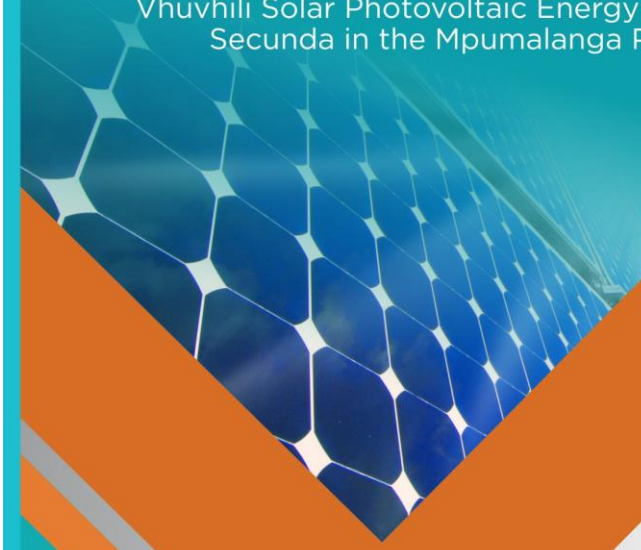
DRAFT BASIC ASSESSMENT REPORT

Proposed Development of a 132 kV Overhead Power Line and Supporting Infrastructure for the Proposed Vhuvhili Solar Photovoltaic Energy Facility, near Secunda in the Mpumalanga Province



APPENDIX D.2

Visual Impact Assessment

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VISUAL IMPACT ASSESSMENT:

Basic Assessment for The Proposed Development of a 132 kV Overhead Power Line and Associated Electrical Grid Infrastructure to support the Proposed Vhuvhili Solar Photovoltaic Energy Facility, near Secunda, Province of Mpumalanga

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Executive Summary

Vhuvhili Solar RF (Pty) Ltd (hereafter referred to as" Vhuvhili Solar") is proposing to develop the Electrical Grid Infrastructure (EGI) comprising a 132kV power line and associated infrastructure near Secunda in the Mpumalanga Province. The aim of the project is to transmit the electricity generated by the proposed Vhuvhili Solar Energy Facility (SEF) to the switching station at the proposed Mukondeleli Wind Energy Facility (WEF). The SEF and WEF projects are subject to separate Scoping and EIA processes which are currently underway.

The Visual Impact Assessment (VIA) has determined that the study area has a somewhat mixed visual character, transitioning from the heavily transformed urban / peri-urban landscape associated with the Secunda urban area and the Sasol Secunda fuel plant in the north-west and the town of Charl Cilliers in the south-west to a more rural / pastoral character across the remainder of the study area. Hence, although EGI development would alter the visual character and contrast with this rural / pastoral character, the location of the proposed EGI in relatively close proximity to these transformed areas as well as the associated extensive power line network will significantly reduce the level of contrast.

The proposed EGI will be subject to a Basic Assessment (BA) process in terms of the National Environmental Management Act, 1998 (Act 107 of 1998) (NEMA), as amended and the 2014 NEMA EIA Regulations, 2014, as amended) Accordingly, a BA process as contemplated in terms of the 2014 NEMA EIA Regulations, as amended, is being undertaken in respect of this project. The competent authority for this BA is the Mpumalanga Department of Agriculture, Rural Development, Land and Environmental Affairs (DARDLEA).

This VIA is being undertaken as part of the BA process.

A broad-scale assessment of visual sensitivity, based on the physical characteristics of the study area, economic activities and land use that predominates, determined that the area would have a **low** visual sensitivity. An important factor contributing to the visual sensitivity of an area is the presence, or absence of visual receptors that may value the aesthetic quality of the landscape and depend on it to produce revenue and create jobs. No formal protected areas, leisure-based tourism activities or ***sensitive*** receptor locations were identified in the study area, thus confirming the low level of visual sensitivity.

The desktop assessment did however identify multiple farmsteads within the study area that could be considered to be receptors, although not all of them would be sensitive to the proposed development. These farmsteads are however regarded as *potentially* sensitive visual receptors as elements of the proposed development could potentially alter natural or semi-natural vistas experienced from these locations. At this stage however, local sentiments towards the proposed development are not known.

A total of 40 receptors were identified within 5 kms of the Vhuvhili EGI combined assessment corridor, three (3) of which are outside the viewshed for the EGI. Of the remaining thirty-seven (37) potentially sensitive receptor locations, two (2) are located within the Vhuvhili SEF project area and it has been assumed that the relevant landowners are involved in the project. As such these landowners are not expected to perceive the proposed development in a negative light.

Only two (2) potentially sensitive receptors (VR27 and VR75) are expected to experience high levels of visual impact. Thirty (30) of the remaining receptor locations are expected to experience moderate levels of impact as a result of the EGI development, while the remaining five (5) would only experience low levels of visual impact.

Although the R546 Main Road could be considered a potentially sensitive receptor road, the likely visual impacts of the proposed development on motorists utilising this route would be reduced by the level of transformation and landscape degradation visible from the road and also by the presence of high voltage power lines adjacent to the route. Visual impacts affecting the R546 are therefore rated as **low.**

A preliminary assessment of overall impacts revealed that visual impacts (post mitigation) associated with the proposed Vhuvhili EGI are of **LOW** significance during construction, operation and decommissioning phases, with a number of mitigation measures available.

Considering the presence of existing mining and industrial activity and proposals for renewable energy facilities in the broader area, the introduction of new EGI in the area will result in further change in the visual character of the area and alteration of the inherent sense of place, extending an increasingly industrial character into the broader area, and resulting in significant cumulative impacts. It is however anticipated that these impacts could be mitigated to acceptable levels with the implementation of the recommended mitigation measures. In light of this, cumulative impacts have been rated as **MODERATE**.

From a visual perspective therefore, the proposed Vhuvhili EGI project is deemed acceptable, and the Environmental Authorisation (EA) should be granted. SLR Consulting is of the opinion that the visual impacts associated with the construction, operation and decommissioning phases can be mitigated to acceptable levels provided the recommended mitigation measures are implemented.

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List of Abbreviations

BA	Basic Assessment
BESS	Battery Energy Storage System
DBAR	Draft Basic Assessment Report
DEIAR	Draft Environmental Impact Assessment Report
DFFE	Department of Forestry, Fisheries and Environment
DM	District Municipality
DSR	Draft Scoping Report
DEM	Digital Elevation Model
EA	Environmental Authorisation
EIA	Environmental Impact Assessment
EMPr	Environmental Management Programme
FEIAR	Final Environmental Impact Assessment Report
FSR	Final Scoping Report
GIS	Geographic Information System
I&AP	Interested and/or Affected Party
IPP	Independent Power Producer
LM	Local Municipality
kV	Kilovolt
DARDLEA	Department of Agriculture, Rural Development, Land and Environmental Affairs
MW	Megawatt
NGI	National Geo-Spatial Information
PV	Photovoltaic
REEA	Renewable Energy EIA Application Database
REF	Renewable Energy Facility
REIPPP	Renewable Energy Independent Power Producer Programme
SANBI	South African National Biodiversity Institute
SEF	Solar Energy Facility
VIA	Visual Impact Assessment
VR	Visual Receptor
WEF	Wind Energy Facility

Glossary

Definitions	
Anthropogenic feature	An unnatural feature resulting from human activity.
Cultural landscape	A representation of the combined worlds of nature and of man illustrative of the evolution of human society and settlement over time, under the influence of the physical constraints and/or opportunities presented by their natural environment and of successive social, economic and cultural forces, both external and internal (World Heritage Committee, 1992).
Sense of place	The unique quality or character of a place, whether natural, rural or urban. It relates to uniqueness, distinctiveness or strong identity.
Scenic route	A linear movement route, usually in the form of a scenic drive, but which could also be a railway, hiking trail, horse-riding trail or 4x4 trail.
Sensitive visual receptors	An individual, group or community that is subject to the visual influence of the proposed development and is adversely impacted by it. They will typically include locations of human habitation and tourism activities.
Slope Aspect	Direction in which a hill or mountain slope faces.
Study area / Visual assessment zone	The study area or visual assessment zone is assumed to encompass a zone of 5 km from the outer boundary of the proposed Solar PV Facility application site.
Viewpoint	A point in the landscape from where a particular project or feature can be viewed.
Viewshed / Visual Envelope	The geographical area which is visible from a particular location.
Visual character	The pattern of physical elements, landforms and land use characteristics that occur consistently in the landscape to form a distinctive visual quality or character.
Visual contrast	The degree to which the development would be congruent with the surrounding environment. It is based on whether or not the development would be in conformity with the land use, settlement density, forms and patterns of elements that define the structure of the surrounding landscape.
Visual exposure	The relative visibility of a project or feature in the landscape.
Visual impact	The effect of an aspect of the proposed development on a specified component of the visual, aesthetic or scenic environment within a defined time and space.
Visual receptors	An individual, group or community that is subject to the visual influence of the proposed development but is not necessarily adversely impacted by it. They will typically include commercial activities, residents and motorists travelling along routes that are not regarded as scenic.
Visual sensitivity	The inherent sensitivity of an area to potential visual impacts associated with a proposed development. It is based on the physical characteristics of the area (visual character), spatial distribution of potential receptors, and the likely value judgements of these receptors towards the new development, which are usually based on the perceived aesthetic appeal of the area.

VISUAL IMPACT ASSESSMENT

This report serves as the Visual Impact Assessment Specialist Report that was prepared as part of the BA for the proposed development of a 132kV gridline and associated EGI, near Secunda in Mpumalanga Province.

1. Introduction

1.1 Scope and Objectives

Vhuvhili Solar RF (Pty) Ltd (hereafter referred to as" Vhuvhili Solar") is proposing to develop the EGI comprising a 132kV power line and associated infrastructure near Secunda in the Mpumalanga Province. The aim of the project is to transmit the electricity generated by the proposed Vhuvhili SEF to the switching station at the proposed Mukondeleli WEF.

This proposed EGI project is currently the subject of an EA)application being submitted under the 2014 NEMA EIA Regulations, as amended. The proposed Vhuvhili SEF and associated infrastructure is subject to a separate EIA Process which is currently being undertaken in parallel to this BA process. The competent authority for this BA is the Mpumalanga DARDLEA.

This VIA is being undertaken as part of the BA process.

Prior to commencing with the VIA in accordance with the Specialist Assessment and Minimum Report Content Requirements for Environmental Impacts on the Visual Theme (Government Notice 320, dated 20 March 2020), a site sensitivity verification was 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).

The aim of the VIA is to identify potential visual issues associated with the proposed development, as well as to determine the potential extent of visual impacts. This involves characterising the visual environment of the area and identifying areas of potential visual sensitivity that may be subject to visual impacts. This VIA focuses on the potentially sensitive visual receptor locations and provides an assessment of the magnitude and significance of the potential visual impacts associated with the proposed development.

1.2 Details of Specialist

This specialist assessment was undertaken by Kerry Schwartz of SLR Consulting, a GIS specialist with more than 20 years' experience in the application of GIS technology in various environmental, regional planning and infrastructural projects. Kerry's GIS skills have been extensively utilised in projects throughout South Africa and in other Southern African countries. Kerry has also undertaken many VIAs in recent years.

A *Curriculum Vitae* is included in **Appendix A** and a signed specialist statement of independence is included in **Appendix B** of this specialist assessment.

1.3 Terms of Reference

Specific requirements for the VIA are outlined below.

- Comply with the Assessment Protocols that were published on 20 March 2020, in Government Gazette 43110, GN 320. This specifically includes Part A, which provides the Site Sensitivity Verification Requirements where a Specialist Assessment is required but no Specific Assessment Protocol has been prescribed.
- Provide a Site Sensitivity Verification Report based on the requirements documented in the Assessment Protocols published on 20 March 2020, in Government Gazette 43110, GN 320.
- Compile a VIA in compliance with Appendix 6 of the 2014 NEMA EIA Regulations, as amended. The Specialist Assessment must also be in adherence to any additional relevant legislation and guidelines that may be deemed necessary. It must also comply with the report templates provided by the CSIR.
- Provide inputs to the Draft BA Report to include a description of the affected environment and environmental sensitivities, key legislation, key issues and detailed assessment of impacts. A template for such inputs will be provided by the CSIR.
- The specialist must undertake a site visit in order to identify the level of sensitivity assigned to the project area on the Screening Tool, and to verify and confirm this sensitivity and land-use, as well as to comply with the requirements of Part A of the Assessment Protocols published on 20 March 2020, in Government Gazette 43110, GN 320.
- Determine, describe and map the baseline environmental condition and sensitivity of the study area. Specify set-backs or buffers, and provide clear reasons for these recommendations.
- Provide sensitivities in KMZ or similar GIS format.
- Provide review input on the preferred power line routing and infrastructure layout following the sensitivity analysis and layout identification.
- The report must describe the visual character of the local area. Any significant visual features or visual disturbances should be identified and mapped, as well as any sensitive visual receptors within the proposed project area or within viewsheds of the projects.
- Visual character and visual absorption capacity should be described.
- Viewsheds for various elements of the proposed development should be calculated, defined and presented, and the varying sensitivities of these viewsheds must be highlighted.
- Mapping of visual sensitivity of the site will require consideration of visual receptors outside the site, and sensitivity to development on the site for potentially affected visual receptors of “very high” sensitivity.
- Assessment to be based on a site visit, visual modelling, and a photographic survey of the surrounding region from which the landscape and visual baselines can be prepared. The assessment must also consider the maps generated by the National Screening Tool.
- Identify and assess the potential direct, indirect and cumulative impacts of the proposed development on the receiving environment from a visual perspective. Impact significance must be rated both without and with mitigation, and must cover the construction, operational and decommissioning phases of the project. The Impact Assessment Methodology must follow that contained in Section B of this ToR, as provided by the CSIR.
- Schematic portrayals of the visual impact of the proposed project infrastructure on the different viewsheds identified must be presented. All impacts should be considered under varying conditions as appropriate to the study i.e., day, night, clear weather, cloudy weather etc.
- Maps depicting viewsheds/line of sight across the site should be generated and included in the reports. These maps should indicate current viewsheds/visual landscape/obstructions as well as expected visual impacts during the construction, operational and decommissioning phases of the proposed development.
- Identify any protocols, legal and permit requirements that are relevant to this project and the implications thereof.
- Provide recommendations with regards to potential monitoring programmes.
- Determine mitigation and/or management measures which could be implemented to as far as possible reduce the effect of negative impacts and enhance the effect of positive impacts. Also

identify best practice management actions, monitoring requirements, and rehabilitation guidelines for all identified impacts. This must be included in the Environmental Management Programme (EMPr).
- Incorporate and address all review comments made by the Project Team (CSIR and Project Applicant) during the various revisions of the specialist report.
- Incorporate and address all issues and concerns raised by Stakeholders, Competent Authority, I&APs and the public during the Public Participation Process (where relevant and applicable).
- Review the Generic EMPr for 1) Power lines (GN 435) and confirm if there are any specific environmental sensitivities or attributes present on the site and any resultant site specific impact management outcomes and actions that are not included in the pre-approved generic EMPr (Part B – Section 1). If so, provide a list of these specific impact management outcomes and actions based on the format of the report template provided by the CSIR.

2. Approach and Methodology

This VIA is based on a combination of desktop-level assessment supported by field-based observation.

- Physical landscape characteristics

Physical landscape characteristics such as topography, vegetation and land use are important factors influencing the visual character and visual sensitivity of the study area. Baseline information about the physical characteristics of the study area was initially sourced from spatial databases provided by National Geospatial Information (NGI), the South African National Biodiversity Institute (SANBI) and the South African National Land Cover Dataset (Geoterraimage – 2020). The characteristics identified via desktop means were later verified during a site visit.

- Identification of sensitive and potentially sensitive receptor locations

Visual receptor locations and routes that are sensitive and / or potentially sensitive to the visual intrusion of the proposed development were assessed to determine the impact of the proposed development on each of the identified receptor locations.

- Fieldwork and photographic review

A two (2) day site visit was undertaken between the 25th and 26th of January 2022 (mid-summer). The aim of the site visit was to:

  - verify the landscape characteristics identified via desktop means;
  - conduct a photographic survey of the proposed study area;
  - verify the sensitivity of visual receptor locations identified via desktop means;
  - eliminate receptor locations that are unlikely to be influenced by the proposed development;
  - identify any additional visually sensitive receptor locations within the study area; and
  - assist with the assessment and rating of receptor impacts.

- Impact Assessment

An Impact Assessment rating matrix (hereafter referred to as the rating matrix) (**Appendix D**) was used to provide an objective evaluation of the significance of the potential visual impacts associated with the proposed development, both before and after implementing mitigation measures. Mitigation measures were identified (where possible) to minimise the potential visual impact of the proposed development. The rating matrix is based on several different factors including geographical extent, probability, reversibility, irreplaceable loss of resources, duration, extent and consequence in order to assign a level of significance to the potential visual impact of the project.

A separate rating matrix was used to assess the visual impact of the proposed EGI project on the visual receptor locations (both sensitive and potentially sensitive), as identified. This matrix is based on three parameters, namely the distance of an identified visual receptor from the proposed development, the presence of screening factors and the degree to which the proposed development would contrast with the surrounding environment.

- Consultation with Interested and Affected Parties (I&APs)

Continuous consultation with &APs during the Public Participation Process (PPP) for the BA will be used (where available) to help establish how the proposed development will be perceived by the various receptors (?) and the degree to which the impact will be regarded as negative. Although I&APs have not yet provided any feedback in this regard, the report will be updated to include relevant information as and when it becomes available.

2.1 Information Sources

The main sources of information which were utilised for the VIA are listed in Error! Reference source not f ound. below:

Table 1: Sources of Information

Data / Information	Source	Date	Type	Description
Elevation data	NGI	2011	Spatial	5m contour national coverage - prone to inaccuracies.
1: 50 000 Topographical Maps	NGI	Various	Spatial	Topographical map series used as background.
Land Cover Data	Department of Forestry, Fisheries and Environment (DFFE) (GEOTERRAIMAGE)	2020	Spatial	2020 South African National Land-Cover Dataset.
Vegetation Classification	SANBI	2018	Spatial	SANBI VegMap based on vegetation Rutherford & Mucina classification 2012.
Satellite Imagery	Google Earth	2022	Spatial	Google Earth Imagery.
South African National Protected Areas Database (SAPAD)	DFFE	2022, Q1	Spatial	Spatial delineation of protected areas in South Africa. Updated quarterly.
National Protected Areas Expansion Strategy (NPAES)	SANBI	2008	Spatial	Spatial delineation of protected areas in South Africa.
The National web-based	DFFE	2022	Report & spatial	High level identification of areas of

Data / Information	Source	Date	Type	Description
Environmental Screening Tool.				environmental sensitivities.
SA REEA	DFFE	2022, Q2	Spatial	SA Renewable Energy EIA Application Database (REEA).

