Appendix H.8

VISUAL IMPACT ASSESSMENT

Igolide Wind Energy Facility

Visual Impact Assessment Report

Igolide Wind (Pty) Ltd

Prepared by:

SLR Consulting (South Africa) Pty Ltd

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SLR Project No.: 720.05085.00010

: ….

22 August 2023

Revision: 01

.: …

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Keywords	WEF, VIA
Status	Draft
Report No.	
SLR Company	SLR Consulting (South Africa) Pty Ltd
DFFE:	
Client Reference	
SLR Portfolio No.	

Revision Record

Revision	Date	Prepared By	Checked By	Authorized By
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Report Sign Off and Approvals

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(Project Manager and author) **(Reviewer)**

Basis of Report

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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 4.0 Appendix A
(b) a declaration that the specialist is independent in a form as may be specified by the competent authority;	Appendix A
(c) an indication of the scope of, and the purpose for which, the report was prepared;	Section 5
(cA) an indication of the quality and age of base data used for the specialist report;	Section 7 Section 8
(cB) a description of existing impacts on the site, cumulative impacts of the proposed development and levels of acceptable change;	Section 13 Section 14
(d) the duration, date and season of the site investigation and the relevance of the season to the outcome of the assessment;	Section 6 Section 7.3
(e) a description of the methodology adopted in preparing the report or carrying out the specialised process inclusive of equipment and modelling used;	Section 7 Appendix C & D
(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 10.3
(g) an identification of any areas to be avoided, including buffers;	Section 10.3
(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 10.3
(i) a description of any assumptions made and any uncertainties or gaps in knowledge;	Section 6
(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;	Sections 13, 14 & 15
(k) any mitigation measures for inclusion in the EMPr;	Section 15
(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 15
(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 18.1
(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.

Regulation GNR 326 of 4 December 2014, as amended 7 April 2017, Appendix 6	Section of Report
(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

Igolide Wind (Pty) Ltd (Igolide) is proposing to develop the Igolide Wind Energy Facility (WEF), near Fochville in Gauteng Province.

The proposed WEF will be subject to a full Scoping and Environmental Impact Assessment (S&EIA) process in terms of the National Environmental Management Act (Act 107 of 1998) (NEMA) as amended and EIA Regulations, 2014. Accordingly, an EIA process as contemplated in terms of the EIA Regulations (2014) is being undertaken in respect of this 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, which is being undertaken in parallel to this EIA process.

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

The VIA has determined that the study area has a somewhat mixed visual character, transitioning from the heavily transformed mining landscape in the north to a more rural / pastoral character across the remainder of the study area. Hence, although a WEF development would alter the visual character and contrast with the rural / pastoral character, the location of the proposed WEF in relatively close proximity to the gold mining complex will significantly reduce the level of contrast.

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

A total of seventy-three potentially sensitive receptor locations were identified within 5 km of the proposed Igolide WEF project area, all but one of which, are inside the viewshed for the proposed WEF. Five receptor locations are however located within the Igolide WEF project area and it is known that these landowners have signed agreements with Igolide regarding the establishment of the proposed WEF. ***None of these receptor locations was found to be sensitive.***

Most of the receptor locations within the 5 km radius are assumed to be farmsteads and residences which could be regarded as potentially sensitive visual receptors as they are located within a mostly rural setting with pastoral / natural vistas that will likely be altered by the proposed development. Although several accommodation / restaurant / wedding venue facilities were identified in the study area, these were not considered sensitive as the type of facilities provided are not expected to be detrimentally affected by changes in the landscape.

Only two of the identified receptors could potentially experience high levels of visual impact, namely Visual Receptor (VR)34 and VR36. Impacts are however expected to be reduced by the proximity of these farmsteads to major road infrastructure in the area. Impacts are expected to be further reduced by the fact that there are relatively few turbines (10) proposed for this development, although local sentiments towards the proposed development are not yet known.

Sixty-seven receptor locations are expected to experience moderate levels of visual impact, while the remaining three receptor locations will only be subjected to low levels of impact.

Although the N12 and the R500 receptor roads traverse the study area, motorists travelling along these routes are only expected to experience moderate impacts from the proposed Igolide WEF. Impacts on the R501 receptor road are expected to be minimal as most sections of this road are outside the viewshed for the proposed turbines.

A preliminary assessment of overall impacts revealed that impacts associated with the proposed Igolide WEF are of LOW significance during both the construction and decommissioning phases. During operation however, visual impacts from the Igolide WEF would be of MODERATE significance with relatively few mitigation measures available to reduce the visual impact.

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

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

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Appendices

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APPENDIX B: SITE SENSITIVITY VERIFICATION

APPENDIX C: RECEPTOR IMPACT RATING

APPENDIX D: IMPACT RATING METHODOLOGY

APPENDIX E: MAPS

Acronyms and Abbreviations

BA	Basic Assessment
BESS	Battery Energy Storage System
DEM	Digital Elevation Model
DFFE	Department of Forestry, Fisheries and Environment
EA	Environmental Authorisation
EIA	Environmental Impact Assessment
GIS	Geographical Information Systems
ha	Hectare
I&AP	Interested and Affected Party
IPP	Independent Power Producer
km	Kilometre
kV	Kilovolt
m	Metre
MW	Megawatt
NEMA	National Environmental Management Act
NGI	National Geo-Spatial Information
O&M	Operation and Maintenance
PV	Photovoltaic
REDZ	Renewable Energy Development Zone
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).

