers and the impact of an introduced object into a particular view or scene) (Young, 2000). In order to assess the visual impact the project has on the affected environment, the visual context (baseline) in which the project is located must be described. The inherent value of the visual landscape to viewers is informed by geology / topography, vegetation and land-use and is expressed as Visual Character (overall impression of the landscape), Visual Quality (how the landscape is experienced) and Sense of Place (uniqueness and identity).

Visual impact is measured as the change to the existing visual environment caused by the project as perceived by the viewers (Young, 2000). The visual impact(s) may be negative, positive or neutral (i.e. the visual quality is maintained). The magnitude or intensity of the visual impacts is determined through analysis and synthesis of the VAC of the landscape (potential of the landscape to absorb the project), zone of visual

influence or exposure[2], visibility (viewing distances), compatibility of the project with landscape integrity (congruence) and the sensitivity of the viewers (receptors).

Sources of visual impacts are identified for the construction, operational and decommissioning phases of the project. The significance of those visual impacts is then assessed using the prescribed impact rating methodology, which includes the rating of:

- Impact consequence, determined by extent, duration and magnitude/intensity of impact (see above);
- Impact probability;
- Impact significance, determined by combining the ratings for consequence and probability; and
- Confidence in the significance rating.

The significance rating methodology is described in more detail in Appendix B.

Mitigation measures recommended to avoid and/or reduce the significance of negative impacts, or to optimise positive impacts, are identified for the project. Impact significance is re-assessed assuming the effective implementation of mitigation measures.

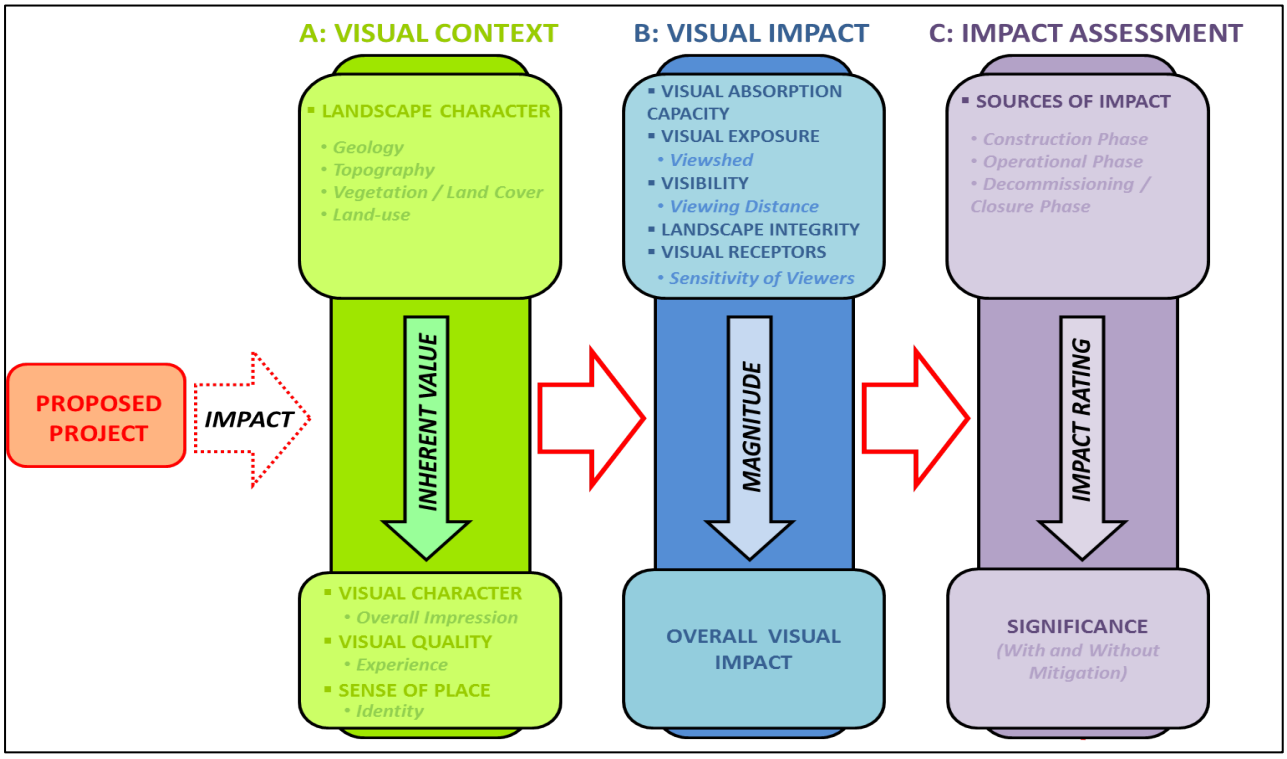


Figure 1-2: Approach to and method for the VIA

1.4.2 Method

The following method was used to assess the visual context (baseline) for the project:

1. Describe the project using information supplied by the proponent and BA team;
2. Collect and review visual data, including data on topography, vegetation cover, land-use and other background information;

[2] Visual exposure of a project can be determined through the analysis of viewsheds, however due to the existing road infrastructure and congruence of the proposed project with the existing infrastructure in the project area viewshed analysis will not be undertaken.

3. Undertake fieldwork, comprising a reconnaissance of the study area, particularly the project site and key viewpoints. The objectives of the fieldwork were to:
    - Familiarise the specialist with the site and its surroundings;
    - Identify key viewpoints / corridors; and
    - Determine and groundtruth the existing visual character and quality in order to understand the sensitivity of the landscape.

Visual 'sampling' using photography was undertaken to illustrate the likely zone of influence and visibility. The location of the viewpoints was recorded with a GPS;

4. Undertake a mapping exercise to define the visual character of the study area; and
5. Identify sensitive receptors.

The following method was used to assess the visual impact of the project:

1. Determine the visual zone of influence or exposure by superimposing the proposed development on aerial imagery, and verified during the site visit;
2. Make field observations at key viewpoints to determine the likely distance at which visual impacts will become indistinguishable;
3. Rate impacts on the visual environment and sense of place based on professional opinion and the prescribed impact rating methodology;
4. Recommend practicable mitigation measures to avoid and/or minimise impacts; and
5. Provide environmental management measures to be included in the Environmental Management Programme (EMPr) for the project.

1.4.3 Site Visit and Data Acquisition

A site visit was undertaken on 14 September 2022. The site visit duration and timing were appropriate to provide the specialist with a representative impression of the site and surroundings.

The following additional information sources were used:

- Maps indicating the location and layout of the project;
- Topographic data, including spatial files with 5 m contours obtained from the Department of Rural Development and Land Reform;
- Aerial images; and
- Other available data on geology, vegetation, land use, receptors etc.

The information is sufficiently recent and detailed to provide appropriate inputs into the VIA.

2. ASSUMPTIONS AND LIMITATIONS

As is standard practice, the VIA is based on a number of assumptions and is subject to certain limitations, which should be borne in mind when considering information presented in this report. These assumptions and limitations include:

- VIA is not, by nature, a purely objective, quantitative process, and depends to some extent on subjective judgments. Where subjective judgments are required, appropriate criteria and motivations for these have been clearly stated;

- The study is based on technical information supplied to SRK, which is assumed to be accurate. This includes the proposed locations, dimensions and layouts of the project components;
- The modelled viewshed is defined as the area within 2 km radius of the powerlines and substation, as the visual impact beyond this distance is considered negligible; and
- This study does not provide motivation for or against the project, but rather seeks to give insight into the visual character and quality of the area, its VAC and the potential visual impacts of the project.

The findings of the VIA are not expected to be affected by these assumptions and limitations.

3. TECHNICAL DESCRIPTION

This section provides a concise description of the proposed project as provided at the time of assessment, focusing on elements relevant to the VIA. The general project description may still be refined, and a more detailed description is provided in the BA Report for the project. Unless changes to the project description affect aspects directly assessed in this VIA, they are not expected to affect the findings of this study.

3.1 Project Location

The project is located approximately 15 km west of Hendrina, within the Steve Tshwete Local Municipality, in the Nkangala District Municipality, Mpumalanga Province. The project will comprise the construction and operation of a ~21 km 132 kV overhead powerline extending between the proposed Hendrina North WEF Substation (proposed as part of this project) and the Hendrina Power Station, near Pullens Hope (Figure 1-1). A 500 m corridor is proposed (250 m on either side) and is being assessed by the BA.

The project will traverse 17 farm portions and the substation will be located on Portion 3 of Farm 185IS Hartebeestkuil (Table 3-1).

Table 3-1: Affected properties

Portion Number	Farm Number	Farm Name
12	153	Driefontein
37	153	Driefontein
2	153	Driefontein
17	153	Driefontein
14	151	Roodepoort
13	151	Roodepoort
2	151	Roodepoort
18	151	Roodepoort
1	151	Roodepoort
8	154	Boschmanskop
3	185	Haartebeestkuil
4	185	Haartebeestkuil
1	25	Broodsneyerplaats
0	162	Hendrina Power Station
0	186	Gloria
11	162	Hendrina Power Station
1	158	Aberdeen

3.1.1 Location Alternatives

Two location (route alignment) alternatives for the 132 kV powerline will be considered and assessed in the BA Report and this VIA report. The two alternative powerlines are as follows (Figure 1-1):

- Powerline Alternative 1 will be ~17 km long and will span over existing roads and farm boundaries.
- Powerline Alternative 2 (preferred) will be ~ 21 km long and will be routed along an existing gravel road to the existing Eskom Hendrina – Abina 132 kV powerline. Thereafter, the proposed powerline will be routed parallel to the Eskom Hendrina – Abina powerline to the Hendrina Power Station. The proposed substation will be located on Portion 3 of Farm 185IS Hartebeestkuil.

3.2 Project Description

The project will comprise two technical components; the substation and the 132 kV powerline.

The substation will have a footprint of up to 3 ha and will comprise the 33/132 kV yard (owned by Enertrag) and the 132 kV switching station yard (owned by Eskom). The substation will be located at the Hendrina North WEF and will comprise feeder bays, transformers, switching station electrical equipment, control building, workshop, telecommunication infrastructure, and access roads.

The 132 kV powerline will connect the substation located at the Hendrina North WEF to the Hendrina Power Station. Pylon structures considered for this powerline include self-supporting suspension monopole structures for the relatively straight sections of the line and angle strain (lattice) towers where the route alignment bends to a significant degree (Table 3-2). The maximum tower height is approximately 40 m.

Table 3-2: Technical powerline details

Powerline capacity:	132 kV powerlines (single circuit or double circuit)
Powerline corridor length:	~17 – 21 km (to be confirmed prior to construction)
Powerline corridors width:	500 m (250 m on either site of the centre line)
Powerline servitude:	32 m per 132 kV powerline
Powerline pylons:	Monopole or Lattice pylons, or a combination of both where required
Powerline pylon height:	Maximum 40 m

3.2.1 No Go Alternative

The 'no-go' alternative is the option of not undertaking the proposed grid connection infrastructure project. Hence, if the 'no-go' option is implemented, there would be no development. This alternative would result in no environmental impacts on the site or the surrounding local area. It provides the baseline against which other alternatives are compared and will be considered throughout the report.

4. LEGAL REQUIREMENTS AND GUIDELINES

Relevant guidelines that provide direction for visual assessment include the Department of Environmental Affairs and Development Planning's (DEA&DP) "Guideline for Involving Visual and Aesthetic Specialists in EIA Processes" (DEA&DP, 2005) and the Landscape Institute's "Guidelines for Landscape and Visual Impact Assessments" (2013), which have been considered in this VIA.

DEA&DP's Guideline (2005) identifies typical components of a visual study:

- Identification of issues and values relating to visual, aesthetic and scenic resources through involvement of stakeholders;
- Identification of landscape types, landscape character and sense of place, generally based on geology, landforms, vegetation cover and land use patterns;
- Identification of viewsheds, view catchment area and the zone of visual influence, generally based on topography;
- Identification of important viewpoints and view corridors within the affected environment, including sensitive receptors;
- Indication of distance radii from the proposed project to the various viewpoints and receptors;
- Determination of the VAC of the landscape, usually based on topography, vegetation cover or urban fabric in the area;
- Determination of the relative visibility, or visual intrusion, of the proposed project;
- Determination of the relative compatibility or conflict of the project with the surroundings; and
- A comparison of the existing situation with the probable effect of the proposed project.

Projects that warrant a visual specialist study include those:

- Located in a receiving environment with:
- Protection status, such as national parks or nature reserves;
- Proclaimed heritage sites or scenic routes;
- Intact wilderness qualities, or pristine ecosystems;
- Intact or outstanding rural or townscape qualities;
- A recognized special character or sense of place;
- Outside a defined urban edge line;
- Sites of cultural or religious significance;
- Important tourism or recreation value;
- Important vistas or scenic corridors;
- Visually prominent ridgelines or skylines; and/or
- Where the project is:
- High intensity, including large-scale infrastructure;
- A change in land use from the prevailing use;
- In conflict with an adopted plan or vision;
- A significant change to the fabric and character of the area;
- A significant change to the townscape or streetscape;
- A possible visual intrusion in the landscape; or
- Obstructing views of others in the area.

In terms of the guideline the proposed grid connection infrastructure can be classified as a Category 5 development, which includes powerlines. While the project is located in a region that can generally be described as a disturbed landscape with low scenic, cultural and historical significance (due to the concentration of mining activity and power plants), within this region the project is situated within an area of medium scenic, cultural, and historical significance. Based on the site visit it became evident that the high visual impact expected in terms of the guideline (see Table 4-1) is lowered to a moderate visual impact, which introduces:

- A potential effect on protected landscapes or scenic resources;
- Some change in the visual character of the area; and

- Introduction of new development or adds to existing development in the area.

Table 4-1: Expected visual impact significance

Type of environment	Type of development				
	Cat 1	**Cat 2**	**Cat 3**	**Cat 4**	**Cat 5**
Protected / wild areas	Moderate	High	High	Very high	Very high
High scenic, cultural, historical value	Minimal	Moderate	High	High	Very high
Medium scenic, cultural, historical value	Little or none	Minimal	**Moderate**	High	High
Low scenic, cultural, historical value / disturbed	Little or none Possible benefits	Little or none	Minimal	Moderate	High
Disturbed or degraded sites	Little or none Possible benefits	Little or none Possible benefits	Little or none	Minimal	Moderate

Such a project typically warrants a Level 3 assessment (see Table 4-2), which includes the following generic steps:

- Identification of issues and site visit;
- Description of receiving environment and proposed project;
- Establishment of view catchment area, view corridors, viewpoints and receptors;
- Indication of potential visual impacts using established criteria;
- Inclusion of potential lighting impacts at night; and
- Description of alternatives, mitigation measures and monitoring programmes.