2.2 Assumptions, Knowledge Gaps and Limitations

Assumptions, knowledge gaps and limitations relevant to this study are outlined below:

- This VIA has been undertaken based on the project description provided by the Developer and the Environmental Assessment Practitioner (EAP) at the inception of the project.
- Power lines are very large structures by nature and could impact on receptors that are located relatively far away, particularly in areas of very flat terrain. Given the nature of the receiving environment and the height of the various components of the proposed development, the study area or visual assessment zone is assumed to encompass a zone of 5 km from the outer boundary of the combined power line assessment corridors. This 5 km limit on the visual assessment zone relates to the importance of distance when assessing visual impacts. Although the proposed development may still be visible beyond 5 km, the degree of visual impact would be diminished considerably and as such the need to assess the impact on potential receptor locations beyond this distance would not be warranted.
- The identification of visual receptors involved a combination of desktop assessment as well as field-based observation. Initially Google Earth imagery was used to identify potential receptors within the study area. Where possible, these receptor locations were verified and assessed during a site visit which was undertaken between the 25th and 26th of January 2022. Due to the extent of the study area however and the number of receptors that could potentially be sensitive to the proposed development, it was not possible to visit or verify every potentially sensitive visual receptor location. As such, several broad assumptions have been made in terms of the likely sensitivity of the receptors to the proposed development. It should be noted that not all receptor locations would necessarily perceive the proposed development in a negative way. This is usually dependent on the use of the facility, the economic dependency of the occupants on the scenic quality of views from the facility and on people's perceptions of the value of "Green Energy". Sensitive receptor locations typically include sites such as tourism facilities and scenic locations within natural settings which are likely to be adversely affected by the visual intrusion of the proposed development. Thus, the presence of a receptor in an area potentially affected by the proposed development does not necessarily mean that any visual impact will be experienced.
- The potential visual impact at each visual receptor location was assessed using a matrix developed for this purpose. The matrix is based on three main parameters relating to visual impact and, although relatively simplistic, it provides a reasonably accurate indicative assessment of the degree of visual impact likely to be experienced at each receptor location as a result of the proposed development. It is however important to note the limitations of quantitatively assessing a largely subjective or qualitative type of impact and as such the matrix should be seen merely as a representation of the likely visual impact at a receptor location.
- The exact status of all the receptors could not be verified during the field investigation and as such the receptor impact rating was largely undertaken via desktop means.
- Receptors that were assumed to be farmsteads were still regarded as being potentially sensitive to the visual impacts associated with the proposed development and were thus assessed as part of the VIA.

- Based on the project description provided by the Developer, all analysis for this VIA is based on a worst-case scenario where the maximum height of power line towers and associated structures is assumed to be 40m.
- Due to the varying scales and sources of information; maps may have minor inaccuracies. Terrain data for this area, derived from the NGI's 5 m Contour Database, is fairly coarse and somewhat inconsistent and as such, localised topographic variations in the landscape may not be reflected on the Digital Elevation Model (DEM) used to generate the viewshed(s) and visibility analysis conducted in respect of the proposed development.
- In addition, the viewshed analysis did not take into account any existing vegetation cover or built infrastructure which may screen views of the proposed development. This analysis should therefore be seen as a conceptual representation or a worst-case scenario.
- No feedback regarding the visual environment has been received from the public participation process to date. Any feedback from the public during the review period of the Draft Basic Assessment Report (DBAR) will however be incorporated into further drafts of this report, if relevant.
- This study includes a broad assessment of the potential cumulative impacts of other renewable energy developments on the existing landscape character and on the identified sensitive receptors. This assessment is based on the information available at the time of writing the report and where information has not been available, broad assumptions have been made as to the likely impacts of these developments.
- No visualisation modelling was undertaken for the proposed development as this is not normally required for linear infrastructure. This can however be provided should the Public Participation process identify the need for this exercise.
- It should be noted that the site visit was undertaken in late January 2022, during mid-summer, which is characterised by higher levels of rainfall and increased vegetation cover. In these conditions, slightly reduced levels of visual impact will be experienced from receptor locations in the surrounding area.
- In clear weather conditions, power lines and associated infrastructure would present a greater contrast with the surrounding landscape than they would on a cloudy overcast day. The field investigation was conducted during clear to partly cloudy weather conditions.

3. Description of Project Aspects relevant to the Visual Impact Assessment

In this section, the typical visual issues related to the establishment of a 132kV power line and associated infrastructure as proposed are discussed.

3.1 Project Components

The proposed development essentially comprises a 132kV overhead transmission power line and associated infrastructure to feed the electricity generated by the proposed Vhuvhili SEF into the proposed switching station to be located at the proposed Mukondeleli WEF. The electricity will be transferred from the proposed on-site substation at the proposed Vhuvhili SEF via a 132 kV power line which extends approximately 12 km in length to the proposed switching station at the proposed Mukondeleli WEF.

Power line assessment corridors with a width of approximately 200 m are being assessed to allow flexibility when determining the final route alignment. The proposed power line however only requires a 32 m wide servitude which would be positioned within the corridor as required by Eskom.

The type of power line towers being considered at this stage include steel lattice pylons or monopole towers, or combination of both where required and it is assumed that these towers will be located approximately 200 m to 300 m apart. The towers will be up to 40 m high, depending on the terrain, but

will ensure minimum overhead line clearances from buildings and surrounding infrastructure. The exact location of the towers will be determined during the final stages of the power line design process.

3.2 Visual Implications

Power line towers and associated structures are very large objects and thus highly visible. According to the project description as outlined above, the maximum tower height envisaged for the proposed power line is 40 m (equivalent in height to a thirteen-storey building). Although a tower / pylon structure would be less visible than a building, the height of the structure means that the tower would still typically be visible from a considerable distance. Visibility would be increased by the fact that the proposed power line comprises a series of towers typically spaced approximately 200 m to 300 m apart in a linear alignment.

The degree of visibility of an object informs the level and intensity of the visual impact, but other factors also influence the nature of the visual impact. The landscape and aesthetic context of the environment in which the object is placed, as well as the perception of the viewer are also important factors. In the context of a power line, the type of tower used as well as the degree to which the towers would impinge upon or obscure a view is also a factor that will influence the experience of the visual impacts.

As described above, power lines are not features of the natural environment but are rather representative of human (anthropogenic) alteration of the natural environment. Thus, power lines could be perceived to be highly incongruous in the context of a largely natural landscape. The height and linear nature of the proposed power line will exacerbate this incongruity, as the towers may impinge on views within the landscape. In addition, the practice of clearing any taller vegetation from areas within the power line servitude can increase the visibility and incongruity of the structure. In a largely natural, bushier setting, vegetation clearance will cause fragmentation of the natural vegetation cover, thus making the proposed power line more visible and drawing the viewer's attention.

The viewer's / receptor's perception of the development is also very important as certain receptors may not consider the development of a power line to be a negative visual impact. The scenic / aesthetic value of an area and the prevalent land use practices also tend to affect people's perception of whether a power line is an unwelcome intrusion, and this in turn will determine the sensitivity of the identified receptors to the proposed development.

Power lines are often perceived as a visual intrusion in areas where value is placed on the scenic or aesthetic character of the area, and where activities, which are based upon the enjoyment of, or exposure to, the scenic or aesthetic features of the area are practiced. Sensitivity to visual impacts is typically most pronounced in areas set aside for conservation of the natural environment (such as protected natural areas or conservancies), or in areas where the natural character or scenic beauty of the area attracts visitors (tourists). Residents and visitors to these areas may perceive power lines and associated infrastructure to be an unwelcome intrusion that would degrade the natural character and scenic beauty of the area, and which could potentially even compromise the practicing of tourism activities in the area.

Conversely, the presence of other anthropogenic objects associated with the built environment may influence the perception of whether a power line is a visual impact. Where industrial-type built-form exists, (such as renewable energy facilities, mining activities, roads, railways and other power lines and substations), the visual environment could be considered to be "degraded" and thus the introduction of a new power line and associated infrastructure into this setting may be considered to be less of a visual impact than if there was no existing built infrastructure visible.

In this context therefore, the visual contrast associated with the introduction of new power line development will be lessened due to the presence of the heavily transformed urban / peri-urban landscape associated

with the Secunda urban area and the Sasol Secunda synthetic fuel plant to the north-west as well as mining activity and existing power line and road infrastructure.

Other factors, as listed below, can also affect the nature and intensity of a potential visual impact associated with a power line:

- The location of the development in the landform setting – i.e. in a valley bottom or on a ridge top. In the latter example the development would be much more visible and would "break" the horizon;
- The presence of macro- or micro-topographical features, built form or vegetation that would screen views of the development from a receptor location;
- The presence of existing, similar features in the area and their alignment in relation to the proposed new development; and
- Temporary factors such as weather conditions (presence of haze, rainfall or heavy mist) which would affect visibility.

In this instance, the proposed EGI is intended to serve the proposed Vhuvhili SEF and as such will only be built if the SEF is developed. The proposed EGI is therefore likely to be perceived to be part of the greater SEF development and the visual impact will be relatively minor when compared to the visual impact associated with the SEF as a whole.

4. Baseline Environmental Description

4.1 General Description

4.1.1 Site Locality

The proposed Vhuvhili EGI project is located approximately 7 km south-east of Secunda in the Govan Mbeki Local Municipality in Mpumalanga Province (**Map 1 in Appendix F**).

The proposed 132 kV power line route alternatives are shown in **Map 2** in **Appendix F**.

4.1.2 Topography

The broader area surrounding the proposed Vhuvhili EGI is characterised by a mix of flat to undulating plains (**Figure 1** and **Figure 2**) intersected by shallow river valleys (**Figure 3**). Areas of slightly higher elevation occur in the central and north-eastern sectors of the study area. Slopes across the study area are relatively gentle to moderate, with steeper slopes being largely associated with the more incised river valleys.

Figure 1: Flat to slightly undulating plains in the north-eastern portion of the study area

Figure 2: View north-east along District Road D823 showing slightly undulating terrain in the south-western sector of the study area

Figure 3: View of the Klipspruit River from District Road D823 in the northern sector of the study area.

The topography and slope of the study area are respectively illustrated in **Map 3 and Map 4 in Appendix F**.

Visual implications

The nature of the topography and the position of the viewer within the landscape are strong factors influencing the types of vistas typically present. Wider vistas will typically be experienced from higher-lying areas or hilltops and as such the view will be directly dependent on whether the viewer is within a valley bottom or in an area of higher elevation. Importantly in the context of this study, the same is true of objects placed at different elevations and within different landscape settings. Objects placed on high-elevation slopes or ridge tops would be highly visible, while those placed in valleys or enclosed plateaus would be far less visible.

Bearing in mind that power line towers are large structures (potentially up to 40 m in height), these structures could potentially be visible from an extensive area around the grid connection infrastructure. GIS technology was used to undertake a preliminary visibility analysis for the proposed power line route alignments. This analysis was based on points at 250 m intervals along the centre line of the corridor alternatives, and assumes a tower height of 40 m. The resulting viewshed indicates the geographical area from where the proposed power lines would theoretically be visible, i.e. the zone of visual influence (or viewshed). This analysis is based entirely on topography (relative elevation and aspect) and does not take into account any existing vegetation cover or built infrastructure which may screen views of the proposed development. In addition, detailed topographic data was not available for the broader study area and as such the viewshed analysis does not take into account any localised topographic variations which may constrain views. This analysis should therefore be seen as a conceptual representation or a worst-case scenario.

The resulting viewshed, as shown in **Map 5 in Appendix F**, indicates that sections of the proposed power line would be visible from many parts of the study area, although the undulating topography has resulted in some areas falling outside the combined viewshed for the proposed power line.

4.1.3 Vegetation

According to Mucina and Rutherford (2006), the study area is dominated by the Soweto Highveld Grassland vegetation type (**Map 6 in Appendix F**) which is characterised by short to medium-high dense, tufted grassland (**Figure 4**).

Figure 4: Grassland visible in the central sector of the study area.

Much of the natural vegetation cover has however been partly removed or transformed by cultivation and clusters of tall exotic trees scattered across the study area and around farmsteads (**Figure 5**).

Figure 5: Typical example of tall trees planted around a farmhouse within the study area.

Visual Implications

Although the proposed development will contrast with the predominant vegetative cover in the area, scattered trees and shrubs will provide some degree of screening thus potentially reducing impacts experienced by the potentially sensitive receptors in the area. In addition, tall trees planted around farmhouses in the area will restrict views of the power line from these receptor locations.

4.1.4 Land Use

According to the South African National Land Cover dataset (Geoterraimage 2020), much of the visual assessment area is classified as “Cultivated Land” interspersed with significant areas of “Grassland”. Small tracts of forested land and numerous water bodies are scattered throughout the study area (**Map 7** in **Appendix F**).

Commercial agriculture, mainly maize cultivation, is the dominant activity in the study area (**Figure 6**) with some limited livestock and game farming. There are multiple farm portions in the study area, resulting in a relatively moderate density of rural settlement with many scattered farmsteads in evidence. Built form in much of the study area comprises farmsteads, ancillary farm buildings and workers’ dwellings, gravel access roads, power and telephone lines and fences.

Figure 6: Maize cultivation in the study area

High levels of human influence are however visible in the northern and north-western sector of the study area. The town of Secunda (**Figure 7**) lies immediately north-west of the study area and the peri-urban areas extending into the study area are dominated by industrial / mining activity (**Figure 8**). In addition, the Sasol Secunda synthetic fuel plant (**Figure 9**) is located on the western boundary of the study area, and this facility together with infrastructure related to the supply and storage of coal and electrical infrastructure (**Figure 10**) has resulted in significant transformation in the landscape. Associated with the Sasol plant is the nearby Riaan Rademan Training Academy (**Figure 11**) and adjacent electrical substation (**Figure 12**), contributing further to the overall transformation of the landscape in this area.

Figure 7: View southwards from Secunda towards the Sasol Fuel Plant

Figure 8: Mining /Quarrying Activity on the periphery of Secunda

Figure 9: Sasol synthetic fuel plant located on the western boundary of the study area.

Figure 10: Infrastructure associated with the Sasol Plant

Figure 11: Riaan Rademan Training Academy

Figure 12: Substation and coal conveyor adjacent to the Riaan Rademan Training Academy (Source: Google Earth 2022)

To the south-west of the Vhuvhili combined grid assessment corridor is the small town of Charl Cilliers (**Figure 13**) forming a significant area of transformation in the landscape.

Figure 13: Approach (from the south on the R546) to the town of Charl Cilliers.

Other evidence of human influence in the area includes mining activity in the central sector of the study area (Bosjesspruit Mine) with some associated service industry as well as road, rail, telecommunications and electricity infrastructure.

Visual Implications

The predominance of cultivated land in conjunction with the remaining natural grassland cover across much of the study area would give the viewer the general impression of a largely rural / pastoral setting. Thus,

the proposed Vhuvhili power line development could potentially alter the visual character and contrast with the typical land use and/or pattern and form of human elements present across the development site and across much of the study area.

In this instance however, high levels of human transformation and visual degradation are evident in the north-west where urban/industrial, peri-urban development and mining activity dominate the landscape on the periphery of the study area. In addition, roads, railways and coal conveyors have further degraded the visual character of the study area to some degree. In addition, the presence of an extensive network of high voltage power lines in the study area will reduce the level of contrast of the proposed development.

4.1.5 Visual Character

The physical and land use-related characteristics of the study area as described above contribute to its overall visual character. Visual character largely depends on the level of change or transformation from a natural baseline in which there is little evidence of human transformation of the landscape. Varying degrees of human transformation of a landscape would engender differing visual characteristics to that landscape, with a highly modified urban or industrial landscape being at the opposite end of the scale to a largely natural, undisturbed landscape. Visual character is also influenced by the presence of built infrastructure including buildings, roads and other objects such as telephone or electrical infrastructure. The visual character of an area largely determines the sense of place relevant to the area. This is the unique quality or character of a place, whether natural, rural or urban which results in a uniqueness, distinctiveness or strong identity.

The predominant land use in the area (maize cultivation) has significantly transformed the natural landscape across much of the study area. In addition, the landscape becomes progressively more transformed towards the northern and north-western boundary of the study area where the town of Secunda, the Sasol Secunda fuel plant and mining activities have resulted in a high degree of visual degradation. Further transformation is evident to the south-west where the town of Charl Cilliers straddles the R546 Main Road. The more industrial and urbanised character of the landscape is an important factor in this context, as the introduction of the proposed power line would result in less visual contrast where other anthropogenic elements are already present, especially where the scale of those elements is similar to that of the proposed development.

The scenic quality of the landscape is also an important factor that contributes to the visual character or inherent sense of place. Visual appeal is often associated with unique natural features or distinct variations in form. As such, the pastoral landscape and rolling hills in parts of the study area are important features that could increase the visual appeal and visual interest in the area.

Cultural landscapes are becoming increasingly important concepts in terms of the preservation and management of rural and urban settings across the world. The concept of ‘cultural landscape’ is a way of looking at a place that focuses on the relationship between human activity and the biophysical environment (Breedlove, 2002). In this instance, the rural / pastoral landscape represents how the environment has shaped the predominant land use and economic activity practiced in the area, as well as the patterns of human habitation and interaction.

Considering this, it is important to assess whether the introduction of a power line and associated infrastructure into the study area would be a degrading factor in the context of the prevailing character of the cultural landscape. Broadly speaking, visual impacts on the cultural landscape in the area around the proposed development would be reduced by the fact that the visual character in much of the area has been significantly transformed and degraded by urban/industrial, mining and infrastructural development.

4.1.6 Visual Absorption Capacity

Visual absorption capacity is the ability of the landscape to absorb a new development without any significant change in the visual character and quality of the landscape. The level of absorption capacity is largely based on the physical characteristics of the landscape (topography and vegetation cover) and the level of transformation present in the landscape.

Although the undulating topography in the study area and the areas of cultivation and grassland would reduce the visual absorption capacity, this would be offset considerably by the presence of urban/industrial, mining and infrastructural development in the vicinity of the proposed Vhuvhili EGI project.

Visual absorption capacity in the study area is therefore rated as **MODERATE**.