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.

Sense of place: The unique quality or character of a place, whether natural, rural or urban. It relates to uniqueness, distinctiveness or strong identity.

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.

Study area / Visual Assessment Zone: The area with a zone of 5 km from the outer boundary of the proposed SEF 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 absorption capacity: The ability for topography and vegetation to provide a screening effect / conceal the proposed development.

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 intrusion: The level of compatibility or congruence of the project with the surrounding landscape or 'sense of place'. It relates to the context of maintaining the unique quality or character of the inherent landscape.

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.

1.0 Introduction

Igolide Wind (Pty) Ltd is proposing to develop the Igolide Wind Energy Facility (WEF), near Fochville in Gauteng Province. The project developer aims to bid the Igolide WEF into the Renewable Energy Independent Power Producer Procurement Programme (REIPPPP) or a similar procurement programme under the Integrated Resource Plan (IRP).

The proposed Igolide WEF is located approximately 3 km north-east of Fochville in the Merafong City Local Municipality in Gauteng Province (Figure 1 and Figure 2). The proposed WEF will be constructed on approximately 680 hectares (ha) of land on the following farm portions:

- Portion 14 of Farm 147 Kraalkop
- Portion 20 of Farm 147 Kraalkop
- Portion RE/22 of Farm 147 Kraalkop
- Portion 8 of Farm 356 Leeuwpoort
- Portion 57 of Farm 356 Leeuwpoort
- Portion 65 of Farm 356 Leeuwpoort
- Portion 66 of Farm 356 Leeuwpoort

The proposed WEF will be subject to a full Environmental Impact Assessment (EIA) process in terms of the National Environmental Management Act (Act 107 of 1998) (NEMA) and EIA Regulations, 2014. Accordingly, an EIA process as contemplated in terms of the EIA Regulations (2014) is being undertaken in respect of this project. The competent authority for this EIA is the national Department of Forestry, Fisheries and Environment (DFFE).

Grid connection infrastructure for the proposed WEF will be subject to a separate Environmental Authorization (EA) Process, which is currently being undertaken in parallel to this EIA process.

Specialist studies, including this Visual Impact Assessment (VIA), have been commissioned to assess and verify the proposed development under the new Gazetted specialist protocols[1].

