VISUAL IMPACT ASSESSMENT FOR THE PROPOSED KRAALTJIES WIND ENERGY FACILITY (EIA PHASE)

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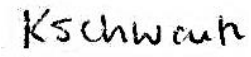

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Regulation GNR 326 of 4 December 2014, as amended 7 April 2017, Appendix 6	**Section of Report**
(a) details of the specialist who prepared the report; and the expertise of that specialist to compile a specialist report including a *curriculum vitae*;	**Section 1.3** **Appendix B**
(b) a declaration that the specialist is independent in a form as may be specified by the competent authority;	**Appendix B**
(c) an indication of the scope of, and the purpose for which, the report was prepared;	**Section 1.2** **Appendix A**
(cA) an indication of the quality and age of base data used for the specialist report;	**Section 1.4** **Section 1.5**
(cB) a description of existing impacts on the site, cumulative impacts of the proposed development and levels of acceptable change;	**Section 6** **Section 8**
(d) the duration, date and season of the site investigation and the relevance of the season to the outcome of the assessment;	**Section 1.4** **Section 2**
(e) a description of the methodology adopted in preparing the report or carrying out the specialised process inclusive of equipment and modelling used;	**Section 1.4**
(f) details of an assessment of the specific identified sensitivity of the site related to the proposed activity or activities and its associated structures and infrastructure, inclusive of a site plan identifying site alternatives;	**Section 6**
(g) an identification of any areas to be avoided, including buffers;	**Section 6.3**
(h) a map superimposing the activity including the associated structures and infrastructure on the environmental sensitivities of the site including areas to be avoided, including buffers;	**Section 6.3**
(i) a description of any assumptions made and any uncertainties or gaps in knowledge;	**Section 2**
(j) a description of the findings and potential implications of such findings on the impact of the proposed activity, including identified alternatives on the environment or activities;	**Section 8**Error! Reference source not found. **Section 10**
(k) any mitigation measures for inclusion in the EMPr;	**Section 9**
(l) any conditions for inclusion in the environmental authorisation;	No specific conditions relating to the visual environment need to be included in the environmental authorisation (EA)
(m) any monitoring requirements for inclusion in the EMPr or environmental authorisation;	**Section 9**
(n) a reasoned opinion— i. whether the proposed activity, activities or portions thereof should be authorised; iA. Regarding the acceptability of the proposed activity or activities; and ii. if the opinion is that the proposed activity, activities or portions thereof should be authorised, any avoidance, management and mitigation measures that should be included in the EMPr or Environmental Authorization, and where applicable, the closure plan;	**Section 12.1**

(o) a summary and copies of any comments received during any consultation process and where applicable all responses thereto; and	No feedback has yet been received from the public participation process regarding the visual environment
(p) any other information requested by the competent authority	No information regarding the visual study has been requested from the competent authority to date.
(2) Where a government notice gazetted by the Minister provides for any protocol or minimum information requirement to be applied to a specialist report, the requirements as indicated in such notice will apply.	**N/A**

EXECUTIVE SUMMARY

South Africa Mainstream Renewable Power Developments (Pty) Ltd (hereafter referred to as "Mainstream"), is proposing to construct the 240MW Kraaltjies Wind Energy Facility (WEF) and associated infrastructure near Beaufort West in the Western Cape Province. The proposed WEF development will be subject to a full Environmental Impact Assessment (EIA) process in terms of the National Environmental Management Act (Act 107 of 1998) (NEMA) as amended and EIA Regulations, 2014 (as amended). Accordingly, an EIA process as contemplated in terms of the EIA Regulations (2014, as amended) is being undertaken in respect of the proposed WEF project. The competent authority for this EIA is the national Department of Forestry, Fisheries and Environment (DFFE). Grid connection infrastructure for the WEF will be subject to a separate Basic Assessment (BA) Process as contemplated in terms of regulation 19 and 20 of the Environmental Impact Assessment Regulations, 2014, which will be undertaken separately to the EIA process and will not form part of this assessment.

This Visual Impact Assessment (VIA) is being undertaken as part of the EIA process.

The VIA has determined that the study area has a largely natural visual character with some pastoral elements. The area has however seen very limited transformation or disturbance and as such the proposed Kraaltjies WEF development is expected to alter the visual character of the area and contrast significantly with the typical land use and / or pattern and form of human elements present. The level of contrast will however be reduced by the presence of the N12 national route and existing high voltage power lines traversing the study area.

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 to moderate visual sensitivity. However, 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.

The area is not typically valued for its tourism significance and there is limited human habitation resulting in relatively few sensitive or potentially sensitive receptors in the area. A total of thirty-five (35) potentially sensitive receptors were identified in the combined study area, all of which are located within 10kms of a turbine placement in the Kraaltjies WEF EIA Phase layout. Three of the receptors identified were found to be linked to leisure-based (specifically nature-based) tourism and are therefore considered to be sensitive receptors although one receptor, Rietpoort Game Farm, was found to be outside the viewshed for the EIA Phase turbine layout. Neither of the remaining sensitive receptors, namely ROAM Safari Lodge and Silwerkaroo Guest House are however expected to experience high levels of visual impact from the proposed WEF facility. Both of these receptors are expected to experience only moderate levels of visual impact. It is believed that ROAM Safari Lodge provides leisure or nature-based tourist facilities located on a relatively large farm property. Details of the levels of activity on different sectors of the farm are not however known and as such, the impact rating matrix for these receptors is based on the assumed location of the main accommodation complex on the property. Accordingly, it should be noted that sections of the property may be slightly closer to the proposed WEF, and as such could be subjected to higher levels of visual impacts, depending on the location of the wind turbines in the final layout. Silwerkaroo Guest House is located inside the proposed Kraaltjies WEF development area and as such, this property forms part of the WEF project. Thus,

it is assumed that the owners have a vested interest in the WEF development and would not perceive the development in a negative light.

The remaining thirty-two identified receptors are all assumed to be farmsteads which are regarded as *potentially* sensitive visual receptors as they are located within a mostly rural setting and the proposed development will likely alter natural vistas experienced from these locations. Seven potentially sensitive receptors were however found to be outside the viewshed for the EIA Phase turbine layout and were excluded from any further assessment.

Six of the potentially sensitive receptor locations are expected to experience high levels of visual impact as a result of the proposed Kraaltjies WEF. The high sensitivity rating relates largely to the fact that these receptors are located in close proximity to the proposed development and they are in zones of high contrast, with little natural screening. Four of these receptors are located within the project areas of adjacent WEF projects, namely Beaufort West WEF, Trakas WEF and Kwagga WEF 1 and this would suggest that the owners / occupants of the relevant farmsteads are not averse to WEF development in the area. In addition, none of these receptors are tourism-related facilities and as such they are not considered to be Sensitive Receptors. Hence the high impact rating assigned to these receptors will not affect the overall impact ratings determined in Section 9.

Seventeen potentially sensitive receptor locations would be subjected to moderate levels of visual impact as a result of the proposed Kraaltjies WEF development, while the remaining two receptors would only experience low levels of visual impact. Eight of these receptors are also located within the project areas of the adjacent WEF projects, namely Beaufort West WEF, Trakas WEF and Kwagga WEF 1 and this would suggest that the owners / occupants of the relevant farmsteads are not averse to WEF development in the area

Although the N12 receptor road traverses the study area, motorists travelling along this route are only expected to experience moderate impacts from the proposed Kraaltjies WEF and associated infrastructure.

An overall impact rating was also conducted as part of the VIA in order to allow the visual impact to be assessed alongside other environmental parameters. The assessment revealed that impacts associated with the proposed Kraaltjies WEF and associated infrastructure will be of low significance during both construction and decommissioning phases. During operation, visual impacts from the WEF would be of medium significance with relatively few mitigation measures available to reduce the visual impact.

Thirteen additional proposed renewable energy developments and infrastructure projects were identified within a 35km radius of the Kraaltjies WEF project, although only eight (8) of these would have any significant impact on the landscape within the visual assessment zone. These projects, namely Koup 1 and Koup 2 WEFs, Beaufort West and Trakas WEFs, Kwagga WEFs 1, 2 and 3 and Heuweltjies WEF, are all located in relatively close proximity to Kraaltjies WEF and are on contiguous properties. These proposed WEFs, in conjunction with the associated grid connection infrastructure, will inevitably introduce an increasingly industrial character into a largely natural, pastoral landscape, thus giving rise to significant cumulative impacts. It is however anticipated that these impacts could be mitigated to acceptable levels with the implementation of the recommendations and mitigation measures stipulated for each of these developments by the visual specialists. In light of this and the relatively low level of human habitation in the study area however, cumulative impacts have been rated as medium.

A comparative assessment of site alternatives for the on-site WEF infrastructure was undertaken to determine which of the site alternatives would be preferred from a visual perspective. No fatal flaws were identified in respect of either of the alternatives for the proposed on-site substation, construction laydown area / BESS facilities and both alternatives were found to be favourable.

From a visual perspective therefore, the proposed Kraalltjies WEF and associated infrastructure project is deemed acceptable and the Environmental Authorization (EA) should be granted. SLR 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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ACRONYMS AND ABBREVIATIONS

Acronym / Abbreviation	Definition
BA	Basic Assessment
DBAR	Draft Basic Assessment Report
DEIAR	Draft Environmental Impact Assessment Report
DEM	Digital Elevation Model
DFFE	Department of Forestry, Fisheries and Environment
DM	District Municipality
DSR	Draft Scoping Report
DTM	Digital Terrain Model
EA	Environmental Authorisation
EIA	Environmental Impact Assessment
EMP	Environmental Management Plan
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
MW	Megawatt
NGI	National Geo-Spatial Information
REF	Renewable Energy Facility
REIPPP	Renewable Energy Independent Power Producer Programme
SACAA	South African Civil Aviation Authority
SANBI	South African National Biodiversity Institute
SEF	Solar Energy Facility
VIA	Visual Impact Assessment
VR	Visual Receptor
WEF	Wind Energy Facility

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.

Sky Space: The area in which the turbine rotors would rotate.

Slope Aspect: Direction in which a hill or mountain slope faces.

Study area / Visual Assessment Zone: The area with a zone of 10km from the outer boundary of the proposed WEF 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 conform 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 for the Proposed Kraaltjies Wind Energy Facility

1. INTRODUCTION

South Africa Mainstream Renewable Power Developments (Pty) Ltd (hereafter referred to as "Mainstream"), is proposing to construct the 240MW Kraaltjies Wind Energy Facility (WEF) and associated infrastructure near Beaufort West in the Western Cape Province. The proposed WEF development will be subject to a full Environmental Impact Assessment (EIA) process in terms of the National Environmental Management Act (Act 107 of 1998) (NEMA) as amended and EIA Regulations, 2014 (as amended). Accordingly, an EIA process as contemplated in terms of the EIA Regulations (2014, as amended) is being undertaken in respect of the proposed WEF project. The competent authority for this EIA is the national Department of Forestry, Fisheries and Environment (DFFE).

Grid connection infrastructure for the WEF will be subject to a separate Basic Assessment (BA) Process as contemplated in terms of regulation 19 and 20 of the Environmental Impact Assessment Regulations, 2014, and will be undertaken separately to the EIA process.

Specialist studies have been commissioned to assess and verify the proposed development under the new Gazetted specialist protocols[1].

1.1 SCOPE AND OBJECTIVES

This Visual Impact Assessment (VIA) is being undertaken as part of the EIA process. The aim of the VIA is to identify potential visual issues associated with the development of the proposed WEF and associated infrastructure, as well as to determine the potential extent of visual impacts. This will be achieved by determining the character of the visual environment and identifying areas of potential visual sensitivity that may be subject to visual impacts. The visual assessment focuses on the potentially sensitive visual receptor locations and provides an assessment of the magnitude and significance of the visual impacts associated with the WEF and the associated infrastructure.

1.2 TERMS OF REFERENCE

The terms of reference for this VIA are included in Appendix A.

1.3 SPECIALIST CREDENTIALS

This VIA was undertaken by Kerry Schwartz, a GIS specialist with more than 25 years' experience in the application of GIS technology in various environmental, regional planning and infrastructural projects. Kerry's GIS and spatial analysis 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 and the relevant VIA project experience is listed in the table below.

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

[1] Formally gazetted on 20 March 2020 (GN No. 320)

Table 1: Relevant Project Experience

Visual Specialist	SLR Consulting – Kerry Schwartz
Contact Details	klschwartz@slrconsulting.com
Qualifications	BA (Geography), University of Leeds 1982
VIA Expertise	• VIAs (EIAs) for the proposed Koup 1 and Koup 2 WEFs and associated Grid Connection Infrastructure, near Beaufort West, Western Cape Province. • VIA (EIA) for the proposed Oya Energy Facility near Matjiesfontein, Western Cape Province; • VIA (BA) for the proposed construction of 132kV power lines to serve the authorised Loeriesfontein 3 PV Solar Energy Facility near Loeriesfontein, Northern Cape Province; • VIA (BA) for the proposed construction of the Oya 132kV power line near Matjiesfontein, Northern and Western Cape Provinces; • VIAs (BA) for the proposed Gromis WEF and associated Grid Connection Infrastructure, near Komaggas, Northern Cape Province. • VIAs (BA) for the proposed Komas WEF and associated Grid Connection Infrastructure, near Komaggas, Northern Cape Province. • VIAs (Scoping and Impact Phase) for the proposed Mooi Plaats, Wonderheuvel and Paarde Valley solar PV plants near Noupoort in the Northern and Eastern Cape Provinces. • VIAs (Scoping and Impact Phase) for the proposed Sendawo 1, 2 and 3 solar PV energy facilities near Vryburg, North West Province. • VIAs (Scoping and Impact Phase) for the proposed Tlisitseng 1 and 2 solar PV energy facilities near Lichtenburg, North West Province. • VIA for the proposed Nokukhanya 75MW Solar PV Power Plant near Dennilton, Limpopo Province. • VIAs (Scoping and Impact Phase) for the proposed Helena 1, 2 and 3 75MW Solar PV Energy Facilities near Copperton, Northern Cape Province. • VIA (EIA) for the proposed Paulputs WEF near Pofadder in the Northern Cape Province. • VIA (EIA) for the proposed development of the Rondekop WEF near Sutherland in the Northern Cape Province. • VIA (BA) for the proposed development of the Tooverberg WEF near Touws Rivier in the Western Cape Province. • VIA (BA) for the proposed development of the Kudusberg WEF near Sutherland, Northern and Western Cape Provinces. • VIA (Scoping and Impact Phase) for the proposed development of the Kuruman Wind Energy Facility near Kuruman, Northern Cape Province. • VIA (Scoping and Impact Phase) for the proposed development of the Phezukomoya Wind Energy Facility near Noupoort, Northern Cape Province. • VIA (Scoping and Impact Phase) for the proposed development of the San Kraal Wind Energy Facility near Noupoort, Northern Cape Province. • VIAs (Scoping and Impact Phase) for the proposed Graskoppies Wind Farm near Loeriesfontein, Northern Cape Province.

	• VIAs (Scoping and Impact Phase) for the proposed Hartebeest Leegte Wind Farm near Loeriesfontein, Northern Cape Province. • VIAs (Scoping and Impact Phase) for the proposed Ithemba Wind Farm near Loeriesfontein, Northern Cape Province. • VIAs (Scoping and Impact Phase) for the proposed Xha! Boom Wind Farm near Loeriesfontein, Northern Cape Province

1.4 ASSESSMENT METHODOLOGY

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

1.4.1 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 initially sourced from spatial databases provided by 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 the site visit.

1.4.2 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 and assessed in order to determine the impact of the proposed development on these receptor locations.

1.4.3 Fieldwork and photographic review

A four (4) day site visit was undertaken between the 21st and the 24th of June 2021 (mid winter). 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).

1.4.4 Visual / Landscape Sensitivity

GIS technology was used to identify any specific areas of potential visual sensitivity within the Kraaltjies WEF development site. These would be areas where the placement of wind turbines would result in the greatest probability of visual impacts on potentially sensitive visual receptors.

In addition, the National Environmental Screening Tool[2] was examined to determine any relative landscape sensitivity in respect of the proposed development.

[2] https://screening. environment.gov.za/screeningtool/

1.4.5 Impact Assessment

A rating matrix was used to provide an objective evaluation of the significance of the visual impacts associated with the proposed development, both before and after implementing mitigation measures. Mitigation measures were identified (where possible) in an attempt to minimise the visual impact of the proposed development. The rating matrix considers a number of different factors including geographical extent, probability, reversibility, irreplaceable loss of resources, duration and intensity, in order to assign a level of significance to the visual impact of the project.

A separate rating matrix was used to assess the visual impact of the proposed development on each visual receptor location (both sensitive and potentially sensitive), as identified. This matrix is based on three (3) 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.

1.4.6 Consultation with I&APs

Continuous consultation with Interested and Affected Parties (I&APs) undertaken during the public participation process will be used (where available) to help establish how the proposed development will be perceived by the various receptor locations and the degree to which the impact will be regarded as negative. Although I&APs have not yet provided any feedback in this regard, feedback received during the EIA phase will be addressed in later updates of this report. .

1.5 SOURCES OF INFORMATION

The main sources of information utilised for this VIA included:

- Project description for the proposed development provided by Mainstream;
- Elevation data from 25m Digital Elevation model (DEM) from the National Geo-Spatial Information (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;
- 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 3 2022);
- The National Web-Based Environmental Screening Tool, Department of Forestry, Fisheries and Environment (DFFE);
- VIA for the proposed Beaufort West Renewable Energy Facilities, Bernard Oberholzer, 2010.
- VIAs for the proposed Koup 1 and Koup 2 WEFs, SiVEST, 2021.

2. ASSUMPTIONS AND LIMITATIONS

- Wind turbines are very large structures and could impact on visual receptors that are located relatively far away, particularly in areas where the terrain is very flat. Given the nature of the receiving environment and the height of the proposed wind turbines, the study area or visual

assessment zone is assumed to encompass an area of 10km from the proposed WEF – i.e. an area of 10km from the boundary of the WEF project area. The application of the 10km limit on the visual assessment zone relates to the fact that visual impacts decrease exponentially over distance. Thus although the WEF may still be visible beyond 10km, the degree of visual impact would diminish considerably. As such, the need to assess the impact on potential receptors 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 21st and the 24th of June 2021. Due to the extent of the study area however, and the fact that many of the identified receptors are farmhouses on private property, it was not possible to visit or verify every potentially sensitive visual receptor location. As such, a number of broad assumptions have been made in terms of the likely sensitivity of the receptors to the proposed development. Sensitive receptor locations typically include sites such as tourism or recreational facilities and scenic locations within natural settings which are likely to be adversely affected by the visual intrusion of the proposed development. It should be noted however 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". 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.
- As stated, 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.
- Where receptors have been identified within the WEF project area, it has been assumed that the land owners or residents at these locations support the proposed renewable energy development and would not view the project in a negative light.
- Based on the project description provided by Mainstream, all analysis for this VIA is based on a worst-case scenario where turbine heights are assumed to be 300 m at the blade tip. Substation, Battery Energy Storage (BESS) facilities and office building heights are assumed to be less than 25m in height.
- Due to the varying scales and sources of information; maps may have minor inaccuracies. Terrain data for this area, derived from the National Geo-Spatial Information (NGI)'s 25m Digital Elevation Model (DEM), is fairly coarse and somewhat inconsistent and as such, localised topographic variations in the landscape may not be reflected on the DEM used to generate the viewshed(s) and visibility analysis conducted in respect of the proposed development.