4.1.7 Sensitive Visual Receptor Locations

A sensitive visual receptor location is defined as a location from where receptors would potentially be impacted by a proposed development. Adverse impacts often arise where a new development is seen as an intrusion that alters the visual character of the area and affects the 'sense of place'. The degree of visual impact experienced will however vary from one receptor to another, depending on the viewer's perception.

A distinction must be made between a receptor location and a sensitive receptor location. A receptor location is a site from where the proposed development may be visible, but the receptor may not necessarily be adversely affected by any visual intrusion associated with the development. Less sensitive receptor locations include locations of commercial activities and certain movement corridors, such as roads that are not tourism routes. More sensitive receptor locations typically include sites that are likely to be adversely affected by the visual intrusion of the proposed development. They include tourism facilities, scenic sites and residential dwellings in natural settings.

The identification of sensitive receptors is typically based on a number of factors which include:

- the visual character of the area, especially taking into account visually scenic areas and areas of visual sensitivity;
- the presence of leisure-based (especially nature-based) tourism in an area;
- the presence of sites / routes that are valued for their scenic quality and sense of place;
- the presence of homesteads / farmsteads in a largely natural setting where the development may influence the typical character of their views; and
- feedback from I&APs, as raised during the public participation process conducted as part of the Environmental Assessment study (BA in this instance).

As the visibility of the development would diminish exponentially over distance, receptors that are closer to the development would experience greater adverse visual impacts than those located further away. Zones of visual impact were therefore delineated based on distance bands measured from the edge of the Vhuvhili EGI combined assessment corridor. Based on the height and scale of the project, the distance intervals chosen for these zones of visual impact are as follows:

- 0 – 500 m (high impact zone)
- 500 m – 2 km (moderate impact zone)
- 2 km – 5 km (low impact zone)

The degree of visual impact experienced will vary from one receptor location to another, as it is largely based on the viewer's perception. Factors influencing the degree of visual impact experienced by the viewer include the following:

- Value placed by the viewer on the natural scenic characteristics of the area;
- The viewer's sentiments toward the proposed development. These may be positive (a symbol of progression toward a less polluted future) or negative (foreign objects degrading the natural landscape); and
- Degree to which the viewer will accept a change in the typical character of the surrounding area.

A preliminary desktop assessment did not identify any formal protected areas or leisure-based tourism activities in the study area for the proposed Vhuvhili EGI. The desktop assessment did however identify multiple farmsteads and residences within the study area. While these homesteads and residences could be considered to be receptors, not all of them would be sensitive to the proposed development and given the number of farmsteads, it was not possible to confirm the presence of receptors at all the identified locations. Notwithstanding these limitations, all the identified receptor locations were assessed as part of the VIA as they are still regarded as being potentially sensitive to the visual impacts associated with the proposed development. ***None of these receptor locations was found to be sensitive.***

Although most of the receptor locations are believed to be farmsteads, they are regarded as ***potentially*** sensitive visual receptors as the proposed development could potentially alter natural or semi-natural vistas experienced from these locations. At this stage however, local sentiments towards the proposed development are not known.

It was noted that residential areas within the town of Charl Cilliers are located within the Vhuvhili EGI study area. While these could be considered as receptors, they are not considered to be sensitive due to their location within built-up, heavily transformed areas. Residential areas within the town of Secunda are outside the study area.

In many cases, roads along which people travel, are regarded as sensitive receptors. The primary thoroughfare in the study area is the R546 Main Road which traverses the eastern sector of the study area, linking Standerton to the south with the N17 National Route and Kinross to the North. The section of this road traversing the study area is not however considered part of a designated scenic route, although the route is an important link and is likely to be utilised, to some extent, by tourists en route to other parts of Mpumalanga Province. As a result, it is considered to be a potentially sensitive receptor road – i.e, a road being used by motorists who may object to the potential visual intrusion of the proposed new power line infrastructure.

The other thoroughfares in the study area are primarily used as local access roads and do not form part of any scenic tourist routes. These roads are not specifically valued or utilised for their scenic or tourism potential and are therefore not regarded as visually sensitive.

The potentially sensitive visual receptor locations identified within the study area for the proposed Vhuvhili EGI are indicated in **Map 8 in Appendix F**.

4.1.8 Receptor Impact Rating

In order to assess the impact of the proposed EGI on the identified potentially sensitive receptor locations, a matrix has been developed that takes into account the factors listed below:

- Distance of a receptor location away from the proposed development (zones of visual impact).
- Presence of screening elements (topography, vegetation etc.).
- Visual contrast of the development with the landscape pattern and form.

These are considered to be the most important factors when assessing the visual impact of a proposed development on a potentially sensitive receptor location in this context. It should be noted that this rating matrix is a relatively simplified way of assigning a likely representative visual impact, which allows a number of factors to be considered. Experiencing visual impacts is however a complex and qualitative phenomenon and is thus difficult to quantify accurately. The matrix should therefore be seen as a representation of the likely visual impact at a receptor location. Part of its limitation lies in the quantitative assessment of what is largely a qualitative or subjective impact.

As described above, distance of the viewer / receptor location from the development is an important factor in the context of experiencing visual impacts which will have a strong bearing on mitigating the potential visual impact. A high impact rating has been assigned to receptor locations that are located within 500 m of the proposed EGI combined assessment corridor. Beyond 5 km, the impact of the power line infrastructure diminishes considerably, as the development would appear to merge with the elements on the horizon.

The presence of screening elements is an equally important factor in this context. Screening elements can be vegetation, buildings, and topographic features. For example, a grove of trees, a series of low hills or a mine dump located between a receptor location and an object could completely shield the object from the receptor. As such, where views of the proposed development are completely screened, the receptor has been assigned an overriding negligible impact rating, as the development would not impose any impact on the receptor.

The visual contrast of a development refers to the degree to which the proposed development would be congruent with the surrounding environment. This is based on whether or not the development would conform to the land use, settlement density, structural scale, form and pattern of natural elements that define the structure of the surrounding landscape. Visual compatibility is an important factor to be considered when assessing the impact of the development on visual receptors within a specific context. A development that is incongruent with the surrounding area could have a significant visual impact on visual receptors as it may change the visual character of the landscape.

In order to determine the likely visual compatibility of the proposed development, the study area was classified into the following zones of visual contrast:

- **High –** undeveloped / natural / rural areas.
- **Moderate –**
  - areas within 500m of existing power lines (>=88kV);
  - areas within 500m of main roads;
  - areas within 500m of railway infrastructure;
  - areas within 500m of cultivated land, commercial forest plantations and urban smallholdings.
- **Low** –
  - areas within 500m of urban / industrial / built-up areas;
  - areas within 500m of mines / quarries etc;
  - areas within 1km of the Sasol Secunda fuel plant;

The receptor impact rating matrix returns a score (**Table 2)** which in turn determines the visual impact rating assigned to each receptor location.

Table 2: Rating Scores

Rating	Overall Score

High Visual Impact	8-9
Moderate Visual Impact	5-7
Low Visual Impact	3-4
Negligible Visual Impact	(overriding factor)

An explanation of the matrix is provided in **Table 3** below.

Table 3: Visual assessment matrix used to rate the impact of the proposed development on potentially sensitive receptors

VISUAL FACTOR	VISUAL IMPACT RATING			
	HIGH	**MODERATE**	**LOW**	**OVERRIDING FACTOR: NEGLIGIBLE**
Distance of receptor away from proposed development	<= 500 m **Score 3**	500 m - 2 km **Score 2**	2 km - 5 km **Score 1**	>5 km
Presence of screening factors	No / almost no screening factors – development highly visible **Score 3**	Screening factors partially obscure the development **Score 2**	Screening factors obscure most of the development **Score 1**	Screening factors completely block any views towards the development, i.e. the development is not within the viewshed
Visual Contrast	**High contrast** with the pattern and form of the natural landscape elements (vegetation and land form), typical land use and/or human elements (infrastructural form) **Score 3**	**Moderate contrast** with the pattern and form of the natural landscape elements (vegetation and land form), typical land use and/or human elements (infrastructural form) **Score 2**	**Corresponds** with the pattern and form of the natural landscape elements (vegetation and land form), typical land use and/or human elements (infrastructural form) **Score 1**	

The full impact rating for the identified receptors within 5 kms of the Vhuvhili EGI combined assessment corridor is provided in **Appendix E**. However, a summary of the overall visual impact is presented in **Table** 4.

Table 4: Summary receptor impact rating for Vhuvhili EGI

OVERALL IMPACT RATING	NUMBER OF SENSITIVE RECEPTORS	NUMBER OF POTENTIALLY SENSITIVE RECEPTORS
HIGH	0	2
MODERATE	0	30
LOW	0	5
TOTAL INCLUDED IN ASSESSMENT	**0**	**37**
OUTSIDE VIEWSHED	*0*	*3*

The table above shows that a total of 40 receptors were identified within 5 kms of the Vhuvhili EGI combined assessment corridor, three (3) of which are outside the viewshed for the EGI. None of the remaining receptors were found to be *sensitive*. As previously mentioned, most of the locations identified are assumed to be farmsteads and although these residences could be considered to be receptors, given the degree of transformation in the landscape, not all of them would be sensitive to the proposed development.

Of the remaining thirty-seven (37) potentially sensitive receptor locations, two (2) are located within the Vhuvhili SEF project area and it has been assumed that the relevant landowners are involved in the project. As such these landowners are not expected to perceive the proposed development in a negative light.

Only two (2) potentially sensitive receptors (VR27 and VR75) are expected to experience high levels of visual impact. Impacts on these receptors are likely to be reduced however due to the fact that both of these receptor locations are located within the project area for the Mukondeleli Wind Energy Facility (WEF) and the landowners have been engaged in the WEF EIA process Thirty (30) of the remaining receptor locations are expected to experience moderate levels of impact as a result of the EGI development, while the remaining five (5) would only experience low levels of visual impact.

As stated above, the R546 Main Road could be considered a potentially sensitive receptor road. Although elements of the EGI development are expected to be visible from sections of the R546, the likely visual impacts of the proposed development on motorists utilising this route would be reduced by the level of transformation and landscape degradation visible from the road and also by the presence of high voltage power lines adjacent to the route.

In light of this, visual impacts affecting the R546 are rated as **low**.

4.1.9 Night-Time Visual Baseline

The visual impact of lighting on the nightscape is largely dependent on the existing lighting present in the surrounding area at night. The night scene in areas where there are numerous light sources will be visually degraded by the existing light pollution and therefore additional light sources are unlikely to have a significant impact on the nightscape. In contrast, introducing new light sources into a relatively dark night sky will impact on the visual quality of the area at night. It is thus important to identify a night-time visual baseline before exploring the potential visual impact of the proposed development at night.

The town of Secunda, located just outside the north-western boundary of the Vhuvhili EGI study area, together with the rural town of Charl Cilliers to the south, are the main sources of light within the broader area. The towns, in conjunction with the Sasol Secunda fuel plant and mining activities are expected to have a significant impact on the night scene in the study area.

Other light sources in the broader area would largely emanate from the many farmsteads dotted across the study area and also from vehicles travelling along the R546 main road and local access roads that pass through the site. Overall, the visual character of the night environment within the study area is considered to be moderately 'polluted' and will therefore **not** be regarded as pristine.

However, power lines and associated towers or pylons are not usually lit up at night and, thus the proposed development is not expected to result in any additional light pollution.

4.1.10 Existing and Proposed Renewable Energy Developments

Although it is important to assess the visual impacts of the proposed Vhuvhili EGI specifically, it is equally important to assess the cumulative visual impact that could materialise as a result of this development. Cumulative impacts occur where existing or planned developments, in conjunction with the proposed development, result in significant incremental changes in the broader study area. In this instance, such developments would include:

- existing mining / quarrying activities;
- existing industrial development including the Sasol Secunda synthetic fuel plant; and
- other existing / proposed renewable energy facilities within a 30km radius.

Existing mining / quarrying and industrial development have already resulted in large scale visual impacts, especially to the north and north-west of the Vhuvhili EGI study area. These developments have significantly altered the sense of place and visual character in the broader region.

Renewable Energy Facilities (REFs) have the potential to cause large-scale visual impacts, and although the level of transformation already present in the landscape will reduce the contrast and overall visual impact of the new development, the incremental change in the landscape will be increased and the visual impacts on surrounding visual receptors would be exacerbated. The South African Renewable Energy EIA Application Database from DFFE (REEA_OR_2022_Q2) records only one approved REF within 30kms of the proposed Vhuvhili EGI project area, this being a Solar PV facility located at the Tutuka Power Station. This project is however some 20 km south of the Vhuvhili EGI project area, and it is not anticipated that this development will result in any significant cumulative impacts affecting the landscape or the visual receptors within the visual assessment zone for the Vhuvhili EGI.

However, it is known that the Vhuvhili EGI project forms part of a larger Renewable Energy cluster of projects proposed in the greater Secunda area. This complex, including wind (Impumelelo and Mukondeleli WEFs) and solar facilities (Vhuvhili SEF) as well as associated grid connection infrastructure, will affect a large portion of the study area.

From a visual perspective, the concentration of REFs in close proximity to existing mining and industrial development as proposed will further change the visual character of the area on the periphery of the Secunda / Trichardt urban area and alter the inherent sense of place, extending an increasingly industrial character into the broader area, and resulting in significant cumulative impacts. It is however anticipated that these impacts could be mitigated to acceptable levels with the implementation of the recommended mitigation measures. In addition, it is possible that these developments in close proximity to each other could be seen as one large REFrather than several separate developments. Although this will not

necessarily reduce impacts on the visual character of the area, it could potentially reduce the cumulative impacts on the landscape.

4.2 Project Specific Description

As the focus of the VIA is largely on the potential impacts of the proposed development on the landscape and the receptors ***in the surrounding area***, the baseline information for the Vhuvhili EGI project area is much the same as that for the broader area. The topography within the project areas will however influence the level of visibility of the proposed development and the prevalent land cover will determine the level of contrast that will be associated with the proposed development. Accordingly, project specific baseline information has only been examined in respect of topography / visibility and land use / land cover.

4.2.1 Topography

The project area for Vhuvhili EGI is characterised by areas of slightly higher elevations intersected by shallow river valleys. Although the proposed power line route alignment will traverse some prominent ridges and areas of higher elevation, it is not anticipated that there will be significant impact on the skyline. In addition, topographic variations in the surrounding area are sufficient to limit views of the new infrastructure from some parts of the study area, although across the remainder of the study area there would be little topographic shielding to reduce visibility from many of the locally occurring receptor locations.

4.2.2 Land Use

The study area is largely characterised by cultivated land interspersed with significant areas of grassland. Much of the EGI assessment corridor traverses areas of cultivation and as such, the proposed development could potentially alter the visual character and contrast significantly with the typical land use present within the corridor. The level of contrast would however be reduced by the presence of nearby existing high voltage power lines and road infrastructure.

4.3 Identification of Environmental Sensitivities

4.3.1 Sensitivities identified by the National Web-Based Environmental Screening Tool

In assessing visual sensitivity, the proposed development was examined in relation to the Landscape Theme of the National Environmental Screening Tool to determine the relative landscape sensitivity for the development of grid connection infrastructure. The tool does not however identify any landscape sensitivities in respect of the proposed power line.

4.3.2 Outcome of the Specialist Sensitivity Analysis and Verification

Visual sensitivity can be defined as the inherent sensitivity of an area to potential visual impacts associated with a proposed development. It is based on the physical characteristics of the area (i.e., topography, landform and land cover), the spatial distribution of potential receptors, and the likely value judgements of these receptors towards a new development (Oberholzer: 2005). A viewer's perception is usually based on the perceived aesthetic appeal of an area and on the presence of economic activities (such as recreational or nature-based tourism) which may be based on this aesthetic appeal.

In order to assess the visual sensitivity of the receiving environment, a matrix has been developed based on the characteristics of the receiving environment which, according to the Guidelines for Involving Visual and Aesthetic Specialists in the EIA Processes, indicate that visibility and aesthetics are likely to be 'key issues' (Oberholzer: 2005).

Based on the criteria in the matrix (**Table 5**), the visual sensitivity of the area is broken up into a number of categories, as described below:

i. **High** - The introduction of a new development such as a power line is likely to be perceived negatively by receptors in this area; it would be considered to be a visual intrusion and may elicit opposition from these receptors.
ii. **Moderate** – Receptors are present, but due to the nature of the existing visual character of the area and likely value judgements of receptors, there would be limited negative perception towards the new development as a source of visual impact.
iii. **Low** - The introduction of a new development would not be perceived to be negative, there would be little opposition or negative perception towards it.

The table below outlines the factors used to rate the visual sensitivity of the study area. The ratings are specific to the visual context of the receiving environment within the study area.

Table 5: Environmental factors used to define visual sensitivity of the study area

FACTORS	DESCRIPTION	RATING									
		1	2	3	4	5	6	7	8	9	10
Pristine / natural / scenic character of the environment	Study area is largely pastoral with some areas of scenic value, although some areas are significantly transformed.										
Presence of sensitive visual receptors	No sensitive receptors have been identified in the study area, although *potentially* sensitive receptors are present.										
Aesthetic sense of place / visual character	Visual character is a typical rural / pastoral landscape, although significantly transformed by urban / industrial development and mining activity.										
Irreplaceability / uniqueness / scarcity value	Few areas of scenic value were found within the study area.										
Cultural or symbolic meaning	Much of the area is a typical rural / pastoral landscape.										
Protected / conservation areas in the study area	No protected or conservation areas were identified in the study area.										
Sites of special interest present in the study area	No sites of special interest were identified in the study area.										
Economic dependency on scenic quality	No tourism/leisure-based facilities were found in the area										
International / regional / local status of the environment	Study area is typical of rural / pastoral landscapes, although significantly transformed by urban / industrial development and mining activity.										
**Scenic quality under threat / at risk of change	Introduction of new power lines will alter the visual character and sense of place, giving rise to significant cumulative impacts										

**Any rating above '5' for this specific aspect will trigger the need to undertake an assessment of cumulative visual impacts.

Low				Moderate					High
10	20	30	40	50	60	70	80	90	100

Based on the above factors, the total score for the study area is 28, which according to the scale above, would result in the area being rated as having a **LOW** visual sensitivity. It should be stressed however that the concept of visual sensitivity has been utilised indicatively to provide a broad-scale indication of whether the landscape is likely to be sensitive to visual impacts and is based on the physical characteristics of the study area, economic activities and land use that predominates. An important factor contributing to the visual sensitivity of an area is the presence, or absence of visual receptors that may value the aesthetic quality of the landscape and depend on it to produce revenue and create jobs and this has been factored into the sensitivity rating above. The presence of visual receptors is examined in more detail in **Section 4.1.7** of this report. However, no formal protected areas, leisure-based tourism activities or sensitive receptor locations were identified in the study area.