Table 4-2: Recommended approach for visual assessment

Approach	Type of issue expected				
	Little or no visual impact	**Minimal visual impact**	**Moderate visual impact**	**High visual impact**	**Very high visual impact**
Level of visual impact recommended	Level 1 visual input	Level 2 visual input	**Level 3 visual assessment**	Level 4 visual assessment	

5. DESCRIPTION OF THE RECEIVING ENVIRONMENT – VISUAL CONTEXT

The following description of the affected environment focuses on the Visual Character of the area surrounding and including the project (the study area) and discusses the Visual Quality and Sense of Place[3]. This baseline information provides the context for the visual analysis.

[3] These terms are explained in the relevant sections below.

5.1 Landscape Character

Landscape character is the description of the pattern of the landscape, resulting from particular combinations of natural (physical and biological) and cultural (land use) characteristics. It focuses on the inherent nature of the land rather than the response of a viewer (Young, 2000).

5.1.1 Geology and Topography

The geology and topography of the area, together with the temperate highveld climate, provide the framework for the basic landscape features and visual elements of the study area.

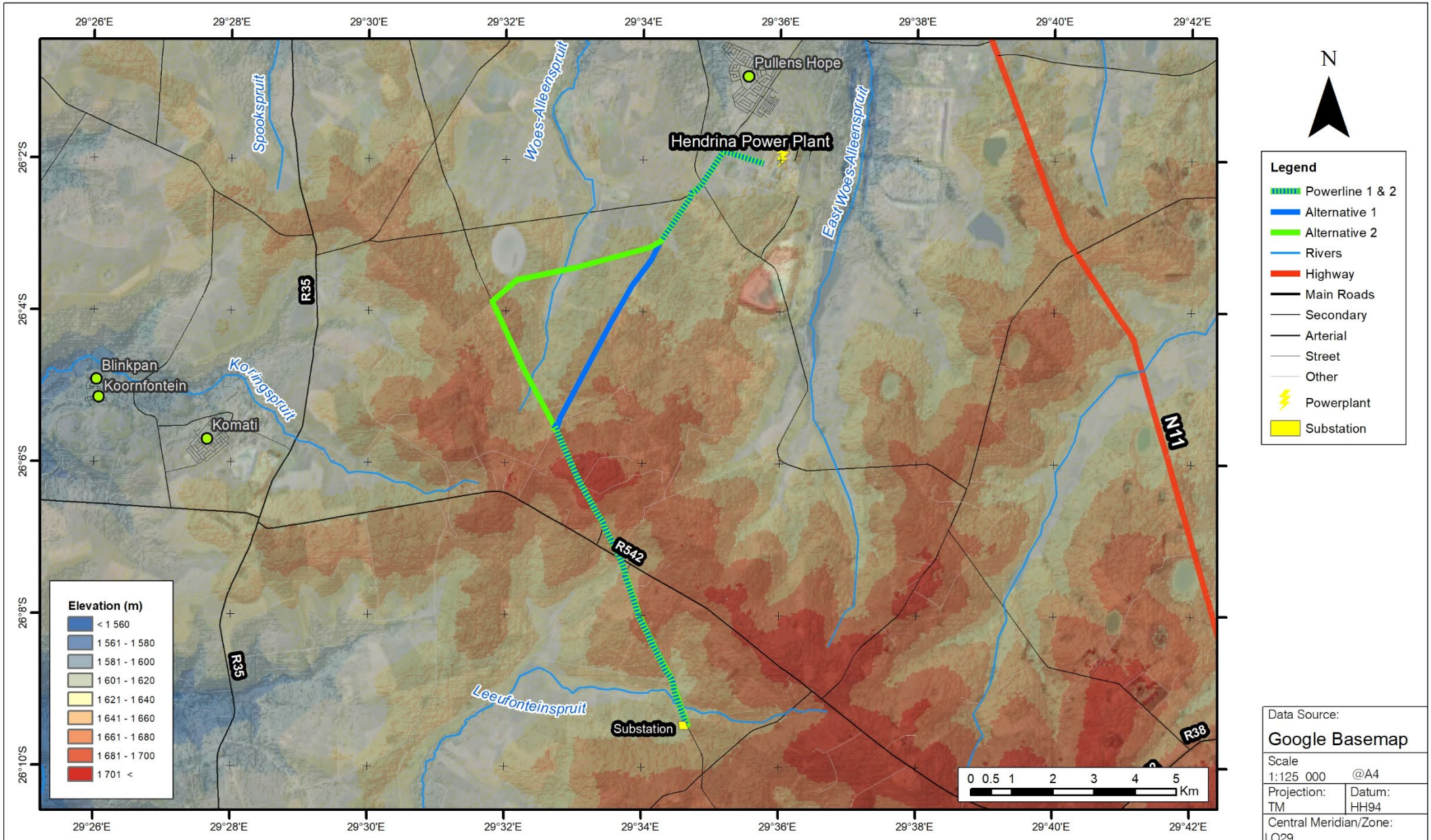
The project falls within the northern portion of the highveld, the elevated inland plateau that comprises roughly 30% of South Africa's land area. The highveld terrain is generally devoid of mountains and consists primarily of rolling plains. This region experiences summer rainfall, with intense afternoon thunderstorms and frost in winter.

The project site comprises 17 properties. These properties comprise an undulating plateau rising to ~1 681 m above mean sea level (mamsl), between the proposed Hendrina North WEF and the Hendrina Power Station (Figure 5-2). The powerline routes traverse the Leeufonteinspruit watercourse, where the elevation is lowest (~1 621 mamsl). Powerline Alignment 2 also traverses Woes-Allenspruit in the northern sections of the route alignment (Figure 5-2).

5.1.2 Vegetation

The project is located within the original extent of the Eastern Highveld Grassland, comprising short dense grassland dominated by the highveld grasses, sour grasses and some woody species, many of them introduced (Figure 5-1). Most of the land within the project area and surrounds has been transformed by anthropogenic activities (see Section 5.1.3).

Figure 5-1: Vegetation in the area surrounding the site



Data Source: Google Basemap

Scale 1:125 000 @A4

Projection: TM | Datum: HH94

Central Meridian/Zone: LO29

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HENDRINA POWERLINE VIA
TOPOGRAPHY MAP

Date: 27/09/2022 | Compiled by: GROS

Project No. 590817 | Fig No. 5-2

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5.1.3 Land Use

The area surrounding the site is predominantly characterised by agricultural activity (mainly maize cultivation and cattle pastures), urban and industrial development, power plants and a network of very large coal mines and associated tailings facilities which blight the landscape. Highly concentrated networks of powerlines emanate from the Hendrina Power Station (Figure 5-3), and other power stations in the region.

Surrounding land use includes:

- Urban areas (e.g. Pullens Hope, Hendrina);
- Farmsteads;
- Hendrina Power Station;
- Powerlines;
- Optimum Coal Mine and tailings dam;
- Agriculture:
    - Afgri grain silo (Figure 5-5);
    - Maize cultivation; and
    - Cattle and sheep pastures.

Figure 5-3: Power plant, and powerlines traversing the landscape

Figure 5-4: Hendrina Power Plant (left of centre) and a tailings dam (right of centre) in the distance

Figure 5-5: Afgri grain silo

The two powerline route alternatives are mostly routed along existing gravel roads and farm boundaries. The northern portion of the alignment for Powerline Alternative 2 will be routed parallel to the existing Eskom Hendrina-Abina 132 kV powerline (Figure 5-6).

Figure 5-6: Existing Eskom Hendrina-Abina 132 kV powerline

5.2 Visual Character

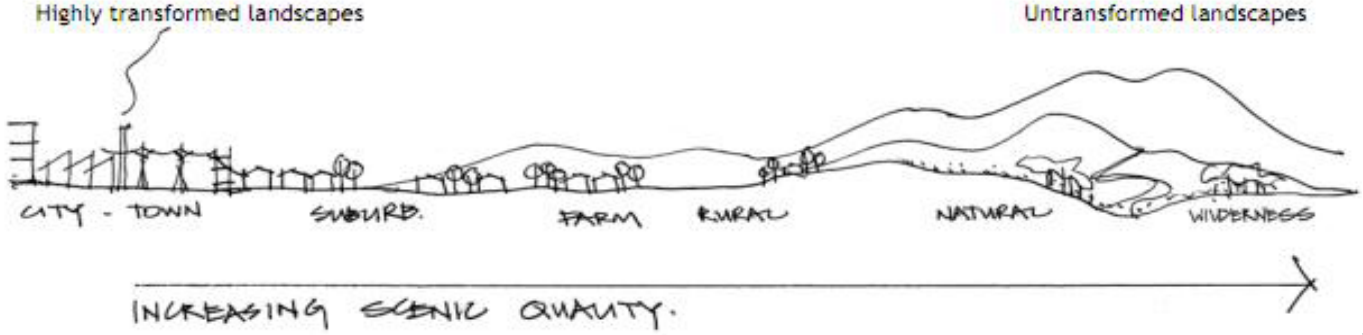
Visual character is descriptive and non-evaluative, which implies that it is based on defined attributes that are neither positive nor negative. It refers to the overall experience and impression of the landscape, such as natural or transformed.

A change in visual character cannot be described as having positive or negative attributes until the viewer's response to that change has been taken into consideration. The probable change caused by the project is assessed against the existing degree of change caused by previous development.

The basis for the visual character is provided by the topography, vegetation and land use of the area, which is a predominantly rural environment characterised by sprawling, often cultivated, farmland and interspersed nodes of development (e.g. towns, farmsteads, power stations, mines etc.), traversed by many powerlines and roads

The site and the surrounding area can be described as a transition landscape (Figure 5-7).

Highly Transformed Landscape – Urban/Industrial	Transition Landscape	Modified Rural Landscape	Natural Transition Landscape	Untransformed Landscape – Natural
Substantially developed landscape. High levels of visual impact associated with buildings, factories, roads and other related infrastructure (e.g. powerlines).	Transitional landscape associated with the interface between, rural, agricultural area and more developed suburban or urban zones.	Typical character is rural landscape, defined by field patterns, forestry plantations and agricultural areas and associated small-scale roads and buildings.	A changing landscape character associated with the interface between natural areas and modified rural / pastoral or agricultural zones.	No / minimal impact associated with the actions of man. National parks, coastlines, pristine forest areas.



Source: (CNDV, 2006)

(Shan Ding Lu, 2009)

(Night Jar Travel South Africa, 2012)

(Boschkloof, 2012)

Figure 5-7: Typical visual character attributes

5.3 Visual Quality

Aesthetic value is an emotional response derived from our experience and perceptions. As such, it is subjective and difficult to quantify in absolute terms. Studies in perceptual psychology have shown that humans prefer landscapes with higher complexity (Crawford, 1994). Landscape quality can be said to increase when:

- Topographic ruggedness and relative relief increases;
- Water forms are present;
- Diverse patterns of grasslands, shrubs and trees occur;
- Natural landscape increases and man-made landscape decreases; and
- Where land use compatibility increases.

The visual quality of the area can be experienced through rolling views across the open flat landscape (Figure 5-8 and Figure 5-9). The study area is defined by the agricultural, mining and industrial activity, as well as infrastructure. The naturally undulating landscape is interrupted by powerlines, Hendrina Power Station, Afgri grain silo and the Optimum Coal Mine tailings dam which detract from the visual quality of the surrounding area. The dams and watercourses/rivers in the area add to the visual quality (Figure 5-9).

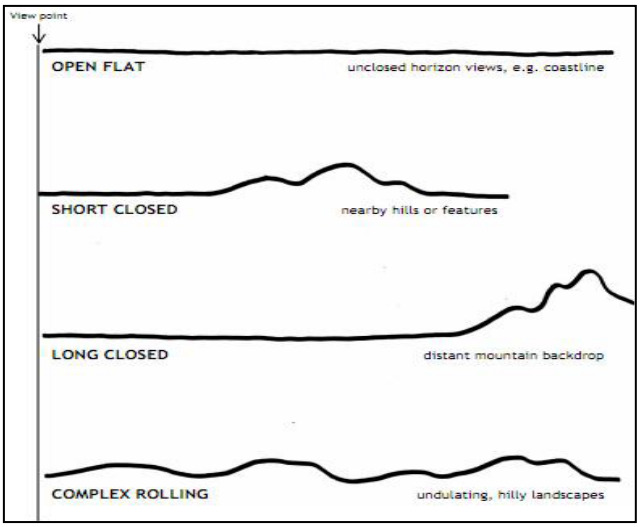


Figure 5-8: Typical views in the landscape

Sources: (CNDV, 2006)

Figure 5-9: Views of the undulating landscape (Viewpoint 12)

5.4 Visual Receptors

Visual receptors were identified based on surrounding land uses, primarily those in urban, farming and industrial areas (see Section 5.1.3). The visual receptors are briefly described below and linked to viewpoints (VP) indicated in Figure 6-4 and Table 6-4:

- Residents in urban areas and farmsteads (VP 1–VP 7, VP 9–VP 14, VP 16, VP 18): The small town of Pullens Hope is located to the north-east of the powerline alignment. Isolated farmsteads are interspersed throughout the area surrounding the powerline alignment alternatives.
- Motorists (VP 1 – VP 8, VP 10, VP 12 – VP 13, VP 15, VP 17): The powerline is routed parallel to numerous roads, including; the R542, Pullens Hope Road and the gravel roads between farms. Both alignment alternatives are largely routed adjacent to roads, traversing some roads at few points.

5.5 Sense of Place

Our sense of a place depends not only on spatial form and quality, but also on culture, temperament, status, experience and the current purpose of the observer (Lynch, 1992). Central to the idea of 'sense of place' or *Genius Loci* is identity. An area will have a stronger sense of place if it can easily be identified, that is to say if it is unique and distinct from other places. Lynch defines 'sense of place' as "the extent to which a person can recognise or recall a place as being distinct from other places – as having a vivid or unique, or at least a particular, character of its own" (Lynch, 1992).