- In addition, the viewshed / visibility analysis does 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 Environmental Impact Assessment Report (DEIR) for the WEF will however be incorporated into further drafts of this report, if relevant.
- At the time of undertaking the visual study no information was available regarding the type and intensity of lighting that will be required for the proposed WEF and therefore the potential impact of lighting at night has not been assessed at a detailed level. However, lighting requirements are relatively similar for all WEFs and as such, general measures to mitigate the impact of additional light sources on the ambiance of the nightscape have been provided.
- At the time of undertaking the visual study no *detailed* information was available regarding the design and layout of services and infrastructure associated with the proposed development. The potential visual impact of the typical infrastructure associated with a wind farm has therefore been assessed.
- In the light of the fact that the renewable energy industry is still relatively new in South Africa, this report draws on international literature and web material to describe the generic impacts associated with WEFs.
- Photomontages have been compiled in respect of the proposed wind turbine layout provided for the EIA phase of the project. These photomontages have been provided merely as indicative illustrations and should not be seen as an accurate representation of the proposed Kraaltjies turbine layout
- Photomontages have not been compiled for all sensitive and potentially sensitive receptor locations. Instead, locations were selected for modelling purposes to provide an indication of how views could potentially be transformed from different locations within the study area. It should be noted that the photomontages are specific to each location, and that even sites in close proximity to one another may be affected in different ways by the proposed WEF development.
- The visual models represent a visual environment that assumes that all vegetation cleared during construction will be restored to its current state after the construction phase. This is however an improbable scenario as some vegetation cover may be permanently removed which may reduce the accuracy of the models generated.
- Although the on-site infrastructure associated with the WEF has not been included in the models, this is not considered to be a major limitation as the visual impact of associated infrastructure would be minor when considering the scale of the infrastructural elements in relation to wind turbines.
- This study includes an 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.
- Every effort has been made to obtain information for the surrounding planned renewable energy developments (including specialist studies, assessment reports and Environmental Management Programmes). However, some of the documents are not currently publicly available for download. The available information was factored into the cumulative impact assessment (Section 8.6).

- It should be noted that the fieldwork for this study was undertaken in late June 2021, during mid-winter. However, the study area is typically characterised by low levels of rainfall all year round and therefore the season is not expected to affect the significance of the potential visual impact of the proposed Kraaltjies WEF development and the associated infrastructure.
- The overall weather conditions in the study area have certain visual implications and are expected to affect the visual impact of the proposed development to some degree. Clear weather conditions tend to prevail throughout the year in the study area. In these clear conditions, the wind turbines would present a greater contrast with the surrounding environment than they would on an overcast day. Clear and overcast weather conditions were experienced during the field investigation and this factor was taken into consideration when undertaking this VIA.
- All mapping inputs for this VIA were originally provided by SiVEST SA (Pty) Ltd, the Environmental Assessment Practitioner (EAP) for this project and maps have since been updated to reflect the WEF layout provided for the EIA Phase of the project.
-

3. TECHNICAL DESCRIPTION

3.1 PROJECT LOCATION

The proposed WEF is located approximately 52km south of Beaufort West in the Western Cape Province and is within the Beaufort West Local Municipality, in the Central Karoo District Municipality (Figure 1).

The WEF application site as shown on the locality map below (Figure 2) is approximately 3994.9 hectares (ha) in extent and incorporates the following farm portions:

- Portion 10 of the Farm Brits Eigendom No 374; and
- Portion 25 of the Farm Brits Eigendom No 374.

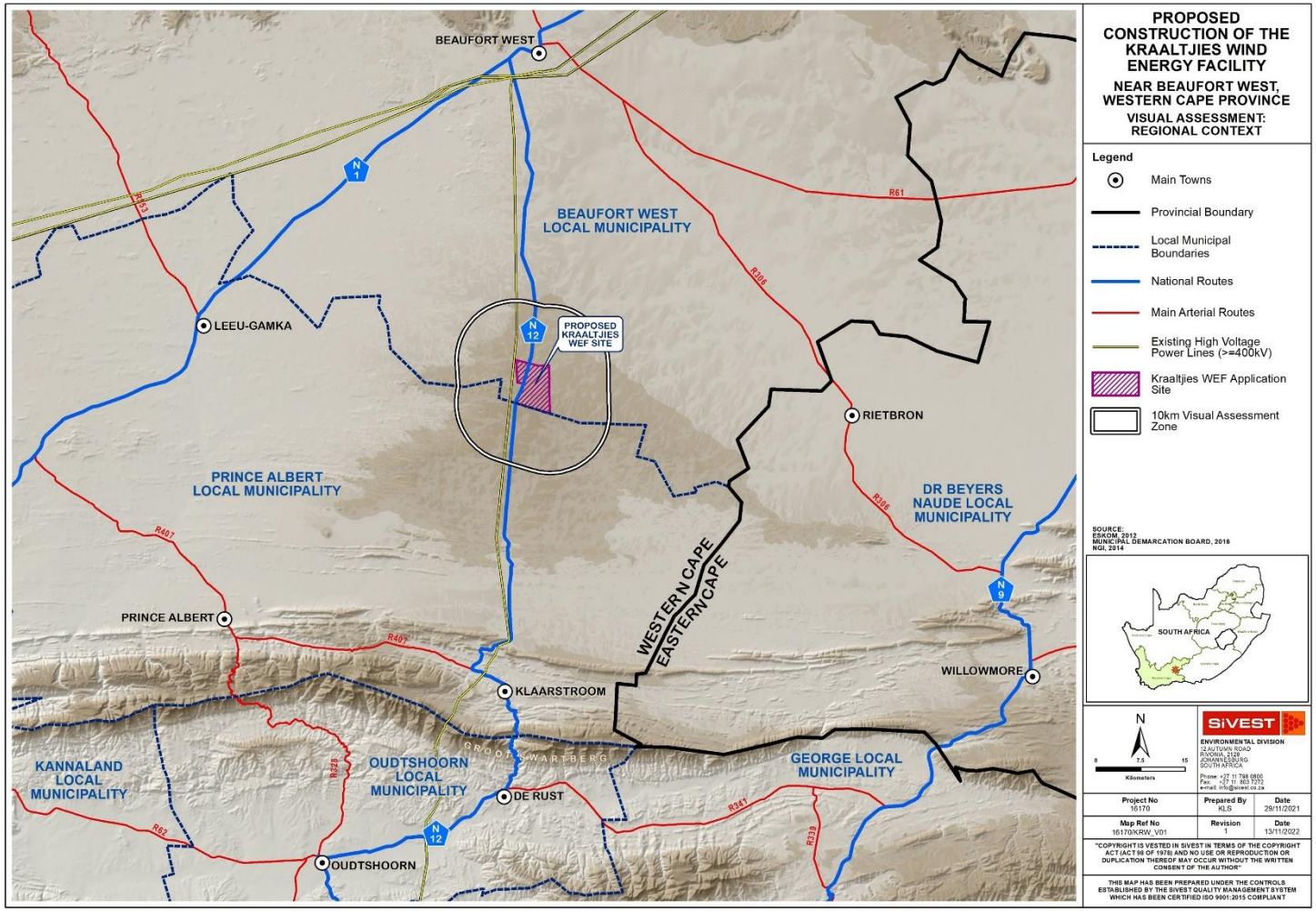

Figure 1: Kraaltjies WEF in the regional context

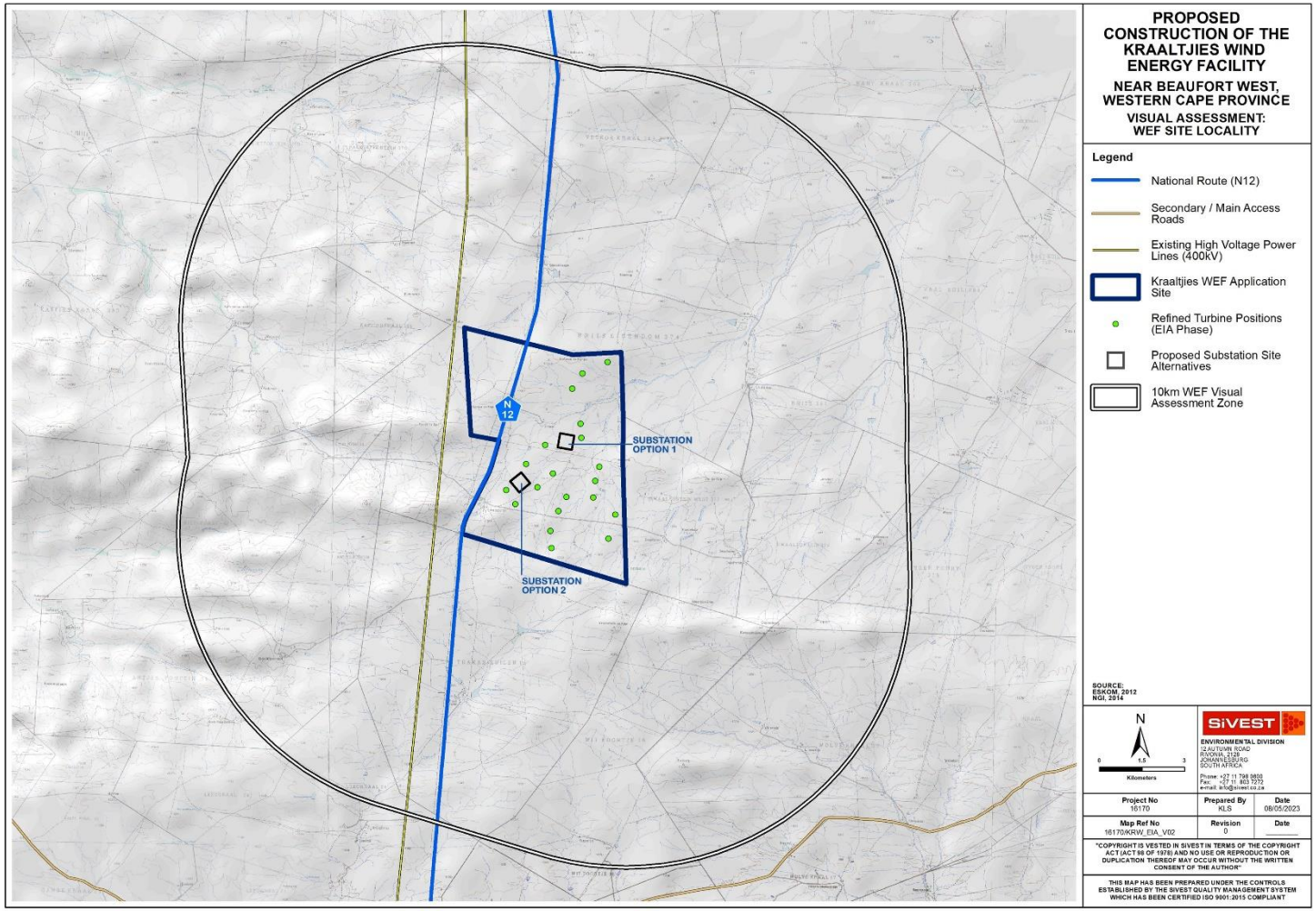

Figure 2: Kraaltjies WEF site locality

3.2 PROJECT TECHNICAL DETAILS

3.2.1 WEF Components

It is anticipated that the proposed Kraaltjies WEF will comprise up to twenty (20) turbines with a maximum total energy generation capacity of up to approximately 240MW. The electricity generated by the proposed WEF development will be fed into the national grid via a 132kV overhead power line. The 132kV overhead power line will however require a separate EA and is subject to a separate BA process, which will be undertaken independently of this EIA process. In summary, the proposed Kraaltjies WEF will include the following components:

- Up to 20 wind turbines, , with a maximum export capacity of approximately 240MW. The final number of turbines and layout of the WEF will, however, be dependent on the outcome of the Specialist Studies conducted during the EIA process and final design;
- Each wind turbine will have a hub height of up to 120m and 200m and rotor diameter of up to approximately 200m (Figure 3);
- Permanent compacted hardstanding areas / platforms (also known as crane pads) of approximately 90m x 50m (total footprint of approx. 4 500m2) per turbine during construction and for on-going maintenance purposes for the lifetime of the proposed development;
- Each wind turbine will consist of a foundation of up to approximately 15m x 15m in diameter. In addition, the foundations will be up to approximately 3m in depth;
- Electrical transformers (690V/11-33kV) adjacent to each wind turbine (typical footprint of up to approximately 2m x 2m) to step up the voltage to 11-33kV;
- One (1) new 11kV - 33/132kV on-site substation consisting of independent Power Producer (IPP) portion (33kv portion to form part of this environmental authorisation application form) and an Eskom portion (132kV portion of the shared 11-33kV/132kV portion) including associated equipment and infrastructure, occupying a total area of approximately 25ha (i.e. 250 000m^2). The Eskom portion, which will be applied for under a separate environmental authorisation application, will be ceded over to Eskom once the IPP has constructed the Eskom switchyard. The necessary Transfer of Rights will be lodged with DFFE when required at a later stage
- A Battery Energy Storage System (BESS) will be located next to the IPP portion / yard of the shared onsite 11-33kV/132kV substation and will be included as part of the 25ha. The storage capacity and type of technology would be determined at a later stage during the development phase, but most likely will comprise an array of containers, outdoor cabinets and/or storage tanks;
- The wind turbines will be connected to the proposed substation via medium voltage (11-33kV) underground cabling and overhead power lines.
- Internal road servitude of 8m and a 20m underground cable or overhead line servitude.
- The main access road will be approximately 8 - 12 m wide. During construction the roads will be up to 13.5m in some parts (i.e. for bringing in transformers etc), after construction they will be rehabilitated back down to 8m or less. Turns will have a radius of up to 50m for abnormal loads (especially turbine blades) to access the various wind turbine positions. It should be noted that the proposed application site will be accessed via the N12 National Route; During operation, internal roads with a width of up to approximately 5m (excluding reserves) wide will provide access to each wind turbine. Existing site roads will be used wherever possible, although new site roads will be constructed where necessary;

- One (1) construction laydown / staging area of up to approximately 3ha. It should be noted that no construction camps will be required in order to house workers overnight as all workers will be accommodated in the nearby town;
- Operation and Maintenance (O&M) buildings, including offices, a guard house, operational control centre, O&M area / warehouse / workshop and ablution facilities to be located on the site identified for the substation. This will be included in the 11-33kV portion/yard of the on-site substation area 25 ha of the IPP portion of the onsite substation;
- A wind measuring lattice (approximately 140m in height) mast has already been strategically placed within the wind farm application site in order to collect data on wind conditions;
- No new fencing is envisaged at this stage. Current fencing is standard farm fence approximately 1-1.5m in height. Fencing might be upgraded (if required) to be up to approximately 2m in height; and
- Water will either be sourced from existing boreholes located within the application site or will be trucked in, should the boreholes located within the application site be limited.

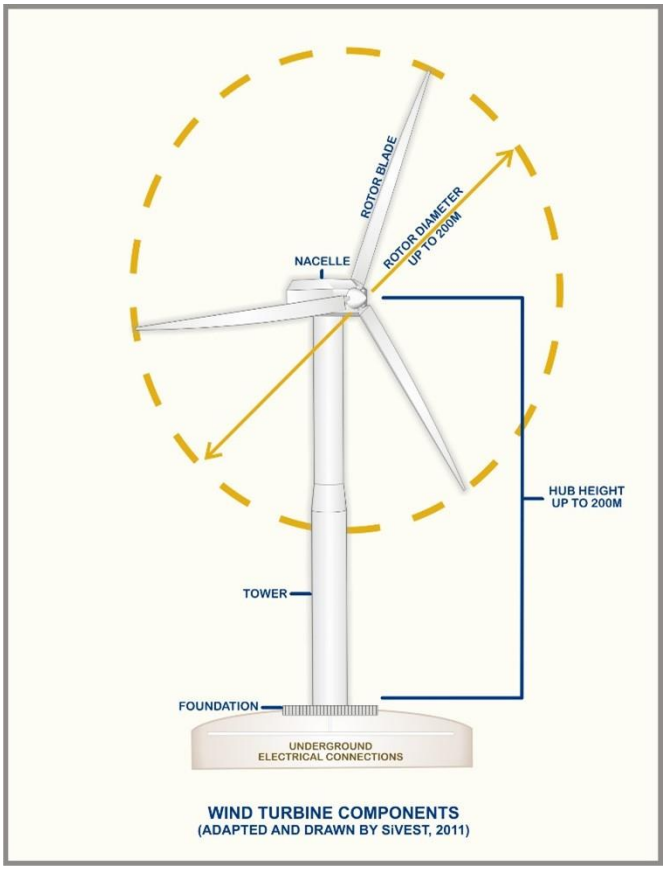

Figure 3: Typical components of a wind turbine

3.2.2 EIA Layout Alternatives

Design and layout alternatives for the proposed WEF are being considered and assessed as part of the EIA. At this stage these include two alternatives for the Substation, Construction Laydown Area / BESS locations (Figure 4).

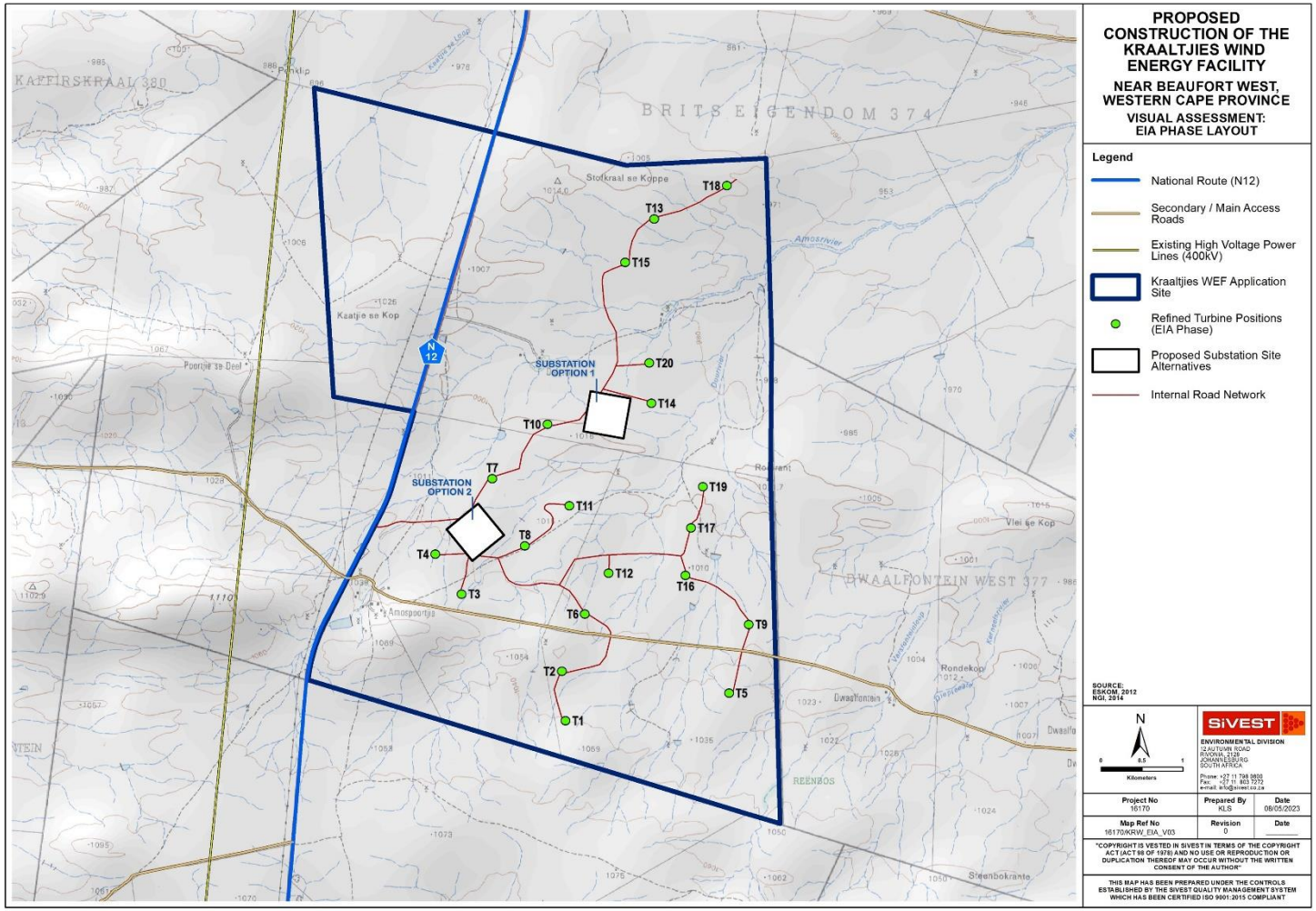

Figure 4: Preliminary Kraaltjies WEF layout

4. LEGAL REQUIREMENTS AND GUIDELINES

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

In terms of the National Environmental Management Act, 1998 (Act No. 107 of 1998), (NEMA) and the EIA Regulations 2014 (as amended), the proposed development includes listed activities which require a full Environmental Impact Assessment (EIA) or a Basic Assessment (BA) to be undertaken. As part of the EIA process, the need for a VIA to be undertaken has been identified in order to assess the visual impact of the proposed WEF and associated infrastructure.