As part of the visual sensitivity assessment, a screening exercise was undertaken with the aim of indicating any areas that should be precluded from the proposed development footprint. From a visual perspective, these are areas where the establishment of power lines would result in the greatest probability of visual impacts on sensitive or potentially sensitive visual receptors.

Using GIS-based visibility analysis, it was possible to determine which sectors of the combined assessment corridor would be visible to the highest numbers of receptors in the study area. This analysis confirmed that areas of higher elevation are visible to greater numbers of potentially sensitive receptors. Hence the visual prominence of a tall structure such as a power line tower would be exacerbated if located on any ridges or a relatively higher-lying plateaus. It is noted that the proposed power line route alignment traverses some ridges and areas of relatively higher elevation that could be seen as areas of potentially high visual sensitivity. **However, the presence of existing power lines and road infrastructure as well as the fact that the study area as a whole is rated as having a low visual sensitivity would reduce the sensitivity rating of the ridges to "Medium".**

In determining visual sensitivity, consideration must be given to the direct visual impact of the power lines on any farmsteads or receptors located in, or within 500m of, the combined assessment corridor. A total of six (6) receptors were found to be within 500m of the assessment corridor, although three (3) of these are located within the Mukondeleli WEF project area. Accordingly, the landowners at these locations are not expected to perceive the EGI development in a negative light.

A 500m zone of *potential visual sensitivity* has been delineated around the remaining three (3) farmsteads that are located on Portions 2, 3 and 10 of the Farm Vlakspruit No 292 IS (**Map 9** in **Appendix F**). At this stage however, the sentiments of the respective landowners are not known and the zones of potential sensitivity are **not considered "no go" areas**, but rather should be viewed as zones where visual impacts may occur.

4.3.3 Sensitivity Analysis Summary Statement

A site sensitivity verification (**Appendix C**) has been conducted in respect of the VIA for the proposed Vhuvhili EGI based on a desktop-level assessment supported by field-based observation. This exercise has verified the areas identified as visually sensitive during the course of the specialist VIA.

5. Alternative Development Footprints

Specialists have been requested to assess the following power line routing alternatives as shown on **Map 2** in **Appendix F**:

Proposed alternatives should the Vhuvhili on-site substation hub A-B (Preferred) be built:

- Alternative 1 will extend from the on-site substation hub (A-B) at the proposed Vhuvhili SEF site to switching station E at the proposed Mukondeleli WEF site.

- Alternative 2 will extend from the on-site substation hub (A-B) at the proposed Vhuvhili SEF site to switching station F at the proposed Mukondeleli WEF site.

Proposed alternatives should the Vhuvhili on-site substation hub C-D (Alternative 2) be built:

- Alternative 3 will extend from the on-site substation hub (C-D) at the proposed Vhuvhili SEF site to switching station E at the proposed Mukondeleli WEF site.
- Alternative 4 will extend from the on-site substation hub (C-D) at the proposed Vhuvhili SEF site to switching station F at the proposed Mukondeleli WEF site.

A comparative assessment has been undertaken in respect of the power line route alternatives to determine which of the alternatives would be preferred from a visual perspective. Preference ratings for each alternative have been based on the following factors:

- The location of each alternative in relation to areas of high elevation, especially ridges, koppies or hills;
- The location of each alternative in relation to sensitive visual receptor locations; and
- The location of each alternative in relation to areas of natural vegetation (clearing site for the development increases the visibility).

The alternatives are rated as preferred; favourable, least-preferred or no-preference described in Table 10 below.

Table 6: Description of preference ratings applied to alternatives

PREFERRED	The alternative will result in a low impact / reduce the impact
FAVOURABLE	The impact will be relatively insignificant
LEAST PREFERRED	The alternative will result in a high impact / increase the impact
NO PREFERENCE	The alternative will result in equal impacts

Detailed comparative assessment tables are provided in **Appendix G**. Summaries of the findings are however provided below.

It should be noted that all four power line route alternatives follow the same alignment for most of their length. However, no fatal flaws were identified for any of the proposed power line route alternatives. No preference was determined for any of the corridor alternatives and all four alternatives were found to be **favourable**.

6. Issues, Risks and Impacts

6.1 Identification of key issues

6.1.1 Key Issues Identified

The potential visual issues / impacts identified during the BA process for the proposed EGI project include:

- Potential visual intrusion resulting from vehicles and equipment during construction and decommissioning phases;
- Potential impacts of increased dust emissions from construction / decommissioning activities and related traffic during construction and decommissioning phases;
- Potential visual scarring of the landscape as a result of site clearance and earthworks during construction;

- Potential alteration of the visual character of the area during operation;
- Potential visual intrusion resulting from power lines located on ridge lines and higher plateaus;
- Potential alteration of the night-time visual environment as a result operational and security lighting associated with the development;
- Potential visual intrusion of any remaining electrical infrastructure on the site during decommissioning; and
- Combined visual impacts (i.e., cumulative visual impacts) from the associated power lines and electrical infrastructure to support several renewable energy facilities in the broader area could potentially alter the sense of place and visual character of the area.

6.2 Identification of Potential Impacts/Risks

Potential visual issues / impacts identified during the VIA resulting from the proposed Vhuvhili power line and associated infrastructure, together with possible mitigation measures are outlined below.

6.2.1 Construction Phase: Potential Impact 1

- Potential alteration of the visual character and sense of place resulting from construction activities.
- Potential visual impacts of construction affecting receptors in the study area, including:
    - visual intrusion resulting from large construction vehicles and equipment;
    - visual effect of construction laydown areas and material stockpiles;
    - impacts of increased dust emissions from construction activities and related traffic;
    - visual scarring of the landscape as a result of site clearance and earthworks; and
    - visual pollution resulting from littering on the construction site.

6.2.2 Operational Phase: Potential Impact 2:

- Potential alteration of the visual character and sense of place;
- Potential visual impacts affecting receptors in the study area, including:
    - visual intrusion resulting from the presence of power lines, particularly in more natural undisturbed settings;
    - impacts of increased dust emissions from maintenance vehicles accessing the site via gravel roads; and
    - visual scarring of the landscape as a result of site clearance and earthworks.

6.2.3 Decommissioning Phase: Impact 3

- Potential visual impacts of decommissioning affecting receptors in the study area, including:
    - visual intrusion resulting from vehicles and equipment involved in the decommissioning process;
    - impacts of increased dust emissions resulting from decommissioning activities and related traffic;
    - visual scarring of the landscape as a result of decommissioning activities; and
    - visual intrusion of any remaining infrastructure on the site.

6.2.4 Cumulative Impacts: Impact 4

- Combined visual impacts from several REFs in the broader area could potentially alter the sense of place and visual character of the area; and
- Combined visual impacts from several REFs in the broader area could potentially exacerbate visual impacts on visual receptors.

7. Impact Assessment

7.1 Potential Impacts during the Construction Phase

Potential visual impacts identified during the Construction Phase of the project are listed below.

- Large construction vehicles and equipment will alter the natural character of the study area and expose visual receptors to impacts associated with construction.
- Construction activities may be perceived as an unwelcome visual intrusion, particularly in more natural undisturbed settings.
- Dust emissions and dust plumes from increased traffic on the gravel roads serving the construction site may evoke negative sentiments from surrounding viewers.
- Surface disturbance during construction would expose bare soil (scarring) which could visually contrast with the surrounding environment.
- Temporary stockpiling of soil during construction may alter the flat landscape. Wind blowing over these disturbed areas could result in dust which would have a visual impact.
- Litter on the construction site may result in visual pollution.

Table 7 below presents the detailed impact ratings associated with the construction of the Vhuvhili EGI, project together with the recommended mitigation measures.

Table 7: Direct Visual Impacts during Construction

Impact	***Impact Criteria***		***Significance and Ranking (Pre-Mitigation)***	***Potential mitigation measures***	***Significance and Ranking (Post-Mitigation)***	***Confidence Level***
CONSTRUCTION PHASE (Direct Impacts)						
Impact 1 ▪ Large construction vehicles and equipment will alter the natural character of the study area and expose visual receptors to impacts associated with construction. ▪ Construction activities may be perceived as an unwelcome visual intrusion, particularly in more natural undisturbed settings. ▪ Dust emissions and dust plumes from increased traffic on the gravel roads serving the construction site may evoke negative sentiments from surrounding viewers. ▪ Surface disturbance during construction would expose bare soil (scarring) which could visually contrast with the surrounding environment. ▪ Temporary stockpiling of soil during construction may alter the flat landscape.	*Status* *Spatial Extent* *Duration* *Consequence* *Probability* *Reversibility* *Irreplaceability*	*Negative* *Local* *Short Term* *Substantial* *Very Likely* *High* *Low*	*Moderate (3)*	▪ Carefully plan to minimise the construction period and avoid construction delays. ▪ Restrict construction activities to daylight hours to negate or reduce the visual impacts associated with lighting. ▪ Position storage/stockpile areas in unobtrusive positions in the landscape, where possible. ▪ Minimise vegetation clearing and rehabilitate cleared areas as soon as possible. ▪ Vegetation clearing should take place in a phased manner. ▪ Make use of existing gravel access roads where possible. ▪ Limit the number of vehicles and trucks travelling to and from the construction site, where possible. ▪ Ensure that suitable dust suppression techniques are implemented: o on all access roads; o in all areas where vegetation clearing has taken place; o on all soil stockpiles. ▪ Maintain a neat construction site by removing litter, rubble and waste materials regularly.	*Low (4)*	*Medium*

Impact	***Impact Criteria***		***Significance and Ranking (Pre-Mitigation)***	***Potential mitigation measures***	***Significance and Ranking (Post-Mitigation)***	***Confidence Level***
Wind blowing over these disturbed areas could result in dust which would have a visual impact. ▪ Litter on the construction site may result in visual pollution.						

7.2 Potential Impacts during the Operational Phase

7.2.1 Impact 2

Potential visual impacts identified during the Operational Phase of the project are listed below.

- The power line may be perceived as an unwelcome visual intrusion, particularly in more natural undisturbed settings.
- The proposed power line will alter the visual character of the surrounding area and expose potentially sensitive visual receptor locations to visual impacts.
- Dust emissions and dust plumes from maintenance vehicles accessing the site via gravel roads may evoke negative sentiments from surrounding viewers.
- .

Table 8 below presents the detailed impact ratings associated with the operation of the Vhuvhili EGI project, together with the recommended mitigation measures.

Table 8: Direct Visual Impacts during Operation

Impact	***Impact Criteria***		***Significance and Ranking (Pre-Mitigation)***	***Potential mitigation measures***	***Significance and Ranking (Post-Mitigation)***	***Confidence Level***
OPERATIONAL PHASE (Direct Impacts)						
Impact 2 ▪ The power line may be perceived as an unwelcome visual intrusion, particularly in more natural undisturbed settings. ▪ The proposed power line will alter the visual character of the surrounding area and expose potentially sensitive visual receptor locations to visual impacts. ▪ Dust emissions and dust plumes from maintenance vehicles accessing the site via gravel roads may evoke negative sentiments from surrounding viewers. ▪ The night-time visual environment will be altered as a result of operational and security lighting associated with the development.	*Status*	*Negative*	*Low (4)*	▪ Where possible, limit the amount of security and operational lighting associated with the power line development. ▪ Where possible, avoid placing lights on pylon structures. ▪ As far as possible, limit the number of maintenance vehicles using access roads. ▪ Ensure that suitable dust suppression techniques are implemented on all gravel access roads. ▪ Non-reflective surfaces should be utilised where possible.	*Low (4)*	*Medium*
	Spatial Extent	*Local*				
	Duration	*Long-term*				
	Consequence	*Moderate*				
	Probability	*Very likely*				
	Reversibility	*High*				
	Irreplaceability	*Low*				

7.3 Potential Impacts during the Decommissioning Phase

7.3.1 Impact 3

Potential visual impacts identified during the Decommissioning Phase of the project are listed below.

- Vehicles and equipment required for decommissioning will alter the natural character of the study area and expose visual receptors to visual impacts.
- Decommissioning activities may be perceived as an unwelcome visual intrusion.
- Dust emissions and dust plumes from increased traffic on the gravel roads serving the decommissioning site may evoke negative sentiments from surrounding viewers.
- Surface disturbance during decommissioning would expose bare soil (scarring) which could visually contrast with the surrounding environment.
- Temporary stockpiling of soil during decommissioning may alter the flat landscape. Wind blowing over these disturbed areas could result in dust which would have a visual impact.
- Decommissioned infrastructure left on the site may be visually intrusive.

Table 9 below presents the detailed impact ratings associated with the decommissioning of the Vhuvhili EGI project, together with the recommended mitigation measures.

Table 9: Direct Visual Impacts during Decommissioning

Impact	***Impact Criteria***		***Significance and Ranking (Pre-Mitigation)***	***Potential mitigation measures***	***Significance and Ranking (Post-Mitigation)***	***Confidence Level***
DECOMMISSIONING PHASE (Direct Impacts)						
Impact 1 ▪ Vehicles and equipment required for decommissioning will alter the natural character of the study area and expose visual receptors to visual impacts. ▪ Decommissioning activities may be perceived as an unwelcome visual intrusion. ▪ Dust emissions and dust plumes from increased traffic on the gravel roads serving the decommissioning site may evoke negative sentiments from surrounding viewers. ▪ Surface disturbance during decommissioning would expose bare soil (scarring) which could visually contrast with the surrounding environment. ▪ Temporary stockpiling of soil during	*Status* *Spatial Extent* *Duration* *Consequence* *Probability* *Reversibility* *Irreplaceability*	*Negative* *Local* *Short Term* *Substantial* *Very likely* *High* *Low*	*Moderate (3)*	▪ All infrastructure that is not required for post-decommissioning use should be removed. ▪ Carefully plan to minimize the decommissioning period and avoid delays. ▪ Position storage/stockpile areas in unobtrusive positions in the landscape, where possible ▪ Maintain a neat decommissioning site by removing rubble and waste materials regularly. ▪ Ensure that dust suppression procedures are maintained on all gravel access roads throughout the decommissioning phase. ▪ All cleared areas should be rehabilitated as soon as possible.	*Low (4)*	*Medium*

Impact	*Impact Criteria*		*Significance and Ranking (Pre-Mitigation)*	*Potential mitigation measures*	*Significance and Ranking (Post-Mitigation)*	*Confidence Level*
DECOMMISSIONING PHASE (Direct Impacts)						
decommissioning may alter the flat landscape. Wind blowing over these disturbed areas could result in dust which would have a visual impact. ▪ Decommissioned infrastructure left on the site may be visually intrusive.						

7.4 Cumulative Impacts

7.4.1 Impact 4

Potential cumulative visual impacts identified of the project are listed below.

- Additional renewable energy and associated grid connection infrastructure developments in the broader area will alter the natural character of the study area towards a more industrial landscape and expose a greater number of receptors to visual impacts.
- Visual intrusion of multiple renewable energy developments may be exacerbated, particularly in more natural undisturbed settings.
- Additional REFs in the area would generate additional traffic on gravel roads thus resulting in increased impacts from dust emissions and dust plumes.
- The night-time visual environment could be altered as a result of operational and security lighting at multiple renewable energy facilities in the broader area.

Table 10 below presents the detailed impact ratings associated with potential cumulative impacts resulting from the construction, operation and decommissioning of the Vhuvhili power line and associated infrastructure, together with the recommended mitigation measures.

Table 10: Cumulative Impacts

Impact	***Impact Criteria***		***Significance and Ranking (Pre-Mitigation)***	***Potential mitigation measures***	***Significance and Ranking (Post-Mitigation)***	***Confidence Level***
CONSTRUCTION PHASE						
Impact 4	*Status*	*Negative*	*Moderate (3)*	▪ Carefully plan to minimise the construction period and avoid construction delays. ▪ Where possible, restrict construction activities to daylight hours in order to negate or reduce the visual impacts associated with lighting. ▪ Position storage/stockpile areas in unobtrusive positions in the landscape, where possible. ▪ Minimise vegetation clearing and rehabilitate cleared areas as soon as possible. ▪ Vegetation clearing should take place in a phased manner. ▪ Make use of existing gravel access roads where possible. ▪ Limit the number of vehicles and trucks travelling to and from the proposed sites, where possible. ▪ Ensure that suitable dust suppression techniques are implemented: ○ on all access roads; ○ in all areas where vegetation clearing has taken place; and ○ on all soil stockpiles. ▪ Maintain a neat construction site by removing litter, rubble and waste materials regularly.	*Moderate (3)*	*Medium*
	Spatial Extent	*Local*				
	Duration	*Short Term*				
	Consequence	*Substantial*				
	Probability	*Very likely*				
	Reversibility	*High*				
	Irreplaceability	*Low*				
OPERATIONAL PHASE						
Impact 4	*Status*	*Negative*	*Moderate (3)*	▪ Where possible, limit the amount of security and operational lighting associated with the power line development. ▪ Where possible, avoid placing lights on pylon structures.	*Moderate (3)*	*Medium*
	Spatial Extent	*Local*				
	Duration	*Long Term*				

Impact	***Impact Criteria***		***Significance and Ranking (Pre-Mitigation)***	***Potential mitigation measures***	***Significance and Ranking (Post-Mitigation)***	***Confidence Level***
	Consequence	*Substantial*		▪ As far as possible, limit the number of maintenance vehicles which using access roads. ▪ Ensure that suitable dust suppression techniques are implemented on all gravel access roads. ▪ Buildings on the site should be painted with natural tones that fit with the surrounding environment. ▪ Non-reflective surfaces should be utilised where possible.		
	Probability	*Very likely*				
	Reversibility	*Moderate*				
	Irreplaceability	*Low*				
DECOMMISSIONING PHASE						
Impact 4	*Status*	*Negative*	*Low (4)*	▪ All infrastructure that is not required for post-decommissioning use should be removed. ▪ Carefully plan to minimize the decommissioning period and avoid delays. ▪ Position storage/stockpile areas in unobtrusive positions in the landscape, where possible ▪ Maintain a neat decommissioning site by removing rubble and waste materials regularly. ▪ Ensure that dust suppression procedures are maintained on all gravel access roads throughout the decommissioning phase. ▪ All cleared areas should be rehabilitated as soon as possible.	*Low (4)*	*Medium*
	Spatial Extent	*Local*				
	Duration	*Short Term*				
	Consequence	*Moderate*				
	Probability	*Very likely*				
	Reversibility	*High*				
	Irreplaceability	*Low*				

7.5 No-Go Impacts

Nature of the impact

The 'No Go' alternative is essentially the option of not developing the Vhuvhili EGI project. Hence, if the 'no-go' option is implemented, there would be no development. The area would thus retain its visual character and sense of place and no visual impacts would be experienced by any locally occurring receptors.