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

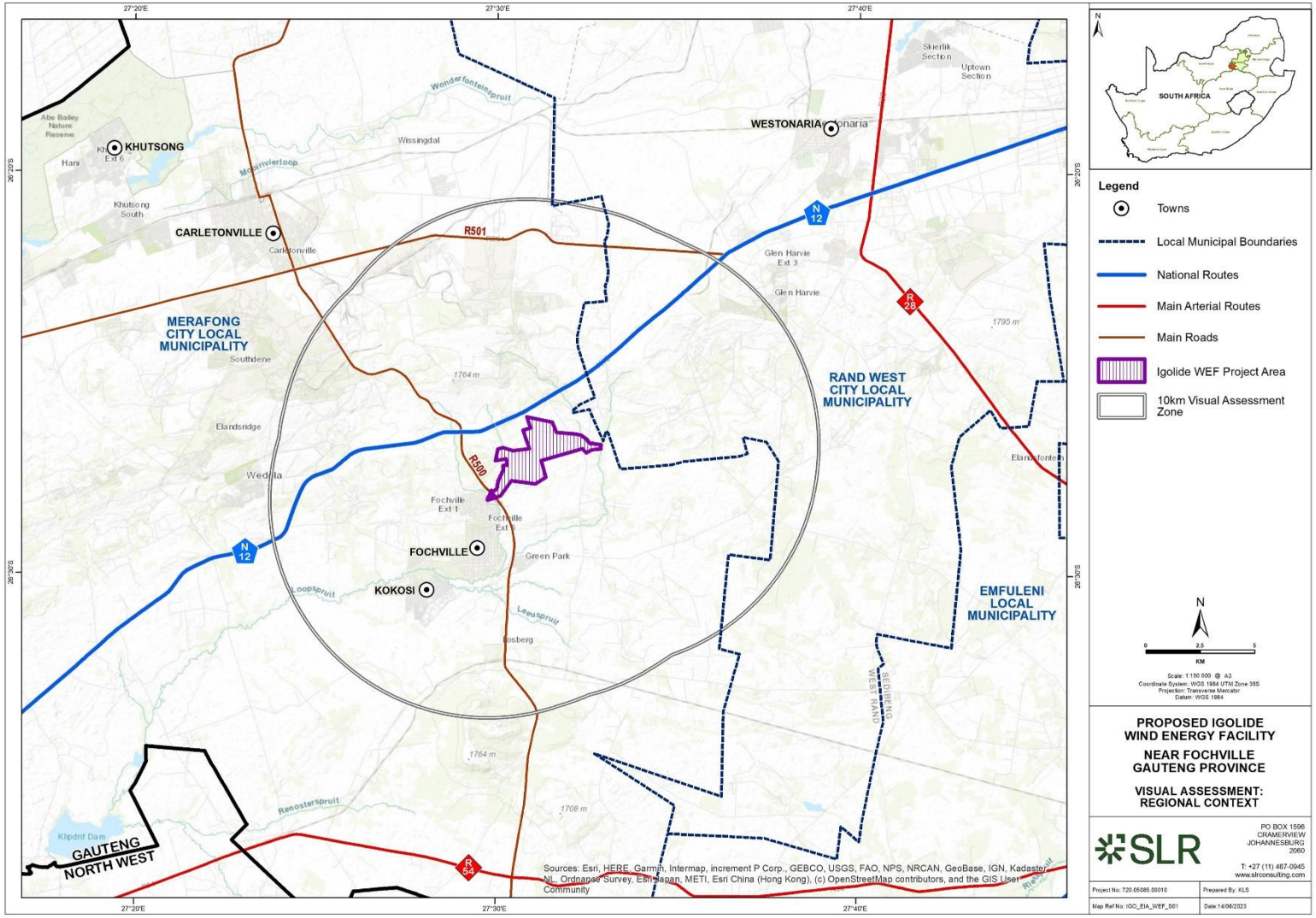

Figure 1: Regional Context

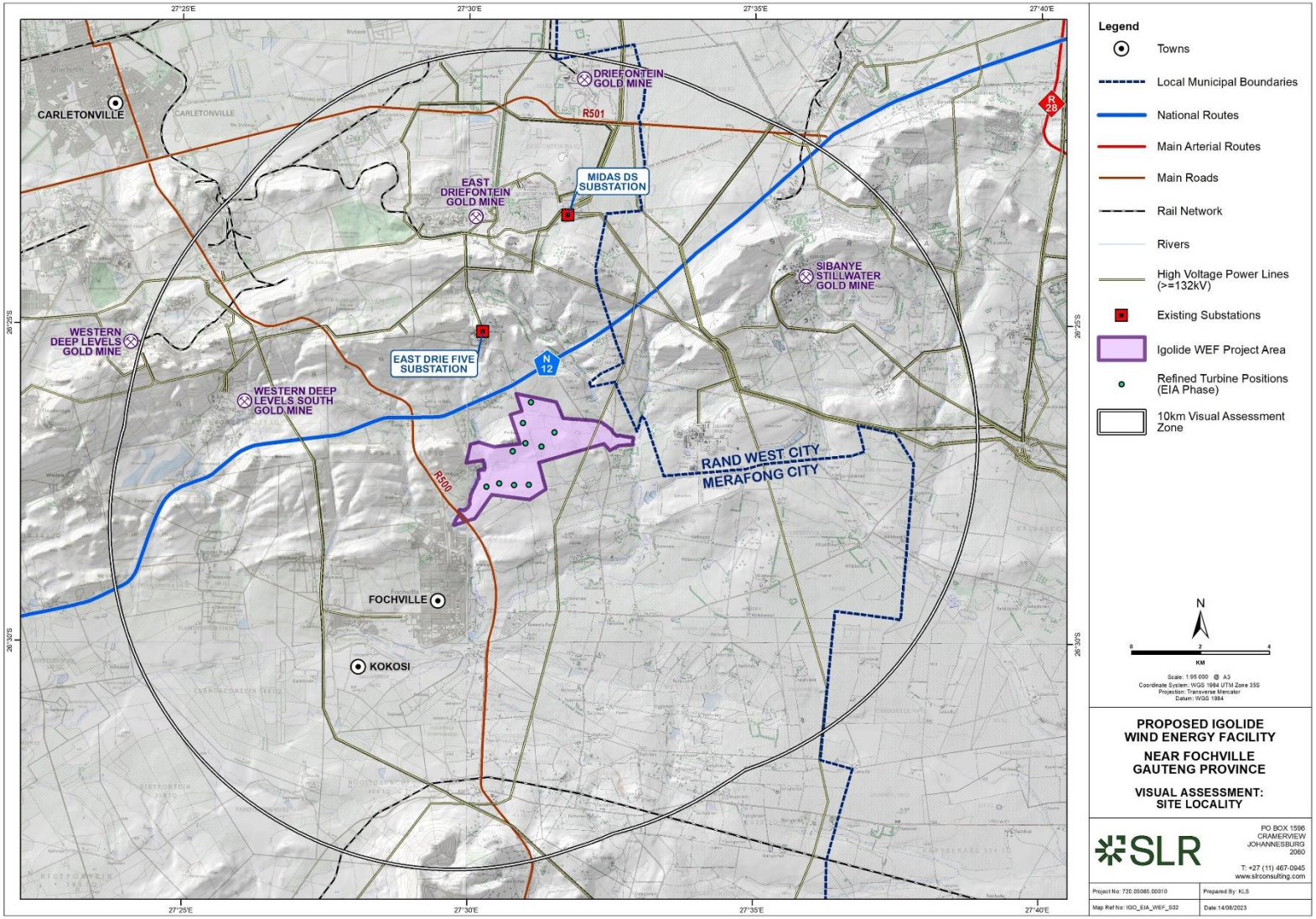

Figure 2: Site Locality

2.0 Technical Description

The Igolide WEF project area as shown in has a total area of approximately 680 hectares (ha), although the WEF footprint is only approximately 50 ha.