There is currently no legislation in 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)
- 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.

This assessment has been 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). Accordingly, this specialist visual assessment has been undertaken in compliance with Appendix 6 of 2014 NEMA EIA Regulations (as amended).

5. FACTORS INFLUENCING VISUAL IMPACT

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.

5.1 VISUAL ENVIRONMENT

WEF developments are not features of the natural environment but are rather a representation of human (anthropogenic) alteration. As such, these developments are likely to be perceived as visually intrusive when placed in largely undeveloped landscapes that have a natural scenic quality and where tourism activities are practised that are dependent on the enjoyment of, or exposure to, the scenic or aesthetic character of the area. Residents and visitors to these areas could perceive the development to be highly incongruous in this context and may regard the development as an unwelcome intrusion which degrades the natural character and scenic beauty of the area, and which could potentially even compromise the practising of tourism activities in the area. In this instance however, the area is not typically valued for its tourism significance and no formal protected areas were identified in the broader area. In addition, very few, leisure-based tourism activities, and no recognised tourism routes were identified in the study area.

In addition, it should be noted that the experience of the viewer is highly subjective and there are those who may perceive wind turbines, for example, as striking elements in an otherwise barren landscape.

The presence of other anthropogenic features associated with the built environment may not only obstruct views but also influence the perception of whether a development is a visual impact. In industrial areas for example, where other infrastructure and built form already exists, the visual environment could be considered to be 'degraded' and thus the introduction of a WEF and associated infrastructure into this setting may be considered to be less visually intrusive than if there was no existing built infrastructure visible.

5.2 SUBJECTIVE EXPERIENCE OF THE VIEWER

The perception of the viewer / receptor toward an impact is highly subjective and involves 'value judgements' on behalf of the receptor. The viewer's perception is usually dependent on the age, gender, activity preferences, time spent within the landscape and traditions of the viewer (Barthwal, 2002). Thus, certain receptors may not consider a WEF and the associated infrastructure to be a negative visual impact as this type of development is often associated with employment creation, social upliftment and the general growth and progression of an area and could even have positive connotations.

5.3 TYPE OF VISUAL RECEPTOR

Visual impacts can be experienced by different types of receptors, including people living or working, or driving along roads within the viewshed of the proposed development. The receptor type in turn affects the nature of the typical 'view', with views being permanent in the case of a residence or other place of human habitation, or transient in the case of vehicles moving along a road. The nature of the view experienced affects the intensity of the visual impact experienced.

It is important to note that visual impacts are only experienced when there are receptors present to experience this impact. Thus, where there are no human receptors or viewers present, there are not likely to be any visual impacts experienced.

5.4 VIEWING DISTANCE

Viewing distance is a critical factor in the experiencing of visual impacts, as beyond a certain distance, even large developments tend to be much less visible, and difficult to differentiate from the surrounding landscape. The visibility of an object is likely to decrease exponentially as one moves away from the source of impact, with the impact at 1 000m being considerably less than the impact at a distance of 500m.

The proposed wind turbines, at a maximum height of 300m, would be the most prominent elements of the WEF facility development. Visual impacts resulting from wind turbines would be greatest within a 1km to 2km radius, and although turbines may still be visible beyond 10km, the degree of visual impact would diminish considerably at this distance (Figure 5).

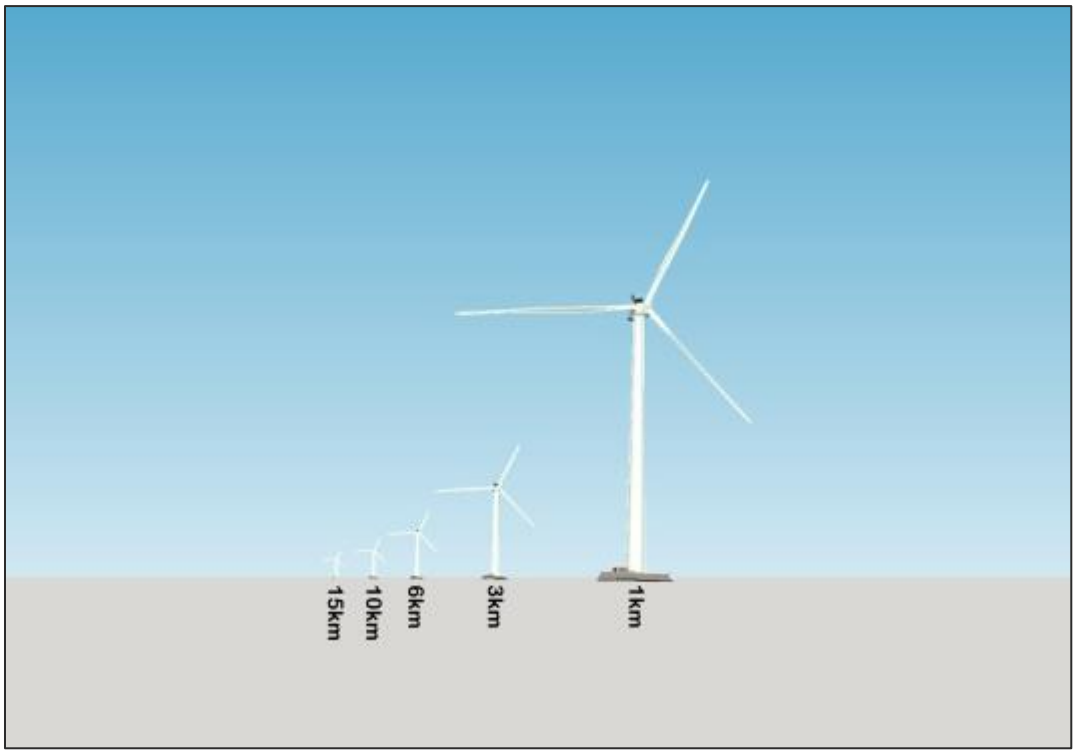

Figure 5: Conceptual representation of the diminishing visibility of a wind turbine over distance.

6. VISUAL CHARACTER AND SENSITIVITY OF THE STUDY AREA

Defining the visual character of an area is an important part of assessing visual impacts as this establishes the visual baseline or existing visual environment in which the development would be constructed. The visual impact of a development is measured by establishing the degree to which the development would contrast with, or conform to, the visual character of the surrounding area. The inherent sensitivity of the area to visual impacts or visual sensitivity is thereafter determined, based on the visual character, the economic importance of the scenic quality of the area, inherent cultural value of the area and the presence of visual receptors.

Physical and land use related characteristics, as outlined below, are important factors contributing to the visual character of an area.

6.1 PHYSICAL AND LAND USE CHARACTERISTICS

6.1.1 Topography

The site proposed for the Kraaltjies WEF development is located in an area largely characterised by flat to gently undulating plains interspersed with low ridges and dry river courses (Figure 6). Areas of slightly greater relief associated with marginally higher elevations are largely concentrated in the southern sector of the study area.

Flat to undulating terrain prevails across much of the WEF development site, with no steep slopes in evidence (Figure 7).

Maps showing the topography and slopes within and in the immediate vicinity of the assessment area are provided in Figure 8 and Figure 9.

Figure 6: Typical terrain in the Kraaltjies WEF study area including undulating plains interspersed with low ridges.

Figure 7: View north across the Kraaltjies WEF project site.

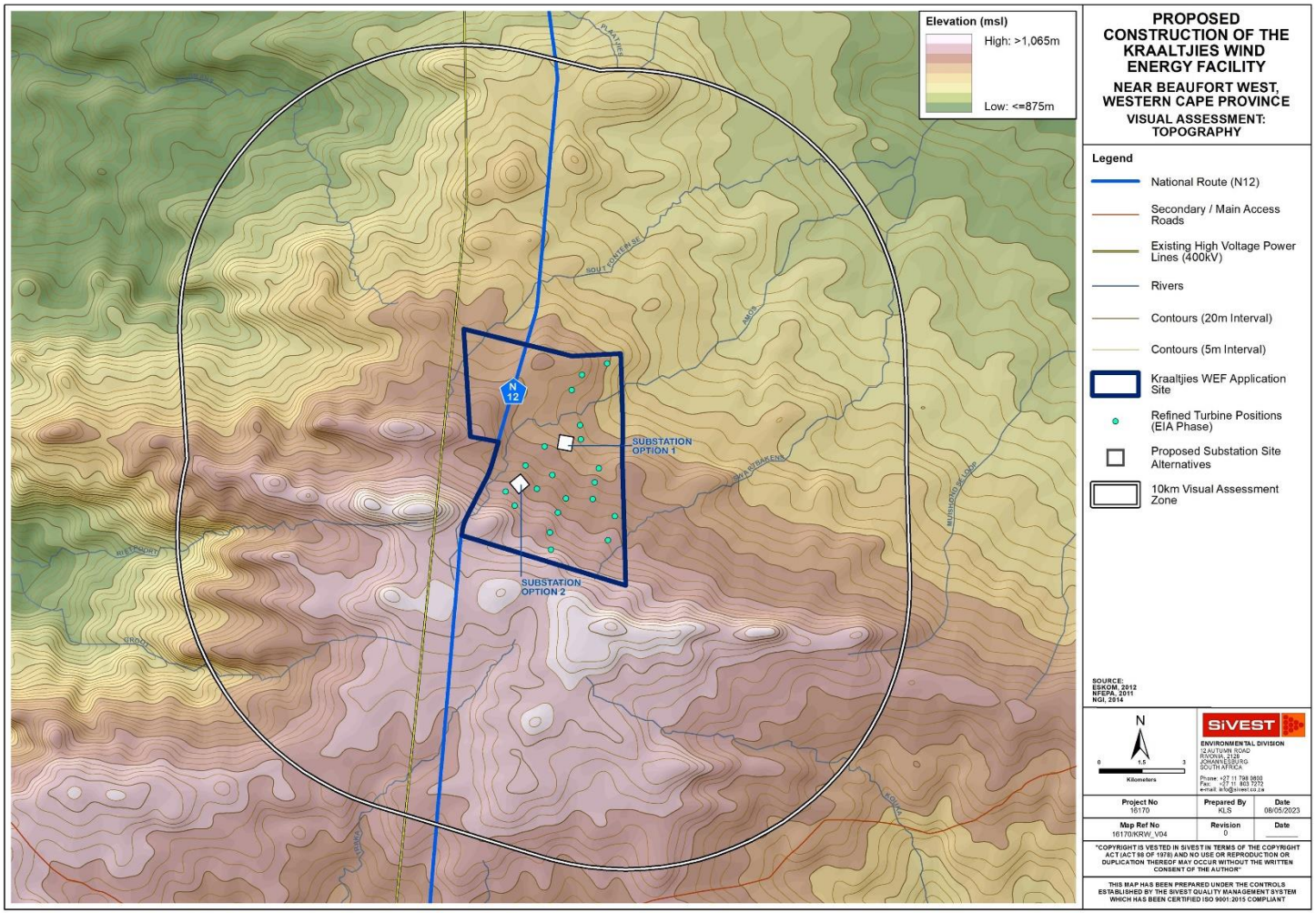

Figure 8: Topography of the study area

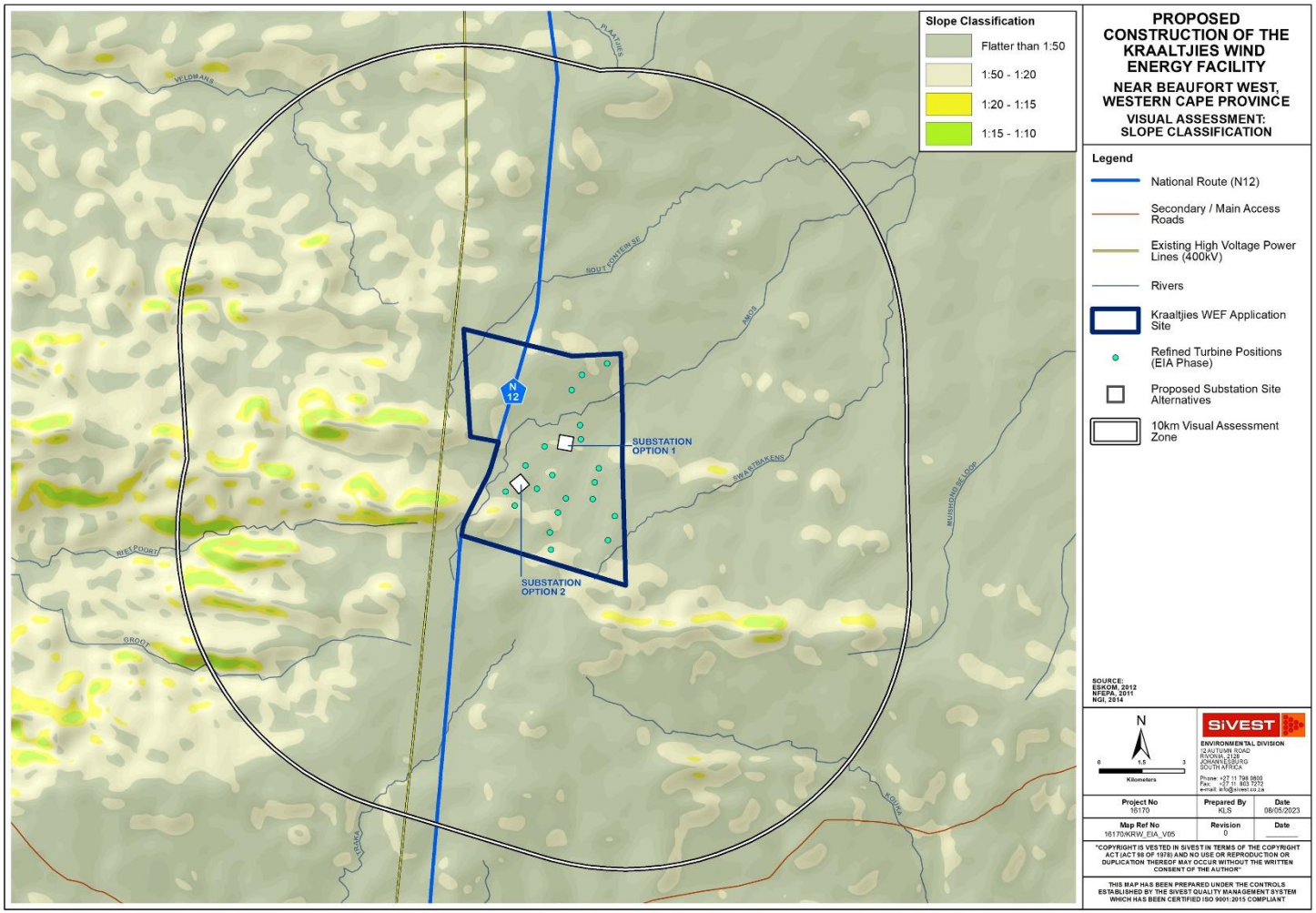

Figure 9: Slope classification within the study area.

Visual Implications

Areas of flat relief, including the flat plains and higher-lying plateaus, are characterised by wide ranging vistas, although views southwards will be marginally constrained by the higher lying terrain in the southern sector of the study area. However, the position of the viewer within the landscape will influence the types of vistas typically present. Viewers located within a more incised valley for example would have limited vistas, whereas much wider vistas would be experienced by viewers on higher-lying ridge tops or slopes. 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 wind turbines are very large structures (potentially up to 300m in height including the rotor blades), these could be visible from a considerable area around the site. Although localised topographic variations may limit views of wind turbines from some of the lower lying areas, particularly in the south-western sector of the study area, there would be very little topographic shielding across the remainder of the study area to lessen the visual impact of the turbines from any locally-occurring receptor locations.

The high degree of visibility was confirmed by way of a preliminary visibility analysis for the EIA Phase turbine layout proposals as provided by Mainstream. A worst-case scenario was assumed when undertaking the analysis, in which the proposed turbines were assigned a maximum height 300 m (maximum height at blade tip). The resulting viewshed, as shown in Figure 10 indicates that the blade tips of wind turbines positioned on the application site would be visible from most parts of the study area.

The visibility analysis is however based entirely on topography and does not consider 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 visibility 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.

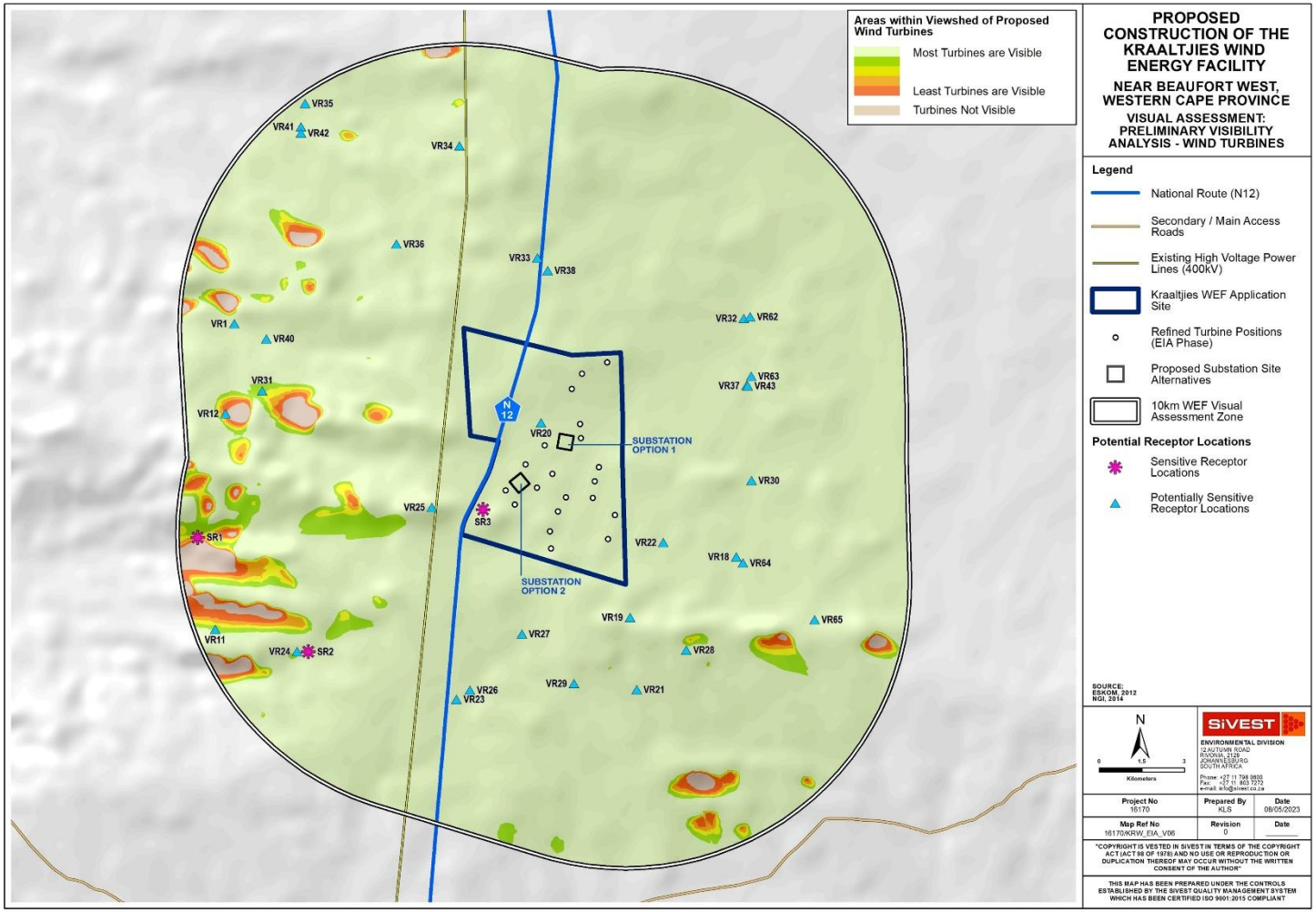

Figure 10: Potential visibility of wind turbines (EIA Phase Layout)

6.1.2 Vegetation

According to Mucina and Rutherford (2006), the entire study area is covered by the Gamka Karoo vegetation type (Figure 11) which is characterised by dwarf spiny shrubland (Figure 12), with some rare low trees.

Other vegetation cover includes exotic tree species and other typical garden vegetation established around farmsteads (Figure 13).