It is often the case that sense of place is linked directly to visual quality and that areas / spaces with high visual quality have a strong sense of place. However, this is not an inviolate relationship and it is plausible that areas of low visual quality may have a strong sense of place or – more commonly – that areas of high visual quality have a weak sense of place. The defining feature of sense of place is uniqueness, generally real or biophysical (e.g. trees in an otherwise treeless expanse), but sometimes perceived (e.g. visible but unspectacular sacred sites and places which evoke defined responses in receptors). In this context Cross (2001) identified six categories of relationships with place: biographical, spiritual, ideological, narrative, cognitive and dependent (Table 5-1).

Table 5-1: Relationship to place

Type of Relationship	Process
Biographical (historical and familial)	Being born in and living in a place. Develops over time
Spiritual (emotional, intangible)	Feeling a sense of belonging
Ideological (moral and ethical)	Living according to moral guidelines for human responsibility to place Guidelines may be religious or secular
Narrative (mythical)	Learning about a place through stories, family histories, political accounts and fictional accounts
Cognitive (based on choice and desirability)	Choosing a place based on a list of desirable traits and lifestyle preferences
Dependent (material)	Constrained by lack of choice, dependency on another person or economic opportunity

Sources: Adapted from Cross (2001)

The sense of place of the surrounding area is strongly influenced by the surrounding land use, which can generally be described as a rural agricultural area, albeit within a region blighted by development mostly associated with coal-fired power generation. The sense of place is not particularly distinct from the rest of the wider region and is not overly memorable.

The relationship of receptors in the study area (Section 5.4) to place may be predominantly biographical, and dependent. A family, for example, whose has farmed in this area for a few generations will have a biographical and dependent attachment to the area.

6. ANALYSIS OF THE MAGNITUDE OF THE VISUAL IMPACT

The following section outlines the analysis that was undertaken to determine the **magnitude or intensity** of the overall visual impact resulting from the project. Various factors were considered in the assessment, including:

- Visual exposure;
- Visual absorption capacity;
- Sensitivity of visual receptors;
- Visibility and viewing distance; and
- Integrity with existing landscape / townscape.

The analysis of the magnitude or intensity of the visual impact, as described in this section, is summarized and integrated in Table 6-6 and forms the basis for the assessment and rating of the impact as documented in Section 6.

6.1 Visual Exposure

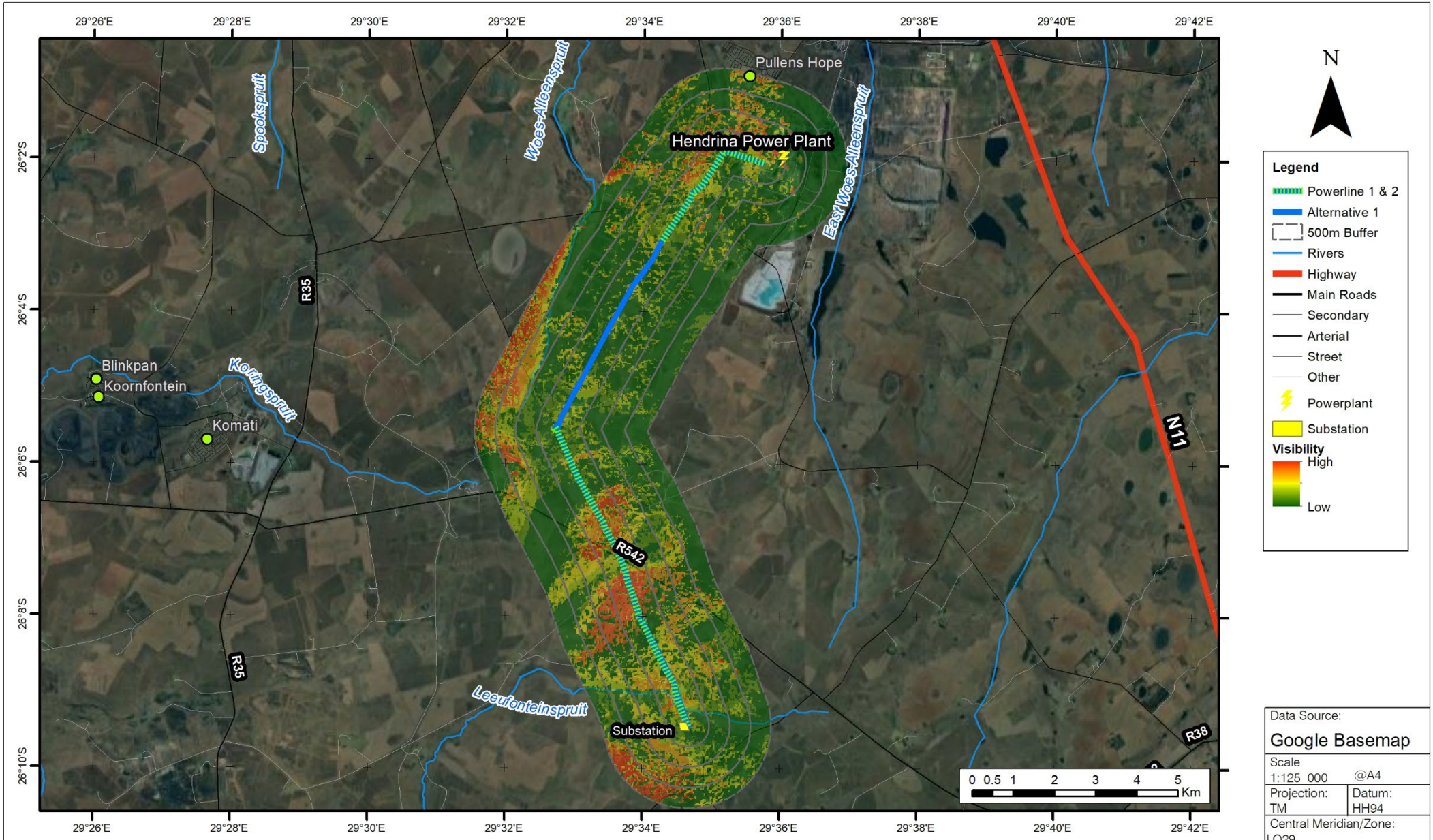
Visual exposure is determined by the zone of visual influence or viewshed. The viewshed is the topographically defined area that includes all the major observation sites from which the project *could* be visible. The viewshed analysis assumes maximum visibility of the project in an environment stripped bare of

vegetation and structures. The viewshed indicates the visibility of the project, accounting for the decrease in visibility as distance from the project increases (Figure 6-1).

The visibility of the two powerline route alternatives will be high due to the proposed height of the pylons (~40 m) above ground. The viewshed indicates that the proposed powerline routes will be visible from some more elevated areas, i.e. towards the north and north west of the powerline route, and in the southern section of the route alignment. Sections of the R542, gravel roads and farmsteads are located will have line of sight of the powerline, according to the viewshed (Figure 6-1and Figure 6-2).

The visibility of the proposed substation is not anticipated to be high, due to the undulating topography.

The visual exposure of proposed infrastructure is thus deemed ***moderate.***



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Central Meridian/Zone: LO29	
Date: 27/09/2022	Compiled by: GROS
Project No. 590817	Fig No. 6-1

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HENDRINA POWERLINE VIA

VIEWSHED FOR PYLONS AND POWERLINE ALTERNATIVE 1 MAP

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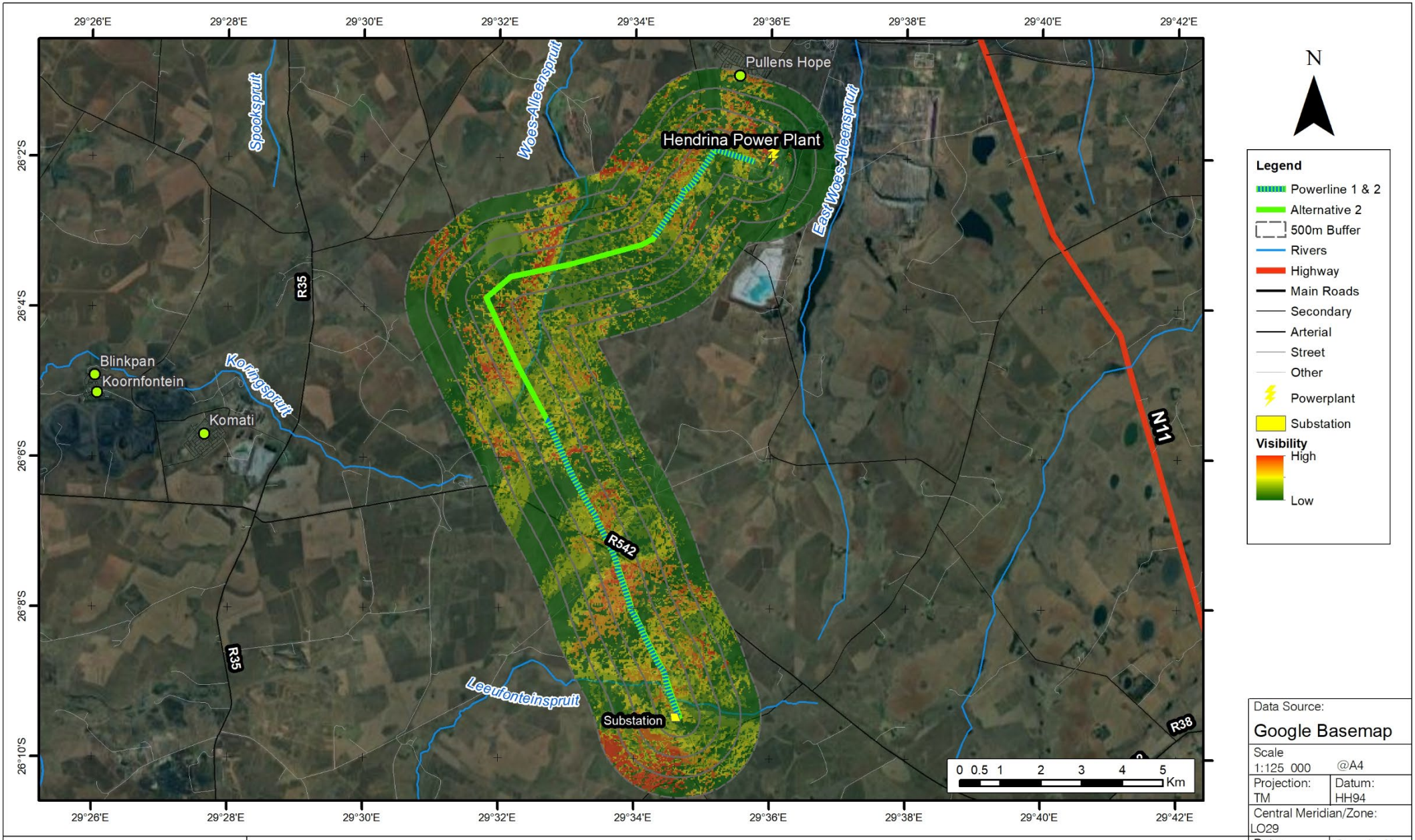

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Projection: TM	Datum: HH94
Central Meridian/Zone: LO29	
Date: 27/09/2022	Compiled by: GROS
Project No. 590817	Fig No. 6-2

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HENDRINA POWERLINE VIA

VIEWSHED FOR PYLONS AND POWERLINE ALTERNATIVE 2 MAP

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6.2 Visual Absorption Capacity

The VAC is the potential for an area to conceal and assimilate the proposed project. Criteria used to determine the VAC of the affected area are defined in Table 6-1. The VAC of an area is increased by:

1. Topography and vegetation that is able to provide screening and increase the VAC of a landscape;
2. The degree of urbanisation compared to open space. A highly urbanised landscape is better able to absorb the visual impacts of similar developments, whereas an undeveloped rural landscape will have a lower VAC; and
3. The scale and density of surrounding development.

These factors frequently apply at different scales, by influencing the VAC in the foreground (e.g. dense bush, existing roads and bridges, small structures), middleground and background (e.g. tall forests, hills, cityscapes).

Rural areas generally have a low VAC. The low VAC of the surrounding area is further reduced by the high vertical profile of the pylons and only marginally increased by the undulating topography. The vegetation of the surrounding area is not expected to screen the powerlines and pylons from receptors. The substation will be screened to a limited degree by the undulating topography and less so by the vegetation.

The study area has a ***low*** VAC for the proposed powerline and the proposed substation.

6.3 Sensitivity of Visual Receptors

Receptors are important insofar as they inform visual sensitivity. The sensitivity of viewers is determined by the number and nature of viewers.

Viewers can be deemed to have:

1. High sensitivity if they view the project from e.g. residential areas, nature reserves and scenic routes or trails;
2. Moderate sensitivity if they view the project from e.g. sporting or recreational areas or places of work; and
3. Low sensitivity if they view the project from or within e.g. industrial, mining or degraded areas, or are transient viewers on roads.

The sensitivity of potential viewers identified in Section 5.4 is described below:

- **Residents in urban areas and farmsteads:** The residents of the Pullens Hope and the isolated farmsteads surrounding the site are considered to have varied visual sensitivities due to the few number of residents (of farmsteads) located in close proximity to the proposed powerline alignments or substation. Residents of Pullens Hope or farmsteads located more than 1 km from the proposed alignments are not expected to have a view of the powerline or substation.
  The residents of farmsteads, due to their proximity to the proposed powerline alignments, are considered more sensitive than the residents of Pullens Hope.
- **Motorists:** Motorists on the R542, Pullens Hope Road and the gravel roads between farms will be powerline receptors, while motorists on the gravel road at the southern section of the powerline route will be substation receptors.

Motorists are considered to have relatively low sensitivity as in some cases their view of the project is fleeting and / or temporary. Furthermore, it is anticipated that these motorists are inured to powerlines traversing the landscape as an existing, dense network of powerlines is a characteristic of this region.