Significance of impact without mitigation measures

Not applicable.

Significance of impact with mitigation measures

Not applicable.

8. Impact Assessment Summary

The impact assessment summary is provided in **Table 11** below.

Table 11: Overall Impact Significance (Post Mitigation)

Phase	**Overall Impact Significance**
Construction	Low (4)
Operational	Low (4)
Decommissioning	Low (4)
Nature of Impact	**Overall Impact Significance**
Cumulative - Construction	Moderate (3)
Cumulative - Operational	Moderate (3)
Cumulative - Decommissioning	Low (4)

9. Legislative and Permit Requirements

Key legal requirements pertaining to the proposed development are outlined below.

In terms of the 2014 NEMA EIA Regulations, as amended, the proposed development includes listed activities which require a BA. As part of the BA process, the need for a VIA to be undertaken has been identified in order to assess the visual impact of the proposed Vhuvhili EGI.

There is currently no legislation within South Africa that explicitly pertains to the assessment of visual impacts, however in addition to NEMA the following legislation has relevance to the protection of scenic resources:

- National Environmental Management: Protected Areas Act, 2003 (Act No. 57 of 2003); and
- National Heritage Resources Act, 1999 (Act No. 25 of 1999).

Based on these Acts protected or conservation areas and sites or routes with cultural or symbolic value have been taken into consideration when identifying sensitive and potentially sensitive receptor locations and rating the sensitivity of the study area.

Accordingly, this VIA has been undertaken in compliance with GN R 320 (20 March 2020 and Appendix 6 of 2014 NEMA EIA Regulations,as amended.

10. Conclusion

A VIA was conducted to assess the magnitude and significance of the potential visual impacts associated with the development of the proposed Vhuvhili EGI near Secunda in the Mpumalanga Province. The VIA has demonstrated that the study area has a somewhat mixed visual character, transitioning from the heavily transformed urban / peri-urban landscape associated with the Secunda urban area and the Sasol Secunda fuel plant in the north-west and the town of Charl Cilliers in the south-west to a more rural / pastoral character across the remainder of the study area. Hence, although EGI development would alter the visual character and contrast with this rural / pastoral character, the location of the proposed EGI in relatively close proximity to these transformed areas as well as the associated extensive power line network will significantly reduce the level of contrast.

A broad-scale assessment of visual sensitivity, based on the physical characteristics of the study area, economic activities and land use that predominates, determined that the area would have a low visual sensitivity. An important factor contributing to the visual sensitivity of an area is the presence, or absence of visual receptors that may value the aesthetic quality of the landscape and depend on it to produce revenue and create jobs. No formal protected areas, leisure-based tourism activities or ***sensitive*** receptor locations were identified in the study area, thus confirming the low level of visual sensitivity.

The desktop assessment did however identify multiple farmsteads and residences within the study area that could be considered to be receptors, although not all of them would be sensitive to the proposed development. These farmsteads are however regarded as potentially sensitive visual receptors as elements of the proposed development could potentially alter natural or semi-natural vistas experienced from these locations. At this stage however, local sentiments towards the proposed development are not known. The Public Participation Process for the BA will be used (where available) to help establish how the proposed development will be perceived by the various I&APs, and the report will be updated to include relevant information as and when it becomes available.

A total of 40 receptors were identified within 5 kms of the Vhuvhili EGI combined assessment corridor, three (3) of which are outside the viewshed for the EGI. Of the remaining thirty-seven (37) potentially sensitive receptor locations, two (2) are located within the Vhuvhili SEF project area and it has been assumed that the relevant landowners are involved in the project. As such these landowners are not expected to perceive the proposed development in a negative light.

Only two (2) potentially sensitive receptors (VR27 and VR75) are expected to experience high levels of visual impact. Thirty (30) of the remaining receptor locations are expected to experience moderate levels of impact as a result of the EGI development, while the remaining five (5) would only experience low levels of visual impact.

Although the R546 Main Road could be considered a potentially sensitive receptor road, the likely visual impacts of the proposed development on motorists utilising this route would be reduced by the level of transformation and landscape degradation visible from the road and also by the presence of high voltage power lines adjacent to the route. Visual impacts affecting the R546 are rated therefore rated as **LOW.**

A preliminary assessment of overall impacts revealed that impacts (post mitigation) associated with the proposed Vhuvhili EGI are of **LOW** significance during construction, operation and decommissioning phases, with a number of mitigation measures available.

Considering the presence of existing mining and industrial activity and proposals for other REFs in the broader area, the introduction of new EGI in the area will result in further change in the visual character of the area and alteration of the inherent sense of place, extending an increasingly industrial character into the broader area, and resulting in significant cumulative impacts. It is however anticipated that these impacts could be mitigated to acceptable levels with the implementation of the recommended mitigation measures. In light of this, cumulative impacts have been rated as **MODERATE**.

10.1 Visual Impact Statement

It is SLR Consulting's opinion that the potential visual impacts associated with the proposed Vhuvhili EGI **are negative and of moderate significance**. Given the absence of sensitive receptors and the significant level of human transformation and landscape degradation in areas near the proposed Vhuvhili EGI, the project is deemed acceptable from a visual perspective and the EA should be granted. SLR Consulting is of the opinion that the impacts associated with the construction, operation and decommissioning phases can be mitigated to acceptable levels provided the recommended mitigation measures are implemented.

11. References

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Appendices

Appendix A - Specialist Expertise

CURRICULUM VITAE

KERRY LIANNE SCHWARTZ

SENIOR GIS CONSULTANT

EMPA, South Africa

QUALIFICATIONS

BA	1982	Geography, Leeds Trinity University, UK

EXPERTISE

- GIS, spatial modelling and 3D analysis
- Visual Impact Assessment
- Fatal Flaw Assessments
- Glint and Glare Assessments

Kerry is a highly focused and dedicated Spatial Professional with strong technical skills and some 27 years' experience in the application and use of geographic analysis and geospatial technologies in support of a range of environmental and development planning projects. While Kerry's expertise is largely centred on the management and presentation of geospatial data for environmental impact assessments, her GIS skills are frequently utilised in support of a range of other projects, including:

- Strategic environmental assessments and management plans;
- Visual and landscape assessments;
- Glint and glare assessments;
- Wetland / surface water assessments;
- Catchment delineation for floodline analysis;
- Urban and Rural Development Planning;
- Transport Assessments; and
- Infrastructure Development Planning.

Kerry has extended her skills base to include the undertaking of specialist Visual Impact Assessments (VIAs) for a range of projects, including renewable energy, power line and residential / mixed-use developments.

PROJECTS

A selection of Kerry's key project's are presented below.

Built Infrastructure

EIA and EMP for a 9km railway line and water pipeline for manganese mine – Kalagadi Manganese	Kerry was responsible for GIS analysis and mapping in support of the EIA project in the Northern Cape, South Africa.
EIA and EMP for 5x 440kV Transmission Lines between Thyspunt (proposed nuclear power station site) and several substations	Kerry was responsible for GIS analysis and mapping in support of the EIA project in the Port Elizabeth area in the Eastern Cape, South Africa.

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EIA for multi petroleum products pipeline from Kendall Waltloo, and from Jameson Park to Langlaagte Tanks farms Pipelines	Kerry was responsible for GIS analysis and mapping in support of the EIA project.
Environmental Management Plan for copper and cobalt mine	Kerry was responsible for GIS analysis and mapping in support of the EMP project in the Democratic Republic of Congo.
EIA and Agricultural Feasibility study for Miwani Sugar Mill	Kerry was responsible for GIS analysis and mapping in support of the EIA project in Kenya.
EIAs for several Solar Photovoltaic Energy Facilities and associated infrastructure	Kerry was responsible for GIS analysis and mapping in support of several EIAs for Solar PV facilities, the most recent projects being: • Oya Energy Facility (Western Cape Province); • Mooi Plaats, Wonderheuvel and Paarde Valley Solar PV Facilities (Northern Cape Province); and • Sendawo 1, 2 and 3 Solar Energy Facilities (North West Province).
EIAs / BAs for several WEFs and associated infrastructure	Kerry was responsible for GIS analysis and mapping in support of several EIAs for Wind Energy Farms, the most recent projects being: • Tooverberg WEF (Western Cape Province); • Rondekop WEF (Western Cape Province); and • Graskoppies, Hartebeest Leegte, Ithuba and !Xha Boom (Leeuwberg Cluster) WEFs (Northern Cape Province).
Basic Assessments for various 400kV and 132kV Distribution Lines for the Transnet Coal Link Upgrade Project	Kerry was responsible for GIS analysis and mapping in support of the powerline BA project in KwaZulu-Natal and Mpumalanga, South Africa.
Environmental Assessment for the proposed Moloto Development Corridor	Kerry was responsible for GIS analysis and mapping in support of the EIA project in the Limpopo Province.
Environmental Advisory Services for the Gauteng Rapid Rail Extensions Feasibility Project	Kerry was responsible for GIS analysis and mapping in support of a feasibility study for a rail extension in Gauteng, South Africa.
Environmental Screening for the Strategic Logistics and Industrial Corridor Plan for Strategic Infrastructure Project 2	Kerry was responsible for GIS analysis and mapping in support of the environmental screening for strategic infrastructure in KwaZulu-Natal, the Free State and Gauteng.

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Fatal Flaw Assessments for various proposed Renewable Energy Facilities	Kerry was responsible for GIS analysis and mapping in support of fatal flaw assessment for renewable energy projects in the Northern Cape and Western Cape Provinces.
	Strategic Planning
Lesotho Highlands Development Association – Lesotho	GIS database development for socio-economic and health indicators arising from Social Impact Assessments
Development Plans for the adjacent towns of Kasane and Kazungula and for the rural village of Hukuntsi	Kerry was responsible for GIS database management, spatial data analysis and mapping for the development plans for towns in Botswana.
Integrated Development Plans for various District and Local Municipalities	Kerry was responsible for GIS database management, spatial data analysis and mapping for various IDPs for District Municipalities in KwaZulu-Natal.
Rural Development Initiative and Rural Roads Identification for uMhlathuze Local Municipality	Kerry was responsible for GIS database management, spatial data analysis and mapping for rural road identification in the uMhlathuze Local Municipality in KwaZulu-Natal.
Tourism Initiatives and Master Plans for areas such as the Mapungubwe Cultural Landscape	Kerry was responsible for GIS database management, spatial data analysis and mapping for various Master Plans in the Limpopo and Northern Cape Provinces.
Spatial Development Frameworks for various Local and District Municipalities	Kerry was responsible for GIS database management, spatial data analysis and mapping for Spatial Development Frameworks for various Municipalities in KwaZulu-Natal, Mpumalanga and the Free State.
Land Use Management Plans/Systems (LUMS) for various Local Municipalities	Kerry was responsible for GIS database management, spatial data analysis and mapping for the development of Land Use Management Systems for various Local Municipalities in KwaZulu-Natal.
Land use study for the Johannesburg Inner City Summit and Charter	Kerry was responsible for GIS database management, spatial data analysis and mapping for the Johannesburg Inner City land use study.
Due Diligence Investigation for the Port of Richards Bay	Kerry was responsible for GIS database management, spatial data analysis and mapping for the Port of Richards Bay Due Diligence Investigation.
	State of the Environment Reporting
2008 State of the Environment Report for City of Johannesburg	Kerry was responsible for GIS database management, spatial data analysis and mapping for the 2008 Johannesburg State of the Environment Report.

CURRICULUM VITAE KERRY SCHWARTZ

	Strategic Environmental Assessments and Environmental Management Frameworks
SEA for Greater Clarens	Kerry was responsible for GIS database management, spatial data analysis and mapping for the Greater Clarens SEA in the Free State Province.
SEA for the Marula Region of the Kruger National Park	Kerry was responsible for GIS database management, spatial data analysis and mapping for the Marula Region SEA on behalf of SANParks.
SEA for Thanda Private Game Reserve	Kerry was responsible for GIS database management, spatial data analysis and mapping for the Thanda Private Game Reserve SEA in KwaZulu-Natal.
SEA for KwaDukuza Local Municipality	Kerry was responsible for GIS database management, spatial data analysis and mapping for the KwaDukuza Local Municipality SEA in KwaZulu-Natal.
SEA for Molemole Local Municipality, Capricorn District Municipality	Kerry was responsible for GIS database management, spatial data analysis and mapping for the Molemole Local Municipality SEA in Limpopo Province.
SEA for Blouberg Local Municipality, Capricorn District Municipality	Kerry was responsible for GIS database management, spatial data analysis and mapping for the Blouberg Local Municipality in Limpopo Province.
SEA for the Bishopstowe study area in the Msunduzi Local Municipality	Kerry was responsible for GIS database management, spatial data analysis and mapping for the Bishopstowee SEA in KwaZulu-Natal.
EMF for proposed Renishaw Estate	Kerry was responsible for GIS database management, spatial data analysis and mapping for the Reinshaw Estate EMF in KwaZulu-Natal.
EMF for Mogale City Local Municipality, Mogale City Local Municipality	Kerry was responsible for GIS database management, spatial data analysis and mapping for the Mogale City Local Municipality EMF in Gauteng.
	Visual Impact Assessments
VIAs for various Solar Power Plants and associated grid connection infrastructure	Kerry was responsible for the GIS mapping and visual impact assessments for various Solar Power Plants and associated grid connection infrastructure (Northern Cape, Free State, Limpopo and North West Province) the most recent projects being: • Oya Energy Facility (Western Cape Province); • Mooi Plaats, Wonderheuvel and Paarde Valley Solar PV facilities (Northern Cape Province); and • Nokukhanya Solar PV Facility (Limpopo Province.

CURRICULUM VITAE — KERRY SCHWARTZ

VIAs for various WEFs and associated grid connection infrastructure	Kerry was responsible for the GIS mapping and visual impact assessments for various Wind Energy Farms and associated grid connection infrastructure (Northern Cape and Western Cape), the most recent projects including: • Gromis and Komas WEFs (Northerrn Cape Province). • Paulputs WEF (Northern Cape Province); • Kudusberg WEF (Western Cape Province); • Tooverberg WEF (Western Cape Province); • Rondekop WEF (Northern Cape Province); and • San Kraal and Phezukomya WEFs (Northern Cape Province).
VIAs for various 400kV and 132kV Distribution Lines for the Transnet Coal Link Upgrade Project	Kerry was responsible for the GIS mapping and visual impact assessments for various powerlines in KwaZulu-Natal and Mpumalanga Provinces.
VIAs for the proposed Assagay Valley and Kassier Road North Mixed Use Development	Kerry was responsible for the GIS mapping and a visual impact assessment for the Assagay Valley and Kassier Road North Mixed Use Development in KwaZulu-Natal.
VIA for the proposed Tinley Manor South Banks Development	Kerry was responsible for the GIS mapping and a visual impact assessment for the Tinley Manor Southbanks Coastal Development in KwaZulu-Natal.
VIA for the proposed Tinley Manor South Banks Beach Enhancement Solution	Kerry was responsible for the GIS mapping and a visual impact assessment for the Tinley Beach Enhancement EIA in KwaZulu-Natal.
VIA for the proposed Mlonzi Hotel and Golf Estate Development	Kerry was responsible for the GIS mapping and a visual impact assessment for the Mlonzi Hotel and Golf Estate in the Eastern Cape.
Landscape Assessment for the Mogale City Local Municipality	Kerry was responsible for the GIS mapping and a visual impact assessment for the Mogale City Local Municipality landscape assessment.

MEMBERSHIPS

GISSA	Member of Geo-Information Society of South Africa
SAGC	Registered as GISc Technician with the South African Geomatics Council, Membership No. GTc GISc 1187

KSchwartz

04 February 2022

Appendix B - Specialist Statement of Independence

10.4 The Specialist

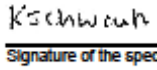
Note: Duplicate this section where there is more than one specialist.

I Kerry Schwartz....., as the appointed specialist hereby declare/affirm the correctness of the information provided as part of the application, and that I:

- In terms of the general requirement to be independent (tick which is applicable):

	other than fair remuneration for work performed/to be performed in terms of this application, have no business, financial, personal or other interest in the activity or application and that there are no circumstances that may compromise my objectivity; or
	am not independent, but another EAP that is independent and meets the general requirements set out in Regulation 13 has been appointed to review my work (Note: a declaration by the review specialist must be submitted);

- have expertise in conducting specialist work as required, including knowledge of the Act, regulations and any guidelines that have relevance to the proposed activity;
- will ensure compliance with the EIA Regulations 2014;
- 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 application;
- will take into account, to the extent possible, the matters listed in regulation 18 of the regulations when preparing the application and any report, plan or document relating to the application;
- will disclose to the proponent or applicant, registered interested and affected parties 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 or the objectivity of any report, plan or document to be prepared by myself for submission to the competent authority (unless access to that information is protected by law, in which case I will indicate that such protected information exists and is only provided to the competent authority);
- declare that all the particulars furnished by me in this form are true and correct;
- am aware that it is an offence in terms of Regulation 48 to provide incorrect or misleading information and that a person convicted of such an offence is liable to the penalties as contemplated in section 49B(2) of the National Environmental Management Act, 1998 (Act 107 of 1998).



Signature of the specialist

SLR Consulting South Africa (Pty) Ltd

Name of company

02 November 2022

Date

Appendix C - Site Sensitivity Verification

Prior to commencing with the specialist assessment in accordance with Appendix 6 of the National Environmental Management Act, 1998 (Act No. 107 of 1998), as amended (NEMA) 2014 Environmental Impact Assessment (EIA) Regulations, as amended, a site sensitivity verification was undertaken in order to confirm the current land use and environmental sensitivity of the proposed Vhuvhili Electrical Grid Infrastructure (EGI) project area as identified by the National Web-Based Environmental Screening Tool (Screening Tool). This site sensitivity verification was undertaken in adherence to the gazetted Environmental Assessment Protocols, specifically with 'Part A - General Protocol for the Site Sensitivity Verification and Minimum Report Content Requirements where a Specialist Assessment is required but no specific Environmental Theme Protocol has been prescribed' (GG 43110 / GNR 320, 20 March 2020).