Much of the study area however is still characterised by natural low shrubland with transformation limited to a few isolated areas where pastoral activities such as livestock rearing and/or cultivation are taking place.

Visual Implications

Vegetation cover across the study area is predominantly short and sparse and thus will not provide any visual screening. In some instances, however, tall exotic trees planted around farmhouses will restrict views from receptor locations.

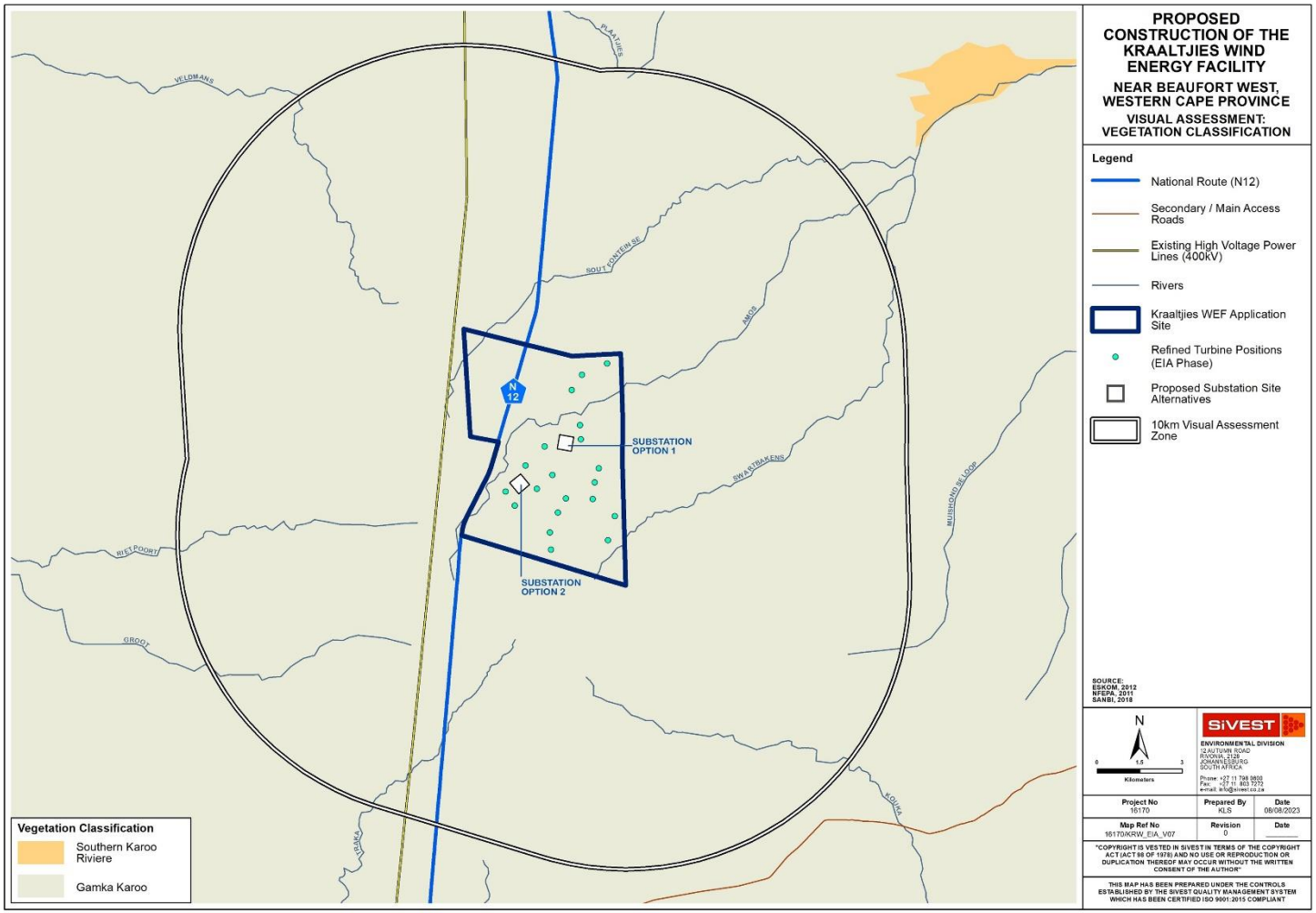

Figure 11: Vegetation classification in the Study Area.

Figure 12: Typical vegetation cover in the study area.

Figure 13: Exotic tree species and other typical garden vegetation established around farmsteads

6.1.3 Land Use

According to the South African National Land Cover dataset (Geoterraimage 2018), much of the visual assessment area is classified as “Bare / Barren Land”, interspersed with patches of low shrubland. While some of these bare / barren areas are representative of transformation due to human activity, in most cases these patches of land are merely undisturbed areas with very sparse vegetation cover. Small tracts of grassland and forested land occur along drainage lines throughout the study area (**Figure 14**).

Agricultural activity in the area is restricted by the arid nature of the local climate and areas of cultivation are largely confined to relatively limited areas distributed along drainage lines. As such, the natural vegetation has been retained across much of the study area. Livestock (sheep) farming is the dominant activity (Figure 15) although the climatic and soil conditions have resulted in low densities of livestock and relatively large farm properties across the area. Thus, the area has a very low density of rural settlement, with relatively few isolated farmsteads in evidence (Figure 16). Built form in much of the study area is limited to isolated farmsteads, including farm worker's dwellings and ancillary farm buildings, gravel access roads, telephone lines, fences, and windmills (Figure 17).

Further human influence is visible in the area in the form of the N12 national route which traverses the study area in a north to south direction (Figure 18). In addition, existing, electrical infrastructure, including 22kV power lines and associated substation (Figure 19) as well as 400kV power lines in this area are also significant man-made features in an otherwise undeveloped landscape. These lines bisect the study area in a north to south alignment, relatively close to the N12.

The closest built-up area is the town of Beaufort West which is situated approximately 52km north of the Kraaltjies WEF application site. The town is well outside the study area for this project and is thus not expected to have an impact on the visual character of the study area.

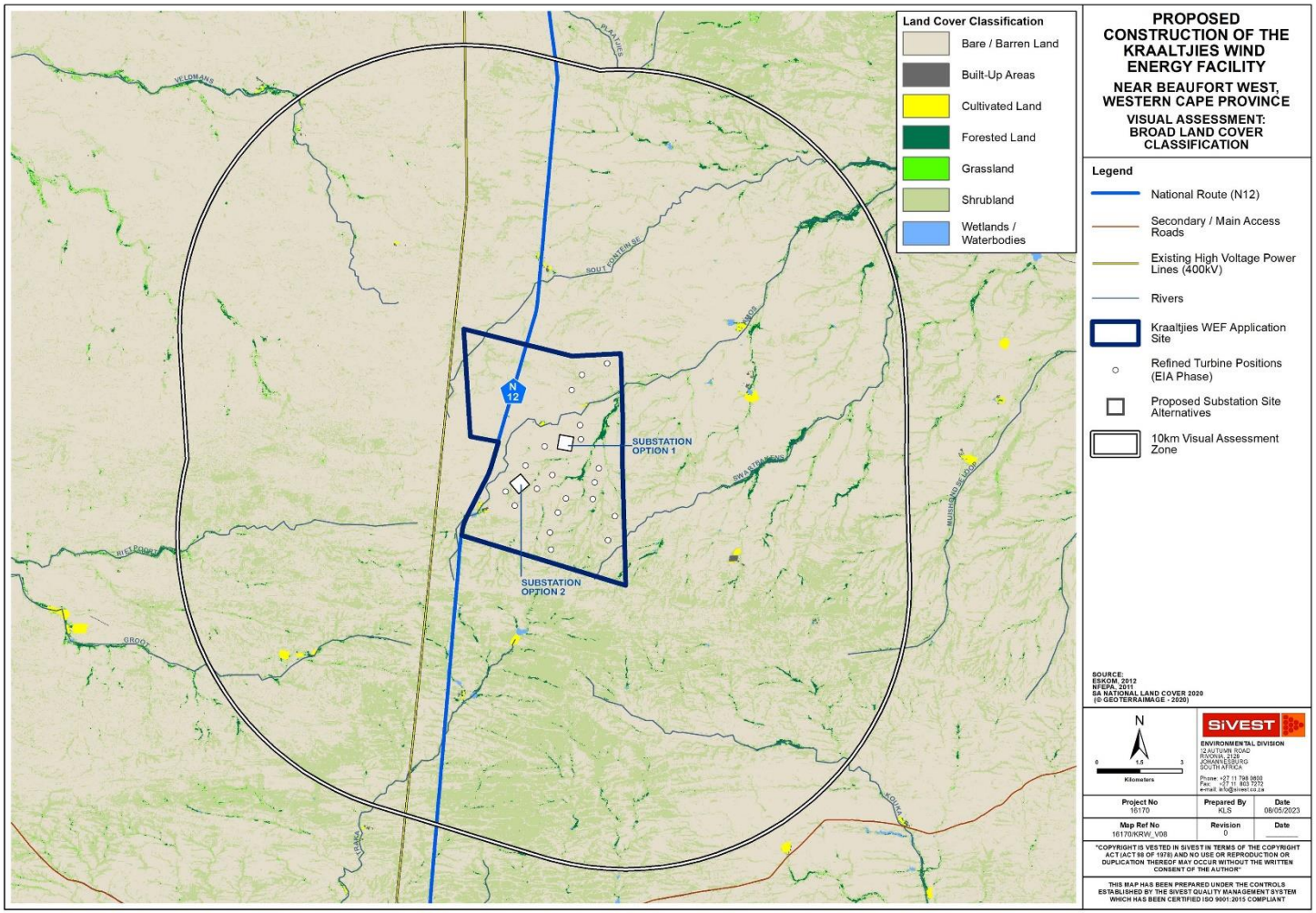

Figure 14: Land cover classification in the study area.

Figure 15: Sheep grazing in the study area

Figure 16: Isolated farmstead typical of the Kraaltjies WEF study area.

Figure 17: Typical example of farm infrastructure.

Figure 18: View southwards along the N12 National Route, on the south-western boundary of the Kraaltjies WEF application site.

Figure 19: 22kV power lines and associated substation north of the Kraaltjies WEF application site, adjacent to the N12.

Visual Implications

Sparse human habitation and the predominance of natural vegetation cover across much of the study area would give the viewer the general impression of a largely natural setting with some pastoral elements. In addition, there are no towns or settlements in the study area resulting in very low levels of human transformation and visual degradation across much of the study area.

The short, scrubby, or grassy vegetation that occurs over the entire study area offers no visual screening in itself, and thus terrain / topography is the most important factor in limiting vistas. Exceptions to this situation occur at some local farmsteads where trees and shrubs have been established around the farmstead, providing some screening from the surrounding areas.

The influence of the level of human transformation on the visual character of the area is described in more detail below.

6.2 VISUAL CHARACTER AND CULTURAL VALUE

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 (sheep farming) has not transformed the natural landscape across much of the study area to any significant degree and there are no towns or built-up areas in the study area influencing the overall visual character. Thus, there are low levels of human transformation and visual degradation across a significant portion of the study area and the natural character has been retained.

There are however prominent anthropogenic elements in the study area including the N12 National Route and 400kV power lines. Other, less prominent elements present in the area include lower voltage power lines, telephone poles, windmills, gravel farm access roads and farm boundary fences. The presence of this infrastructure is an important factor in this context, as the introduction of the proposed WEF and associated infrastructure would result in less visual contrast where other anthropogenic elements are already present

The scenic quality of the landscape is also an important factor contributing to the visual character of an area or the inherent sense of place. Visual appeal is often associated with unique natural features or distinct variations in landform. As such, the largely natural landscapes which occur in the wider study area could potentially increase the scenic appeal and visual interest in the area.

The greater area surrounding the development site is an important component when assessing visual character. The area can be considered to be a typical Karoo or “platteland” landscape that would characteristically be encountered across the high-lying dry western and central interior of South Africa. Much of South Africa’s dry Karoo interior consists of wide-open, uninhabited spaces sparsely punctuated by scattered farmsteads and small towns. Over the last few of decades, an increasing number of tourism routes have been established within the Karoo, and in a context of increasing urbanisation in South Africa’s major centres, the Karoo is being marketed as an undisturbed getaway. Examples of this may be found in the “Getaway Guide to Karoo, Namaqualand and Kalahari” (Moseley and Naude-Moseley, 2008).

The typical Karoo landscape can be considered a valuable ‘cultural landscape’ in the South African context. Although the cultural landscape concept is relatively new, it is becoming increasingly important in terms of the preservation and management of rural and urban settings across the world (Breedlove, 2002). In 1992 the World Heritage Committee adopted the following definition for cultural landscapes:

Cultural landscapes represent 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.

Cultural Landscapes can fall into three categories (according to the Committee's Operational Guidelines):

- "a landscape designed and created intentionally by man";
- an "organically evolved landscape" which may be a "relict (or fossil) landscape" or a "continuing landscape"; and
- an "associative cultural landscape" which may be valued because of the "religious, artistic or cultural associations of the natural element".

The typical Karoo landscape, consisting of wide-open plains and isolated relief interspersed with isolated farmsteads, windmills and stock holding pens, is an important part of the cultural matrix of the South African environment. The Karoo farmstead is also a representation of how the harsh arid nature of the environment in this part of the country has shaped the predominant land use and economic activity practiced in the area, as well as the patterns of human habitation and interaction. The presence of small towns, such as Beaufort West, engulfed by an otherwise rural, almost barren environment, form an integral part of the wider Karoo landscape. As such, the Karoo landscape as it exists today has value as a cultural landscape in the South African context. In terms of the types of cultural landscape listed above, the Karoo cultural landscape would fall into the second category, that of an organically evolved, "continuing" landscape.

In light of this, it is important to assess whether the introduction of a WEF and associated infrastructure into the study area would be a degrading factor in the context of the natural Karoo character of the landscape. Broadly speaking, visual impacts on the cultural landscape in the area around the proposed development would be reduced by the fact that the area is relatively remote and there are few tourism or nature-based facilities in the study area. In addition, although the elements of the proposed Kraaltjies WEF would be visible from the N12 national route, the section of this route that traverses the study area does not form part of a designated scenic route and is not expected to experience heavy volumes of tourist traffic.

A further consideration is the fact that a number of WEFs have been developed or are likely to be developed across the Karoo, and as such it is conceivable that WEFs and their associated infrastructure may in the future become an integral part of the typical Karoo cultural landscape.

A more detailed assessment of the potential impacts of the proposed WEF and associated infrastructure on the cultural landscape has been included in the Heritage Impact Assessment (HIA) undertaken by PGS Heritage in respect of the proposed project.

6.3 VISUAL 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 area, 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 2), the visual sensitivity of the area is classified according to the categories described below:

i. High - The introduction of a new development such as a WEF would be 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 2: 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 natural with areas of scenic value and some pastoral elements.										
Presence of sensitive visual receptors	Relatively few sensitive receptors have been identified in the study area.										
Aesthetic sense of place / visual character	Visual character is typical of Karoo Cultural landscape.										
Irreplaceability / uniqueness / scarcity value	Although there are areas of scenic value within the study area, these are not rated as highly unique.										
Cultural or symbolic meaning	Much of the area is typical of a Karoo Cultural 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	Relatively few tourism/leisure-based facilities in the area										
International / regional / local status of the environment	Study area is typical of Karoo landscapes										
**Scenic quality under threat / at risk of change	Introduction of a WEF and associated infrastructure will alter the visual character and sense of place. In addition, the development of other renewable energy facilities in the broader area as planned will introduce an increasingly industrial character, 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 44, which according to the scale above, would result in the area being rated as having a low to moderate 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.

No formal protected areas were identified in the study area, and only three leisure-based tourism activities or sensitive receptor locations were identified in the study area. In addition, relatively few potentially sensitive receptors were found to be present.

During the initial stages of the EIA, a site sensitivity assessment was undertaken to inform the site layout for the WEF. The aim of this exercise was to indicate any areas of the application site which should be precluded from the development footprint. From a visual perspective, sensitive areas would be areas where the establishment of wind turbines, power lines or substations would result in the greatest probability of visual impacts on sensitive or potentially sensitive visual receptors.

6.3.1 WEF Sensitivity Analysis

Using GIS-based visibility analysis, it was possible to determine that the tip of at least one turbine blade (i.e., at a maximum height of 300m) would be visible from most of the identified potentially sensitive receptors in the study area and as such, no areas on the site are significantly more visible than the remainder of the site. It should be noted however that the visual prominence of a very tall structure such as a wind turbine would be exacerbated if located on a ridge top or a relatively high lying plateau. As such, it is recommended that wind turbines should preferably not be located on the highest ridges within the WEF project area, as far as possible. While these ridges could be seen as areas of potentially higher visual sensitivity, the study area as a whole is rated as having a low to moderate visual sensitivity, and as such, the sensitivity rating would be reduced to “Medium-High”. Hence the ridges are not considered to be “no go areas”, but rather should be viewed as zones where turbine placement would be least preferred.

From a visual perspective, another concern is the direct visual impact of the turbines on any farmsteads or receptors located on the application site. Accordingly, a 1km visual sensitivity zone has been delineated around the existing residence on the application site. This 1km buffer is in accordance with the flicker-sensitive buffers applied in the DFFE Screening Tool. In addition, a 1km zone of potential visual sensitivity has been delineated on either side of the N12 national route.

The preclusion of turbine development from these zones would reduce the direct impact of the turbines on the occupants of the farmsteads and on passing motorists, especially those impacts related to shadow flicker (see Section 7.1.1 below). At this stage however, the visual sensitivity zones are *not* considered “no go” areas, but rather should be viewed as zones where development should be limited as far as practically possible. It should be stressed that these zones apply to turbine development only. The visual impacts

resulting from the associated on-site infrastructure are considered to have far less significance when viewed in the context of multiple wind turbines and as such the associated on-site infrastructure has been excluded from the sensitivity analysis.

The areas of potential visual sensitivity to WEF development are shown in Figure 20. It should be noted the proposed turbine layout has largely avoided the areas identified.

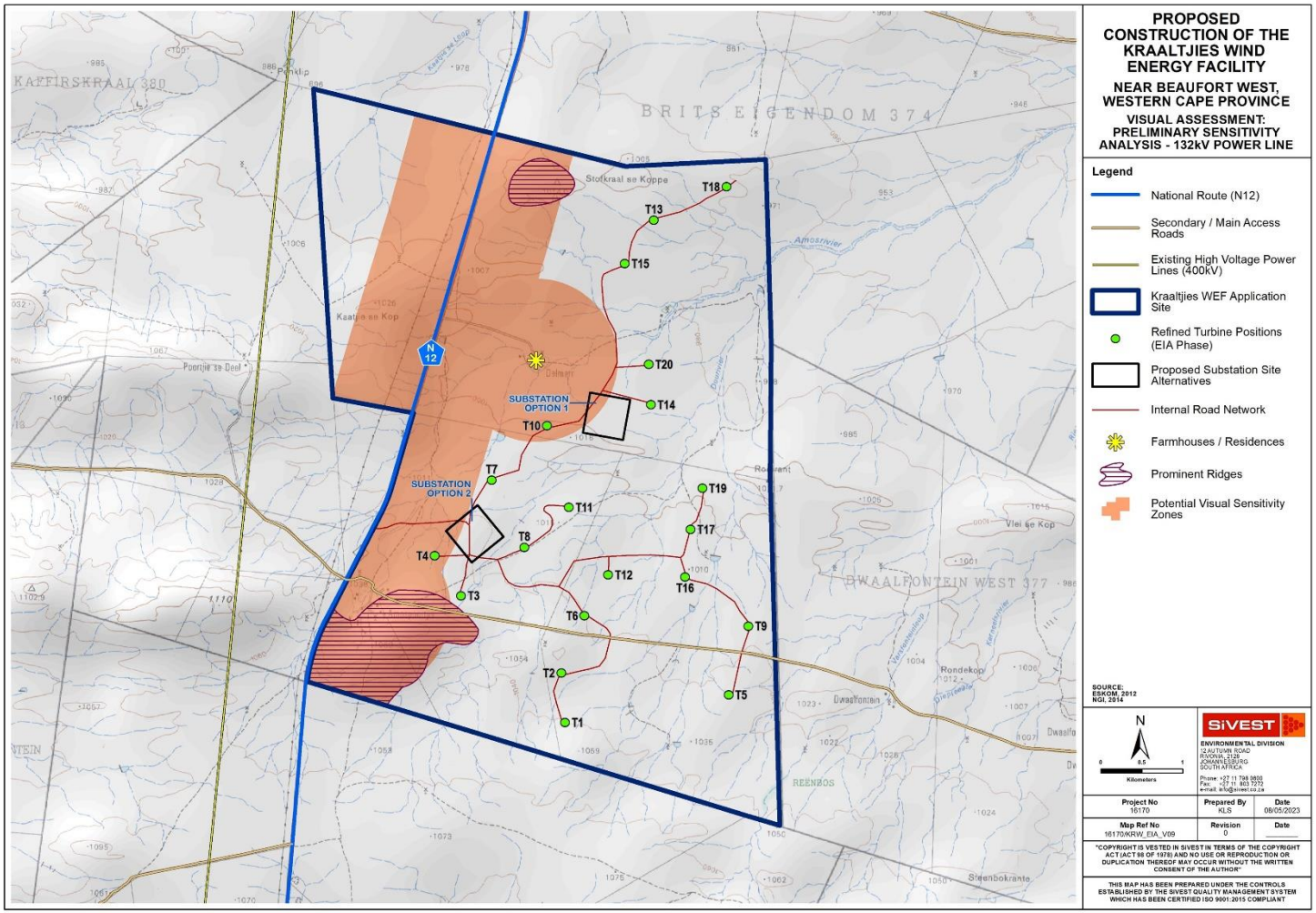

Figure 20: Visual sensitivity on the Kraaltjies WEF application site.