The high sensitivity of the visual receptors in close proximity to the proposed powerline, e.g. residents of farmsteads, is moderated by the large number of transient motorists, as well as receptors' familiarity with and acceptance of views of powerlines in the surrounding landscape. As such, the sensitivity of the viewers or visual receptors potentially affected by the visual impact of the project is considered to be ***moderate.***

Table 6-1: Visual absorption capacity criteria

High	Moderate	Low
The area is able to absorb the visual impact as it has: ▪ Undulating topography and relief ▪ Good screening vegetation (high and dense) ▪ Is highly urbanised in character (existing development is of a scale and density to absorb the visual impact).	The area is moderately able to absorb the visual impact, as it has: ▪ Moderately undulating topography and relief ▪ Some or partial screening vegetation ▪ A relatively urbanised character (existing development is of a scale and density to absorb the visual impact to some extent.	The area is not able to absorb the visual impact as it has: ▪ Flat topography ▪ Low growing or sparse vegetation ▪ Is not urbanised (existing development is not of a scale and density to absorb the visual impact to some extent.)
 http://www.franschhoek.co.za	 http://wikipedia.org	 http://www.butbn.cas.cz
 http://commons.wikimedia.org	 http://blogs.agu.org	 http://fortheinterim.com

6.4 Viewing Distance and Visibility

The distance of a viewer from an object is an important determinant of the magnitude of the visual impact. This is because the visual impact of an object diminishes / attenuates as the distance between the viewer and the object increases. Thus, the visual impact at 1 000 m would, nominally, be 25% of the impact as viewed from 500 m. At 2 000 m it would be 10% of the impact at 500 m (Hull and Bishop, 1988 in (Young, 2000)).

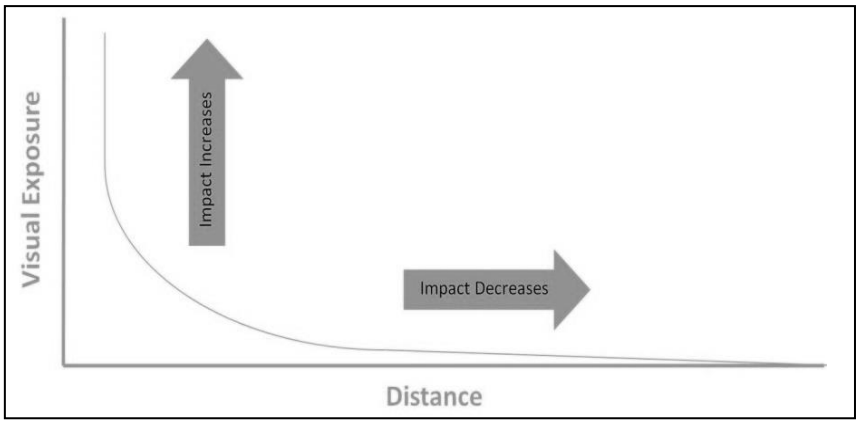


Figure 6-3: Visual exposure vis-à-vis distance

Sources: Adapted from Hull and Bishop, 2998 in (Young, 2000)

Three basic distance categories can be defined for a project of this scale (as discussed and represented in Table 6-2): foreground, middleground and background.

A number of viewpoints were selected to indicate locations from where receptors may (or may not) view the project. The viewpoints are shown in Figure 6-4 and listed in Table 6-4. Current views from these points are shown in Appendix C.

Table 6-2: Distance categories

FOREGROUND (0 – 1 km)	The zone where the proposed project will dominate the frame of view. The project will be *highly visible* unless obscured.
MIDDLEGROUND (1 - 2 km)	The zone where colour and line are still readily discernible. The project will be *moderately visible* but will still be easily recognisable.
BACKGROUND (2 - 5 km)	This zone stretches from 2 km to 5 km. Objects in this zone can be classified as *marginally visible* to *not visible*.

The predicted visibility of (any element of the project) from each viewpoint is described in Table 6-4, based on the visibility categories in Table 6-2. Note that unlike visual exposure (Section 6.1) which describes areas from which the project may be visible without taking local screening into account (i.e. the viewshed), visibility describes predicted, actual visibility. The visibility of the project can be summarised as follows:

- Powerline Alternative 1 (only) will be visible in the middleground / background to receptors at the farmstead located at VP 7 and 9.
- Powerline Alternative 2 (only) will be highly visible in the foreground from most viewpoints (farmsteads and motorists) near the proposed powerline route (VP 6 - 7) and visible in the middleground and background from VP 4.

- Both Powerline Alternative 1 and 2 will be highly visible in the foreground from most viewpoints (farmsteads and motorists) near the proposed powerline route (VP 1 - 2, VP 8, VP 10, VP 12 - 13, VP 15), and visible in the middleground and background to receptors at VP 3 and VP 16.
- The Powerline Alternatives are considered to be marginally visible or not visible to receptors located over 2 km from the site, screened by topography and / or where the powerline is anticipated to be obscured by existing powerlines (VP 4 - VP 6, VP 9, VP 11, VP 14 and VP 17 - VP 18).

Overall, the proposed alignments are highly visible in the foreground and middleground to most of the isolated farmsteads, and motorists on the surrounding roads: as such the visibility of the project is ***moderate***.

Table 6-3: Visibility criteria

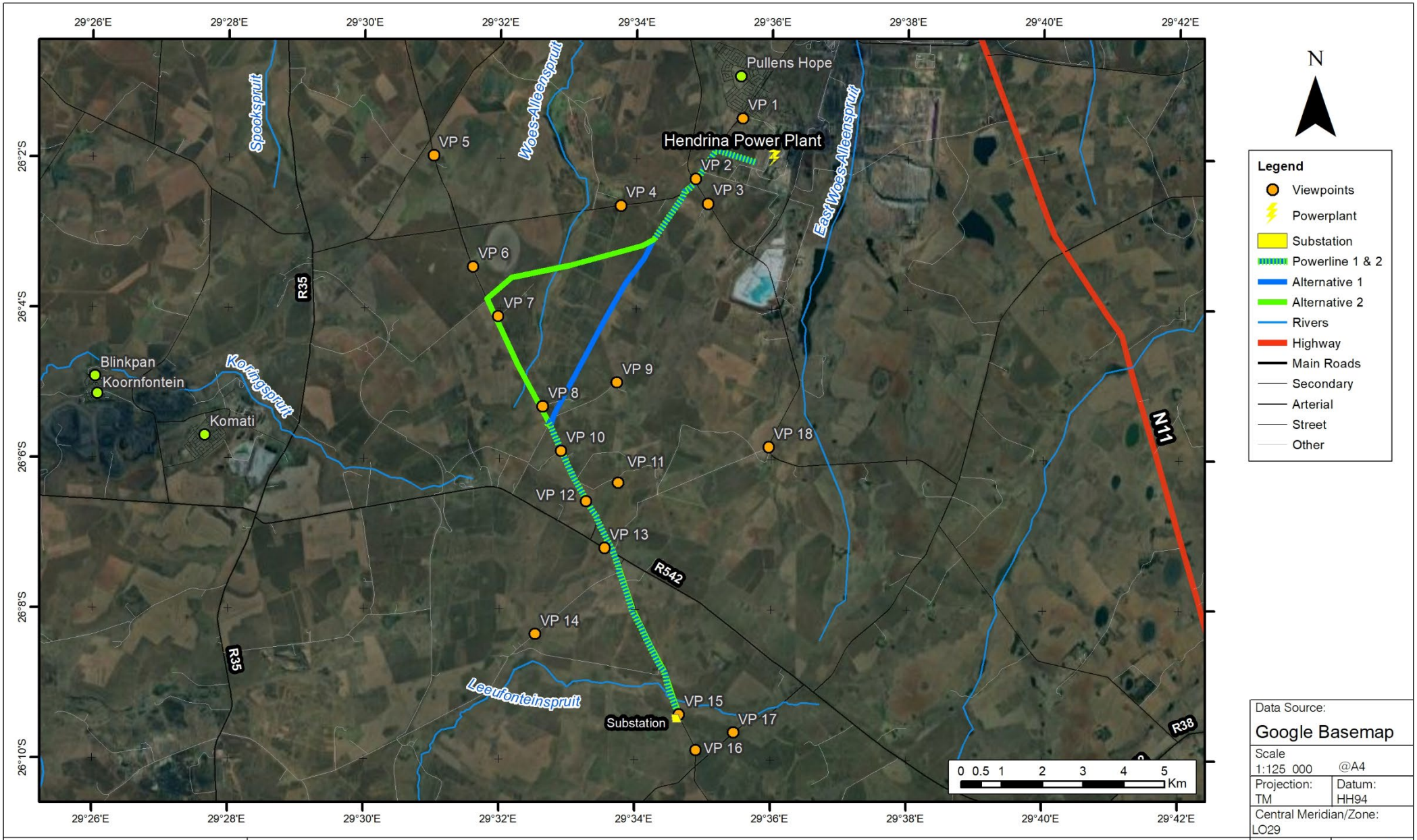
NOT VISIBLE	Project cannot be seen	
MARGINALLY VISIBLE	Project is only just visible / partially visible (usually in the background zone)	
VISIBLE	Project is visible although parts may be partially obscured (usually in middleground zone)	
HIGHLY VISIBLE	Project is clearly visible (usually in foreground or middleground zone)	

Table 6-4: Visibility from viewpoints

Viewpoint #	Location	Co-ordinates	Direction of view	Potential Receptors	Visibility
VP 1	Pullens Hope, Pullens Hope Road	26° 1' 27.78" S 29° 35' 33.56" E	Looking south-west	Pullens Hope residents and motorists travelling on Pullens Hope Road.	**Powerline Alternative 1 & 2: Highly Visible** The powerline will be visible in the middleground, however obscured by the many powerlines connecting to Hendrina Power Station.
VP 2	Farmsteads 1	26° 2' 16.01" S 29° 34' 52.29" E	Looking north-east, east and south-west	Residents of farmsteads and motorists on Pullens Hope Road.	**Powerline Alternative 1 & 2: Highly Visible** The powerline will be visible in the foreground, routed along Pullens Hope Road.
VP 3	Bosmanskop Farm	26° 2' 35.97" S 29° 35' 2.98" E	Looking north and west	Residents of Bosmanskop Farm and motorists.	**Powerline Alternative 1 & 2: Visible** The powerline will be visible from the boundary of Bosmanskop Farm. It is anticipated the the vegetation around the farmstead will screen the powerline from the residents.
VP 4	Farmstead 2	26° 2' 37.74" S 29° 33' 46.03" E	Looking east and south	Residents of farmstead and motorists on the gravel road.	**Powerline Alternative 1: Marginally Visible** The powerline will be marginally visible in the background, blending into the landscape as the powerline extends southwards.
					Powerline Alternative 2: Visible The powerline will be visible in the background and partially obscured by the existing Hendrina-Abina powerline to farmstead residents as well as motorists travelling along the gravel road.
VP 5	Broodsnyersplaas BV Groendag	26° 1' 58.25" S 29° 31' 0.78" E	Looking east and south-east	Residents of farmstead and motorists on the gravel road.	**Powerline Alternative 1: Not Visible** The powerline will not be visible to the south-east due to distance (> 5 kms) and intervening, elevated topography.
					Powerline Alternative 2: Marginally Visible The powerline will be marginally visible in the landscape.
VP 6	De Beer Farm	26° 3' 27.05" S 29° 31' 35.67" E	Looking east and south	Residents of De Beer Farm and motorists on gravel road.	**Powerline Alternative 1: Not Visible** The powerline will not be visible to the receptors due to distance (> 3 kms).
					Powerline Alternative 2: Highly Visible The powerline will be visible to the farmstead as well as motorists on the gravel road. The

Viewpoint #	Location	Co-ordinates	Direction of view	Potential Receptors	Visibility
					powerline may be obscured and/or assimilated by the existing 132 kV powerline that is visible in the landscape to the receptors.
VP 7	Farmstead 2	26° 4' 6.63" S 29° 31' 58.27" E	Looking north-east, east and south	Residents of farmstead and motorists travelling on the gravel road.	**Powerline Alternative 1: Visible** The powerline will be visible in the background.
					Powerline Alternative 2: Highly Visible The powerline will be visible to the north, north-east and west in the middle ground, but may be obscured by the existing 132 kV powerline to the north and north-east. The farmstead is screened by vegetation.
VP 8	Afgri Grain Silo	26° 5' 18.32" S 29° 32' 37.67" E	Looking north-east and south	Motorists on the gravel road	**Powerline Alternative 1: Highly Visible** The powerline will be visible in the foreground and middle ground to the east and south, where the powerline starts to route along the road.
					Powerline Alternative 2: Highly Visible The powerline will be visible in the foreground as it is routed adjacent to the gravel road.
VP 9	Farmstead 3	26° 4' 59.25" S 29° 33' 43.26" E	Looking north, west and south	Residents of the farmstead	**Powerline Alternative 1: Visible** The powerline will be visible to the north in the middle ground before it is screened by the grain silo in the north-west.
					Powerline Alternative 2: Not Visible The powerline will not be visible to receptors due to distance (> 3 kms) and intervening, elevated topography.
VP 10	Farmstead 4	26° 5' 53.83" S 29° 32' 54.06" E	Looking north-west and south-east	Residents of the farmstead and motorists on the gravel road.	**Powerline Alternative 1 & 2: Highly Visible** The powerline will be visible in the middleground to residents of the farmstead set back from the gravel road.
VP 11	WA de Klerk Farm	26° 6' 19.23" S 29° 33' 44.45" E	Looking north, south-west and north-west	Residents of WA de Klerk Farm	**Powerline Alternative 1 & 2: Not Visible** The powerlines are not visible to the farmsteads on WA de Klerk Farm due to the intervening, elevated topography and orientation of the dwelling to the north-east.