2.1 Project Technical Details

The proposed Igolide WEF will comprise up to 10 wind turbine generators (WTGs) with a maximum capacity of up to 100MWac. Turbines will have a hub height of up to 200m and a rotor diameter of up to 200m (Figure 3). Associated on-site infrastructure is described in the summary table below (Table 1).

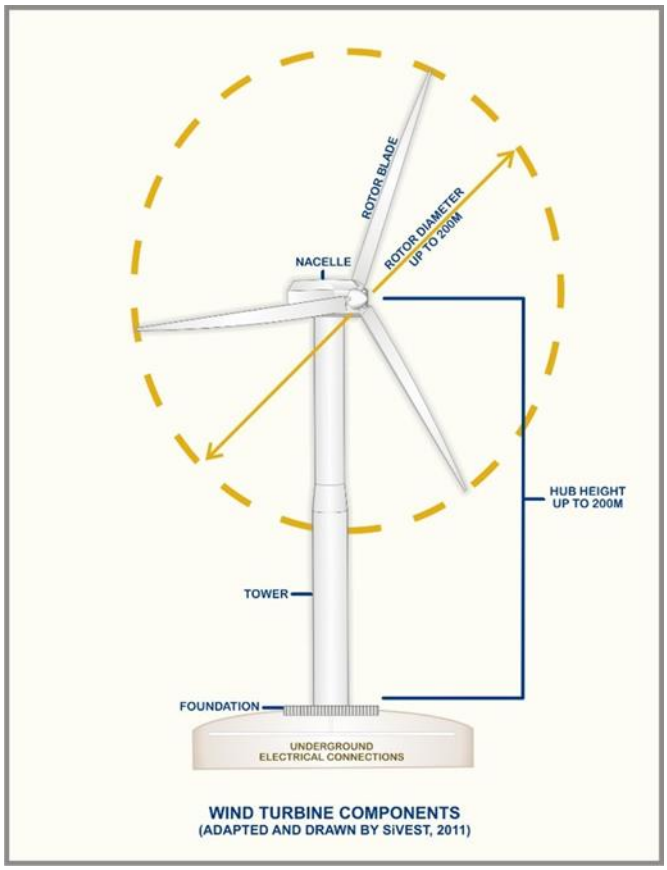

Figure 3: Typical components of a Wind Turbine

Table 1: Igolide WEF Project Summary

Facility Name:	Igolide Wind Energy Facility (WEF)
Applicant:	Igolide Wind (Pty) Ltd
Municipalities:	Merafong City Local Municipality in the Gauteng Province of South Africa
Extent:	680ha
Footprint:	50ha
Capacity:	Up to 100MW
No. of turbines:	10
Turbine hub height:	Up to 200m

Rotor Diameter:	Up to 200m
Tip Height:	Up to 300m
Foundation:	Approximately 25m diameter x 3m deep – 500 m^3 – 650m^3 concrete. Volume to be excavated will be approximately 2 200m^3, in sandy soils due to access requirements and safe slope stability requirements.
Turbine Hardstand:	Hardstand does not require concrete. Area required will be approximately 1 ha per turbine.
Tower Type:	Steel or concrete towers can be utilised at the site. Alternatively, the towers can be of a hybrid nature, comprising concrete towers and top steel sections.
On-site IPP substation and battery energy storage system (BESS):	The total footprint for the on-site substation, including the BESS, will be up to 2.5ha in extent. The on-site IPP portion substation will consist of a high voltage substation yard to allow for multiple up to 132kV feeder bays and transformers, control building, telecommunication infrastructure, and other substation components, as required. A 500m buffer around the on-site IPP substation has been identified to ensure flexibility in routing the powerline. The BESS storage capacity will be up to 100MW/400 megawatt-hour (MWh) with up to four hours of storage. It is proposed that Lithium Battery Technologies, such as Lithium Iron Phosphate, Lithium Nickel Manganese Cobalt oxides or Vanadium Redox flow technologies will be considered as the preferred battery technology; however, the specific technology will only be determined following Engineering, Procurement, and Construction ("EPC") procurement. The main components of the BESS include the batteries, power conversion system and transformer which will all be stored in various rows of containers. The BESS components will arrive on site pre-assembled.
Grid (to form part of a separate application for EA)	A single or double circuit 132kV overhead powerline and 132kV switching station (with a footprint of 1.5ha, to be located adjacent to the on-site IPP substation) to feed the electricity generated by the proposed WEF into Eskom's Midas Main Transmission Substation via a 11km overhead line. A corridor of up to 250m in width (125m on either side of the centre line) has been identified for the placement of the up to 132kV single or double circuit power line to allow flexibility in the design of the final powerline route, and for the avoidance of sensitive environmental features (where possible).
Cables:	The medium voltage collector system will comprise cables up to and including 33kV that run underground, except where a technical assessment suggests that overhead lines are required, connecting the turbines to the on-site IPP substation.
Operations and Maintenance (O&M) building and storerooms:	The Operations and Maintenance ("O&M") building footprint will be located near the on-site substation. Typical areas include: - Operations building – 20m x 10m = 200m^2 - Workshop and stores area – of ~300m^2 - Refuse area for temporary waste storage and conservancy tanks to service ablution facility. The total combined area of the buildings will not exceed 5 000m^2.