6.3.2 Sensitivities identified by the National Screening Tool: WEF

In assessing visual sensitivity of the proposed Kraalltjies WEF, consideration was given to the Landscape and Flicker Themes of the National Environmental Screening Tool. Under the Landscape Theme, as shown in Figure 21 below, the tool identifies areas of Very High sensitivity in respect of WEF development on the Kraaltjies WEF site. According to the Screening Tool, the high sensitivity rating applied to the WEF site is associated with the presence of natural features such as mountain tops, high ridges and steep slopes. Based on these criteria, a significant portion of the site would be ruled out for WEF development.

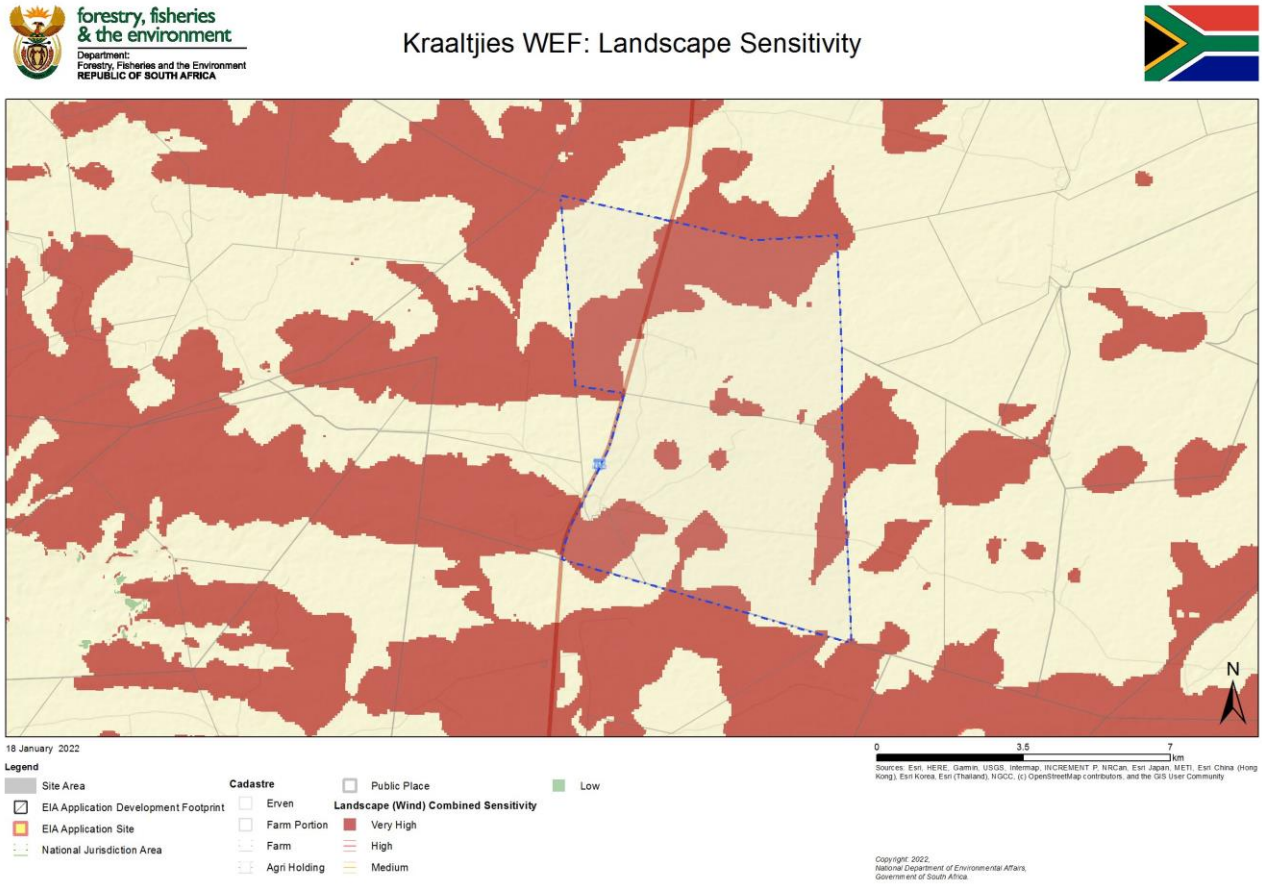

Figure 21: Relative Landscape Sensitivity (January 2022)

The flicker theme demarcates areas (1 km buffers) of sensitivity around identified receptors in the area (Figure 22). Under this theme, potential flicker receptors have been identified on the site, or within 1 km of the site boundary. Buffers demarcated around these receptors have been assigned a “very high” sensitivity rating.

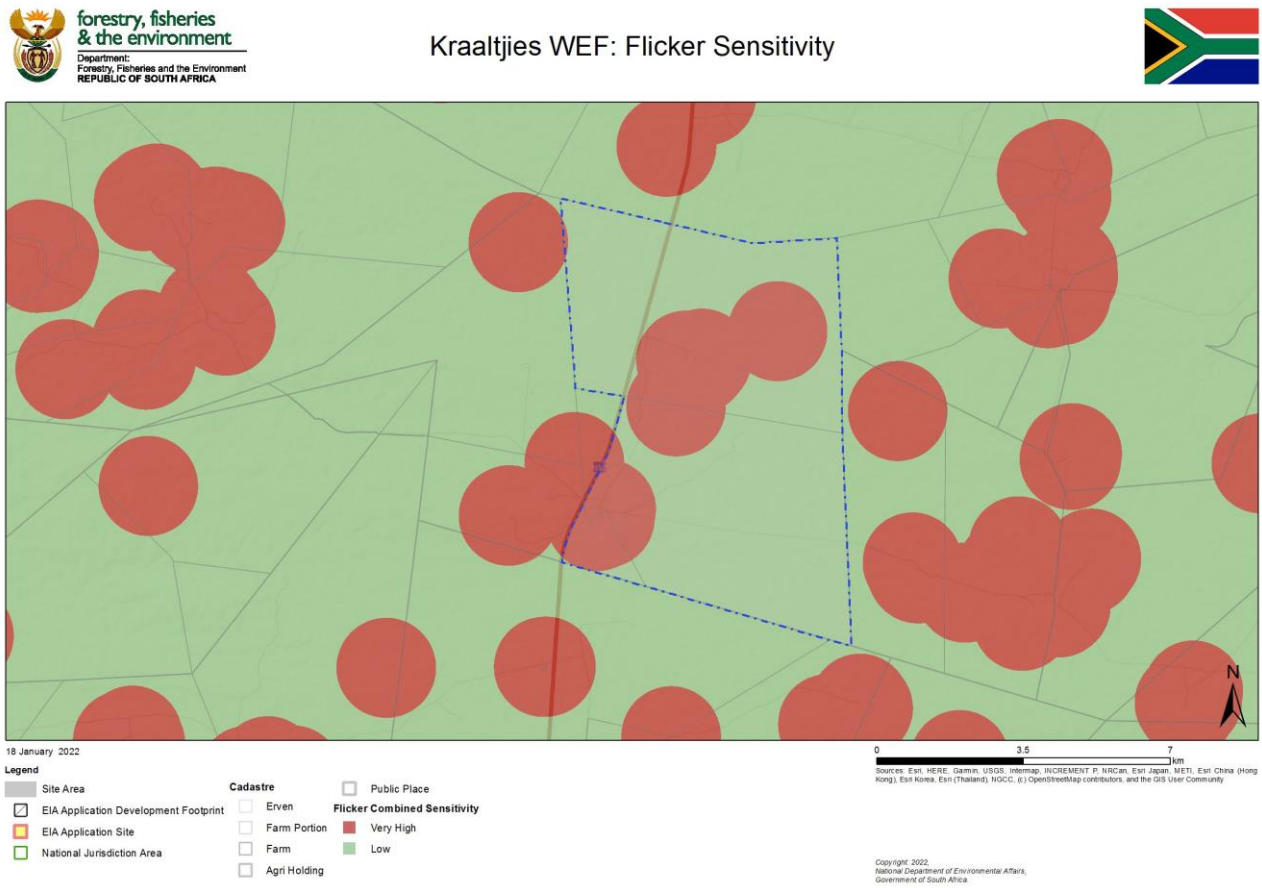

Figure 22: Flicker Sensitivity (January 2022)

The Screening Tool provides a very high level, desktop assessment and as such the results of the study must be viewed against the findings of the field investigation as well as factors affecting visual impact, such as:

- the presence of visual receptors;
- the distance of those receptors from the proposed development; and
- the likely visibility of the development from the receptor locations.

6.3.3 Sensitivity Analysis Summary for WEF Development

Although the Screening Tool identifies significant areas of very high landscape and flicker sensitivity on the Kraaltjies WEF application site, the site sensitivity verification exercise conducted in respect of this VIA (Appendix C) found little evidence to support this sensitivity rating. The desktop topographic assessment of the area 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 a few shallow ridges in a largely flat to gently undulating landscape. The sensitivity analysis above has recognised these ridges and identified the higher ridges as zones where development would be least preferred.

The presence of some receptors, either on the Kraaltjies WEF application site, or within 1km of the site boundary, was confirmed by the site sensitivity verification exercise. However, an assessment of receptor locations using Google Earth showed that there were no receptors present at most of the locations identified by the National Screening Tool. The remaining (confirmed) receptor was factored into the

sensitivity analysis, together with a 1km buffer, which is considered sufficient to reduce any adverse effects of shadow flicker. It should be noted that the affected receptor is not expected to be sensitive to the proposed development due to the fact that it is located within the WEF project area and it is assumed that the relevant land owners support the proposed project.

6.4 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.

The relatively flat topography in the study area and the relative lack of screening vegetation would reduce the visual absorption capacity across much of the area. This would be offset to some degree where the landscape has already undergone significant transformation, specifically in the areas adjacent to the N12 National route and the 400kV power lines, thus increasing the overall visual absorption capacity of the landscape.

Visual absorption capacity in the study area is therefore rated as low to moderate.

7. TYPICAL VISUAL IMPACTS ASSOCIATED WITH WIND ENERGY FACILITES

In this section, the typical visual issues related to the establishment of a WEF and associated infrastructure as proposed are discussed. It is important to note that the renewable energy industry is still relatively new in South Africa and as such this report draws on international literature and web material (of which there is significant material available) to describe the generic impacts associated with WEFs.

7.1 WIND ENERGY FACILITIES

As previously mentioned, at this stage it is anticipated that the proposed project will consist of up to 20 wind turbines and associated infrastructure with a total generation capacity of up to approximately 240MW. The wind turbines will have a hub height of up to 200m and a rotor diameter of up to 200m (maximum tip height of 300m). The height of the turbines and their location on relatively flat to gently undulating terrain would result in the development typically being visible from some distance as shown in Figure 23.

Figure 23: Wind turbines at Loeriesfontein 2 WEF in the Northern Cape Province.

Internationally, studies have demonstrated that there is a direct correlation between the number of turbines and the degree of objection to a wind farm, with less opposition being encountered when fewer turbines are proposed (Devine-Wright, 2005). Certain objectors to wind farms also mention the "sky space" occupied by the rotors of a turbine, this being the area in which the rotors would rotate.

The visual prominence of wind turbines would be exacerbated within natural settings, in areas of flat terrain or if located on ridge tops. Given the height of the turbines, even dense stands of wooded vegetation are only likely to offer partial visual screening.

7.1.1 Shadow Flicker

Shadow flicker may occur when the sun is low on the horizon and shines through the rotating blades of a wind turbine, resulting in a moving shadow. The rotating blades repeatedly cast a shadow which will be perceived as a "flicker" and this flicker-effect can potentially impact on residents located near the wind turbines.

The effect of shadow flicker is however only likely to be experienced by people situated directly within the shadow cast by the blade of the wind turbine. As such, shadow flicker is only expected to have an impact on and cause health risks to people residing in houses located relatively close to a wind turbine and at a specific orientation, particularly in areas where there is little screening present. Shadow flicker may also be experienced by and impact on motorists if a wind turbine is located in close proximity to an existing road.

The impact of shadow flicker can be effectively mitigated by choosing the correct site and layout for the wind turbines, taking into consideration the orientation of the turbines relative to the nearby houses and the latitude of the site. Hence appropriate development restriction zones around residences and along main roads will reduce the adverse effects of shadow flicker, while tall structures and trees will also obstruct shadows and prevent the effect of shadow flicker from impacting on surrounding residents.

7.1.2 Motion-based visual intrusion

An important component of the visual impacts associated with wind turbines is the movement of the rotors. Labelled as motion-based visual intrusion, this refers to the tendency of the viewer to focus on discordant, moving features when scanning the landscape. Evidence from surveys of public attitudes towards wind farms however suggest that the viewing of moving blades is not necessarily perceived negatively (Bishop and Miller, 2006).

7.2 ASSOCIATED ON-SITE INFRASTRUCTURE

Typical impacts associated with the associated infrastructure as described in Section 3.2.1 are outlined below.

Substations and 11-33kV overhead power lines are generally large, highly visible structures which are more industrial in character than many other components of a WEF. As they are not features of the natural environment, but are representative of human (anthropogenic) alteration, substations will be perceived to be incongruous when placed in largely natural landscapes. Conversely, the presence of other anthropogenic objects associated with the built environment, especially other substations or power lines, may result in the visual environment being considered to be 'degraded' and thus the introduction of a substation or powerline into this setting may be less of a visual impact than if there was no existing built infrastructure visible. In this instance, the substation, as well as the associated 11-33kV overhead powerlines are intended to serve the proposed Kraaltjies WEF project and as such, is likely to be perceived as part of the greater WEF development. Thus, the visual impact of the substation will be relatively minor when compared to the visual impact associated with the WEF development as a whole.

Surface clearance for cable trenches, access roads, laydown areas and other on-site infrastructure may result in the increased visual prominence of these features, thus increasing the level of contrast with the surrounding landscape. Buildings, BESS containers and associated infrastructure placed in prominent positions such as on ridge tops may break the natural skyline, drawing the attention of the viewer. In addition, security lighting on the site may impact on the nightscape (8.4).

The visual impact of the on-site infrastructure associated with a WEF is generally not regarded as a significant factor when compared to the visual impact associated with wind turbines. The infrastructure would however increase the visual "clutter" in the WEF project area and magnify the visual prominence of the development if located on ridge tops or flat sites in natural settings where there is limited tall, wooded vegetation to conceal the impact.

8. IMPACT ASSESSMENT

8.1 SENSITIVE VISUAL RECEPTORS

A sensitive visual receptor location is defined as a location where receptors would potentially be impacted by a proposed development. Adverse impacts often arise where a new development is seen as an intrusion which 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, as it is largely based 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 or 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 interested and affected parties, as raised during the public participation process conducted as part of the EIA study.

As the visibility of the development would diminish exponentially over distance (refer to Section 5.4 above), receptor locations which are closer to the WEF would experience greater adverse visual impacts than those located further away.

The degree of visual impact experienced will however vary from one inhabitant 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 structures. These may be positive (a symbol of progression toward a less polluted future) or negative (foreign objects degrading the natural landscape).
- Degree to which the viewer will accept a change in the typical Karoo character of the surrounding area.

8.2 RECEPTOR IDENTIFICATION

Preliminary desktop assessment of the study area for the proposed Kraaltjies WEF identified thirty-five potentially sensitive visual receptor locations, most of which appear to be existing farmsteads. All of these receptors were found to be within 10kms of a turbine placement in the Kraaltjies WEF EIA Phase layout.

Three of the receptors identified were found to be linked to leisure-based (specifically nature-based) tourism and are therefore considered to be sensitive receptors. One of these receptor locations, namely Rietpoort Game Farm was however found to be outside the viewshed for the EIA Phase turbine layout. The sensitive receptors in the viewshed are as follows:

- ROAM Safari Lodge; and
- Silwerkaroo Guest House.

As stated, the remaining receptors identified appear to be farmsteads which are regarded as potentially sensitive visual receptors as they are located within a mostly rural setting with natural vistas that will likely be altered by the proposed development. Local sentiments toward the proposed development are however unknown at this stage.

In many cases, roads along which people travel, are regarded as sensitive receptors. The primary thoroughfare in the study area is the N12 national route which links George and Knysna in the Western Cape with Kimberley in the north and Gauteng Province to the north-east. In the local context, the N12 is the primary access route to Beaufort West and the N1 to the north-east, and to Outdshoorn and the N9 in the south-west.

The section of the N12 traversing the study area is not considered part of a designated scenic route, although the route is an important link and is utilised, to some extent, for its tourism potential. 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 WEF and associated infrastructure.

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 identified potentially sensitive visual receptor locations for the proposed WEF are indicated in Figure 24.

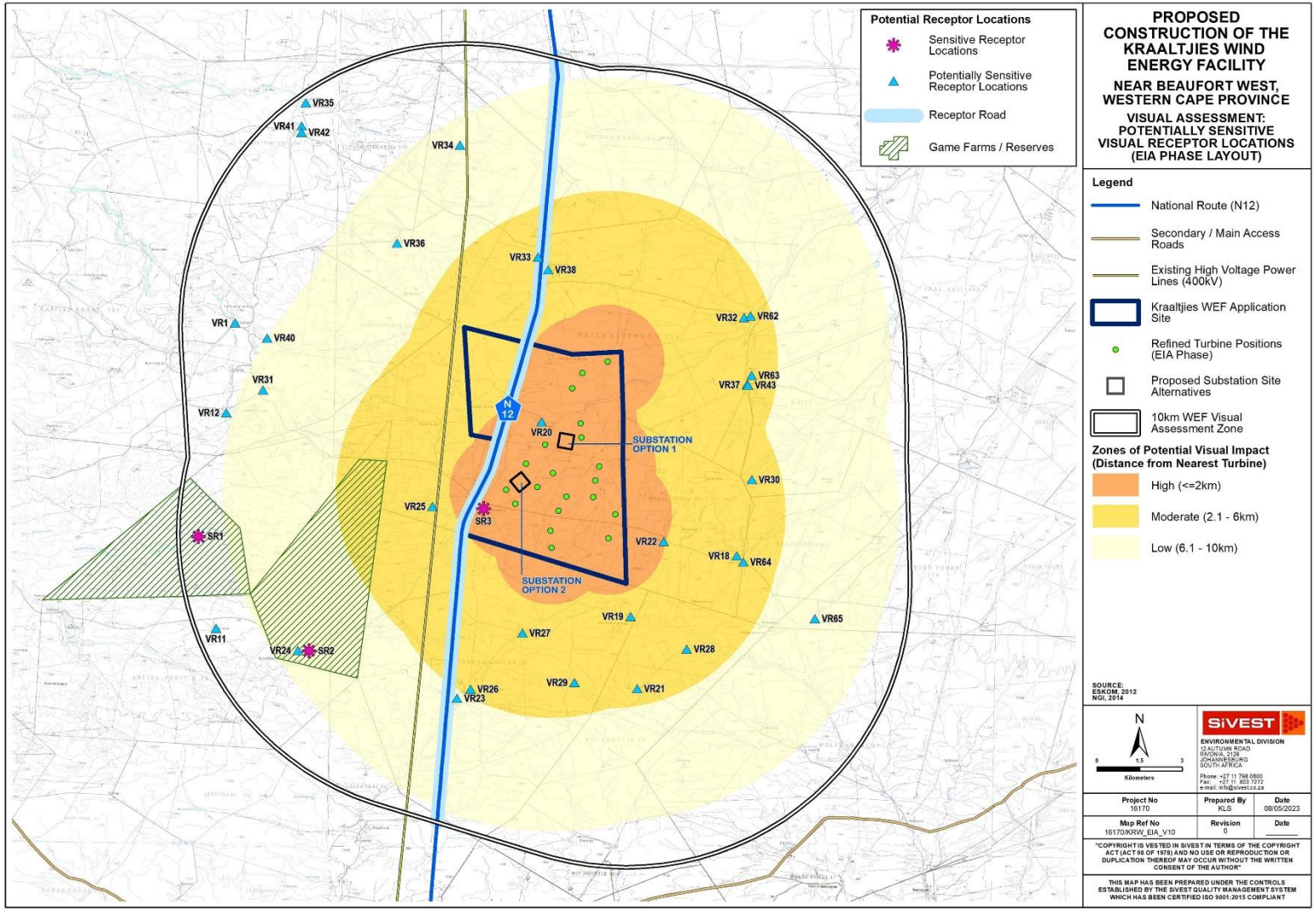

Figure 24: Potentially sensitive receptor locations within 10kms of the Kraaltjies WEF application site

8.3 RECEPTOR IMPACT RATING

A matrix is used to assess the impact of the proposed facility on each of the identified potentially sensitive receptor locations.