Viewpoint #	Location	Co-ordinates	Direction of view	Potential Receptors	Visibility
VP 12	Farmstead 5	26° 6' 34.05" S 29° 33' 16.35" E	Looking north-west and south-east	Residents of farmstead and motorists on the gravel road	**Powerline Alternative 1 & 2: Highly Visible** The powerline will be visible to the farmstead residents as well as motorists in the foreground.
VP 13	R542	26° 7' 11.35" S 29° 33' 32.89" E	Looking east and south	Residents of dwellings adjacent to the R542 and motorists on the R542.	**Powerline Alternative 1 & 2: Highly Visible** The powerline will be visible to farmstead residents as well as motorists in the foreground. There are no other powerlines to screen and/or assimilate views of the proposed powerline.
VP 14	Farmstead 6	26° 8' 20.34" S 29° 32' 31.81" E	Looking east and south-east	Residents of farmstead	**Powerline Alternative 1 & 2: Marginally Visible** The powerline may be marginally visible in the background from the farmstead, and is not screened partially by vegetation or topography. An existing, large powerline is visible in the foreground.
VP 15	Hendrina WEF Substation	26° 9' 24.07" S 29° 34' 39.38" E	Looking north and south-west	Motorists on the gravel road.	**Powerline Alternative 1 & 2: Highly Visible** The powerline will be highly visible in the foreground to motorists travelling on this gravel road. The substation will be visible in the foreground to motorists.
VP 16	Farmsteads 7	26° 9' 52.45" S 29° 34' 54.29" E	Looking north-west	Residents of the farmstead and motorists on the gravel road.	**Powerline Alternative 1 & 2: Visible** The powerline will be partially visible to residents and motorists when not screened by the topography.
VP 17	Unnamed Road (South)	26° 9' 38.37" S 29° 35' 27.31" E	Looking north-west	Motorists on the unnamed road (south)	**Powerline Alternative 1 & 2: Marginally Visible** The powerline will be marginally visible in the background across the landscape.
VP 18	Farmstead 8	26° 5' 50.20" S 29° 35' 57.71" E	Looking west	Residents of the farmstead.	**Powerline Alternative 1 & 2: Not Visible** The powerline is not visible to receptors due to distance (> 5 kms) and intervening, elevated topography.



Data Source:	Google Basemap
Scale	1:125 000 @A4
Projection: TM	Datum: HH94
Central Meridian/Zone:	LO29
Date:	27/09/2022
Compiled by:	GROS
Project No.	590817
Fig No.	6-4

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HENDRINA POWERLINE VIA

VIEWPOINTS MAP

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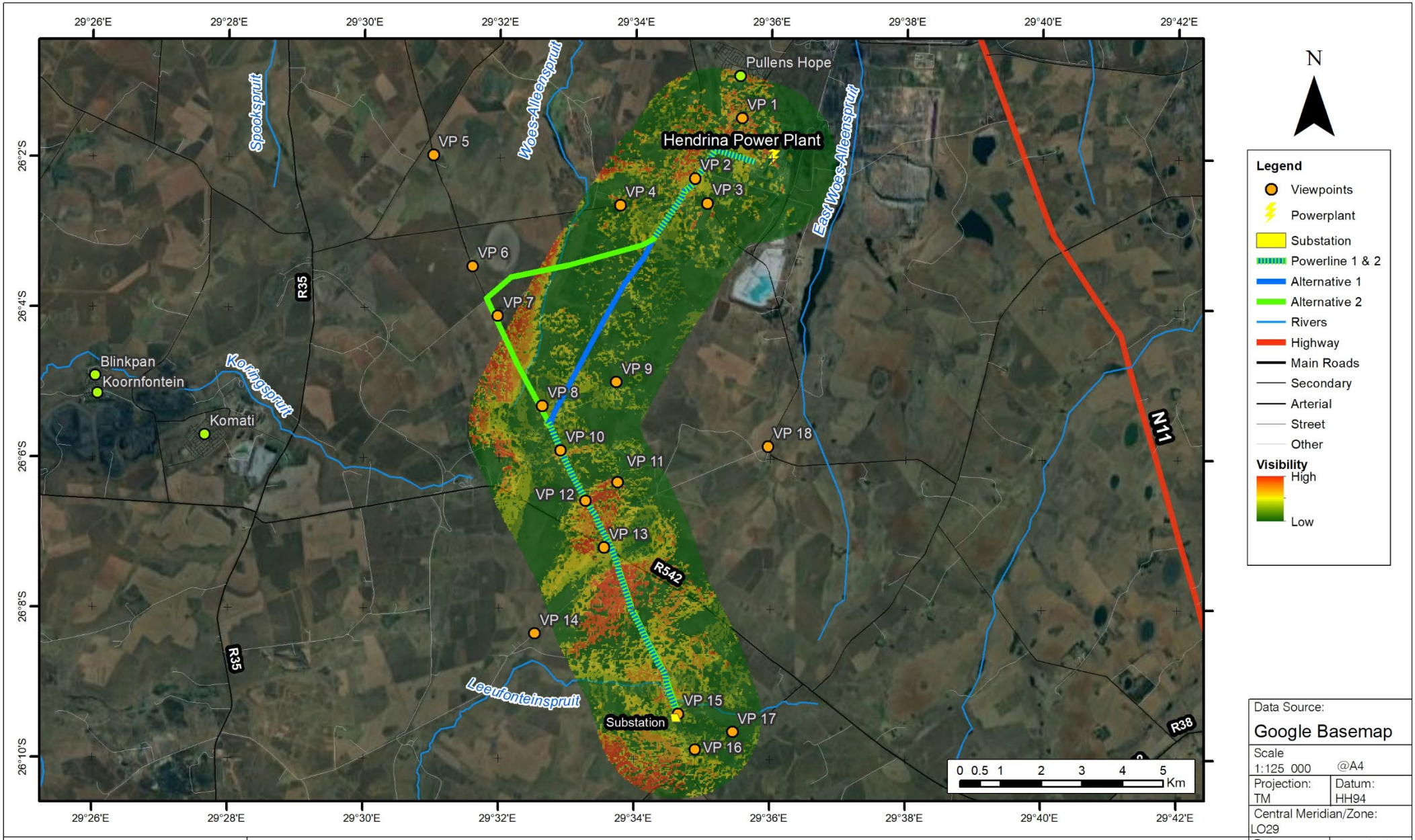

Data Source:	Google Basemap
Scale	1:125 000 @A4
Projection: TM	Datum: HH94
Central Meridian/Zone:	LO29
Date:	27/09/2022
Compiled by:	GROS
Project No.	590817
Fig No.	6-5

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HENDRINA POWERLINE VIA

VIEWSHED AND VIEWPOINTS FOR PYLONS AND POWERLINE ALTERNATIVE 1 MAP

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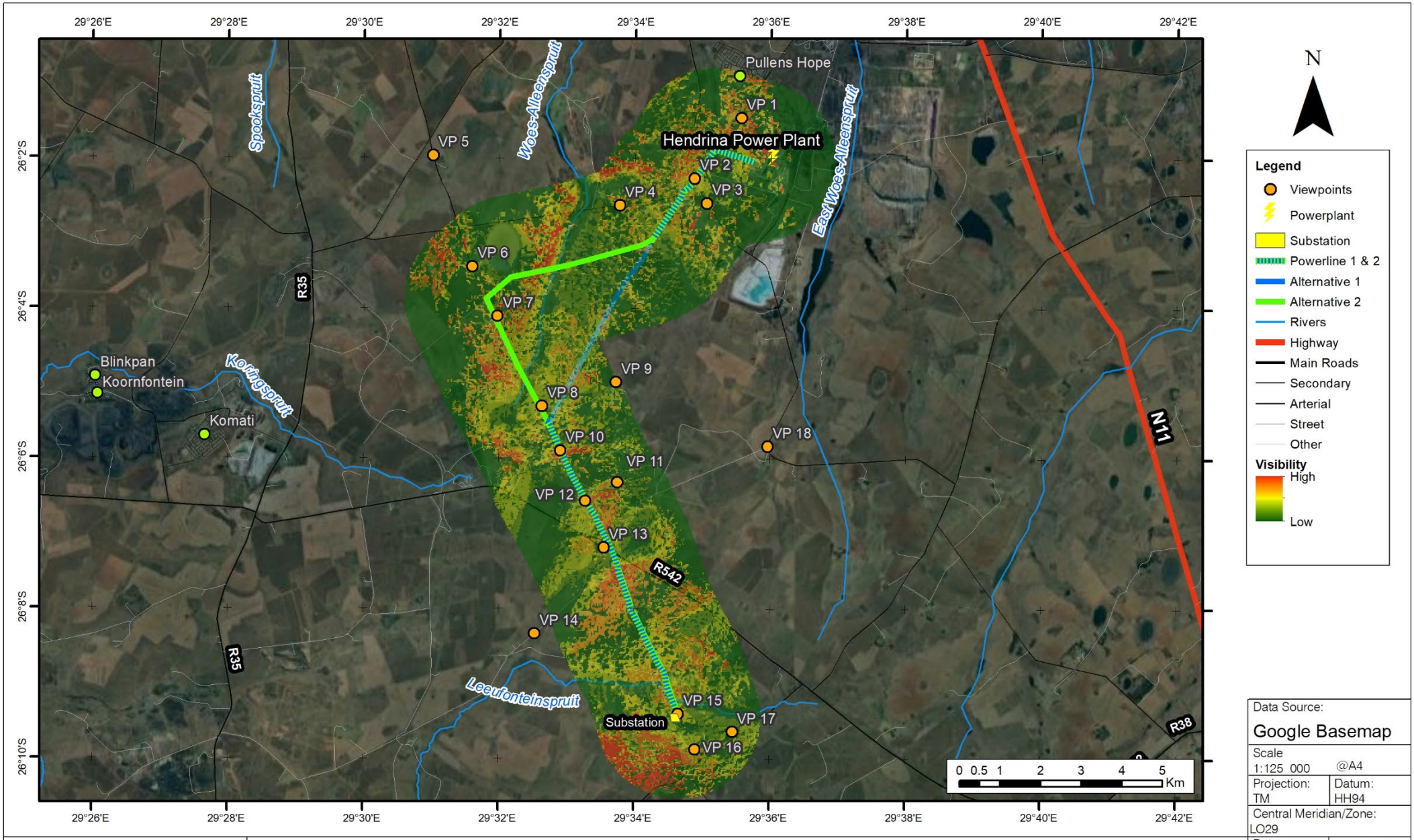

Data Source:	Google Basemap
Scale 1:125 000	@A4
Projection: TM	Datum: HH94
Central Meridian/Zone: LO29	
Date: 27/09/2022	Compiled by: GROS
Project No. 590817	Fig No. 6-6

srk consulting

HENDRINA POWERLINE VIA

VIEWSHED AND VIEWPOINTS FOR PYLONS AND POWERLINE ALTERNATIVE 2 MAP

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6.5 Compatibility with Landscape Integrity

Landscape (or townscape) integrity refers to the compatibility of the development / visual intrusion with the existing landscape. The landscape integrity of the project is rated based on the relevant criteria listed in Table 5-5.

Table 6-5: Landscape integrity criteria

Criterion	Landscape integrity		
	High	**Moderate**	**Low**
	The project is:		
Consistency with existing land use of the area	Consistent	Moderately consistent	Not consistent / very different
Sensitivity to natural environment	Highly sensitive	Moderately sensitive	Not sensitive
Consistency with urban texture and layout	Consistent	Moderately consistent	Not consistent / very different
Congruence of buildings / structures with / sensitivity to existing architecture / buildings	Congruent / sensitive	Moderately congruent / sensitive	Not congruent / sensitive
Scale and size relative to nearby existing development	Similar	Moderately similar	Different

The proposed project is located within a rural, agricultural area with sprawling farmlands surrounding the proposed site. Further afield, the region is blighted by development mostly associated with coal-fired power generation. Most of Powerline Alternative 1 and 2 is routed along established gravel roads and parallel to a smaller ~11 kV powerline. Where Powerline Alternative 2 is not routed along an existing road, it is routed parallel to the existing Eskom Hendrina – Abina 132 kV powerline.

Grid infrastructure such as substations and powerlines are common in the area surrounding the proposed project, with small and large powerlines traversing the landscape and substations interspersed throughout the project area. As such, the proposed infrastructure is consistent with type, scale and size of the existing infrastructure within the landscape.

The project is deemed to have a ***high*** integrity with the surrounding landscape.

6.6 Magnitude of the Overall Visual Impact

Based on the above criteria, the magnitude or intensity of the overall visual impact that is expected to result from the project has been rated. Table 6-6 provides a summary of the criteria, a descriptor summarising the status of the criteria and projected impact magnitude ratings.

The overall magnitude of the visual impact that is expected to result from the project is rated as ***moderate***. The moderate visual exposure and landscape integrity and low VAC are moderated by the low viewer sensitivity.

Table 6-6: Magnitude of overall visual impact

Criteria	Rating	Comments
Visual Exposure (Viewshed)	Moderate	The visibility of the two powerline alternatives will be high due to the height of the pylons (~40 m) above ground. The viewshed indicates that the powerline routes will be visible from some more elevated areas, i.e. towards the north and north west of the powerline route, and in the southern section of the route alignment. The powerline will be visible from sections of the R542, gravel roads and farmsteads, according to the viewshed. The visibility of the proposed substation is not anticipated to be high, due to screening by the undulating topography.
Visual Absorption Capacity	Low (Powerline and Substation)	The low VAC of the surrounding area is further reduced by the high vertical profile of the pylons and only marginally increased by the undulating topography. The vegetation of the surrounding area is not expected to screen the powerlines and pylons from receptors. The substation will be screened to a limited degree by the undulating topography and less so by the vegetation.
Viewer Sensitivity (Receptors)	Low	Although sensitive visual receptors are located within close proximity of the powerline alignments, it is anticipated that they are inured to powerlines traversing the landscape. Motorists will have fleeting and / or temporary views of the project, and are considered less sensitive and inured to powerlines traversing landscape.
Viewing Distance and Visibility	Moderate	The proposed alignments are visible in the foreground and middleground to most of the isolated farmsteads and motorists on the surrounding roads.
Landscape Integrity	Moderate	Grid infrastructure such as substations and powerlines are common in the area surrounding the proposed project, with small and large powerlines already traversing the landscape, and substations interspersed throughout the project area. As such, the proposed infrastructure is consistent with type, scale and size of the existing infrastructure within the landscape.

7. SPECIALIST FINDINGS / IDENTIFICATION AND ASSESSMENT OF IMPACTS

The following section describes the visual impacts anticipated during the construction and operational phases, and assesses the significance of these impacts utilising the impact rating methodology presented in Appendix B.

Possible measures to avoid, mitigate or compensate visual impacts will be considered and recommended, depending on the severity of impacts and the feasibility of measures. The mitigation hierarchy and sample measures are provided below (DEA&DP, 2005):

- Avoid, e.g. by re-examining the need for the proposed project, relocating the project or re-designing the project;

- Mitigate (reduce), e.g. through adjustments to the siting and design of the project, careful selection of finishes and colours, use of earthworks (such as berms) and planting to provide visual screening and dust control where required;
- Rehabilitate and restore, e.g. through on-site and off-site landscape rehabilitation of areas affected by the project, which may include re-instating landforms and natural vegetation, provision of landscaped open space etc.;
- Compensate and offset, where avoidance or mitigation cannot achieve the desired effect; and
- Enhance, where the proposed project is located in run-down areas or degraded landscapes.