Construction camps:	The construction camp will house the contractor offices, ablution facilities, mess area, etc., and will have a footprint of 1ha. The construction camp will be demolished after commercial operations date and the area rehabilitated.
Temporary laydown or staging areas:	The laydown area will be used for the storage of equipment or components that will be incorporated into the facility (such as electrical cables) as well as non-facility related equipment and components such as shipping frames, concrete shuttering, etc. The laydown area will also be used for the storage (and filling of vehicles) of diesel fuel. The laydown area will have a footprint of up to 2ha, which could increase to 3ha for concrete towers, should they be required. The laydown area will be demolished after commercial operations date and the area rehabilitated.
Cement Batching Plant (temporary):	The cement batching plant will be used to mix and blend cement, water, sand and aggregates to form quality concrete to be used for foundations. The cement batching plant will have a footprint of 1ha.
Access and Internal Roads:	Access and internal roads will have a width of 8 - 10m, increasing up to 20m for turning circle/bypass areas to allow for larger component transport. The access and internal roads will be placed within a corridor of up to 20m width to accommodate cable trenches, stormwater channels and turning circle/bypass areas of up to 20m. Existing access roads will be used where possible to minimise impact. Where required, the width of the existing roads will be widened to ensure the passage of vehicles.
Supporting Infrastructure:	- Fencing; - Lighting; - Lightning protection; - Telecommunication infrastructure; - Stormwater channels; - Water pipelines; - Offices; - Operational and control centre; - Operations and maintenance area / warehouse / workshop; - Ablution facilities; - Gatehouse; - Security building; - Visitor's centre; and - Substation building.
Site coordinates (centre point)	26°27'2.44"S / 27°30'58.82"E
Affected farm portion/s	- Portion 14 of Farm 147 Kraalkop - Portion 20 of Farm 147 Kraalkop - Portion RE/22 of Farm 147 Kraalkop - Portion 8 of Farm 356 Leeuwpoort - Portion 57 of Farm 356 Leeuwpoort - Portion 65 of Farm 356 Leeuwpoort - Portion 66 of Farm 356 Leeuwpoort

2.2 Site Alternatives

2.2.1 WEF Site Alternatives

No layout alternatives are being considered for the WEF as the location of the wind turbines has been determined based on technical and environmental considerations (based on desktop screening of the site). The layout assessed during the Scoping Phase of the EIA process (Figure 4) has been refined in in accordance with findings of the respective specialist studies. The EIA Phase layout is presented in Figure 5.

2.2.2 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.