The matrix is based on 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.

8.3.1 Distance

As described above, the 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 within 2km of the nearest turbine location within the Kraaltjies WEF Project area. The visual impact of the turbines will diminish beyond 10km as the structures would appear to merge with the elements on the horizon. Any visual receptor locations beyond this distance have therefore not been assessed as they fall outside the study area and would not be visually influenced by the proposed development.

At this stage of the process, zones of visual impact for the proposed WEF have been delineated according to distance from the nearest turbine. Based on the height and scale of the WEF project, the distance intervals chosen for the zones of visual impact, as shown in Figure 24, are as follows:

- 0 – 2km (high impact zone);
- 2km – 6km (moderate impact zone);
- 6km - 10km (low impact zone).

8.3.2 Screening Elements

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 or a series of low hills located between a receptor location and an object could completely shield the object from the receptor.

8.3.3 Visual Contrast

The visual contrast of a development refers to the degree to which the 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 receptors within a specific context. A development that is incongruent with the surrounding area could change the visual character of the landscape and have a significant visual impact on sensitive receptors.

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 any existing power line; in undeveloped / natural / rural area;
    - areas within 150m of cultivated land / plantations / farm buildings.
- Low – areas within 500m of N12 National Route.

These zones are depicted in Figure 25 below

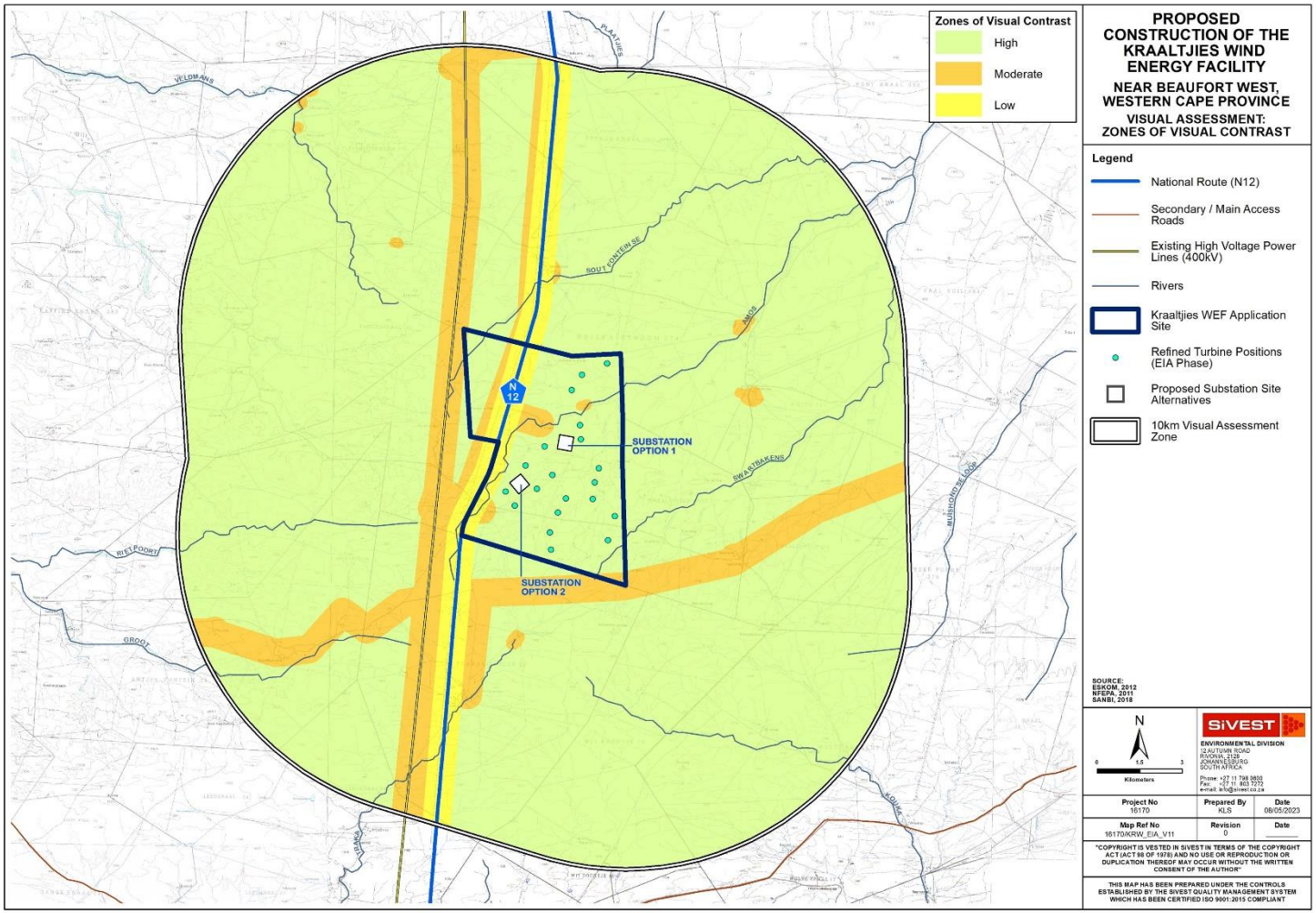

Figure 25: Zones of visual contrast within the combined study area.

8.3.4 Impact Rating Matrix

The receptor impact rating matrix returns a score which in turn determines the visual impact rating assigned to each receptor location (Table 3) below.

Table 3: 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 4** below.

Table 4: 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	WEF: <= 2km **Score 3**	WEF: 2 - 6km **Score 2**	WEF: 6km - 10km **Score 1**	WEF: >10km
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 receptor impact rating for the Kraaltjies WEF is provided in Appendix D. However, Table 5 below presents a summary of the overall visual impact of the proposed WEF on each of the potentially sensitive visual receptor locations identified within 10kms of the proposed WEF application site.

Table 5: Summary receptor impact rating for the proposed Kraaltjies WEF

OVERALL IMPACT RATING	NUMBER OF SENSITIVE RECEPTORS	TOTAL NUMBER OF POTENTIALLY SENSITIVE RECEPTORS	RECEPTORS INSIDE VIEWSHED
HIGH	0	6	6
MODERATE	2	17	19
LOW	0	2	2
TOTAL ASSESSED	***2***	***25***	***27***
OUTSIDE VIEWSHED	***1***	***7***	

The table above shows that neither of the identified sensitive receptors within the viewshed for the proposed wind turbines would experience high levels of visual impact as a result of the proposed Kraaltjies WEF development, and both are expected to experience only moderate levels of visual impact. It is believed that ROAM Safari Lodge provides leisure or nature-based tourist facilities located on a relatively large farm property. Details of the levels of activity on different sectors of the farm are not however known and as such, the impact rating matrix for this receptor is based on the assumed location of the main accommodation complex on the property. Accordingly, it should be noted that sections of the property may be slightly closer to the proposed WEF, and as such could be subjected to higher levels of visual impacts, depending on the location of the wind turbines in the final layout. Silwerkaroo Guest House is located inside the proposed Kraaltjies WEF development area and as such, this property forms part of the WEF project. Thus, it is assumed that the owners have a vested interest in the WEF development and would not perceive the development in a negative light.

Seven *potentially* sensitive receptors were found to be outside the viewshed for the EIA Phase turbine layout and were excluded from any further assessment. Six of the potentially sensitive receptor locations are expected to experience high levels of visual impact as a result of the proposed Kraaltjies WEF. The high sensitivity rating relates largely to the fact that these receptors are located in close proximity to the proposed WEF and they are in zones of high contrast, with little natural screening. Four of these receptors are located within the project areas of adjacent WEF projects, namely Beaufort West WEF, Trakas WEF and Kwagga WEF 1 and this would suggest that the owners / occupants of the relevant farmsteads are not averse to WEF development in the area. In addition, none of these receptors are tourism-related facilities and as such they are not considered to be Sensitive Receptors. Hence the high impact rating assigned to these receptors will not affect the overall impact ratings determined in Section 8.6.

Seventeen potentially sensitive receptor locations would be subjected to moderate levels of visual impact as a result of the proposed Kraaltjies WEF development, while the remaining two receptors would only experience low levels of visual impact. Eight of the potentially sensitive receptors are also located within the project areas of the adjacent WEF projects, namely Beaufort West WEF, Trakas WEF and Kwagga WEF 1

and this would suggest that the owners / occupants of the relevant farmsteads are not averse to WEF development in the area

As stated above, the N12 national route could be considered as a potentially sensitive receptor road and elements of the WEF are expected to be visible to motorists travelling along this route. The degree of visibility is restricted to some extent along certain sections of the road by the topography and the likely visual impacts of the proposed development would depend on the location of the different elements on the site. In light of this, visual impacts affecting the N12 are rated as **moderate**.

8.4 NIGHT-TIME IMPACTS

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 wind farm at night.

Much of the study area is characterised by natural areas with pastoral elements and low densities of human settlement. As a result, relatively few light sources are present in the broader area surrounding the proposed development site. The closest built-up area is the town of Beaufort West which is situated approximately 52km north of the application site and is thus too far away to have significant impacts on the night scene. At night, the general study area is therefore characterised by a picturesque dark starry sky and the visual character of the night environment across the broader area is largely 'unpolluted' and pristine. Sources of light in the area are limited to isolated lighting from surrounding farmsteads and transient light from the passing cars travelling along the N12 national route.

Given the scale of the proposed WEF, the operational and security lighting required for the proposed project is likely to intrude on the nightscape and create some glare, which will contrast with the extremely dark backdrop of the surrounding area. In addition, red hazard lights placed on top of the turbines may be particularly noticeable as their colour will differ from the few lights typically found within the environment and the flashing will draw attention to them

8.5 SHADOW FLICKER IMPACTS

As described in Section 7.1.1, rotating wind turbine blades repeatedly cast a shadow which will be perceived as a "flicker" and this flicker-effect can potentially impact on residents located near the wind turbines.

Although detailed modelling of the shadow flicker effect has not been undertaken for the Kraaltjies WEF, impacts have been assessed based on the type of building on the site, the distance of the building from the nearest turbine and the presence of vegetative or topographic screening. The rule of thumb is that shadow flicker impacts are only potentially problematic if a turbine is located within 800 metres of an occupied building. In this instance, turbines have not been placed within 800m of the only residence identified on the site.

Accordingly, shadow flicker impacts resulting from the proposed Kraaltjies WEF are not expected to be significant.

8.6 CUMULATIVE IMPACTS

Although it is important to assess the visual impacts of the proposed Kraaltjies WEF and associated infrastructure specifically, it is equally important to assess the cumulative visual impact that could materialise if other renewable energy facilities (both wind and solar facilities) and associated infrastructure projects are developed in the broader area. 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 renewable energy facilities and associated infrastructure development.

Renewable energy facilities have the potential to cause large scale visual impacts and the location of several such developments in close proximity to each other could significantly alter the sense of place and visual character in the broader region. Although power lines and substations are relatively small developments when compared to renewable energy facilities, they may still introduce a more industrial character into the landscape, thus altering the sense of place.

Thirteen additional renewable energy projects were identified within a 35 km radius of the proposed Kraaltjies WEF (Figure 26). These projects, as listed in Table 6 below, were identified using the DFFE's Renewable Energy EIA Application Database for SA in conjunction with information provided by Independent Power Producers operating in the broader region. It is assumed that all of these renewable energy developments include grid connection infrastructure, although details of this infrastructure were not available for all of the identified developments at the time of writing this report.

Table 6: Renewable energy developments proposed within a 35km radius of the Kraaltjies WEF application site.

Project	DEA Reference No	Technology	Capacity	Status of Application / Development
Proposed Wind and Solar Facility on the Farm Lombardskraal 330	14/12/16/3/3/2/406	Solar	20MW	EIA in Process
Proposed Leeu Gamka Solar Power Plant	12/12/20/2296	Solar	-	EIA in Process
Proposed Beaufort West Wind Farm and associated grid connection infrastructure	12/12/20/1784/1	Wind	140MW	Approved
Proposed Trakas Wind Farm and associated grid connection infrastructure	12/12/20/1784/2	Wind	140MW	Approved
Proposed Koup 1 WEF and associated grid connection infrastructure	TBA	Wind	140MW	EIA in Process

Proposed Koup 2 WEF and associated grid connection infrastructure	TBA	Wind	140MW	EIA in Process
Proposed Kraaltjies WEF and associated infrastructure	TBA	Wind	240MW	EIA in Process
Proposed Kwagga WEF 1	14/12/16/3/3/2/2070	Wind	279MW	EIA in Process
Proposed Kwagga WEF 2	14/12/16/3/3/2/2071	Wind	341MW	EIA in Process
Proposed Kwagga WEF 3	14/12/16/3/3/2/2072	Wind	204.6MW	EIA in Process
Proposed Jessa M WEF	14/12/16/3/3/1/2494	Wind	220MW	Approved
Proposed Jessa S WEF	14/12/16/3/3/1/2497	Wind	203.5MW	Approved
Proposed Jessa Z WEF	14/12/16/3/3/1/2496	Wind	220MW	Approved

As can be seen from this table, two of these projects are Solar Energy facilities (SEFs), and the remaining eleven projects are WEFs. Although SEFs are expected to have different impacts when compared to WEF projects, these renewable energy developments are however relevant as they influence the cumulative visual impact of the proposed development.

The two SEFs, namely the proposed Leeu Gamka Solar Power Plant and the proposed SEF facility on the Farm Lombardskraal No 330, as well as the Jessa M, Jessa S and Jessa Z WEFs, are all located more than 20kms from the Kraaltjies WEF project area, in close proximity to the N1 and N12 National Routes respectively. Given the distance from the study area and the concentration of these facilities in close proximity to existing built infrastructure, it is not anticipated that these developments will result in any significant cumulative impacts affecting the landscape or the visual receptors within the assessment zone for the Kraaltjies WEF project. It is also noted that although the DFFE database reflects that EIAs for both the SEF projects have been “in process” for at least seven years, investigations have not found any information pertaining to either project.

The eight WEFs projects, namely Koup 1 and Koup 2 WEFs, Beaufort West and Trakas WEFs, Kwagga WEFs 1, 2 and 3 and Heuweltjies WEF, are located in relatively close proximity to Kraaltjies WEF and are on contiguous properties. Heuweltjies WEF, which lies to the south of the Kraaltjies WEF site, is the subject of a separate EIA process which is currently being undertaken in parallel to this EIA for the proposed Kraaltjies WEF.

These proposed WEFs, in conjunction with the associated infrastructure, will inevitably introduce an increasingly industrial character into a largely natural, pastoral landscape, thus giving rise to significant cumulative impacts.

A cursory examination of the literature available for the environmental assessments undertaken for the proposed WEFs showed that the visual impacts identified, and the recommendations and mitigation measures provided are largely consistent with those identified in this report. Where additional mitigation measures were provided in respect of the other renewable energy applications, these have been incorporated into this report where relevant.

From a visual perspective, the concentration of renewable energy facilities as proposed will inevitably change the visual character of the area and alter the inherent sense of place, introducing 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 recommendations and mitigation measures put forward by the visual specialists in their respective reports. In addition, it is possible that these developments, located in very close proximity to each other could be seen as one large WEF rather 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.

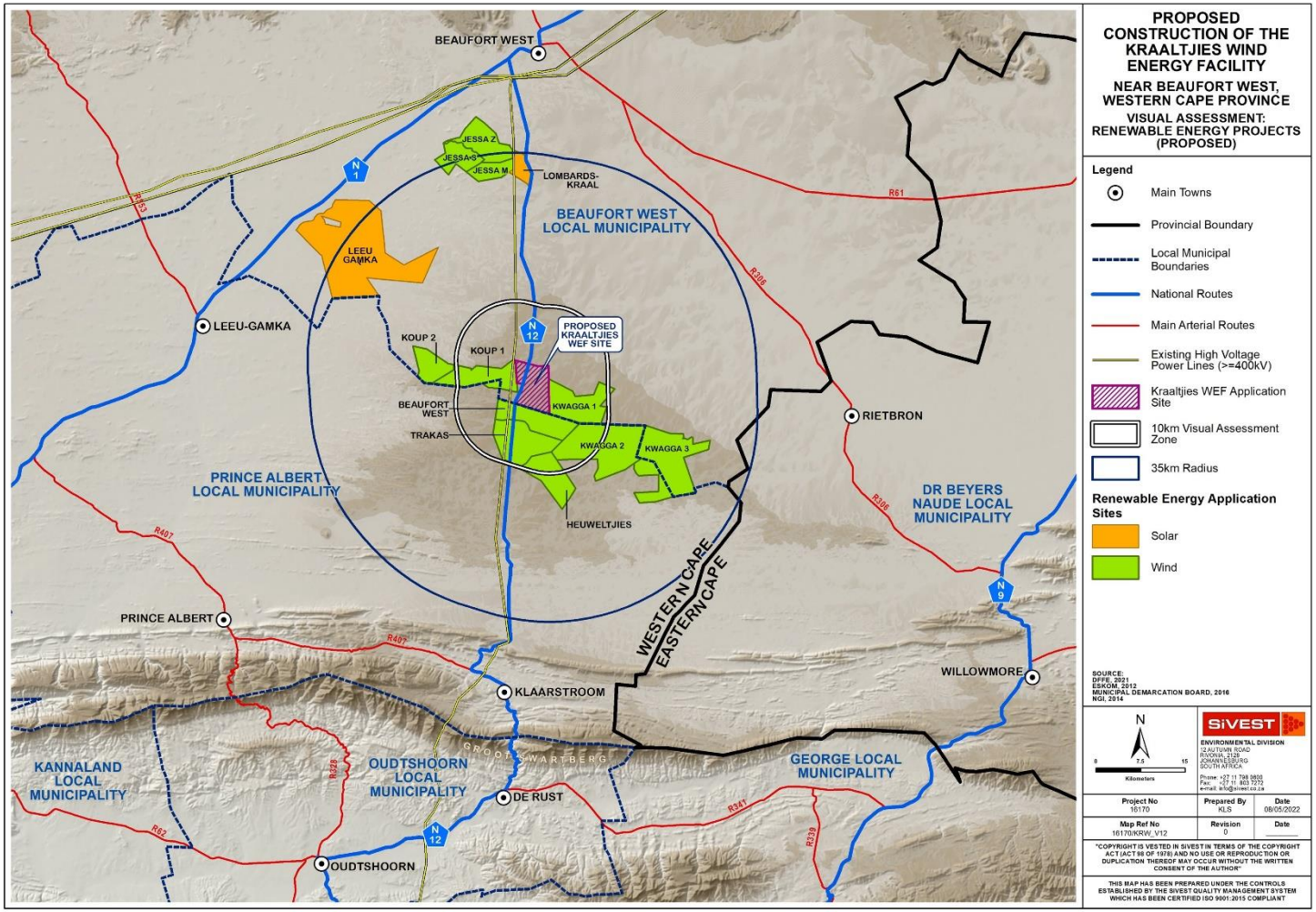

Figure 26: Renewable energy facilities proposed within a 35km radius of the Kraaltjies WEF application sites

8.7 PHOTOMONTAGES

Photomontages (visual simulations) have been compiled to provide an indication of how the proposed Kraaltjies WEF development would appear from selected view points within the study area (Figure 27). Photomontages for these locations were compiled by superimposing a 3-Dimensional model of the Kraaltjies WEF turbine layout onto photographs taken during the site visit.