The project relates to the greenfield development of a 132 kV powerline and substation as such the potential visual impacts are far more extensive than they would be for a brownfield project.

Direct visual and aesthetic impacts are likely to result from the following project interventions and/or activities:

- Earthworks and construction activities (including clearing of vegetation and associated generation of dust);
- Change in character of the area caused by project; and
- Increased light pollution.

The visual and aesthetic impacts generated by the project are likely to be associated with visual intrusion and visual quality.

7.1 Construction Phase

7.1.1 Altered Sense of Place and Visual Intrusion caused by Construction Activities

Visual impacts will be generated by construction activities such as earthworks, which can generate dust, and from construction infrastructure, plant and materials on site (e.g. site camp, plant and machinery, and stockpiles of excavated material). Dust generated during construction will be visually unappealing and may detract from the visual quality (and sense of place) of the area. These impacts are typically limited to the immediate area surrounding the construction site (powerline alignment and substation footprint) and access roads/tracks, during the construction period. Since the construction footprint for pylons is very small, pertinent impacts (e.g. from dust) are likely to be limited. Impacts associated with the substation may be more significant.

Construction activities will have a greater impact in the foreground where receptors are particularly exposed to these visual impacts.

These construction phase impacts are anticipated to impact adjacent farmstead receptors to a larger degree than motorists, as their experience of the area is fleeting.

The impact is assessed to be of ***low*** significance with and without the implementation of mitigation (Table 7-1).

7.2 Operational Phase

7.2.1 Altered Sense of Place and Visual Intrusion caused by the 132 kV Powerline Alternative 1

For ~8 kms, Powerline Alternative 1 is routed along a gravel road before it is routed along farm boundaries for ~8 kms to the Hendrina Power Station. This is the landowners preferred route.

Unlike Powerline Alternative 2, Alternative 1 is not routed adjacent to an existing 132 kV powerline. As such, this alternative will interrupt views across the landscape to both motorists and farmstead receptors, and will be visually intrusive and increase visual clutter in the landscape.

The impact is assessed to be of of ***medium*** significance with and without the implementation of mitigation (Table 7-1).

7.2.2 Altered Sense of Place and Visual Intrusion caused by the 132 kV Powerline Alternative 2

Powerline Alternative 2 is ~21 km in length and extends northwards for ~11 km from the proposed substation, routed along an existing road until meets the existing Hendrina-Abina 132 kV powerline. The powerline then follows the Hendrina-Abina 132 kV powerline route to the Hendrina Power Station.

For ~10 kms, Powerline Alternative 2 will be routed parallel to an existing powerline which may obscure and/or assimilate the proposed powerline, thereby minimising additional visual clutter in the surrounding area. From km 11, Powerline Alternative 2 tracks along the road to the proposed substation, where it will not be absorbed or obscured by any infrastructure, and is expected to be visually intrusive to motorists on the gravel road and R542. The powerline will be visually intrusive to some farmstead receptors, with views across the landscape.

The impact is assessed to be of ***medium*** significance with and without the implementation of mitigation (Table 7-1).

7.2.3 Altered Sense of Place and Visual Quality caused by the Substation

The proposed ~3 ha substation will be developed adjacent to the property boundary and gravel road, and will comprise various electrical grid infrastructure components.

The substation will be largely screened by topography to residential receptors in the surrounding area, however motorists on the adjacent network of gravel roads in close proximity to the substation will have a view of the substation.

Due to the shape, form and texture of the infrastructure comprising the substation, it will be visually intrusive to receptors and exacerbate visual clutter. This potential impact is ameliorated insofar as affected motorists will largely have fleeting views of the substation.

The impact is assessed to be of of ***medium*** significance with and without the implementation of mitigation (Table 7-1).

7.2.4 Altered Visual Quality caused by Light Pollution at Night

Lighting will be installed around the substation to improve security.

The installation of lighting around the substation will generate nightglow, altering the sense of place and visual quality, especially to those (farmstead) receptors not currently exposed to nightglow emanating from surrounding residential / developed areas.

Lighting is not easily screened by vegetation or topography, and the proposed lighting for substation will alter visual quality of the surrounding area.

The impact is assessed to be of ***medium*** significance and with the implementation of mitigation is reduced to ***low*** (Table 7-1).

7.3 Decommissioning Phase

7.3.1 Altered Sense of Place caused by Decommissioning Activities

While the proposed powerline and substation are anticipated to operate in the long-term, when decommissioning is required visual impacts will be generated.

The decommissioning of the powerline and substation will include earthworks, the movement of plant and equipment (e.g. plant and machinery, and stockpiles of excavated/salvaged material). Dust generated during decommissioning will be visually unappealing and may detract from the visual quality (and sense of place) of the area. These impacts are typically limited to the immediate area surrounding the site and powerline, during the decommissioning period.

Decommissioning activities will have a greater impact in the foreground where receptors are particularly exposed to these visual impacts.

These decommissioning phase impacts will impact adjacent residential receptors to a larger degree than motorists, as the latters experience of the area is fleeting.

The impact is assessed to be of ***low*** significance with and without the implementation of mitigation (Table 7-1).

7.4 Cumulative Impacts

7.4.1 Introduction

For the purposes of this report, cumulative impacts are defined as ‘direct and indirect impacts that act together with existing or future potential impacts of other activities or proposed activities in the area / region that affect the same resources and / or receptors’.

For the most part, cumulative effects or aspects thereof are too uncertain to be quantifiable, due mainly to a lack of data availability and accuracy. This is particularly true of cumulative effects arising from potential or future projects, the design or details of which may not be finalised or available and the direct and indirect impacts of which have not yet been assessed.

For practical reasons, the identification and management of cumulative impacts are limited to those effects generally recognised as important on the basis of scientific concerns and/or concerns of affected communities, in this case effects of other renewable energy facilities and large-scale infrastructure projects.

7.4.2 Cumulative Impacts Analysis

In addition to the project, other past, present and future activities have taken place or are proposed within a 35 km radius of the project site that might have caused or may cause impacts and may interact with impacts caused by the project. These are briefly discussed in this section.

There are five power stations (Kriel Power Station, Komati Power Station, Duvha Power Station, Hendrina Power Station and Arnot Power Station) within a 35 km radius of the proposed Hendrina Powerline. Power lines radiate from each of these power stations, forming a dense network of large- and small-scale powerlines, affecting visual quality and sense of place in this transition landscape. The proposed powerline and substation associated with this project will add to these accumulating impacts.

SiVEST's Impact Assessment methodology has been used to evaluate the cumulative visual impacts of the project on the sense of place of the surrounding 35 km radius. The cumulative impact of the 132 kV powerline and substation is assessed to be of ***medium*** significance with and without the implementation of mitigation (Table 7-1).

7.5 Overall Impact Rating

The impact assessment and ratings for the 132 kV powerline and substation are summarised in Table 7-1 below.

Table 7-1: Rating of impacts

ENVIRONMENTAL PARAMETER	ISSUE / IMPACT / ENVIRONMENTAL EFFECT/ NATURE	ENVIRONMENTAL SIGNIFICANCE BEFORE MITIGATION									RECOMMENDED MITIGATION MEASURES	ENVIRONMENTAL SIGNIFICANCE AFTER MITIGATION								
		E	P	R	L	D	I / M	TOTAL	STATUS (+ /-)	S		E	P	R	L	D	I / M	TOTAL	STATUS (+ / -)	S
Construction Phase																				
Altered Sense of Place and Visual Intrusion caused by Construction Activities	Dust generated during construction will be visually unappealing and may detract from the visual quality (and sense of place) of the area. These impacts are typically limited to the immediate area surrounding the construction site (powerline alignment and substation footprint) and access roads/tracks, during the construction period.	2	4	1	2	1	2	20	-	Low	• Limit vegetation clearance and the construction footprint, including access road footprints, to what is absolutely essential. • Consolidate the footprint of the construction camp to a functional minimum. • Avoid excavation, handling and transport of materials which may generate dust under very windy conditions. • Keep stockpiled aggregates and sand covered to minimise dust generation. • Keep construction site tidy.	2	3	1	2	1	2	18	-	Low
Operational Phase																				
Altered Sense of Place and Visual Intrusion caused by the 132kV Powerline Alternative 1	Alternative 1 is routed along a gravel road and farm boundaries. Unlike Powerline Alternative 2, Alternative 1 is not routed adjacent to an existing 132 kV powerline. As such, this alternative is anticipated to interrupt views across the landscape to both motorists and farmstead receptors, and will be visually intrusive and increase visual clutter in the landscape.	2	4	2	2	3	2	26	-	Medium	• Do not install or affix lights on pylons.	2	4	2	2	3	2	26	-	Medium

ENVIRONMENTAL PARAMETER	ISSUE / IMPACT / ENVIRONMENTAL EFFECT/ NATURE	ENVIRONMENTAL SIGNIFICANCE BEFORE MITIGATION									RECOMMENDED MITIGATION MEASURES	ENVIRONMENTAL SIGNIFICANCE AFTER MITIGATION								
		E	P	R	L	D	I / M	TOTAL	STATUS (+ /-)	S		E	P	R	L	D	I / M	TOTAL	STATUS (+ / -)	S
Altered Sense of Place and Visual Intrusion caused by the 132kV Powerline Alternative 2	Alternative 2 will be routed parallel to an existing powerline, for at least half the route, which may obscure and/or assimilate the proposed powerline and minimise additional visual clutter in the surrounding area. The powerline is not expected to be absorbed or obscured by any infrastructure, and is expected to be visually intrusive to motorists travelling along the gravel road and R542. The powerline will be visually intrusive to some farmstead receptors, with views across the landscape.	2	3	2	2	3	2	24	-	Medium	• Do not install or affix lights on pylons.	2	3	2	2	3	2	24	-	Medium
Altered Sense of Place and Visual Intrusion caused by the Substation	Due to the shape, form and texture of the infrastructure comprising the substation, it will be visually intrusive to receptors and exacerbate visual clutter. This potential impact is ameliorated insofar as affected motorists will largely have fleeting views of the substation.	2	4	2	2	3	2	26	-	Medium	• Fence the perimeter of the substation with green or black fencing. • Ensure that the roof colour of the proposed buildings blends into the landscape.	2	4	2	2	3	2	26	-	Medium
Altered Visual Quality caused by Light Pollution at Night	The installation of lighting around the substation is anticipated to generate nightglow, altering the sense of place and visual quality to those (farmstead) receptors not currently exposed to nightglow emanating from surrounding residential / developed areas. Lighting is not easily screened by vegetation or topography, and the proposed lighting for the powerline and substation is anticipated to alter	2	4	1	2	3	2	24	-	Medium	• Reduce the height of lighting masts to a workable minimum. • Direct lighting inwards and downwards to limit light pollution.	1	2	1	2	3	2	18	-	Low

ENVIRONMENTAL PARAMETER	ISSUE / IMPACT / ENVIRONMENTAL EFFECT/ NATURE	ENVIRONMENTAL SIGNIFICANCE BEFORE MITIGATION									RECOMMENDED MITIGATION MEASURES	ENVIRONMENTAL SIGNIFICANCE AFTER MITIGATION								
		E	P	R	L	D	I / M	TOTAL	STATUS (+ /-)	S		E	P	R	L	D	I / M	TOTAL	STATUS (+ / -)	S
	visual quality of the surrounding area.																			
Decommissioning Phase																				
Altered Sense of Place caused by the decommissioning activities	Dust generated during decommissioning activities will be visually unappealing and may detract from the visual quality (and sense of place) of the area. These impacts are typically limited to the immediate area surrounding the site, during the decommissioning period.	2	4	1	2	1	2	20	-	Low	• Limit vegetation clearance and the footprint of decommissioning, and access road footprints, to what is absolutely essential. • Avoid excavation, handling and transport of materials which may generate dust under very windy conditions. • Keep stockpiled aggregate and sand covered to minimise dust generation. • Keep site tidy.	2	3	1	2	1	2	18	-	Low
Cumulative Impact																				
Altered Sense of Place caused by the Powerline	Additional powerlines installed across the surrounding area will interrupt views and result in visual intrusion and altered sense of place.	2	4	2	3	3	3	42	-	Medium	• Do not install or affix lights on pylons. • Align proposed powerlines along existing powerline routes	2	4	2	3	3	2	28	-	Medium

7.6 Input into the EMPr

Table 7-2 provides a description of the key monitoring recommendations for each mitigation measure identified for each phase of the project for inclusion in the EMPr or Environmental Authorisation (EA).

Table 7-2: EMPr measures

Impact / Aspect	Mitigation / Management Actions	Responsibility	Methodology	Mitigation / Management Objectives and Outcomes	Frequency
Construction Phase					
Altered Sense of Place and Visual Intrusion	▪ Limit vegetation clearance and the construction footprint, including access road footprints, to what is absolutely essential.	Contractor	▪ Plan which areas require the clearance of vegetation. ▪ Only clear the vegetation when works in the area will be undertaken.	Limit deterioration of visual quality.	Throughout construction.
	▪ Consolidate the footprint of the construction camp to a functional minimum.		▪ Ensure that the construction camp is consolidated during the design phase		
	▪ Avoid excavation, handling and transport of materials which may generate dust under very windy conditions.		▪ During very windy conditions cease excavation, handling and transportation of materials which may generate dust.		
	▪ Keep stockpiled aggregates and sand covered to minimise dust generation.		▪ Stockpile all aggregates and sand. ▪ Keep stockpiles covered when not in use.		
	▪ Keep construction site tidy.		▪ Implement measures to keep the site tidy.		
Operational Phase					
Altered Sense of Place and Visual Intrusion	▪ Do not install or affix lights on pylons.	Contractor	▪ Prohibit installation of lighting on pylons in the design.	Limit light pollution.	Once the powerline is installed. Throughout operation.
	▪ Fence the perimeter of the substation with green or black fencing.		▪ Install a perimeter fence.	Limit visual intrusion and altered sense of place.	On completion of construction activities. Throughout operation.
	▪ Ensure that the roof colour of the proposed buildings blends into the landscape.		▪ Incorporate colour requirements in the design.		
Altered visual quality	▪ Reduce the height of lighting masts to a workable minimum.	Developer and Contractor	▪ Incorporate lighting requirements in the design.	Limit light pollution	Once construction activities have concluded. Throughout operation
	▪ Direct lighting inwards and downwards to limit light pollution.				
Decommissioning Phase					
Altered Sense of Place caused by the	▪ Limit vegetation clearance and the footprint of decommissioning,	Contractor	▪ Plan which areas require the clearance of vegetation.	Limit deterioration of visual quality.	Throughout decommissioning

Impact / Aspect	Mitigation / Management Actions	Responsibility	Methodology	Mitigation / Management Objectives and Outcomes	Frequency
decommissioning activities	including access road footprints, to what is absolutely essential.		▪ Only clear the vegetation when works in the area will be undertaken.		
	▪ Avoid excavation, handling and transport of materials which may generate dust under very windy conditions.		▪ During very windy conditions cease excavation, handling and transportation of materials which may generate dust.		
	▪ Keep stockpiled aggregates and sand covered to minimise dust generation.		▪ Stockpile all aggregates and sand. ▪ Keep stockpiles covered when not in use.		
	▪ Keep site tidy.		▪ Implement measures to keep the site tidy.		