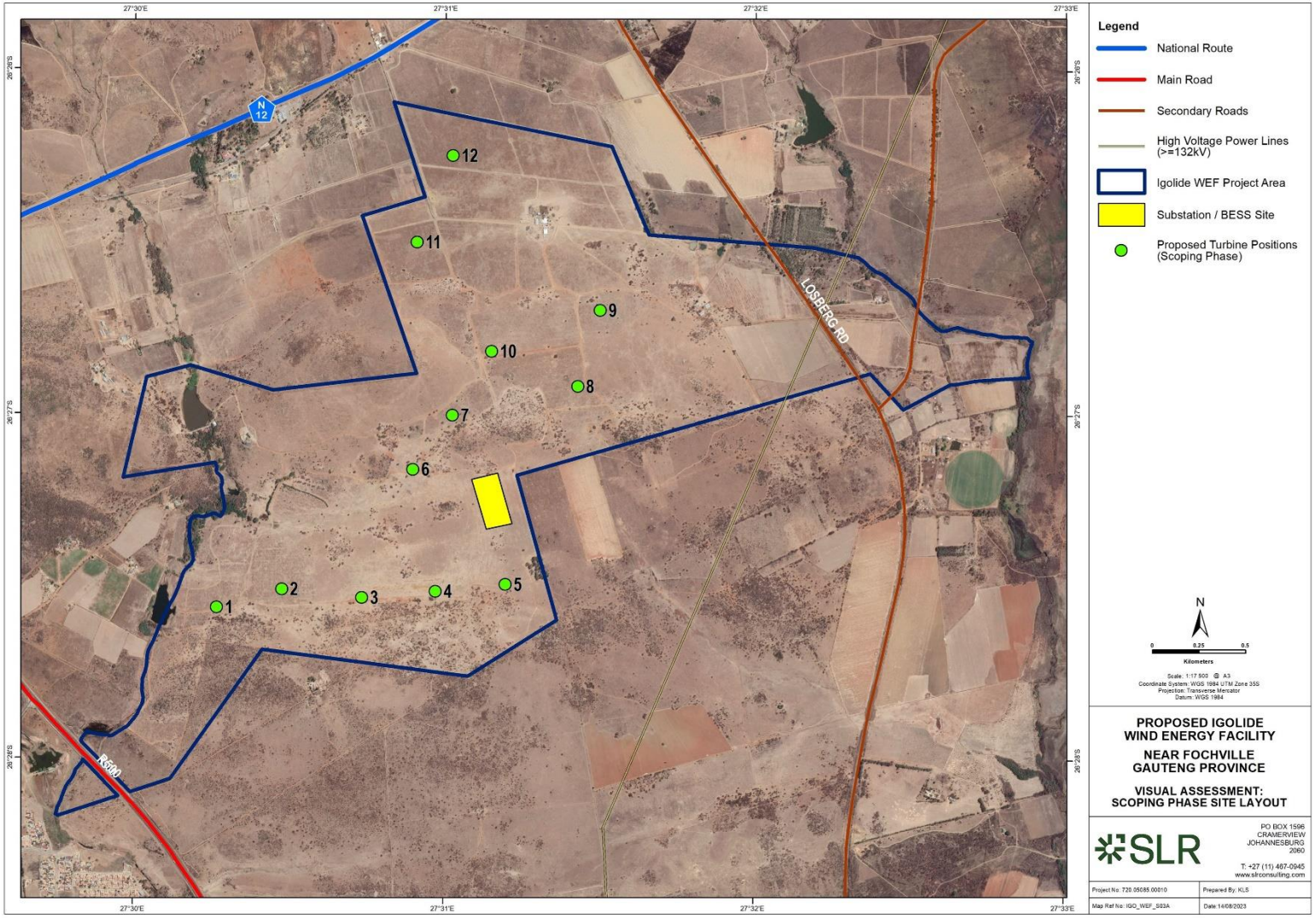

Figure 4: Scoping Phase WEF site layout

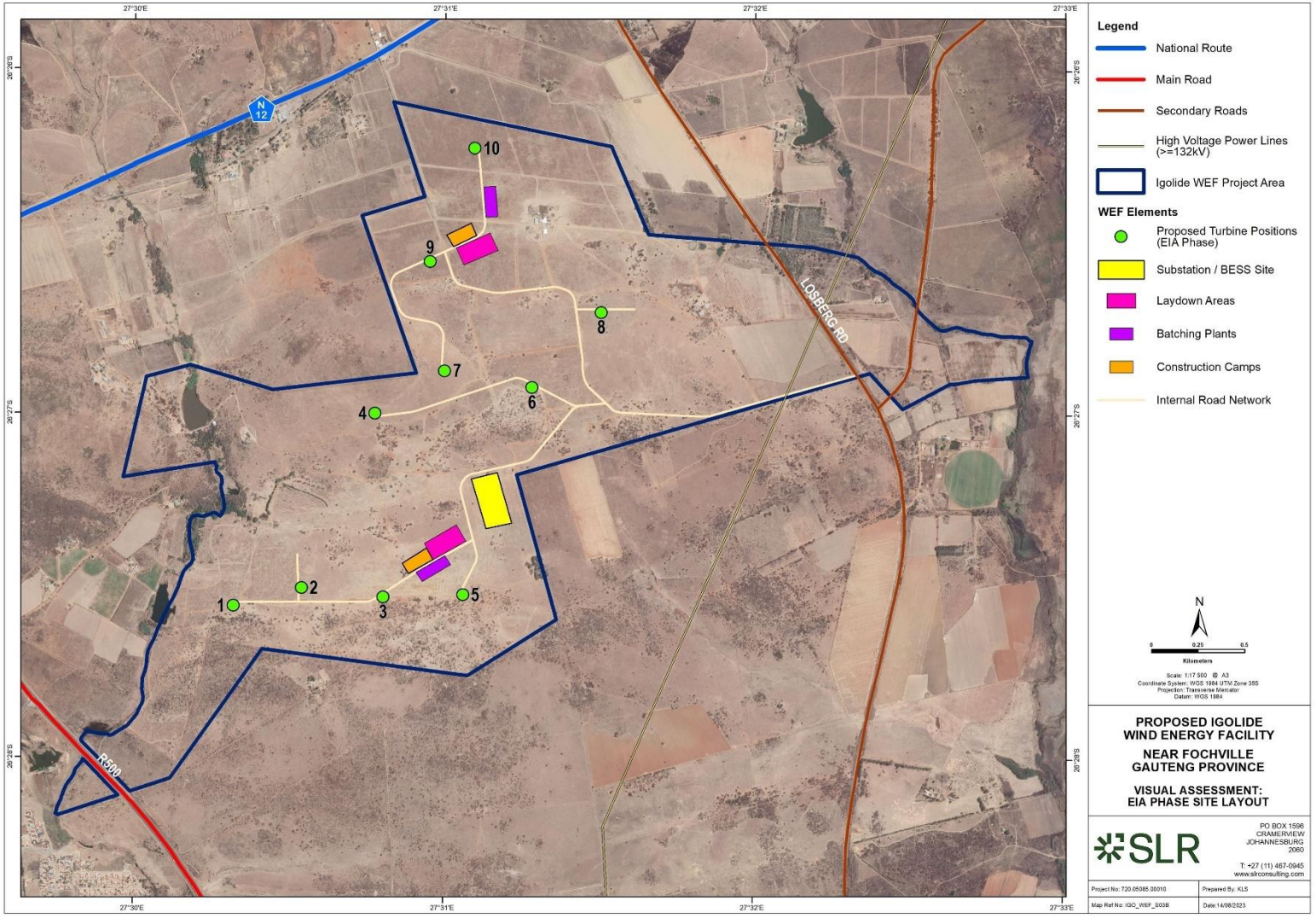

Figure 5: EIA Phase WEF site layout

3.0 Legal Requirements and Guidelines

Further to NEMA and the EIA regulations, there is currently no legislation within South Africa that explicitly pertains to the assessment of visual impacts, however, the following legislation has relevance to the protection of scenic resources:

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

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

The "Guidelines for Involving Visual and Aesthetic Specialists in the EIA Processes" document by Oberholzer (2005) has been used as a guideline for this VIA. These guidelines provide criteria that determine potential visual impacts posed by proposed developments.

4.0 Specialist Credentials

SLR's VIA team is led 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 (Table 2).

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

Table 2: 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. • VIA (BA) for the proposed Gromis WEF and associated Grid Connection Infrastructure, near Komaggas, Northern Cape Province. • VIA (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. • VIAs (Scoping and Impact Phase) for the proposed development of the Kuruman Wind Energy Facility near Kuruman, Northern Cape Province. • VIAs (Scoping and Impact Phase) for the proposed development of the Phezukomoya Wind Energy Facility near Noupoort, Northern Cape Province. • VIAs (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

5.0 Scope and Objectives

The aim of this report is to present the findings of the visual specialist assessment to provide specialist inputs to the Draft Environmental Impact Report (DEIR) for the Igolide WEF. The assessment will identify potential visual issues associated with the development of the proposed Igolide 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 facility.

6.0 Assumptions and Limitations

- This visual study has been undertaken based on the updated project description dated June 2023 as provided by the Proponent and the Environmental Assessment Practitioner.
- 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 10km limit on the visual assessment zone relates to the fact that visual impacts decrease exponentially over distance. Thus, although the turbines 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 9th and 10th of February 2022. Due to the extent of the study area however and the number of receptors that could potentially be sensitive to the proposed development, it was not possible to visit or verify every potentially sensitive visual receptor location. As such, several broad assumptions have been made in terms of the likely sensitivity of the receptors to the proposed development.
- It should be noted that not all receptor locations would necessarily perceive the proposed development in a negative way. This is usually dependent on the use of the facility, the economic dependency of the occupants on the scenic quality of views from the facility and on people's perceptions of the value of "Green Energy". Sensitive receptor locations typically include sites such as tourism facilities and scenic locations within natural settings which are likely to be adversely affected by the visual intrusion of the proposed development. Thus, the presence of a receptor in an area potentially affected by the proposed development does not necessarily mean that any visual impact will be experienced.