The details of the site sensitivity verification are noted below:

Date of Site Visit	25 – 26 January 2022
Specialist Name	Assessment undertaken by Kerry Schwartz Field investigation undertaken by Stephan Jacobs and Gugu Dhlamini
Professional Registration Number	South African Geomatics Council – GTc GISc 1187
Specialist Affiliation / Company	SLR Consulting

1. Site Sensitivity Verification

A site sensitivity verification has been conducted in support of the Visual Impact Assessment (VIA) for the Vhuvhili EGI near Secunda in the Mpumalanga Province. The verification exercise is based on a desktop-level assessment supported by field-based observation and involved an assessment of factors as outlined below.

1.1 Physical landscape characteristics

Physical landscape characteristics such as topography, vegetation and land use are important factors influencing the visual character and visual sensitivity of the study area. Baseline information about the physical characteristics of the study area was sourced from spatial databases provided by National Geospatial Information (NGI), the South African National Biodiversity Institute (SANBI) and the South African National Land Cover Dataset (Geoterraimage – 2020). The characteristics identified via desktop analysis were then checked against the findings of the site visit.

1.2 Identification of sensitive receptors

Visual receptor locations and routes that are sensitive and / or potentially sensitive to the visual intrusion of the proposed development were identified by way of a desktop assessment as well as field-based investigation. Google Earth imagery (2022) was used to identify potential receptors within the study area and where possible, these receptor locations were then checked against the findings of the field investigation.

1.3 Fieldwork and photographic review

A two (2) day site visit was undertaken between the 25th and the 26th of January 2022 (mid-summer). The purpose of the site visit was to:

- verify the landscape characteristics identified via desktop means;
- conduct a photographic survey of the study area;
- verify, where possible, the sensitivity of visual receptor locations identified via desktop means;
- eliminate receptor locations that are unlikely to be influenced by the proposed development;
- identify any additional visually sensitive receptor locations within the study area; and
- inform the impact rating assessment of visually sensitive receptor locations (where possible).

1.4 Sources of Information

The main sources of information utilised for this site sensitivity verification exercise included:

- Elevation data (5m contours) the NGI;
- 1:50 000 topographical maps of South Africa from the NGI;
- Land cover and land use data extracted from the 2020 South African National Land-Cover Dataset provided by GEOTERRAIMAGE (2020);
- Vegetation classification data extracted from the South African National Biodiversity Institute's (SANBI's) VEGMAP 2018 dataset;
- Google Earth Satellite imagery 2022;
- South African Renewable Energy EIA Application Database from Department of Environmental Affairs (incremental release Quarter 2 2022);
- The National Web-Based Environmental Screening Tool, Department of Forestry, Fisheries and Environment (DFFE);

2. Outcome of Site Sensitivity Verification

The assessment has shown that, overall the study area has a somewhat mixed visual character, transitioning from the heavily transformed urban / peri-urban landscape associated with the Secunda urban area and the Sasol Secunda fuel plant in the north-west and the town of Charl Cilliers in the south-west to a more rural / pastoral character across the remainder of the study area. Hence, although EGI development would alter the visual character and contrast with this rural / pastoral character, the location of the proposed EGI in relatively close proximity to these transformed areas as well as the associated extensive power line network will significantly reduce the level of contrast.

A broad-scale assessment of landscape sensitivity, based on the physical characteristics of the study area, economic activities and land use that predominates, determined that the area would have a low visual sensitivity. No formal protected areas, leisure-based tourism activities or ***sensitive*** receptor locations were identified in the study area, thus confirming the low level of visual sensitivity.

As part of the visual sensitivity assessment, a screening exercise was undertaken with the aim of indicating any areas that should be precluded from the proposed development footprint. From a visual perspective, these are areas where the establishment of power lines would result in the greatest probability of visual impacts on sensitive or potentially sensitive visual receptors.

Using GIS-based visibility analysis, it was possible to determine which sectors of the combined assessment corridor would be visible to the highest numbers of receptors in the study area. This analysis confirmed that areas of higher elevation are visible to greater numbers of potentially sensitive receptors. Hence the visual prominence of a tall structure such as a power line tower would be exacerbated if located on any ridges or a relatively higher-lying plateaus. It is noted that the proposed power line route alignment traverses some low ridges and areas of relatively higher elevation that could be seen as areas of potentially high visual sensitivity. **However, the presence of existing power lines and road infrastructure as well as the fact that the study area as a whole is rated as having a low visual sensitivity would reduce the sensitivity rating of the ridges to "Medium".**

In determining visual sensitivity, consideration must be given to the direct visual impact of EGI on any farmsteads or receptors located in, or within 500m of, the combined assessment area. A total of six (6) receptors were found to be within 500m of the assessment corridor, although three (3) of these are located within the Mukondeleli WEF project area. Accordingly, the landowners at these locations are not expected to perceive the EGI development in a negative light.

A 500m zone of *potential visual sensitivity* has been delineated around the remaining three (3) farmsteads that are located on Portions 2, 3 and 10 of the Farm Vlakspruit No 292 IS. At this stage however, the sentiments of the respective landowners are not known and the zones of potential sensitivity are **not considered "no go" areas**, but rather should be viewed as zones where visual impacts may occur.

The zones of potential visual sensitivity are shown in Error! Reference source not found..

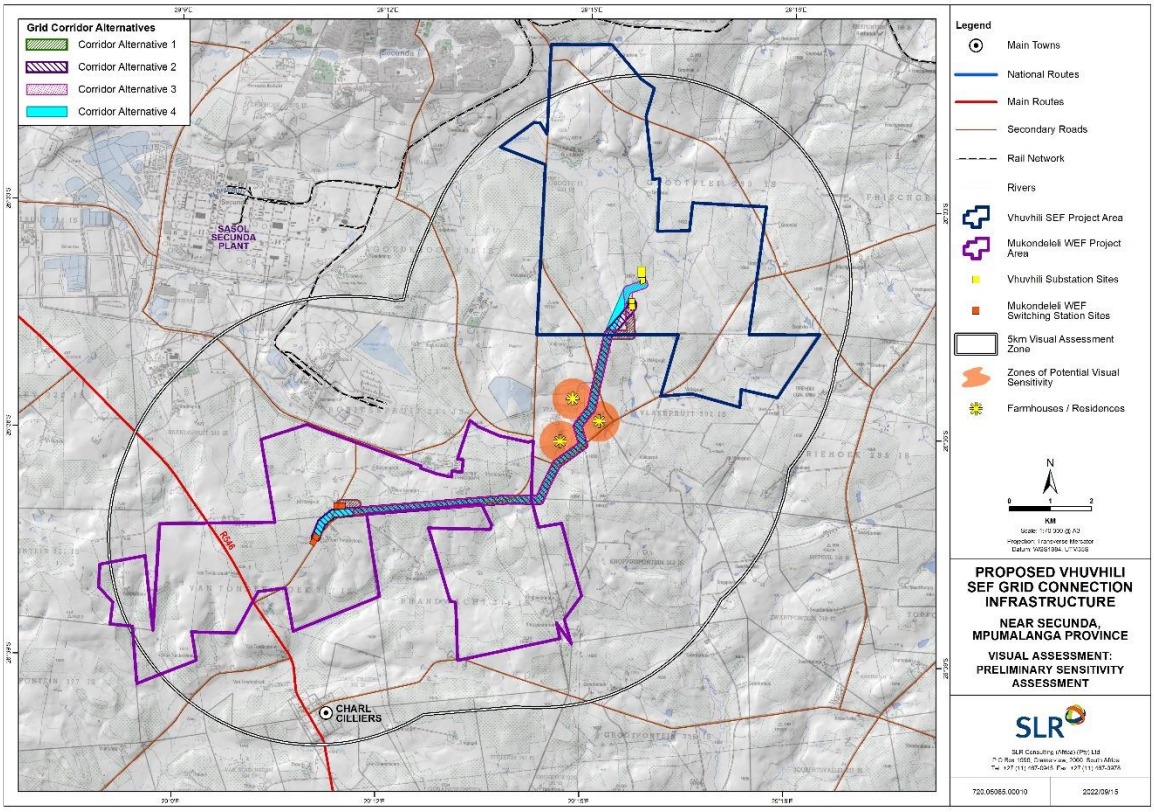


Figure 1: Areas of Potential Visual Sensitivity affecting the Vhuvhili EGI Combined Assessment Corridor

3. National Environmental Screening Tool

In assessing visual sensitivity, the proposed development was examined in relation to the Landscape Theme of the National Environmental Screening Tool to determine the relative landscape sensitivity for the development of grid connection infrastructure. The tool does not however identify any landscape sensitivities in respect of the proposed power line development.

4. Sensitivity Analysis Summary

Although the Screening Tool identifies significant areas of very high landscape sensitivity, the site sensitivity verification exercise conducted in respect of this VIA (Appendix E) did not indicate the presence of mountaintops, **high** ridges or any significantly steep slopes. This assessment, confirmed by the field investigation, showed the presence of low ridges and plateaus in a largely undulating landscape. The sensitivity analysis above has recognised these ridges and identified the higher ridges as zones where development would be least preferred.

5. Conclusion

A site sensitivity verification has been conducted in respect of the VIA for the proposed development of the EGI for the proposed Vhuvhili SEF. This verification has been based on a desktop-level assessment supported by field-based observation.

As stated above, the National Environmental Screening Tool does not identify any Landscape Sensitivities in respect of power line development in the area. Accordingly, the areas identified as visually sensitive (**Figure 1**) have been verified.

Appendix D: Impact Assessment Methodology

The impact assessment includes:

- *the nature, significance and consequences of the impact and risk;*
- *the extent and duration of the impact and risk;*
- *the probability of the impact and risk occurring;*
- *the degree to which impacts and risks can be mitigated;*
- *the degree to which the impacts and risks can be reversed; and*
- *the degree to which the impacts and risks can cause loss of irreplaceable resources.*

As per the DFFET Guideline 5: Assessment of Alternatives and Impacts, the following methodology is applied to the prediction and assessment of impacts and risks. Potential impacts and risks have been rated in terms of the direct, indirect and cumulative:

- *Direct impacts are impacts that are caused directly by the activity and generally occur at the same time and at the place of the activity. These impacts are usually associated with the construction, operation or maintenance of an activity and are generally obvious and quantifiable.*
- *Indirect impacts of an activity are indirect or induced changes that may occur as a result of the activity. These types of impacts include all the potential impacts that do not manifest immediately when the activity is undertaken or which occur at a different place as a result of the activity.*
- *Cumulative impacts are impacts that result from the incremental impact of the proposed activity on a common resource when added to the impacts of other past, present or reasonably foreseeable future activities. Cumulative impacts can occur from the collective impacts of individual minor actions over a period of time and can include both direct and indirect impacts.*

The impact assessment methodology includes the following aspects:

- *Nature of impact/risk - The type of effect that a proposed activity will have on the environment.*

- *Status - Whether the impact/risk on the overall environment will be:*
    - *Positive - environment overall will benefit from the impact/risk;*
    - *Negative - environment overall will be adversely affected by the impact/risk; or*
    - *Neutral - environment overall not be affected.*

- *Spatial extent – The size of the area that will be affected by the impact/risk:*
    - *Site specific;*
    - *Local (<10 km from site);*
    - *Regional (<100 km of site);*
    - *National; or*
    - *International (e.g. Greenhouse Gas emissions or migrant birds).*

- *Duration – The timeframe during which the impact/risk will be experienced:*
    - *Very short term (instantaneous);*
    - *Short term (less than 1 year);*
    - *Medium term (1 to 10 years);*
    - *Long term (the impact will cease after the operational life of the activity (i.e. the impact or risk will occur for the project duration)); or*
    - *Permanent (mitigation will not occur in such a way or in such a time span that the impact can be considered transient (i.e. the impact will occur beyond the project decommissioning)).*

- *Consequence – The anticipated consequence of the risk/impact:*
    - *Extreme (extreme alteration of natural systems, patterns or processes, i.e. where environmental functions and processes are altered such that they permanently cease);*
    - *Severe (severe alteration of natural systems, patterns or processes, i.e. where environmental functions and processes are altered such that they temporarily or permanently cease);*

  - *Substantial (substantial alteration of natural systems, patterns or processes, i.e. where environmental functions and processes are altered such that they temporarily or permanently cease);*
  - *Moderate (notable alteration of natural systems, patterns or processes, i.e. where the environment continues to function but in a modified manner); or*
  - *Slight (negligible alteration of natural systems, patterns or processes, i.e. where no natural systems/environmental functions, patterns, or processes are affected).*

- *Reversibility of the Impacts - the extent to which the impacts/risks are reversible assuming that the project has reached the end of its life cycle (decommissioning phase):*
  - *High reversibility of impacts (impact is highly reversible at end of project life i.e. this is the most favourable assessment for the environment);*
  - *Moderate reversibility of impacts;*
  - *Low reversibility of impacts; or*
  - *Impacts are non-reversible (impact is permanent, i.e. this is the least favourable assessment for the environment).*

- *Irreplaceability of Receiving Environment/Resource Loss caused by impacts/risks – the degree to which the impact causes irreplaceable loss of resources assuming that the project has reached the end of its life cycle (decommissioning phase):*
  - *High irreplaceability of resources (project will destroy unique resources that cannot be replaced, i.e. this is the least favourable assessment for the environment);*
  - *Moderate irreplaceability of resources;*
  - *Low irreplaceability of resources; or*
  - *Resources are replaceable (the affected resource is easy to replace/rehabilitate, i.e. this is the most favourable assessment for the environment).*

Using the criteria above, the impacts have been further assessed in terms of the following:

- *Probability – The probability of the impact/risk occurring:*
  - *Extremely unlikely (little to no chance of occurring);*
  - *Very unlikely (<30% chance of occurring);*
  - *Unlikely (30-50% chance of occurring)*
  - *Likely (51 – 90% chance of occurring); or*
  - *Very Likely (>90% chance of occurring regardless of prevention measures).*

To determine the significance of the identified impact/risk, the consequence is multiplied by probability (qualitatively as shown in Figure 1).

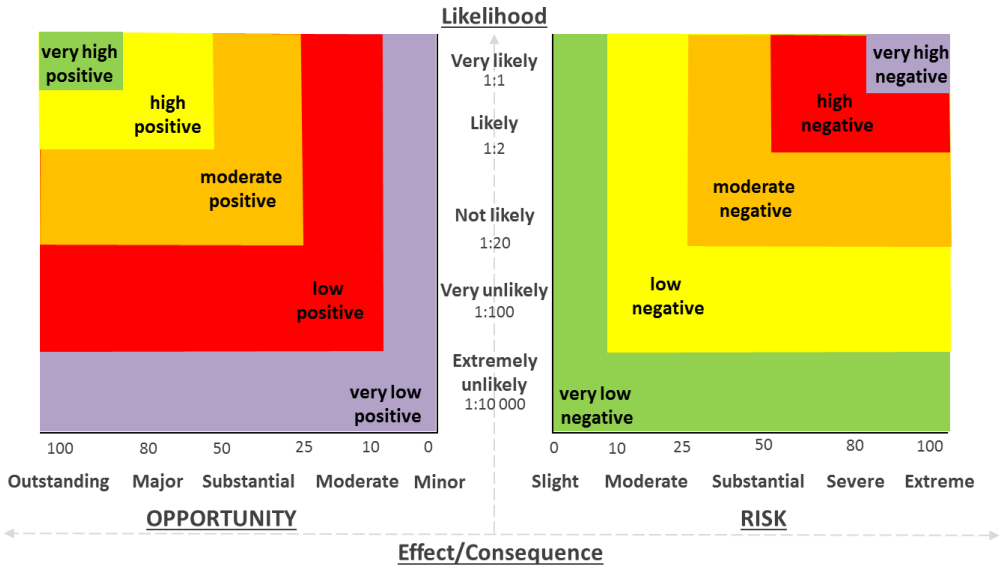


Figure 1. Guide to assessing risk/impact significance as a result of consequence and probability.

- *Significance – Will the impact cause a notable alteration of the environment?*
    - *Very low (the risk/impact may result in very minor alterations of the environment and can be easily avoided by implementing appropriate mitigation measures, and will not have an influence on decision-making);*
    - *Low (the risk/impact may result in minor alterations of the environment and can be easily avoided by implementing appropriate mitigation measures, and will not have an influence on decision-making);*
    - *Moderate (the risk/impact will result in moderate alteration of the environment and can be reduced or avoided by implementing the appropriate mitigation measures, and will only have an influence on the decision-making if not mitigated);*
    - *High (the risk/impact will result in major alteration to the environment even with the implementation on the appropriate mitigation measures and will have an influence on decision-making); and*
    - *Very high (the risk/impact will result in very major alteration to the environment even with the implementation on the appropriate mitigation measures and will have an influence on decision-making (i.e. the project cannot be authorised unless major changes to the engineering design are carried out to reduce the significance rating)).*

With the implementation of mitigation measures, the residual impacts/risks are ranked as follows in terms of significance:

- *Very low = 5;*
- *Low = 4;*
- *Moderate = 3;*
- *High = 2; and*
- *Very high = 1.*

Confidence – The degree of confidence in predictions based on available information and specialist knowledge:

- *Low;*
- *Medium; or*
- *High.*

Appendix E: Receptor Impact Rating

Receptor Location	Distance to nearest PV Array			Screening		Contrast		OVERALL IMPACT RATING	
	KMs	Rating		Rating		Rating		Rating	
INSIDE VIEWSHED									
VR16	3.5	Low	1	High	3	Mod	2	MODERATE	6
VR17	3.3	Low	1	Mod	2	Mod	2	MODERATE	5
VR18	4.0	Low	1	High	3	Mod	2	MODERATE	6
VR19	4.1	Low	1	High	3	High	3	MODERATE	7
VR20	3.0	Low	1	Mod	2	Mod	2	MODERATE	5
VR22	2.3	Low	1	High	3	Mod	2	MODERATE	6
VR23	4.7	Low	1	Mod	2	Mod	2	MODERATE	5
VR24	3.9	Low	1	High	3	Low	1	MODERATE	5
VR25 - Equestrian Centre	3.0	Low	1	High	3	Mod	2	MODERATE	6
VR26	0.7	Mod	2	Mod	2	Mod	2	MODERATE	6
VR27	0.3	High	3	High	3	Mod	2	HIGH	8
VR28	1.6	Mod	2	Low	1	Mod	2	MODERATE	5
VR29	0.4	High	3	Mod	2	Low	1	MODERATE	6
VR30	0.8	Mod	2	Low	1	Mod	2	MODERATE	5
VR31	0.7	Mod	2	Low	1	Mod	2	MODERATE	5
VR32	0.5	Mod	2	High	3	Mod	2	MODERATE	7
VR33	2.4	Low	1	Low	1	Mod	2	LOW	4
VR34	2.2	Low	1	Mod	2	Mod	2	MODERATE	5
VR35 - Zorgen Vrij Wedding Venue	0.4	High	3	Low	1	Mod	2	MODERATE	6
VR36	0.2	High	3	Low	1	Mod	2	MODERATE	6
VR37	0.3	High	3	Mod	2	Mod	2	MODERATE	7
VR38	3.5	Low	1	Mod	2	Mod	2	MODERATE	5
VR39	2.6	Low	1	High	3	High	3	MODERATE	7
VR40	1.6	Mod	2	Low	1	Mod	2	MODERATE	5
VR41	1.6	Mod	2	Mod	2	Mod	2	LOW	
VR45	4.9	Low	1	Low	1	Mod	2	LOW	4
VR46	3.8	Low	1	Low	1	Mod	2	LOW	4
VR52	4.3	Low	1	Low	1	Mod	2	LOW	4
VR73	3.3	Low	1	Mod	2	High	3	MODERATE	6