8. COMPARATIVE ASSESSMENT OF ALTERNATIVES

The impacts of the two Powerline Alternatives have been assessed in Section 7.2.1 and 7.2.2, and Table 7-1 above. The overall impact significance rating for both Powerline Alternative 1 and 2 is *medium* with and without the implementation of mitigation. However, it is evident that Powerline Alternative 2 has a lower impact significance score (Table 7-1) with and without the implementation of mitigation in comparison to Powerline Alternative 1. This is due to the proposed alignment of Powerline Alternative 2 parallel to the existing 132 kV Hendrina-Abina powerline, minimising additional visual clutter to receptors. Therefore, Powerline Alternative 2 is the preferred powerline alignment from a visual perspective; however Powerline Alternative 1 is also considered acceptable (i.e. is not fatally flawed).

8.1 No-Go Alternative

The No Go alternative entails no change to the status quo, in other words, no 132 kV powerline and substation (see Section 3.2.1).

Should the application for the Hendrina 132 kV powerline and substation be refused, the visual impacts will not be realised.

9. CONCLUSION

The VIA describes and interprets the visual context or affected environment in which the project is located: this provides a visual baseline or template and aims to ascertain the aesthetic uniqueness of the project area. To better understand the magnitude or intensity of visual and sense of place impacts, the capacity of the project area and receptors to accommodate, attenuate and absorb impacts was analysed in considerable detail. To assess impact significance, the project was “introduced” into the baseline, taking account of the attenuating capacity of the project area.

The following findings are pertinent:

- Enertrag proposes to develop a 132 kV powerline and substation to evacuate power produced at the Hendrina North WEF to the Hendrina Power Station, near Hendrina, Mpumalanga. Two powerline alignment alternatives have been assessed, traversing 17 farms in the Steve Tshwete Local Municipality. The proposed substation will have a footprint of up to 3 ha.
- The basis for the landscape and visual character of the region is provided by the geology / topography, vegetation and land use of the area, which is predominantly a rural environment and can be described as a transition landscape. The site comprises an undulating plateau rising to ~1 681 mamsl. Most of the land within the project area and surrounds has been transformed by agricultural activity (mainly maize cultivation and grazing), urban and industrial development, power plants and a network of very large coal mines and associated tailings facilities which blight the landscape.
- The visual quality of the area can be experienced through rolling views of the open flat landscape that is interrupted by powerlines, the Hendrina Power Station, Afgri grain silo and the Optimum Coal Mine tailings dam which detract from the visual quality of the surrounding area. The dams and watercourses/rivers in the area add to the visual quality.
- The receptors identified based on the surrounding land uses include residents of urban areas and farmsteads and motorists travelling on the numerous roads in and around the project area.

- The study area surrounding the site is strongly influenced by the surrounding land uses and which can be described as rural agricultural areas, albeit within a region blighted by development mostly associated with coal-fired power generation. The sense of place is not particularly distinct from the rest of the wider region and is not overly memorable.
- The visibility of the two powerline route alternatives will be high due to the proposed height of the pylons (~40 m) above ground. The proposed powerline will be visible from some more elevated areas. Sections of the R542, gravel roads and farmsteads will have line of sight of the powerline, according to the viewshed. The visibility of the proposed substation is not anticipated to be high due to the undulating topography. The visual exposure of the project is deemed to be moderate.
- The low VAC of the the surrounding area is further reduced by the high vertical profile of the pylons and only marginally increased by the undulating topography. The substation will be screened to a limited degree by the undulating topography and less so by the vegetation. The study area has a low VAC for the powerline and substation.
- The high sensitivity of the visual receptors in close proximity to the proposed powerline, e.g. residents of farmsteads, is moderated by the large number of transient motorists as well as receptors' familiarity with and acceptance of views of powerlines in the surrounding landscape. As such, the sensitivity of the viewers or visual receptors potentially affected by the visual impact of the project is considered to be moderate.
- The proposed alignments are highly visible in the foreground and middleground to most of the isolated farmsteads and motorists on the surrounding roads: as such the visibility of the project is moderate.
- Grid infrastructure such as substation and powerlines are common in the area surrounding the proposed project, with small to large powerlines traversing the landscape and substations interspersed throughout the project area. As such the proposed infrastructure is consistent with type, scale and size of the existing infrastructure within the landscape. The project is deemed to have a high integrity with the surrounding landscape.
- Construction activities will generate visual impacts related to earthworks and construction infrastructure, plant and materials on site. These activities are visually intrusive and will mostly impact receptors in the foreground. The impact is assessed to be of low significance with and without the implementation of mitigation.
- The powerline will be visually intrusive and enhance visual clutter in the landscape. Powerline Alternative 1 not be routed parallel to an existing 132 kV powerline, and will interrupt views to both motorists and farmstead receptors. Powerline Alternative 2 will be routed parallel to the existing 132 kV Hendrina-Abina powerline, and may obscure and/or assimilate the powerline and minimise additional visual clutter in the surrounding areas. The impact for both Powerline Alignment 1 and 2 is assessed to be of *medium* significance with and without the implementation of mitigation.
- The proposed ~3 ha substation will comprise various electrical grid infrastructure components, and will be visually intrusive and add to visual clutter. The impact is assessed to be of *medium* significance with and without the implementation of mitigation.
- Installation of lighting at the substation will generate nightglow, altering the sense of place and visual quality to the surrounding receptors. The impact is assessed to be of *medium* significance and with the implementation of mitigation is reduced to *low*.
- Decommissioning activities will generate visual impacts related to earthworks and construction infrastructure, plant and materials on site. These activities are visually intrusive and will mostly impact receptors in the foreground. The impact is assessed to be of low significance with and without the implementation of mitigation.

- Numerous power stations and associated powerline networks are located within 35 km of the proposed project site. Powerlines radiate from each of these power stations, forming a dense network of large and small scale powerlines affecting visual quality and sense of place in this transition landscape. The proposed project and substation associated with this project will add to these accumulating impacts. The cumulative impact of the 132 kV powerline and substation is assessed to be of *medium* significance with and without the implementation of mitigation. Based on the assessment, Powerline Alternative 2 is the preferred powerline alignment from a visual perspective; however Powerline Alternative 1 is also considered acceptable (i.e. is not fatally flawed).

9.1 Impact Statement

The proposed project comprises the development of a substation and 132 kV powerline, further altering the visual landscape of the project area. This project is moderately congruent with and marginally affects the integrity of the landscape, as five power stations and the associated highly concentrated network of powerlines exist within the project area and the wider region. Due to the high vertical profile of the pylons, the VAC of the project area is low, however the undulating topography is expected to increase the VAC to a degree. The substation will be screened by the topography to a limited degree and less so by the vegetation.

This project will alter the visual quality during the construction and decommissioning phases, as well as alter the sense of place, visual quality and result in visual intrusion during the operational phase. These impacts are deemed to be acceptable on the assumption that the mitigation measures listed in Section 7.6 are implemented.

Based on the assessment and the assumption that the mitigation measures will be implemented, the specialist is of the opinion that the visual impacts of the project (Powerline Alternative 1 and 2) are both acceptable, and there is no reason not to authorise the project. Powerline Alignment 2 is the preferred alternative from a visual perspective.

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Appendix A: Specialist CV

Appendix B: Impact Assessment Methodology

Appendix C: Views from Viewpoints

Viewpoint 1: Pullens Hope Road - looking south. The 132 kV powerline will be visible, but obscured and assimilated by the existing powerlines.

Viewpoint 2: Farmstead 1 - looking north - east towards the Hendrina Power Station. The proposed powerline will be routed parallel to the existing 132 kV Hendrina-Abina powerline (left of centre in the photograph).

Viewpoint 3: Bosmanskop Farm – looking north-west towards the proposed 132 kV powerline route. The existing 132 kV Hendrina – Abina powerline (which will run parallel to the proposed powerline) is visible in the middleground.

Viewpoint 4: Farmstead 2 – looking south towards the proposed 132 kV powerline route. Powerline Alternative 2 will be routed parallel to the existing 132 kV Hendrina – Abina powerline visible in the middleground / background.

Viewpoint 5: Broodsnyersplaas BV Groendag – looking south-east towards the proposed 132 kV powerline route. Powerline Alternative 1 will not be visible due to distance (> 5 km) and topography. Powerline Alternative 2 will be marginally visible in the background.

Viewpoint 6: De Beer Farm – looking south-east towards Powerline Alternative 2 alignment. The Hendrina-Abina powerline traverses the landscape in the middleground. Powerline Alternative 1 is not visible to these receptors. Powerline Alternative 2 will be highly visible in the middleground.

Viewpoint 7: Farmstead 2 – looking north-west towards Powerline Alternative 2. Powerline Alternative 2 will be highly visible to receptors in the middleground.

Viewpoint 7: Farmstead 2 – looking south-east towards Powerline Alternative 1. Powerline Alternative 1 will be marginally visible to receptors in the middleground / background.

Viewpoint 8: Afgri grain silo – looking south-west towards the convergence of Powerline Alternative 1 and 2. The powerline alignment will highly visible as it is routed parallel to the small powerlines right of center in the photo and gravel road (not visible in the photo).

Viewpoint 8: Afgri grain silo – looking east toward Powerline Alternative 1 routed in front of the grain silo. The powerline will be highly visible in the foreground.

Viewpoint 9: Farmstead 3 – looking south-west towards Powerline Alternative 1. Powerline Alternative 1 will be visible to receptors in the middleground.

Viewpoint 10: Farmstead 4 – looking south-west towards the site. Powerline Alternative 1 and 2 will be routed parallel to the small (11 – 33 kV) powerline in the foreground and therefore will be highly visible to receptors.

Viewpoint 11: WA de Klerk Farm – looking south-west toward Powerline Alternative 1 and 2. Due to the intervening elevated topography and distance, the powerline route is not visible to receptors.

Viewpoint 12: Farmstead 5 – looking south-east. Powerline Alternative 1 and 2 will be routed adjacent to this gravel road and will be highly visible to receptors (right side of the photograph) in the foreground.

Viewpoint 13: R542 – looking south-east. Powerline Alternative 1 and 2 will be traverse the farms on the left (north) and extend across the R542 in the foreground. The powerline will be highly visible to receptors.

Viewpoint 14: Farmstead 6 – looking east toward Powerline Alternative 1 and 2. The proposed powerline will be marginally visible in the background. A large (>132 kV powerline) traverses the landscape in the foreground.

Viewpoint 15: Hendrina WEF Substation– looking north-west. Powerline Alternative 1 and 2 will be routed adjacent to this gravel road and will be highly visible to receptors (right side of the photograph) in the foreground. The substation will be located on the farm on the left (west) and will be visible in the foreground.

Viewpoint 16: Farmstead 7 – looking north-west towards the Powerline Alternative 1 and 2. Powerline Alternative 1 and 2 will be partially visible in the middle ground to the receptors.

Viewpoint 17: Unnamed Road (South) – looking north-west. Powerline Alternative 1 and 2 will be marginally visible in the background across the landscape.

Viewpoint 18: Farmstead 8 – looking north-west towards the Powerline Alternative 1 and 2. Powerline Alternative 1 and 2 are not visible to receptors due to distance (>5 kms) and topography.

SITE SENSITIVITY VERIFICATION
(IN TERMS OF PART A OF THE ASSESSMENT PROTOCOLS PUBLISHED IN GN 320 ON 20 MARCH 2020

1 INTRODUCTION

Enertrag South Africa (Pty) Ltd (Enertrag) intends to develop a 132 kV overhead powerline (OHPL) that will evacuate power produced at the Hendrina North Wind Energy Facility (WEF) to Hendrina Power Station, near Hendrina, Mpumalanga Province (the project - Figure 1). The powerline will have a maximum length of 21 km and will traverse a number of farms in the Steve Tshwete Local Municipality. The proposed 3 ha substation will be located on Portion 3 of Farm 185IS Hartebeestkuil.

SRK Consulting (South Africa) (Pty) Ltd (SRK) has been appointed by SiVEST (SA) (Pty) Ltd (SiVEST), on behalf of Enertrag, to undertake the Visual Impact Assessment (VIA) to inform the required Basic Assessment (BA) process required in terms of the National Environmental Management Act 107 of 1998 (NEMA) and the Environmental Impact Assessment (EIA) Regulations, 2014 as amended and conducted by SiVEST.