- The potential visual impact at each visual receptor location was assessed using a matrix developed for this purpose. The matrix is based on three main parameters relating to visual impact and, although relatively simplistic, it provides a reasonably accurate indicative assessment of the degree of visual impact likely to be experienced at each receptor location as a result of the proposed development. It is however important to note the limitations of quantitatively assessing a largely subjective or qualitative type of impact and as such the matrix should be seen merely as a representation of the likely visual impact at a receptor location.
- The exact status of all the receptors could not be verified during the field investigation and as such the receptor impact rating was largely undertaken via desktop means.
- Receptors that were assumed to be farmsteads were still regarded as being potentially sensitive to the visual impacts associated with the proposed development and were thus assessed as part of the VIA.
- Where receptors have been identified within the Igolide WEF project area, it has been assumed that the landowners or residents at these locations support the proposed WEF development and would not view the project in a negative light.
- Based on information provided by the project developer, 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**, while substation, BESS facilities and office building heights are assumed to be between 10m and 22 m 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 consider 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 DEIR for the Facility 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. General measures to mitigate the impact of additional light sources on the ambiance of the nightscape have however been provided.
- In the light of the fact that renewable energy projects are still relatively new in South Africa and as such, this report is based on assumptions as to the likely generic impacts associated with the proposed development.
- This study includes a broad assessment of the potential cumulative impacts of other renewable energy developments on the existing landscape character and on the identified sensitive receptors.
- Photomontages included in this report have been provided merely as indicative illustrations and should not be seen as an accurate representation of the proposed Igolide turbine layout.
- Photomontages have not been compiled for all potentially sensitive receptor locations. Instead a range of locations was 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 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.
- At the time the VIA was undertaken the proposed project was still in the planning stage and as such the turbine layout, as provided by the client, may change. In addition, infrastructure associated with the WEF has not been included in the models.
- The site visit was undertaken in early February 2022, during mid-summer, which is characterised by higher levels of rainfall and increased vegetation cover. In these conditions, slightly reduced levels of visual impact will be experienced from receptor locations in the surrounding area. Accordingly, Google Earth Street View has been used to provide an indication of views during the drier season when vegetation cover provides less screening.
- In clear weather conditions, wind turbines would present a greater contrast with the surrounding environment than they would on an overcast day. The field investigation was conducted during clear to partly cloudy weather conditions.