VR74	1.5	Mod	2	Low	1	Mod	2	MODERATE	5
VR75	0.1	High	3	Mod	2	High	3	HIGH	8
VR76	1.9	Mod	2	Low	1	Mod	2	MODERATE	5
VR78	3.5	Low	1	Mod	2	Mod	2	MODERATE	5
VR79	4.5	Low	1	Mod	2	Mod	2	MODERATE	5
VR93	3.1	Low	1	Mod	2	Mod	2	MODERATE	5
VR94	2.4	Low	1	High	3	Mod	2	MODERATE	6
VR95	4.8	Low	1	Mod	2	Mod	2	MODERATE	5
OUTSIDE VIEWSHED									
VR47	*5.0*	***NIL***							
VR72	*4.6*								
VR77	*3.0*								

Appendix F: Maps

Appendix G: Comparative Assessment of Alternatives

Table 1: Comparative Assessment of Alternatives – Vhuvhili 132kV Grid Connection Corridors

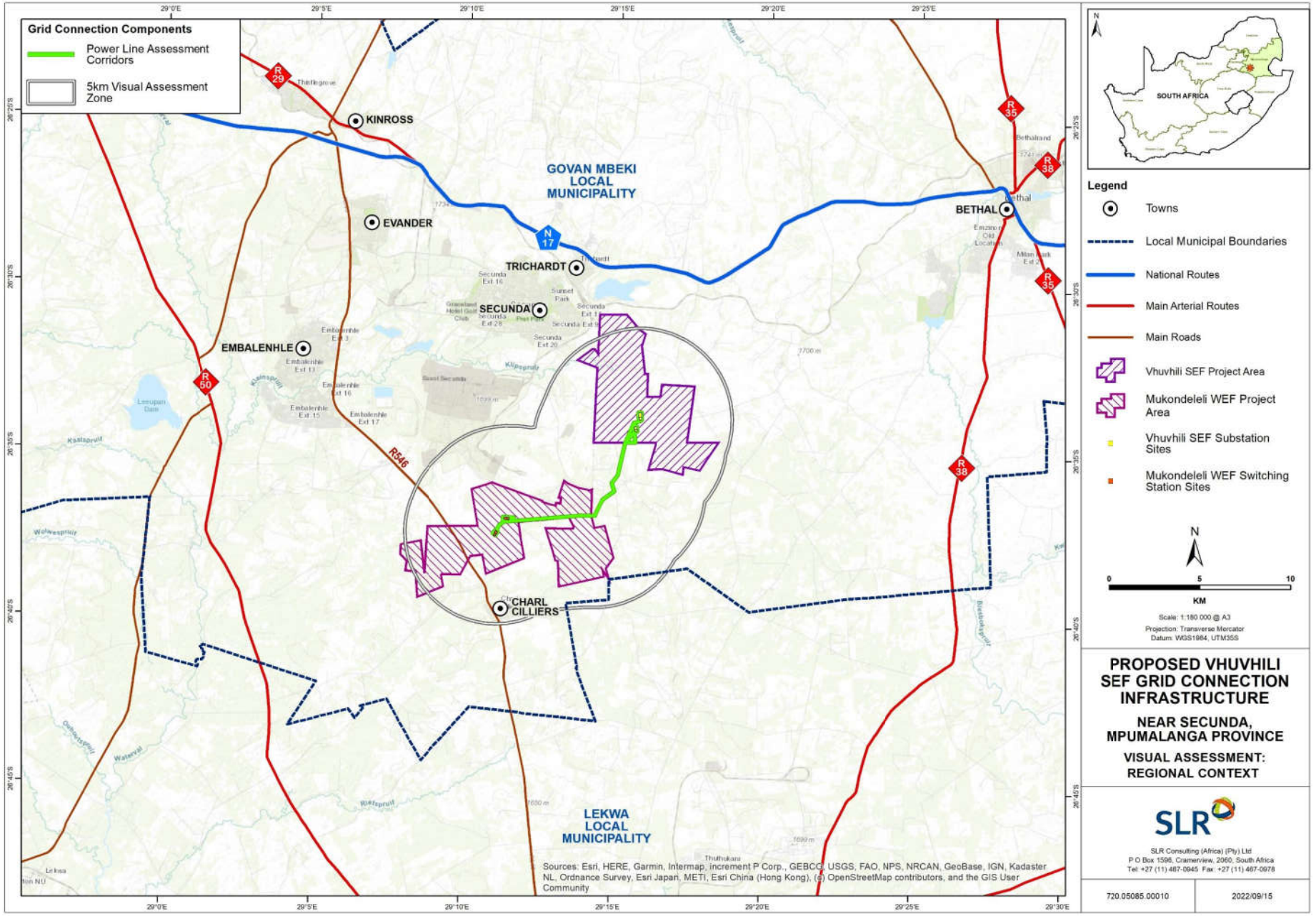
Alternative	Preference	Reasons (incl. potential issues)
VHUVHILI 132kV POWER LINES		
Power line Corridor Alternative 1	Favourable	▪ Power Line Corridor Alternative 1 is approximately 11 km in length, linking Vhuvhili SEF substation hub A-B to the proposed Mukondeleli switching station (E). ▪ This route alignment traverses some areas of higher elevations and will be moderately exposed on the skyline. ▪ There are no sensitive receptors within 5km of this alternative. ▪ Five (5) potentially sensitive receptors are within 500m of the assessment corridor and are thus expected to experience high levels of visual impact. Impacts would however be reduced due to the proximity of the existing power line and road infrastructure. In addition, two (2) of these receptors are located within the project area for Mukondeleli WEF and as such the land owners are not expected to perceive the proposed development in a negative light. ▪ The remaining receptors are all more than 700m away and would experience moderate to low levels of visual impact. ▪ There are no fatal flaws associated with Alternative 1 and this alternative is considered **Favourable** from a visual perspective.
Power line Corridor Alternative 2		▪ Power Line Corridor Alternative 2 is approximately 11.5 km in length, linking Vhuvhili SEF substation hub A-B to the proposed Mukondeleli switching station (F). This route follows the same alignment as that for the other three corridor alternatives for most of its length. ▪ This route alignment traverses some areas of higher elevations and will be moderately exposed on the skyline. ▪ There are no sensitive receptors within 5km of this alternative. ▪ Six (6) potentially sensitive receptors are within 500m of the assessment corridor and are thus expected to experience high levels of visual impact. Impacts would however be reduced due to the proximity of the existing power line and road infrastructure. In addition, three (3) of these receptors are located within the project area for Mukondeleli WEF and as such the land owners are not expected to perceive the proposed development in a negative light. ▪ The remaining receptors are all more than 700m away and would experience moderate to low levels of visual impact. ▪ There are no fatal flaws associated with Alternative 2 and this alternative is considered **Favourable** from a visual perspective.
Power line Corridor Alternative 3	Favourable	▪ Power Line Corridor Alternative 3 is approximately 12 km in length, linking Vhuvhili SEF substation hub C-D to the proposed Mukondeleli switching station (E). This route follows the same

Alternative	Preference	Reasons (incl. potential issues)
		alignment as that for the other three corridor alternatives for most of its length. ▪ This route alignment traverses some areas of higher elevations and will be moderately exposed on the skyline. ▪ There are no sensitive receptors within 5km of this alternative. ▪ Five (5) potentially sensitive receptors are within 500m of the assessment corridor and are thus expected to experience high levels of visual impact. Impacts would however be reduced due to the proximity of the existing power line and road infrastructure. In addition, two (2) of these receptors are located within the project area for Mukondeleli WEF and as such the land owners are not expected to perceive the proposed development in a negative light. ▪ The remaining receptors are all more than 700m away and would experience moderate to low levels of visual impact. ▪ There are no fatal flaws associated with Alternative 3 and this alternative is considered **Favourable** from a visual perspective.
Power line Corridor Alternative 4	Favourable	▪ Power Line Corridor Alternative 4 is approximately 12 km in length, linking Vhuvhili SEF substation hub C-D to the proposed Mukondeleli switching station (F). This route follows the same alignment as that for the other three corridor alternatives for most of its length. ▪ This route alignment traverses some areas of higher elevations and will be moderately exposed on the skyline. ▪ There are no sensitive receptors within 5km of this alternative. ▪ Six (6) potentially sensitive receptors are within 500m of the assessment corridor and are thus expected to experience high levels of visual impact. Impacts would however be reduced due to the proximity of the existing power line and road infrastructure. In addition, three (3) of these receptors are located within the project area for Mukondeleli WEF and as such the land owners are not expected to perceive the proposed development in a negative light. ▪ The remaining receptors are all more than 700m away and would experience moderate to low levels of visual impact. ▪ There are no fatal flaws associated with Alternative 4 and this alternative is considered **Favourable** from a visual perspective.

Appendix F

Maps

MAP 1: Regional Context



PROPOSED VHUVHILI SEF GRID CONNECTION INFRASTRUCTURE

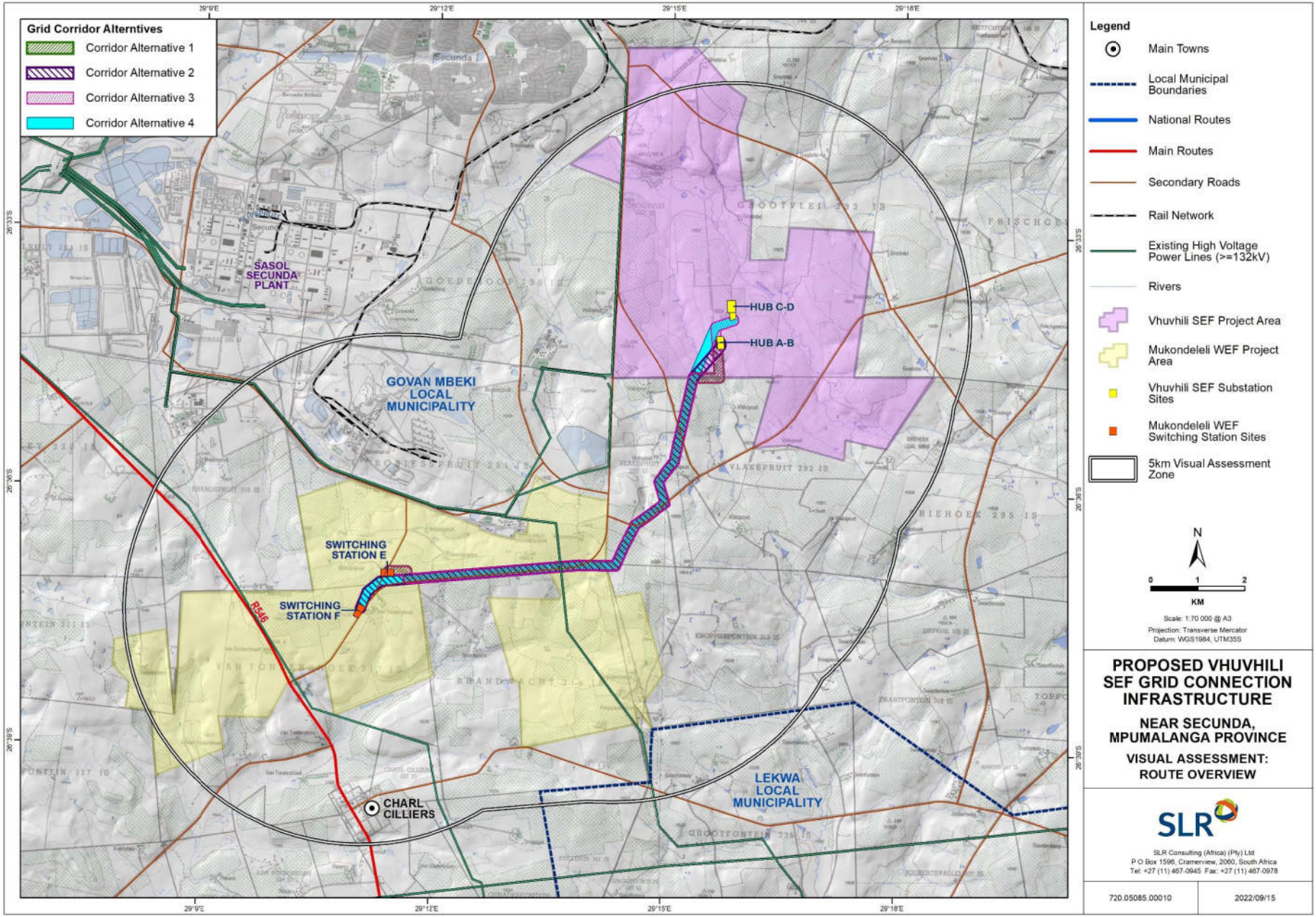
NEAR SECUNDA, MPUMALANGA PROVINCE

VISUAL ASSESSMENT: REGIONAL CONTEXT

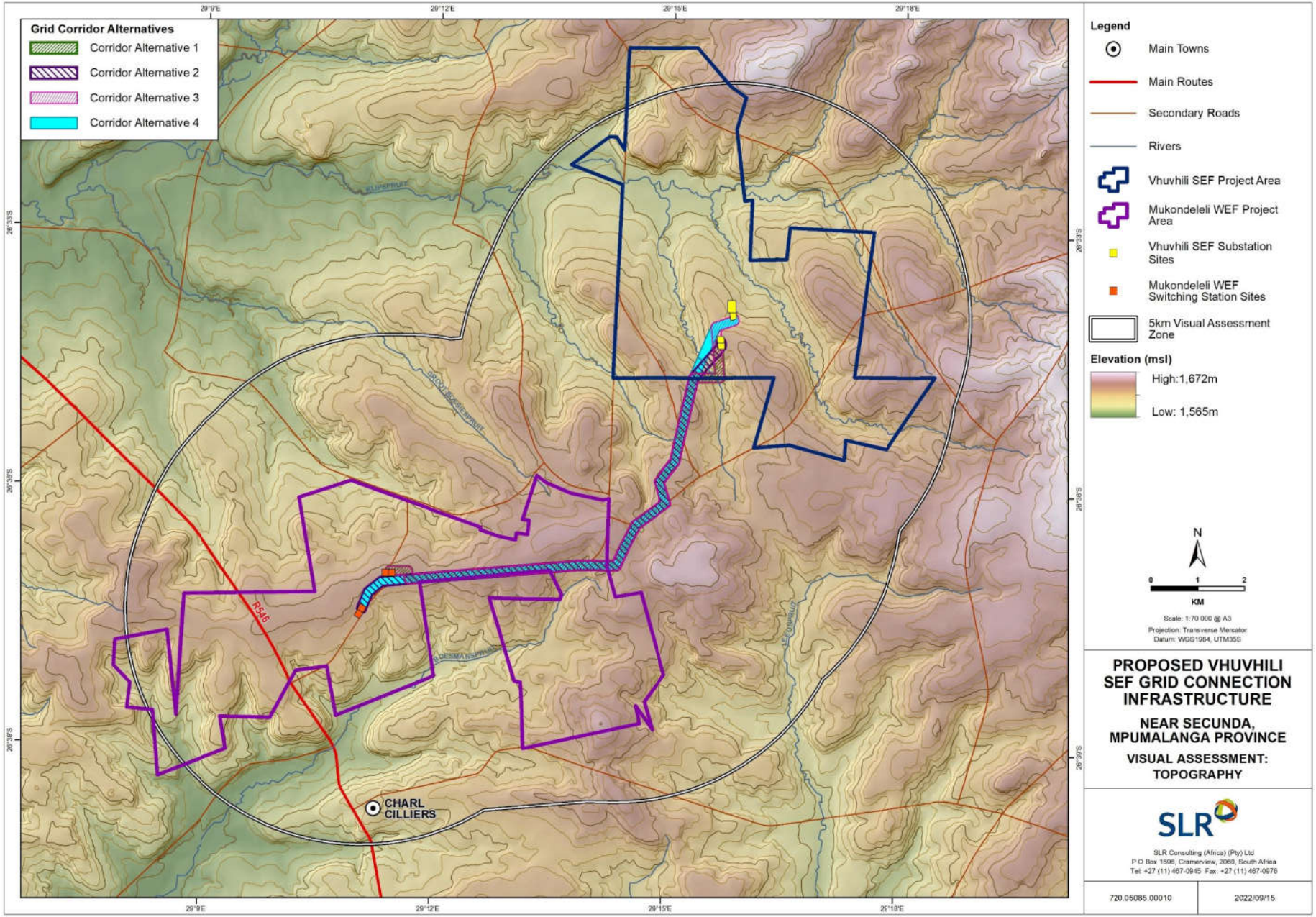
SLR Consulting (Africa) (Pty) Ltd
P O Box 1596, Cramerview, 2060, South Africa
Tel: +27 (11) 467-0945 Fax: +27 (11) 467-0978