Limitations associated with this exercise are outlined below.

- Fieldwork was undertaken during the initial phase of the project when the turbine layout was still in the preliminary design phase and as such it was not possible to identify a good range of suitable viewpoints to be visited and photographed.
- Access to areas off the main roads was restricted and as such, only a limited number of viewpoints were photographed.
- Photomontages are specific to each location, and even sites in close proximity to one another may be affected in different ways by the proposed WEF development.
- The photomontages represent a visual environment that assumes that all vegetation cleared during construction will be restored to its current state after the construction phase. This is however an improbable scenario as some vegetation cover may be permanently removed which may reduce the accuracy of the models generated.
- Infrastructure associated with the WEF has not been included in the models.
- These photomontages have been provided merely as indicative illustrations and should not be seen as an accurate representation of the proposed Kraaltjies WEF turbine layout.

However, the resulting photomontages presented below are still considered relevant as they illustrate how views from each selected viewpoint could potentially be transformed by the proposed WEF development if the wind turbines are erected within the project area as proposed.

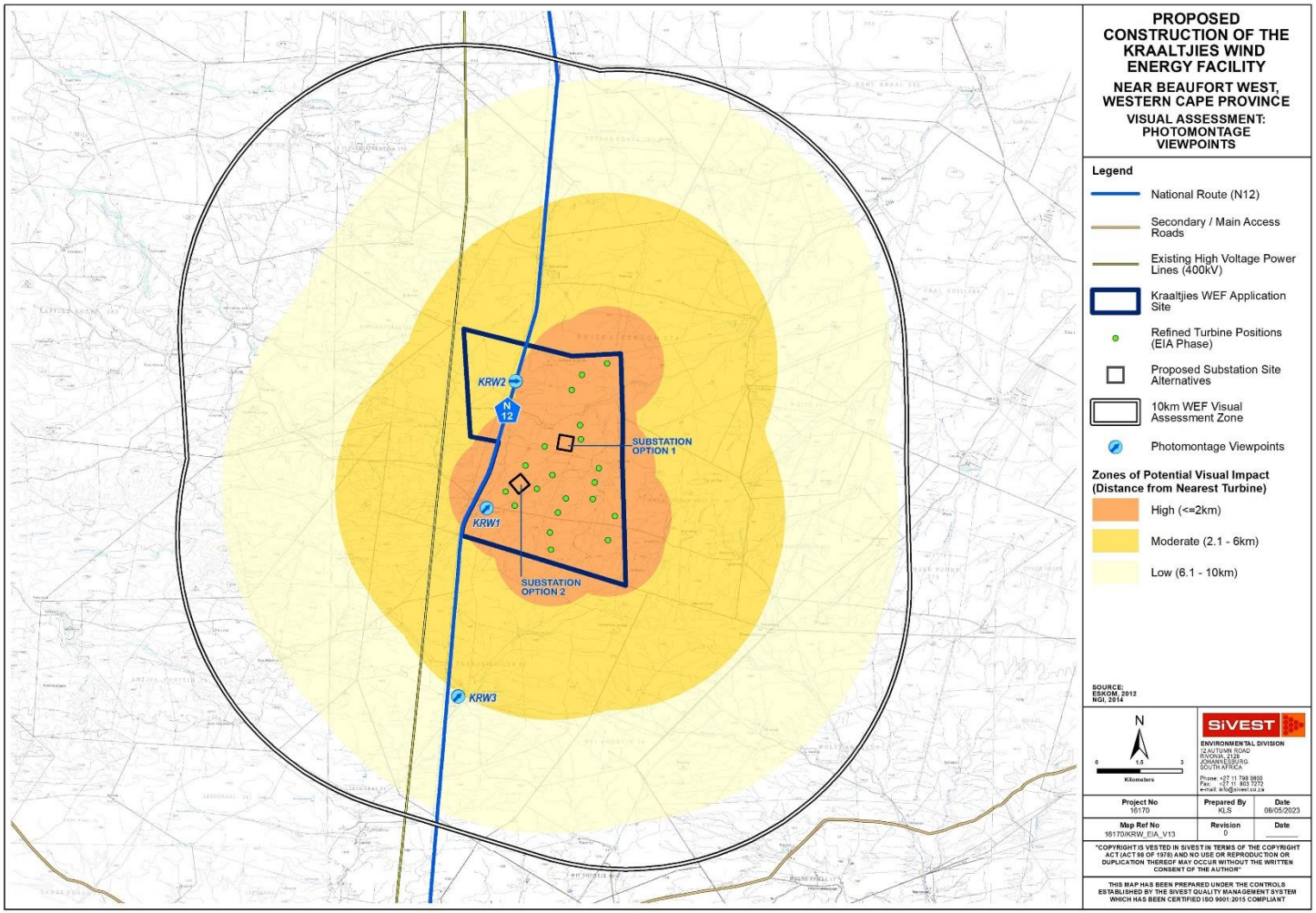

Figure 27: Photomontage Viewpoints

8.7.1 Viewpoint KRW1

This point is located within the Kraaltjies WEF project area, close to the Silwerkaroo Guest House and the N12 National route. Turbines are highly visible to the north and east of this location, with the nearest turbine being approximately 930m away. As such this location is in a zone of high visual impact .

Figure 28: View north-east from Viewpoint KRW1 - Pre-Construction

Figure 29: View north-east from Viewpoint KRW1 – Post-Construction

8.7.2 Viewpoint KRW2

This point is located in the northern sector of the Kraaltjies WEF project area, on the N12 National route, some 2.1km from the nearest turbine. As such this location is in a zone of moderate visual impact. Turbines are visible from this distance and hence would also be visible to motorists travelling along this section of the N12.

Figure 30: View east from Viewpoint KRW2 - Pre-Construction

Figure 31: View east-from Viewpoint KRW2 - Post-Construction

8.7.3 Viewpoint KRW3

This point is located some 5 km south-west of the Kraaltjies WEF project area, close to the N12 National Route and approximately 6 km from the nearest turbine. Although turbines are visible from this location, impacts will be significantly reduced at this distance. As such, this location is in a zone of low visual impact. At this distance, weather conditions could however potentially affect the visual impact as shown in Figure 33 where cloud cover is slightly reducing the visibility of the turbines

Figure 32: View north-east from Viewpoint KRW3 - Pre-Construction

Figure 33: View east from Viewpoint KRW3 - Post-Construction

9. OVERALL IMPACT RATING

The EIA Regulations, 2014 (as amended) require that an overall rating for visual impact be provided to allow the visual impact to be assessed alongside other environmental parameters. The tables below present the impact matrix for visual impacts associated with the proposed construction and operation of the Kraaltjies WEF and the associated infrastructure. Preliminary mitigation measures have been determined based on best practice and literature reviews.

Please refer to **Appendix E** for an explanation of the impact rating methodology.

9.1 KRAALTJIES WEF PROJECT AND ASSOCIATED ONSITE INFRASTRUCTURE

KRAALTJIES WEF AND ASSOCIATED ONSITE INFRASTRUCTURE (INCLUDING BESS, SUBSTATION, CABLING AND ACCESS ROADS)																				
ENVIRONMENTAL PARAMETER	**ISSUE / IMPACT / ENVIRONMENTAL EFFECT/ NATURE**	**ENVIRONMENTAL SIGNIFICANCE BEFORE MITIGATION**									**RECOMMENDED MITIGATION MEASURES**	**ENVIRONMENTAL SIGNIFICANCE AFTER MITIGATION**								
		E	**P**	**R**	**L**	**D**	**I / M**	**TOTAL**	**STATUS (+ OR -)**	**S**		**E**	**P**	**R**	**L**	**D**	**I / M**	**TOTAL**	**STATUS (+ OR -)**	**S**
Construction Phase																				
▪ Potential alteration of the visual character and sense of place ▪ Potential visual impact on receptors in the study area	▪ Large construction vehicles, equipment and construction material stockpiles 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 resulting in visual scarring of the landscape and increasing the level of visual 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.	2	3	1	2	1	2	18	-	Low	▪ Carefully plan to mimimise the construction period and avoid construction delays. ▪ Inform receptors within 1km of the WEF development area of the construction programme and schedules. ▪ Inform receptors within 500m of the proposed substation of the construction programme and schedules. ▪ Minimise vegetation clearing and rehabilitate cleared areas as soon as possible. ▪ Vegetation clearing should take place in a phased manner as far as practically possible. ▪ Maintain a neat construction site by removing rubble and waste materials regularly. ▪ Position storage / stockpile areas in unobtrusive positions in the landscape, where possible. ▪ Where possible, underground cabling should be utilised. ▪ 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 dust suppression techniques are implemented: ▪ on all internal access roads; ▪ in all areas where vegetation clearing has taken place; ▪ on all soil stockpiles.	2	2	1	2	1	2	16	-	Low

Operational Phase																				
▪ Potential alteration of the visual character and sense of place. ▪ Potential visual impact on receptors in the study area. ▪ Potential visual impact on the night time visual environment.	▪ The development may be perceived as an unwelcome visual intrusion, particularly in more natural undisturbed settings. ▪ The proposed WEF and associated infrastructure 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 at the proposed WEF. ▪ Shadow flicker impacts may affect residents within 800m of a turbine placement.	2	3	3	3	3	2	28	-	Medium	▪ Design Phase ▪ Where possible, fewer but larger turbines with a greater output should be utilised rather than a larger number of smaller turbines with a lower capacity. ▪ Where possible, the operation and maintenance buildings and laydown areas should be consolidated to reduce visual clutter. ▪ Where possible, underground cabling should be utilised. ▪ Turbines should not be located within 800m of an occupied building to avoid shadow flicker impacts. ▪ Operational Phase ▪ Turbine colours should adhere to CAA requirements. Bright colours and logos on the turbines should be kept to a minimum. ▪ Inoperative turbines should be repaired promptly, as they are considered more visually appealing when the blades are rotating (or at work) (Vissering, 2011). ▪ If turbines need to be replaced for any reason, they should be replaced with the same model, or one of equal height and scale to lessen the visual impact. ▪ As far as possible, limit the number of maintenance vehicles which are allowed to access the site. ▪ Ensure that dust suppression techniques are implemented on all gravel access roads. ▪ As far as possible, limit the amount of security and operational lighting present on site. ▪ Light fittings for security at night should reflect the light toward the ground and prevent light spill. ▪ Lighting fixtures should make use of minimum lumen or wattage. ▪ Mounting heights of lighting fixtures should be limited, or alternatively foot-light or bollard level lights should be used.	2	3	3	2	2	2	24	-	Medium

											▪ If possible, make use of motion detectors on security lighting. ▪ Where an occupied building is located within 800m of a wind turbine, then the potential for shadow flicker should be assessed. ▪ Where possible, the operation and maintenance buildings should be consolidated to reduce visual clutter. ▪ The operations and maintenance (O&M) buildings should not be illuminated externally at night. ▪ The O&M buildings should be painted in natural tones that fit with the surrounding environment. ▪ Buildings on the substation site should be painted with natural tones that fit with the surrounding environment. ▪ Non-reflective surfaces should be utilised where possible.								
Decommissioning Phase																				
▪ Potential visual intrusion resulting from vehicles and equipment involved in the decommissioning process; ▪ Potential visual impacts of increased dust emissions from decommissioning activities and related traffic; and ▪ Potential visual intrusion of any remaining infrastructure on the site.	▪ 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.	2	3	1	2	1	2	18	-	Low	▪ All infrastructure that is not required for post-decommissioning use should be removed. ▪ Carefully plan to minimize the decommissioning period and avoid delays. ▪ Maintain a neat decommissioning site by removing rubble and waste materials regularly. ▪ Ensure that dust suppression procedures are maintained on all gravel internal access roads throughout the decommissioning phase. ▪ All cleared areas should be rehabilitated as soon as possible. ▪ Rehabilitated areas should be monitored post-decommissioning and remedial actions implemented as required.	2	2	1	2	1	2	16	-	Low
Cumulative																				
▪ Potential alteration of the visual character and sense of place in the broader area.	▪ Additional renewable energy developments in the broader area will alter the natural character of the study area towards a more industrial	3	4	2	3	3	2	30	-	Medium	▪ Carefully plan to minimise the construction period and avoid construction delays. ▪ Position laydown areas and related storage/stockpile areas in	3	3	2	2	2	2	24	-	Medium

▪ Potential visual impact on receptors in the study area. ▪ Potential visual impact on the night time visual environment.	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 renewable energy facilities 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.									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 as far as practically possible. ▪ Where possible, the operation and maintenance buildings should be consolidated to reduce visual clutter. ▪ As far as possible, limit the number of maintenance vehicles which are allowed to access the facility. ▪ Ensure that dust suppression techniques are implemented on all gravel internal access roads. ▪ As far as possible, limit the amount of security and operational lighting present on site. ▪ Light fittings for security at night should reflect the light toward the ground and prevent light spill. ▪ Lighting fixtures should make use of minimum lumen or wattage. ▪ Mounting heights of lighting fixtures should be limited, or alternatively foot-light or bollard level lights should be used. ▪ If possible, make use of motion detectors on security lighting. ▪ The operations and maintenance (O&M) buildings should not be illuminated externally at night. ▪ The O&M buildings should be painted in natural tones that fit with the surrounding environment.								

10.COMPARATIVE ASSESSMENT OF ALTERNATIVES

The layout alternatives for the proposed Kraaltjies Substation, Construction Laydown Area / BESS site, as shown in Figure 4, are comparatively assessed in Table 7 below.

The aim of the comparative assessment is to determine which of the alternatives would be preferred from a visual perspective. Preference ratings for each alternative are provided in the tables below. The alternatives are rated as preferred; favourable, least-preferred or no-preference.

The degree of visual impact and the preference rating has been determined 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).
-

Key

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

10.1 ON-SITE INFRASTRUCTURE

Table 7: Comparative Assessment of Alternatives: WEF Infrastructure

Alternative	Preference	Reasons (incl. potential issues)
SUBSTATION / CONSTRUCTION LAYDOWN / BESS SITE		
Substation, Construction Laydown Area and BESS Site Option 1	Favourable	▪ Option 1 is located on gently sloping terrain and would only be moderately exposed on the skyline. ▪ The closest sensitive receptor to this alternative is approximately 3.4km away, this being SR3. The visual impacts from Option 1 affecting this receptor are therefore rated as low. Visual impacts affecting SR3 are however likely to be reduced by its proximity to the N12 and existing 400kV power lines, and also the fact that this receptor is located within the Kraaltjies WEF project area.

Alternative	Preference	Reasons (incl. potential issues)
		▪ The other 2 sensitive receptors are more than 10kms away and thus not expected to experience any visual impacts as a result of the substation complex. ▪ The closest potentially sensitive receptor to this alternative is approximately 800m from the substation site boundary, this being VR20. The visual impacts from Alternative 1 affecting this receptor are therefore rated as moderate. Impacts would be reduced however due to the fact that VR20 is located within the project area for the Kraaltjies WEF and as such the landowners are involved in the project. The remaining receptors are all more than 5km away, and as such impacts would be negligible. ▪ The N12 receptor road is 2kms from this site alternative, and as such visual impacts affecting motorists using this route would be rated as low. ▪ In light of the above, there are no fatal flaws associated with Option 1 and this alternative is considered favourable from a visual perspective.
Substation, Construction Laydown Area and BESS Site Option 2	Favourable	▪ Option 2 is located on slightly sloping terrain and as such would only be moderately exposed on the skyline. ▪ The closest sensitive receptor to this alternative is approximately 1.3km away, this being SR3. The visual impacts from Option 2 affecting this receptor are therefore rated as low. Visual impacts affecting SR3 are likely to be further reduced by its proximity to the N12 and existing 400kV power lines, and also the fact that this receptor is located within the Kraaltjies WEF project area. ▪ The other 2 sensitive receptors are more than 9kms away and thus not expected to experience any visual impacts as a result of the substation complex. ▪ The closest potentially sensitive receptor to this alternative is approximately 1.9km away, this being VR20. The visual impacts from Alternative 2 affecting this receptor are therefore rated as low. Impacts would be reduced however due to the fact that VR20 is located within the project area for the Kraaltjies WEF and as such the

Alternative	Preference	Reasons (incl. potential issues)
		landowners are involved in the project. The remaining receptors are all more than 3km away, and as such impacts would be low to negligible. ▪ The N12 receptor road is approximately 830m from this site alternative at its closest point, and as such visual impacts affecting motorists using this route would be rated as moderate. ▪ In light of the above, there are no fatal flaws associated with Option 2 and this alternative is considered favourable from a visual perspective.

10.2 NO-GO ALTERNATIVE

The 'no-go' alternative is the option of not undertaking the proposed 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.

11. PROPOSED LAYOUT

Subsequent to the completion of all specialist studies, Mainstream has designed the proposed Kraaltjies WEF layout in line with the recommendations of the various specialists. The proposed layout as shown in Figure 4 has been assessed from a visual perspective and it has been concluded that these amendments do not change the findings of this VIA.

12.CONCLUSION

A visual impact assessment study was conducted to assess the magnitude and significance of the potential visual impacts associated with the development of the proposed Kraaltjies WEF and associated infrastructure near Beaufort West in the Western Cape Province. Overall, sparse human habitation and the predominance of natural vegetation cover across much of the study area would give the viewer the general impression of a largely natural setting with some pastoral elements. As such, a WEF development would alter the visual character and contrast significantly with the typical land use and /or pattern and form of human elements present across the broader study area. The level of contrast will however be reduced by the presence of the N12 national route and existing high voltage power lines traversing the study area.

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 to moderate visual sensitivity. However, 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.

The area is not typically valued for its tourism significance and there is limited human habitation resulting in relatively few sensitive or potentially sensitive receptors in the area. A total of thirty-five (35) potentially sensitive receptors were identified in the combined study area, all of which are located within 10kms of a turbine placement in the Kraaltjies WEF EIA Phase layout. Three of the receptors identified were found to be linked to leisure-based (specifically nature-based) tourism and are therefore considered to be sensitive receptors, although Rietpoort Game Farm was found to be outside the viewshed for the EIA Phase turbine layout. Neither of the remaining sensitive receptors, namely ROAM Safari Lodge and Silwerkaroo Guest House are however expected to experience high levels of visual impact from the proposed WEF facility. Both of these receptors are expected to experience only moderate levels of visual impact. It is believed that ROAM Safari Lodge provides leisure or nature-based tourist facilities located on a relatively large farm property. Details of the levels of activity on different sectors of the farm are not however known and as such, the impact rating matrix for these receptors is based on the assumed location of the main accommodation complex on the property. Accordingly, it should be noted that sections of the property may be slightly closer to the proposed WEF, and as such could be subjected to higher levels of visual impacts, depending on the location of the wind turbines in the final layout. Silwerkaroo Guest House is located inside the proposed Kraaltjies WEF development area and as such, this property forms part of the WEF project. Thus, it is assumed that the owners have a vested interest in the WEF development and would not perceive the development in a negative light.

The remaining thirty-two identified receptors are all assumed to be farmsteads which are regarded as *potentially* sensitive visual receptors as they are located within a mostly rural setting and the proposed development will likely alter natural vistas experienced from these locations. Seven potentially sensitive receptors were however found to be outside the viewshed for the EIA Phase turbine layout and were excluded from ant further assessment.