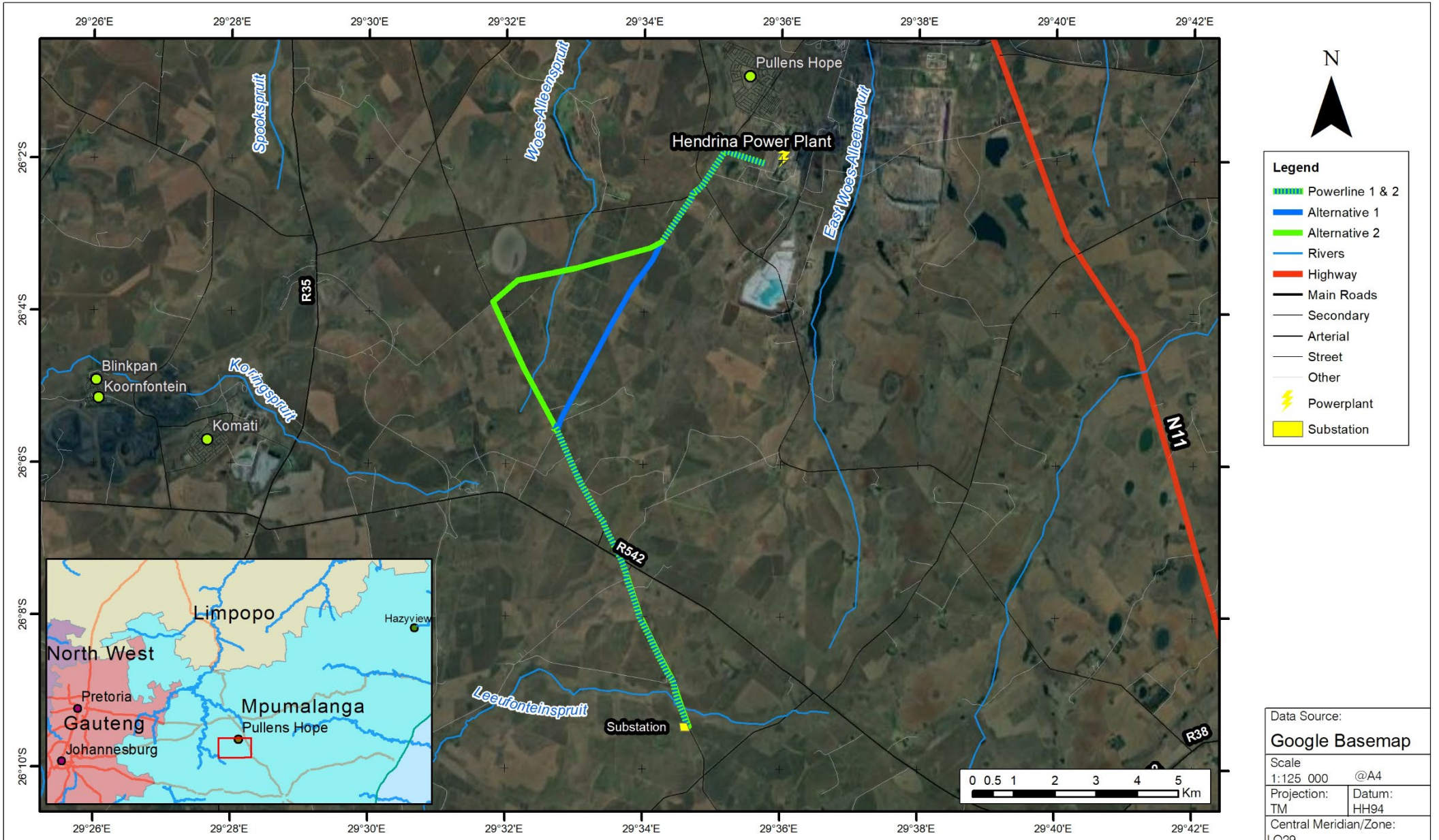
In accordance with Appendix 6 of the NEMA EIA Regulations of 2014, a site sensitivity verification has been undertaken in order to confirm the current land use and environmental sensitivity of the proposed project area as identified by the National Web-Based Environmental Screening Tool (Screening Tool).

2 SITE SENSITIVITY VERIFICATION

A site visit was undertaken on 14 September 2022. The site visit duration and timing were appropriate to provide the specialist with a representative impression of the site and surroundings.

The following additional information sources were used to inform the site sensitivity verification:

- Maps indicating the location and layout of the project;
- Topographic data, including spatial files with 5 m contours obtained from the Department of Rural Development and Land Reform;
- Aerial images; and
- Other available data on geology, vegetation, land use, receptors etc.



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Scale 1:125 000 @A4

Projection: TM | Datum: HH94

Central Meridian/Zone: LO29

Date: 23/09/2022 | Compiled by: GROS

Project No. 590817 | Fig No. 1

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HENDRINA POWERLINE VIA

LOCALITY MAP

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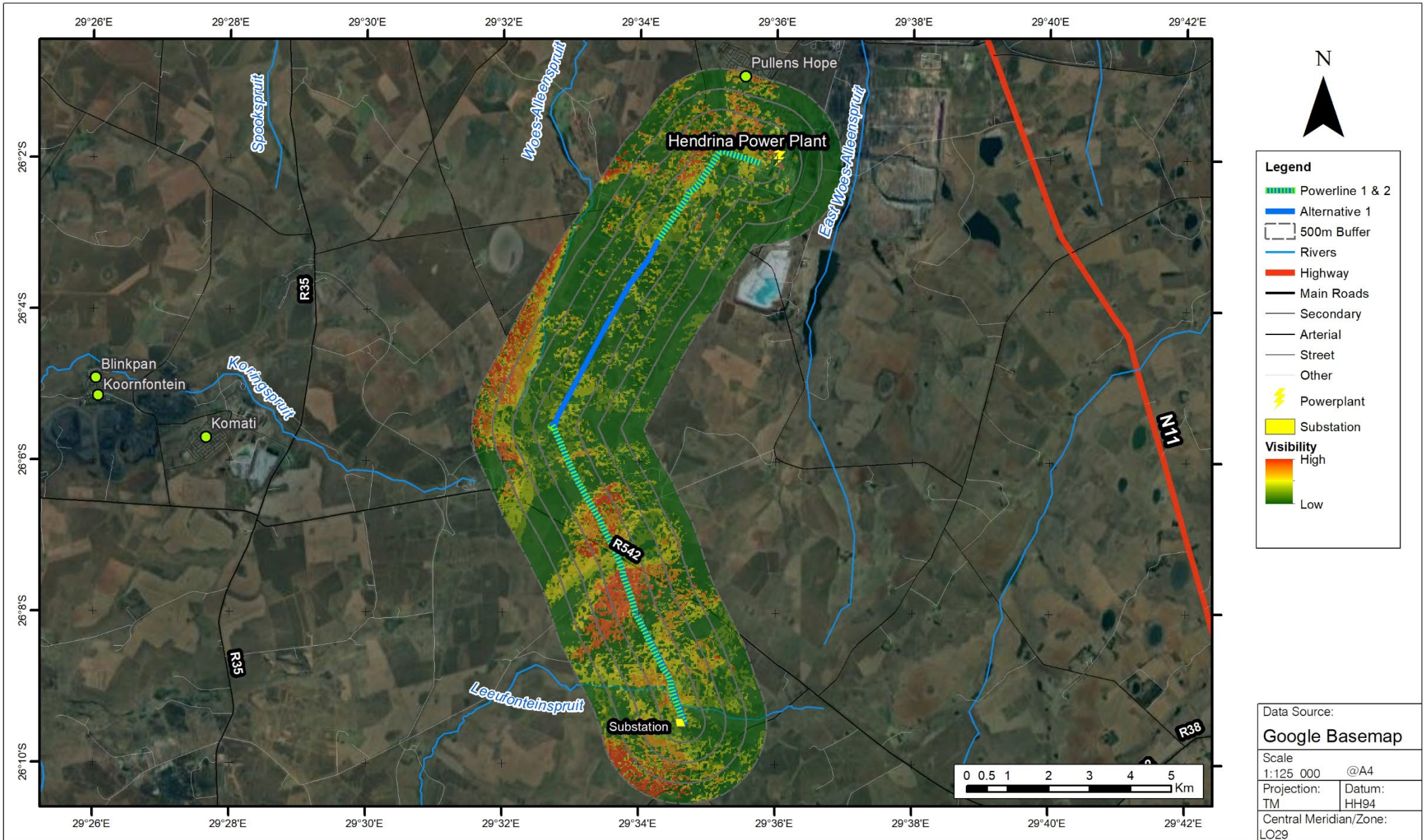
3 OUTCOME OF SITE SENSITIVITY VERIFICATION

The magnitude (or intensity) of various factors is considered when determining and verifying the site sensitivity. These factors include:

- Visual exposure;
- Visual absorption capacity;
- Sensitivity of visual receptors;
- Visibility and viewing distance; and
- Integrity with existing landscape / townscape.

The magnitude (or intensity) of these factors is summarised below:

- Visual exposure:
    - The visibility of the two powerline route alternatives will be high due to the proposed height of the pylons (~40 m) above ground. The viewshed indicates that the proposed powerline routes will be visible from some more elevated areas, i.e. towards the north and north west of the powerline route, and in the southern section of the route alignment. Sections of the R542, gravel roads and farmsteads will have line of sight of the powerline, according to the viewshed (Figure 2 and Figure 3).
    - The visual exposure of the proposed project is deemed ***moderate***.
- Visual Absorption Capacity (VAC):
    - The low VAC of the surrounding area is further reduced by the high vertical profile of the pylons and only marginally increased by the undulating topography. The vegetation of the surrounding area is not expected to screen the powerlines and pylons from receptors. The substation will be screened to a limited degree by the undulating topography and less so by the vegetation.
    - The study area has a ***low*** VAC for the proposed powerline and the proposed substation.
- Visual sensitivity of receptors:
    - The high sensitivity of the visual receptors in close proximity to the proposed powerline, e.g. residents of farmsteads, is moderated by the high number of transient motorists as well as receptors' familiarity with and acceptance of views of powerlines in the surrounding landscape.
    - The sensitivity of the viewers or visual receptors is considered to be ***moderate***.
- Viewing distance and visibility:
    - The proposed alignments are highly visible in the foreground and middleground to most of the isolated farmsteads and motorists on the surrounding roads.
    - The visibility of the project is ***moderate***.



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Central Meridian/Zone:	LO29
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HENDRINA POWERLINE VIA

VIEWSHED FOR PYLONS AND POWERLINE ALTERNATIVE 1 MAP

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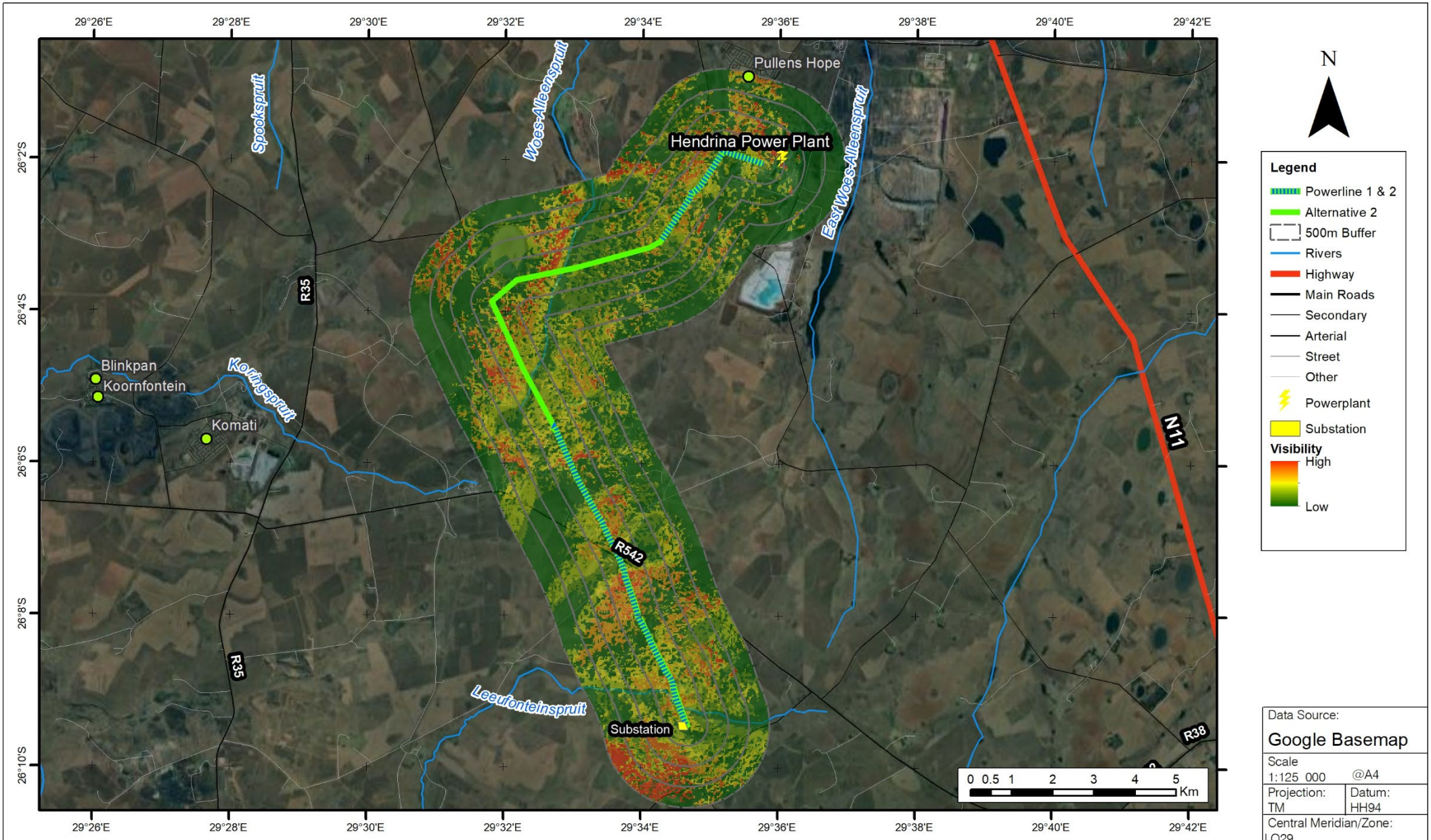

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HENDRINA POWERLINE VIA

VIEWSHED FOR PYLONS AND POWERLINE ALTERNATIVE 2 MAP

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- Compatibility with landscape integrity:
    - Grid infrastructure such as substations and powerlines are common in the area surrounding the proposed project, with small and large powerlines traversing the landscape and substations interspersed throughout the project area (Figure 4). As such, the proposed infrastructure is consistent with type, scale and size of the existing infrastructure within the landscape.
    - The project is deemed to have a ***high*** integrity with the surrounding landscape.

Figure 4: Power plant, and powerlines traversing the landscape.

As a result of the magnitude of factors considered, the site is of ***medium*** landscape (visual) sensitivity to the proposed project.

4 CONCLUSION

The Screening Tool does not identify a landscape (visual) sensitivity theme for this project. The site sensitivity verification finds the site to be of a **medium** landscape (visual) sensitivity.