720.05085.00010 | 2022/09/15

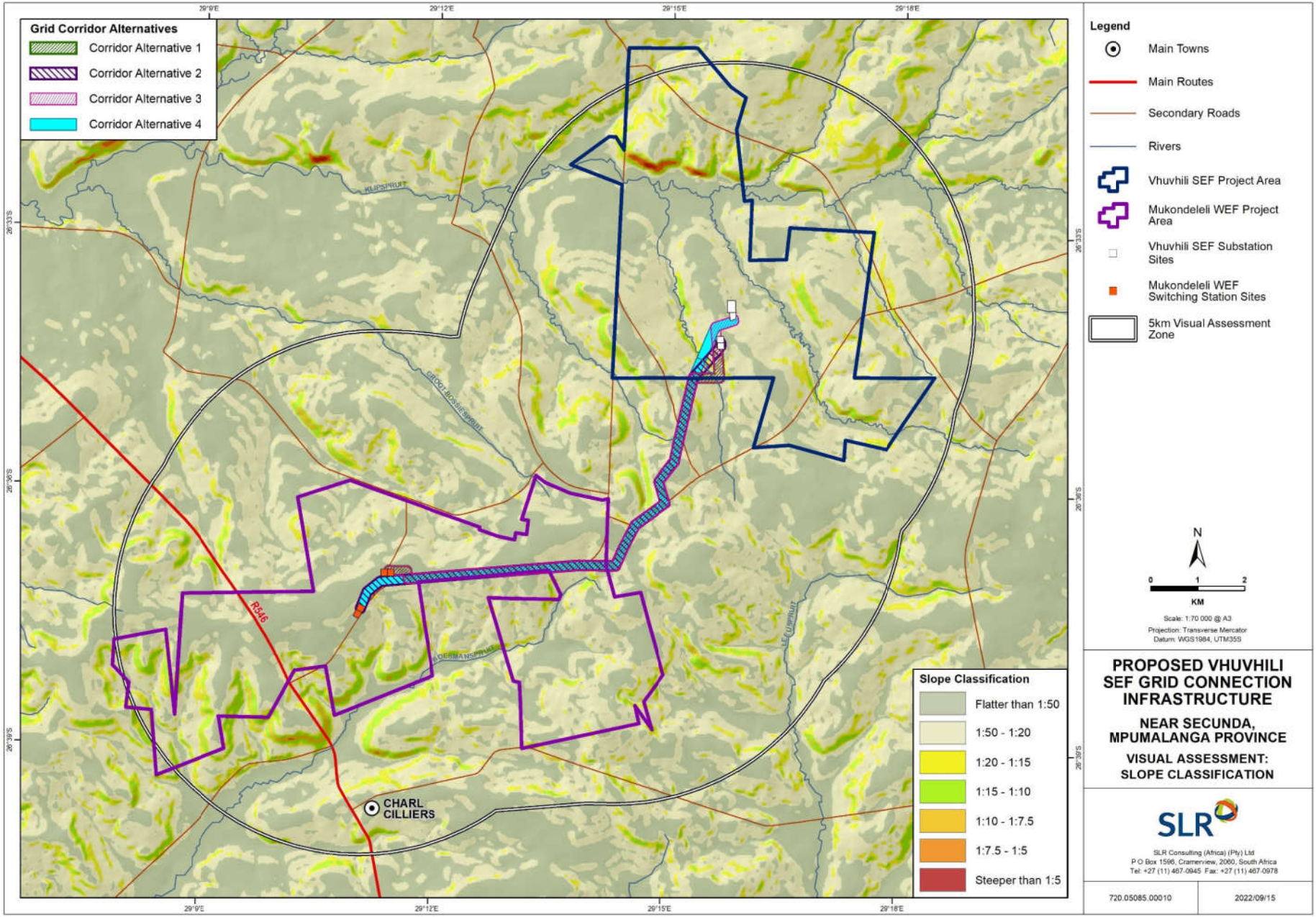
MAP 2: Route Overview



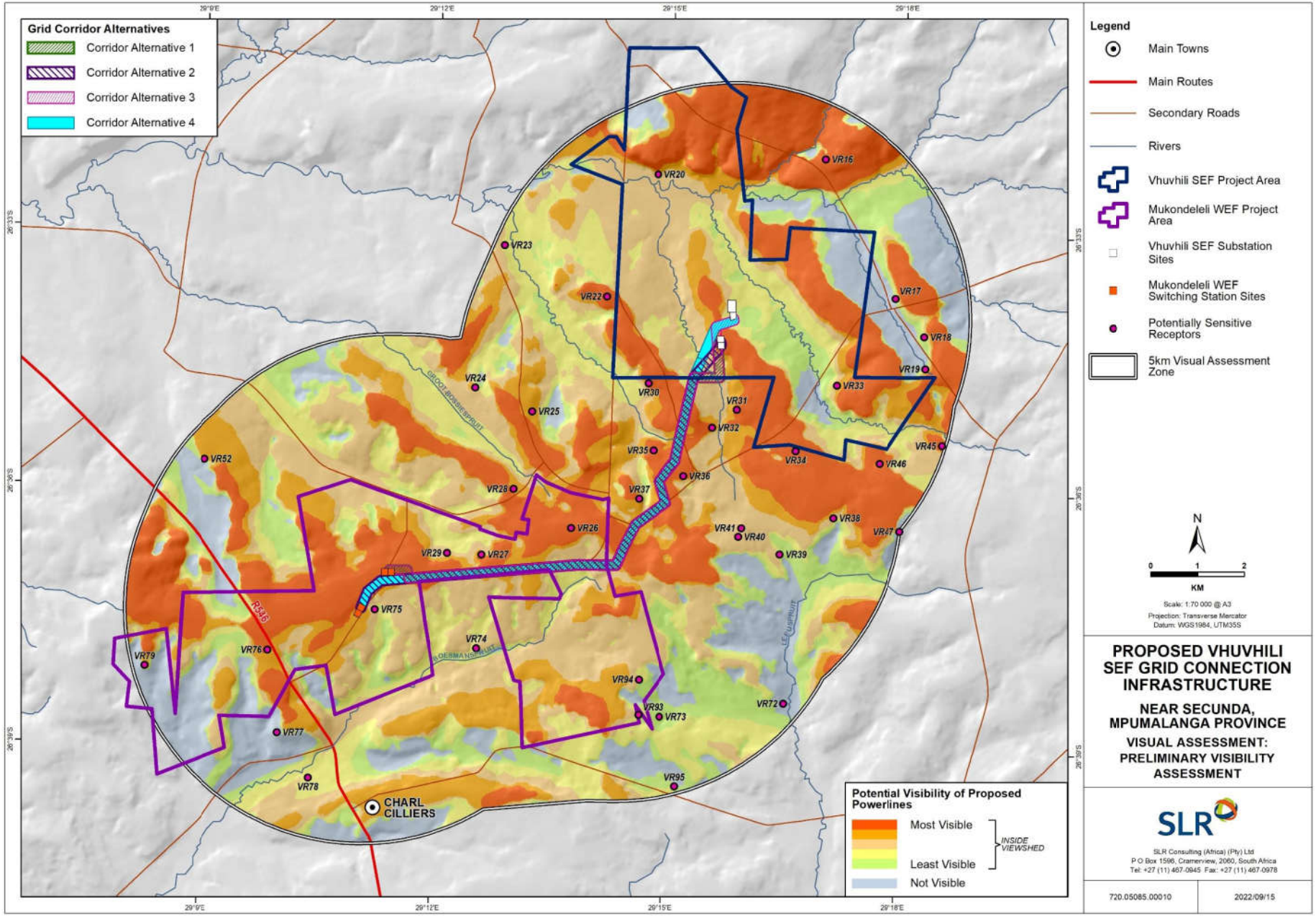
MAP 3: Topography



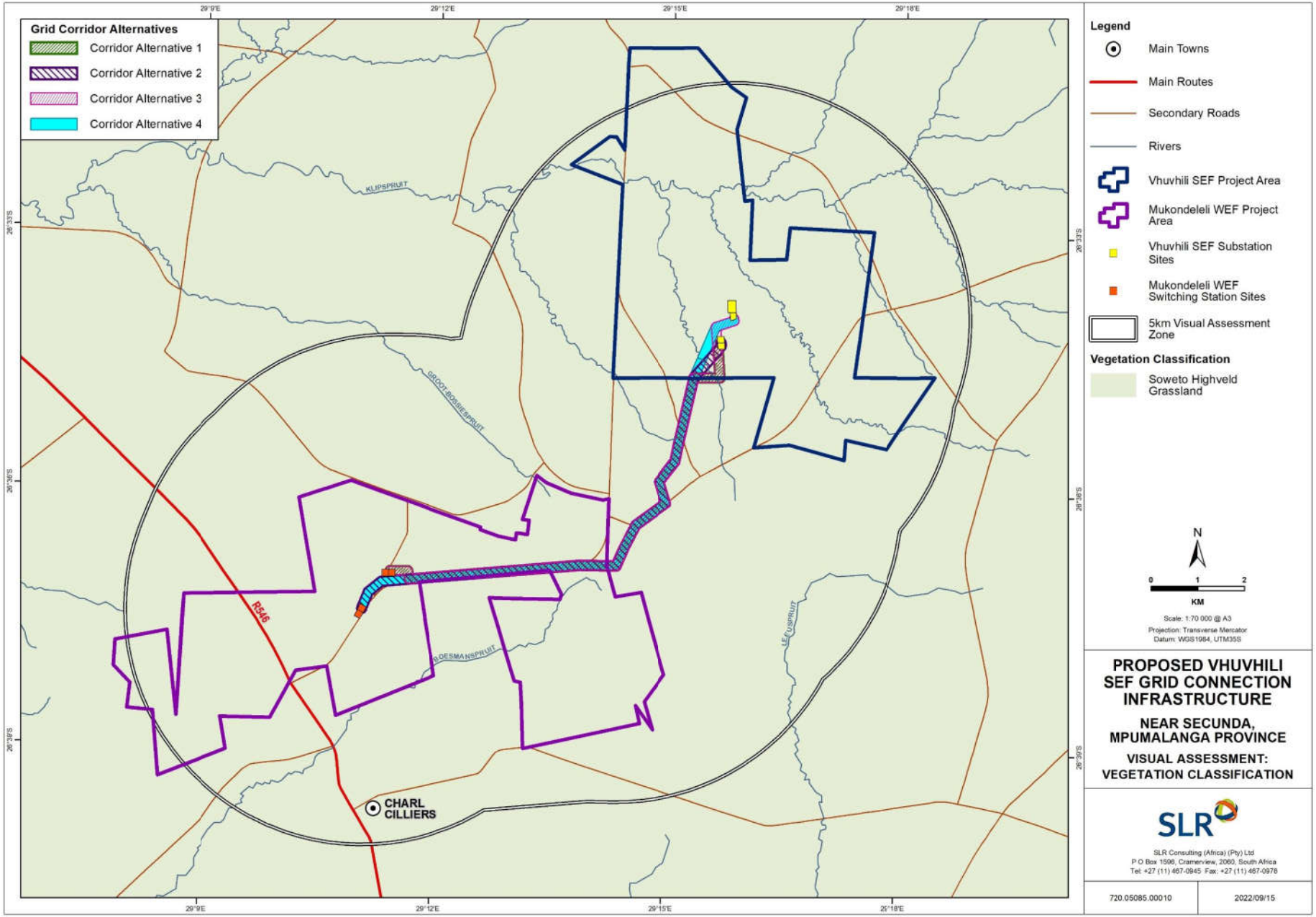
MAP 4: Slope Classification



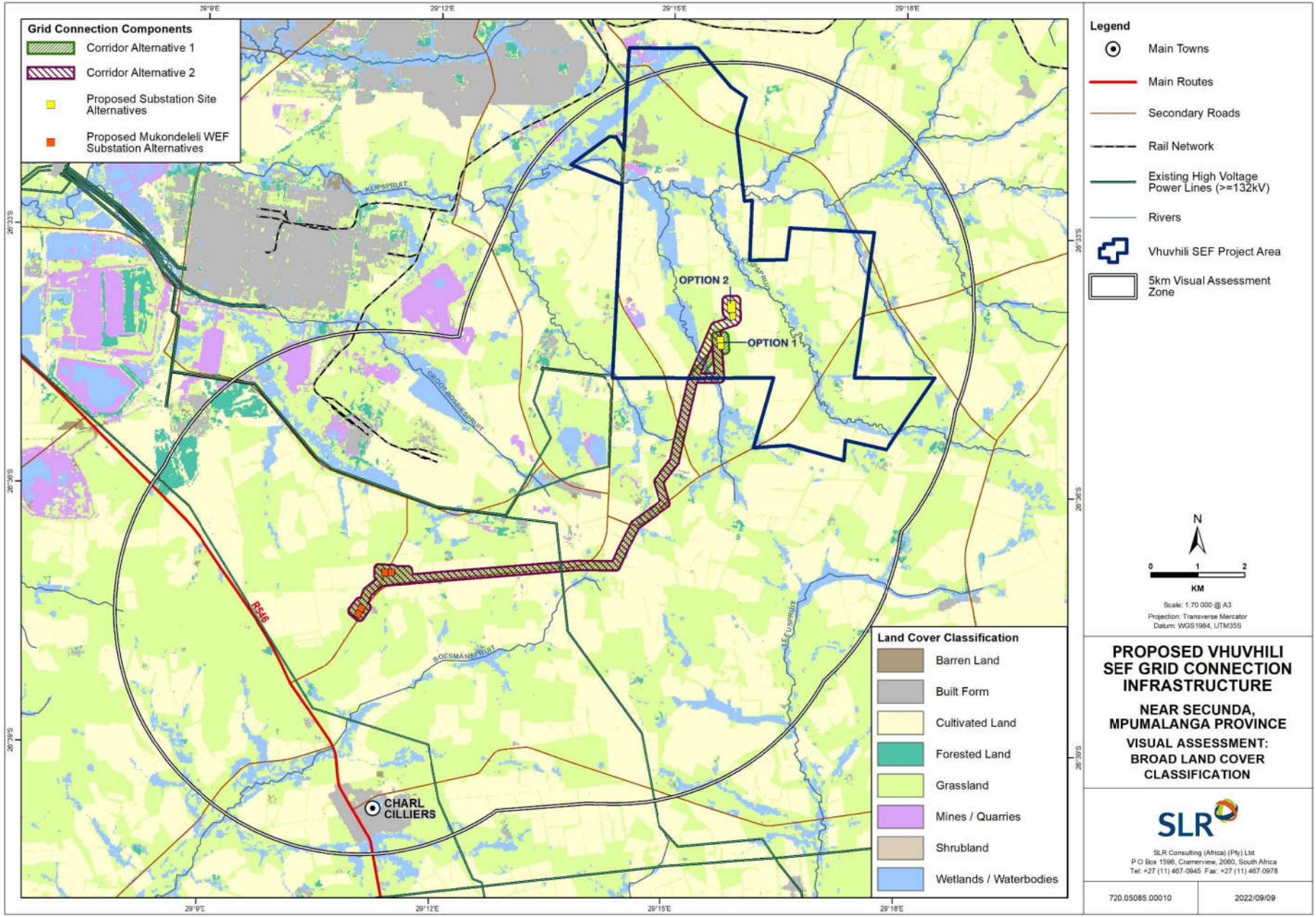
MAP 5: Potential Visibility of EGI



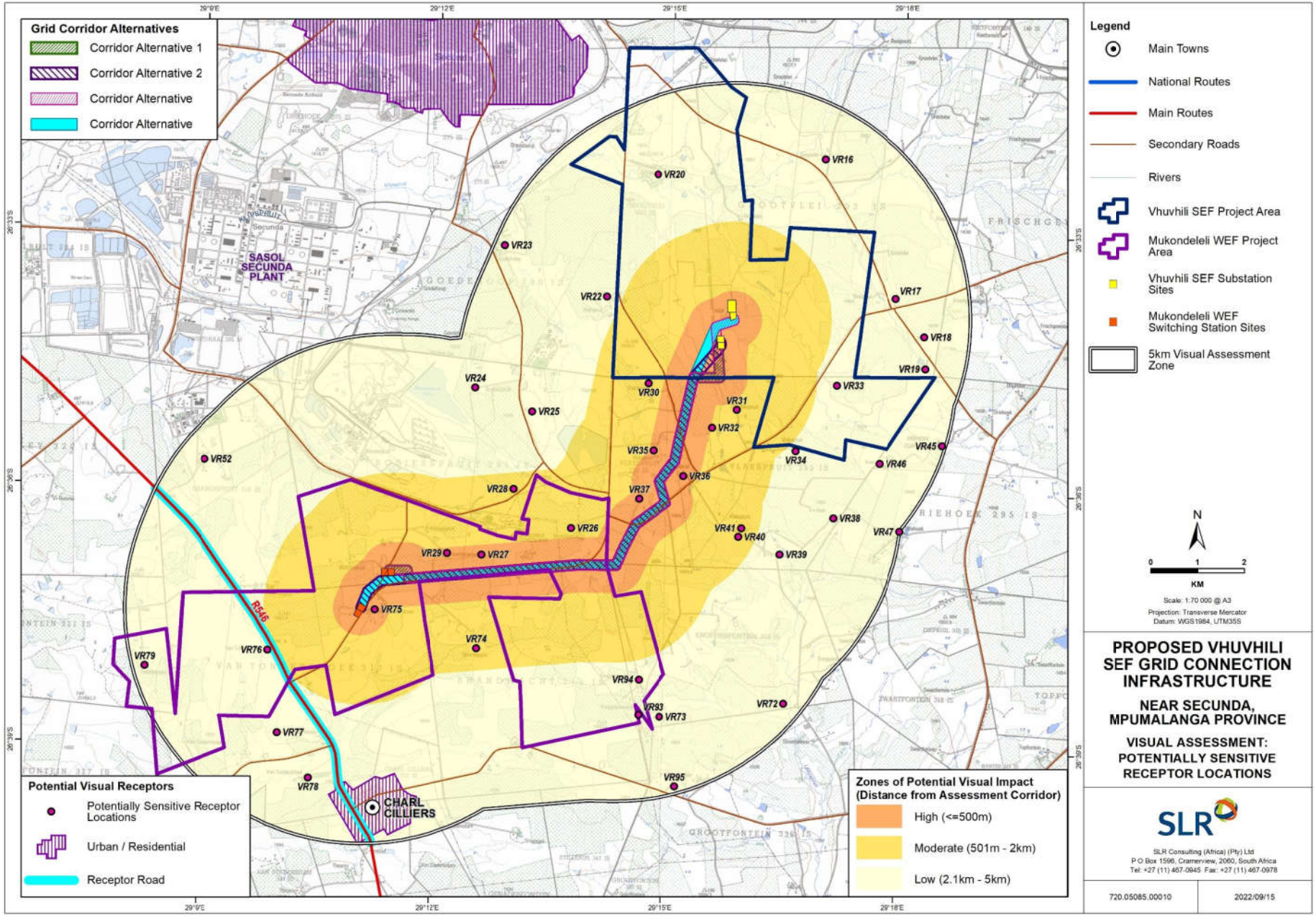
MAP 6: Vegetation Classification



MAP 7: Land Cover Classification



MAP 8: Potentially Sensitive Receptor Locations



MAP 9: Visual Sensitivity on the Vhuvhili EGI Assessment Corridor