Six of the *potentially* sensitive receptor locations are expected to experience high levels of visual impact as a result of the proposed Kraaltjies WEF. The high sensitivity rating relates largely to the fact that these receptors are located in close proximity to the proposed development and they are in zones of high

contrast, with little natural screening. Four of these receptors are located within the project areas of adjacent WEF projects, namely Beaufort West WEF, Trakas WEF and Kwagga WEF 1 and this would suggest that the owners / occupants of the relevant farmsteads are not averse to WEF development in the area. In addition, none of these receptors are tourism-related facilities and as such they are not considered to be Sensitive Receptors. Hence the high impact rating assigned to these receptors will not affect the overall impact ratings determined in Section 9.

Seventeen potentially sensitive receptor locations would be subjected to moderate levels of visual impact as a result of the proposed Kraaltjies WEF development, while the remaining two receptors would only experience low levels of visual impact. Eight of these receptors are also located within the project areas of the adjacent WEF projects, namely Beaufort West WEF, Trakas WEF and Kwagga WEF 1 and this would suggest that the owners / occupants of the relevant farmsteads are not averse to WEF development in the area

Although the N12 receptor road traverses the study area, motorists travelling along this route are only expected to experience moderate impacts from the proposed Kraaltjies WEF and associated infrastructure.

An overall impact rating was also conducted as part of the VIA in order to allow the visual impact to be assessed alongside other environmental parameters. The assessment revealed that impacts associated with the proposed Kraaltjies WEF and associated infrastructure will be of low significance during both construction and decommissioning phases. During operation, visual impacts from the WEF would be of medium significance with relatively few mitigation measures available to reduce the visual impact.

Thirteen additional proposed renewable energy developments and infrastructure projects were identified within a 35km radius of the Kraaltjies WEF project, although only eight (8) of these would have any significant impact on the landscape within the visual assessment zone. These projects, namely Koup 1 and Koup 2 WEFs, Beaufort West and Trakas WEFs, Kwagga WEFs 1, 2 and 3 and Heuweltjies WEF, are all located in relatively close proximity to Kraaltjies WEF and are on contiguous properties. These proposed WEFs, in conjunction with the associated grid connection infrastructure, will inevitably introduce an increasingly industrial character into a largely natural, pastoral landscape, thus giving rise to significant cumulative impacts. It is however anticipated that these impacts could be mitigated to acceptable levels with the implementation of the recommendations and mitigation measures stipulated for each of these developments by the visual specialists. In light of this and the relatively low level of human habitation in the study area however, cumulative impacts have been rated as medium.

A comparative assessment of site alternatives for the on-site WEF infrastructure was undertaken in order to determine which of the site alternatives would be preferred from a visual perspective. No fatal flaws were identified in respect of either of the alternatives for the proposed on-site substation, construction laydown area / BESS facilities and both alternatives were found to be favourable.

12.1 VISUAL IMPACT STATEMENT

It is SLR's opinion that the potential visual impacts associated with the proposed Kraaltjies WEF and associated infrastructure development are negative and of moderate significance. Given the low level of human habitation and the absence of sensitive receptors however, the project is deemed acceptable from

a visual perspective and the EA should be granted. SLR 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.

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APPENDIX C: SITE SENSITIVITY VERIFICATION

Prior to commencing with the specialist assessment in accordance with Appendix 6 of the National Environmental Management Act (Act 107 of 1998, as amended) (NEMA) Environmental Impact Assessment (EIA) Regulations of 2014, a site sensitivity verification was undertaken in order to confirm the current land use and environmental sensitivity of the proposed Kraaltjies Wind Energy Facility (WEF) and associated infrastructure 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	21 – 24 June 2021
Specialist Name	Assessment undertaken by Kerry Schwartz (SLR Consulting) Field investigation undertaken by Riona Patak (SiVEST)
Professional Registration Number	South African Geomatics Council – GTc GISc 1187
Specialist Affiliation / Company	SLR Consulting; SiVEST SA (Pty) Ltd

1 SITE SENSITIVITY VERIFICATION

A site sensitivity verification has been conducted in support of the Visual Impact Assessment (VIA) for the proposed Kraaltjies WEF and associated infrastructure. 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 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 21st and the 24th of June 2021 (mid winter). 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 SOURCE OF INFORMATION

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

- Elevation data from 25m Digital Elevation model (DEM) from the National Geo-Spatial Information (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;
- Vegetation classification data extracted from the South African National Biodiversity Institute's (SANBI's) VEGMAP 2018 dataset;
- Google Earth Satellite imagery 2021;
- 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);
- VIA for the proposed Beaufort West Renewable Energy Facilities, Bernard Oberholzer, 2010.
- VIAs for the proposed Koup 1 and Koup 2 WEFs, SiVEST, 2021.

2 OUTCOME OF SITE SENSITIVITY VERIFICATION

Overall, sparse human habitation and the predominance of natural vegetation cover across much of the study area would give the viewer the general impression of a largely natural setting with some pastoral elements. As such, a WEF development with associated infrastructure would alter the visual character and contrast significantly with the typical land use and/or pattern and form of human elements present across the broader study area. The level of contrast will however be reduced by the presence of the N12 national route and existing high voltage power lines traversing the study area.

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 to moderate visual sensitivity.

A site sensitivity assessment was undertaken to inform the site layout for the WEF. The aim of this exercise was to indicate any areas of the application site or which should be precluded from the development footprint. From a visual perspective, sensitive areas would be areas where the establishment of wind turbines, power lines or substations would result in the greatest probability of visual impacts on sensitive or potentially sensitive visual receptors.

2.1 WEF SITE SENSITIVITY

Using GIS-based visibility analysis, it was possible to determine that the tip of at least one turbine blade (ie at a maximum height of 300m) would be visible from most of the identified potentially sensitive receptors in the study area and as such, no areas on the site are significantly more visible than the remainder of the site. It should be noted however that the visual prominence of a very tall structure such as a wind turbine would be exacerbated if located on a ridge top or a relatively high lying plateau. As such, it is recommended that wind turbines should preferably not be located on the highest ridges within the WEF development area. While these ridges could be seen as areas of potentially higher visual sensitivity, the study area as a whole is rated as having a low to moderate visual sensitivity, and as such, the sensitivity rating would be reduced to "Medium-High". Hence the ridges are not considered to be "no go areas", but rather should be viewed as zones where turbine placement would be least preferred.

From a visual perspective, another concern is the direct visual impact of the turbines on any farmsteads or receptors located on the application site. Accordingly, a 1km visual sensitivity zone has been delineated around the existing residence on the application site. This 1km buffer is in accordance with the flicker-sensitive buffers applied in the DFFE Screening Tool. In addition, a 1km zone of potential visual sensitivity has been delineated on either side of the N12 national route.

The preclusion of turbine development from these zones would reduce the direct impact of the turbines on the occupants of the farmsteads and on passing motorists, especially those impacts related to shadow flicker. At this stage however, the visual sensitivity zones are not considered "no go" areas, but rather should be viewed as zones where development should be limited. It should be stressed that these zones on the WEF development site apply to turbine development only. The visual impacts resulting from the associated on-site infrastructure are considered to have far less significance when viewed in the context of multiple wind turbines and as such the associated on-site infrastructure has been excluded from the sensitivity analysis.

The areas identified as visually sensitive to WEF development are shown in **Figure 1** below.

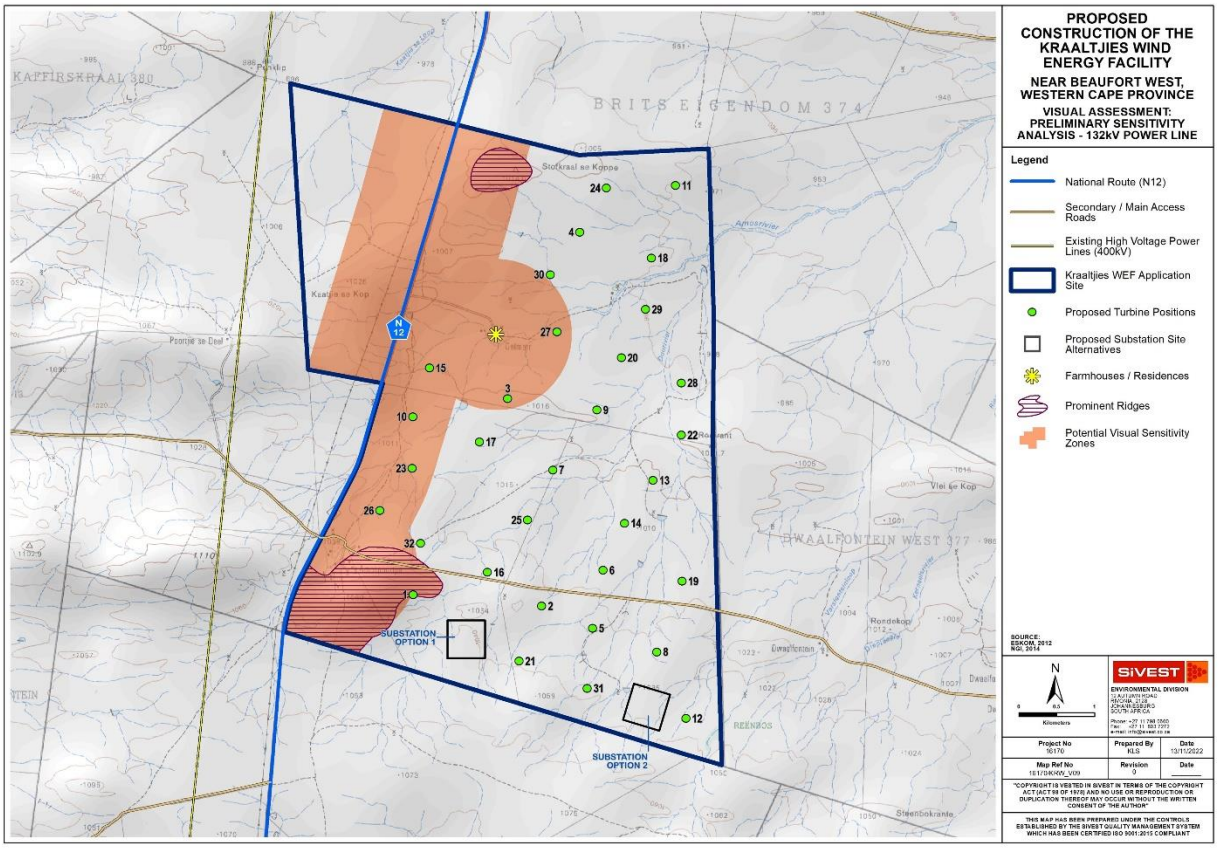

Figure 1: Areas of Potential Visual Sensitivity on the Kraaltjies WEF Application Site

3 NATIONAL ENVIRONMENTAL SCREENING TOOL

3.1 WEF SITE SENSITIVITY

In assessing visual sensitivity of the proposed Kraaltjies WEF, consideration was given to the Landscape and Flicker Themes of the National Environmental Screening Tool. Under the Landscape Theme, as shown in **Figure 2** below, the tool identifies areas of Very High sensitivity in respect of WEF development on the Kraaltjies WEF site. According to the Screening Tool, the high sensitivity rating applied to the WEF site is associated with the presence of natural features such as mountain tops, high ridges and steep slopes. Based on these criteria, a significant portion of the site would be ruled out for WEF development.

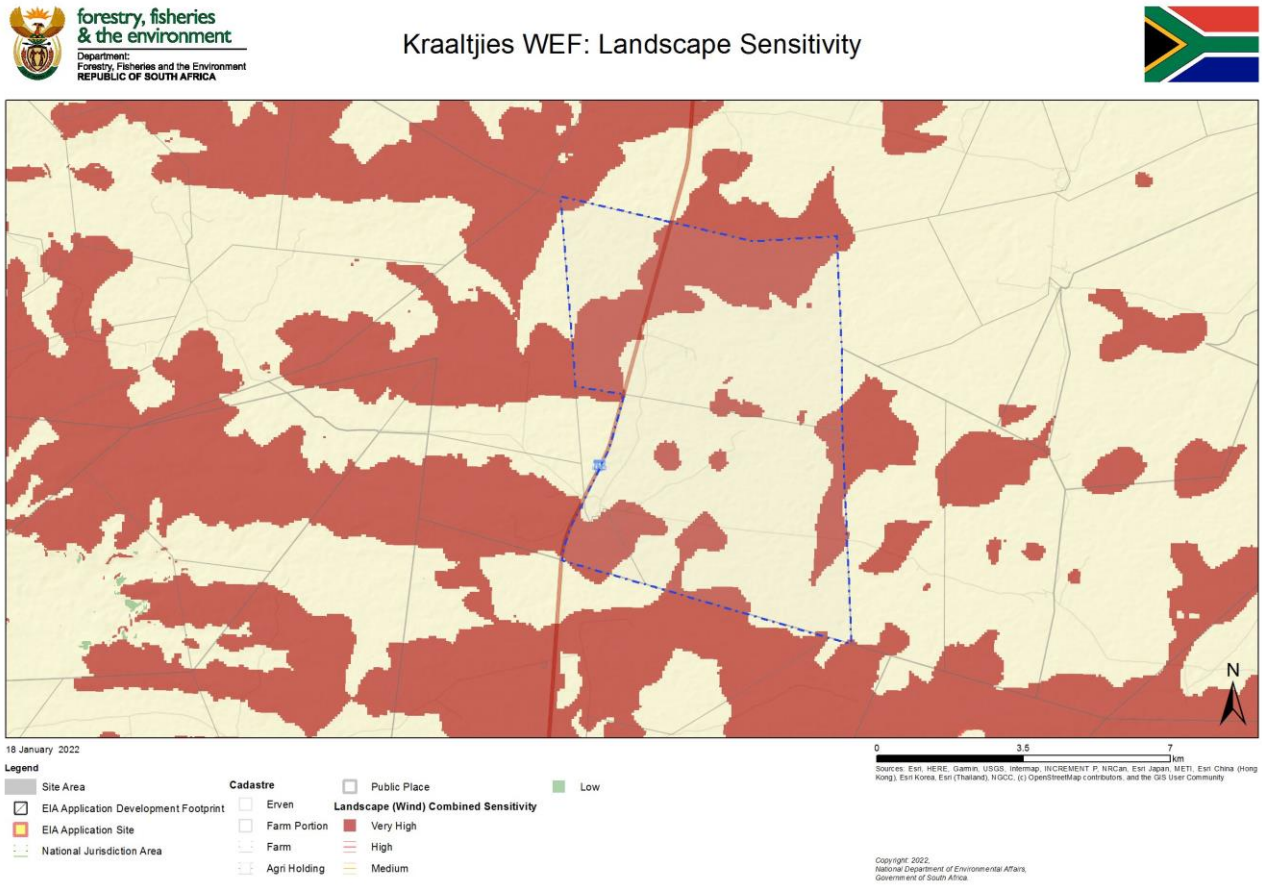

Figure 2: Relative Landscape Sensitivity (January 2022)

The flicker theme demarcates areas (1 km buffers) of sensitivity around identified receptors in the area (**Figure 3**). Under this theme, potential flicker receptors have been identified on the site, or within 1 km of the site boundary. Buffers demarcated around these receptors have been assigned a “very high” sensitivity rating.

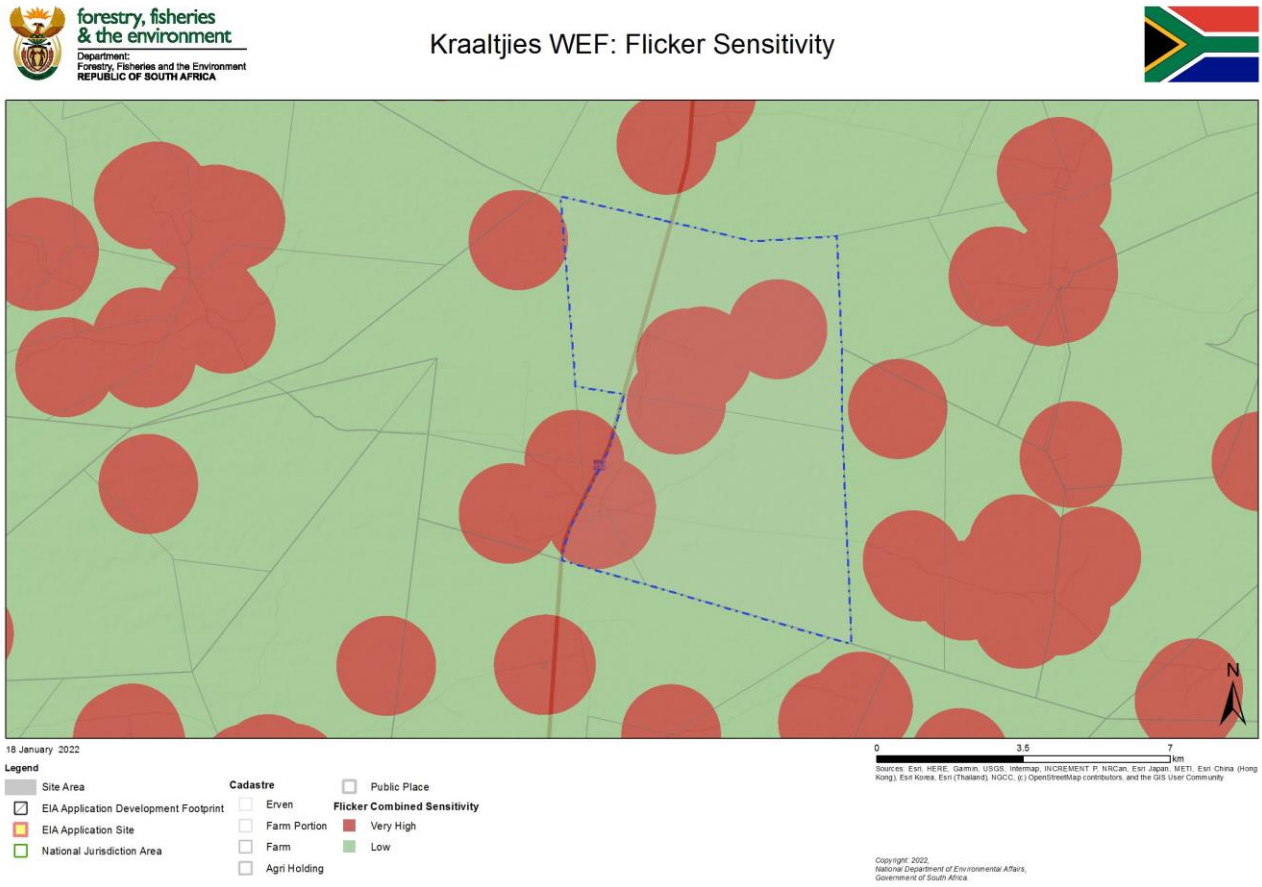

Figure 3: Flicker Sensitivity (January 2022)

The Screening Tool provides a very high level, desktop assessment and as such the results of the study must be viewed against the findings of the field investigation as well as factors affecting visual impact, such as:

- the presence of visual receptors;
- the distance of those receptors from the proposed development; and
- the likely visibility of the development from the receptor locations.

3.2 SENSITIVITY ANALYSIS SUMMARY FOR WEF DEVELOPMENT

Although the Screening Tool identifies significant areas of very high landscape and flicker sensitivity on the Kraaltjies WEF application site, the site sensitivity verification exercise conducted found little evidence to support this sensitivity rating. The desktop topographic assessment of the area 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 a few shallow ridges in a largely flat to gently undulating landscape. The sensitivity analysis above has recognised these ridges and identified the higher ridges as zones where development would be least preferred.

The presence of receptors, either on the Kraaltjies WEF application site, or within 1km of the site boundary, was confirmed by the site sensitivity verification exercise. However, an assessment of receptor locations using Google Earth showed that there were no receptors present at some of the locations identified by the National Screening Tool. The remaining (confirmed) receptors were factored into the sensitivity analysis, together with a 1km buffer.

4 CONCLUSION

A site sensitivity verification has been conducted in respect of the Visual Impact Assessment (VIA) for the proposed 240MW Kraaltjies WEF and associated infrastructure near Beaufort West in the Western Cape Province. This verification has been based on a desktop-level assessment supported by field-based observation.

As outlined above, the sensitivities identified have been further assessed in relation to the sensitivities identified in terms of the Landscape and Flicker Themes of the National Environmental Screening Tool and the areas identified as visually sensitive during the course of the specialist Visual Impact Assessment and associated field work have been verified.

RECORD OF REPORT DISTRIBUTION

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