7.0 Assessment Methodology

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

7.1 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 the 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.

7.2 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 to determine the impact of the proposed development on these receptor locations.

7.3 Fieldwork and Photographic Review

A three-day site visit was undertaken between 9th and 10th of February 2022 (mid summer). The purpose of the site visit was to:

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

7.4 Visual / Landscape Sensitivity

GIS technology was used to identify any specific areas of potential visual sensitivity within the Igolide WEF project area. These would be areas where the placement of the wind turbines and associated infrastructure would result in the greatest probability of visual impacts on potentially sensitive visual receptors.

7.5 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 WEF project on any potentially sensitive visual receptor locations identified. This matrix is based on three parameters, namely the distance of

an identified visual receptor from the proposed development, the presence of screening factors and the degree to which the proposed development would contrast with the surrounding environment.

7.6 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, the final report will be updated to include relevant information as and when it becomes available.

8.0 Sources of Information

The main sources of information utilised for this VIA included:

- Project description for the proposed development provided by the Proponent;
- Elevation data from 25 m 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 SANBI's Vegetation Map 2018 dataset;
- Google Earth Satellite imagery 2023;
- South African Renewable Energy EIA Application Database from DFFE (incremental release Quarter 1 2023), and
- The National Web-Based Environmental Screening Tool by the DFFE.

9.0 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.

9.1 Visual Environment

Wind turbines 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 potentially 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, no leisure-based tourism activities, and no recognised tourism routes were identified in the study area. In addition, significant transformation in parts of the study area has resulted in considerable degradation of the scenic quality of the 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 into this setting may be considered to be less visually intrusive than if there was no existing built infrastructure visible.

9.2 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 find wind turbines to be attractive features in the landscape and thus this facility would not be associated with negative visual impacts. This type of development is often associated with employment creation, social upliftment and progress towards clean energy and could even have positive connotations.

9.3 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.

9.4 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 1 000 m being considerably less than the impact at a distance of 500 m.

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 6).

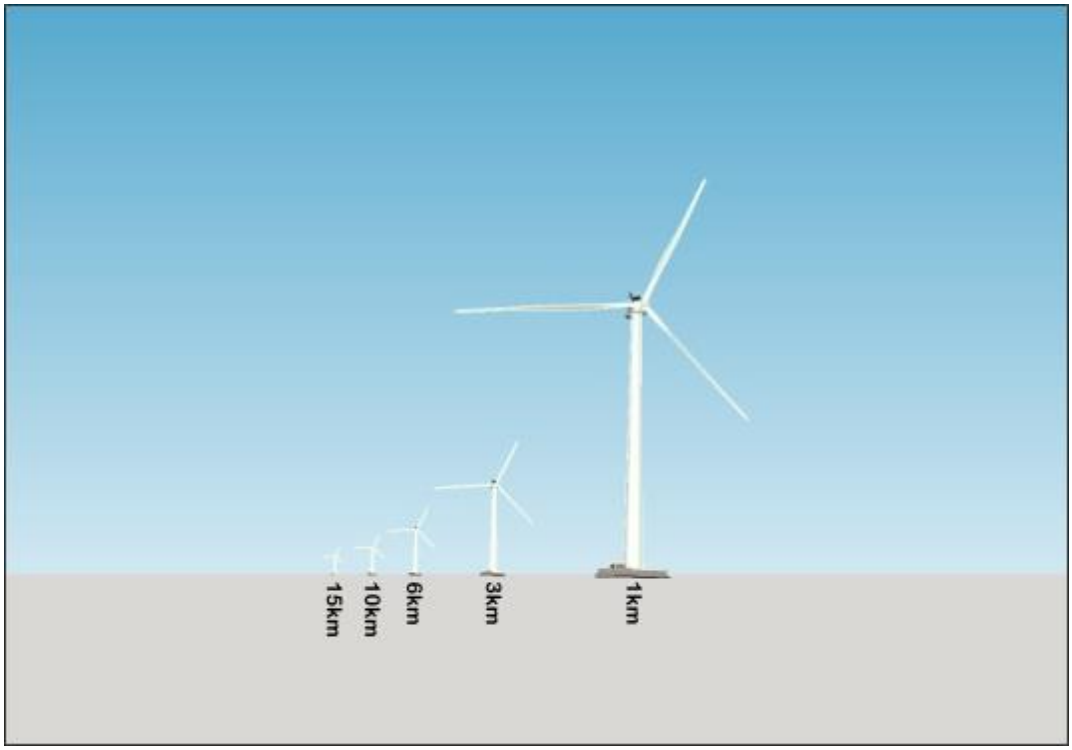

Figure 6: Conceptual representation of the diminishing visibility of a wind turbine over distance

10.0 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.

10.1 Physical and Land Use Characteristics

10.1.1 Topography

The broader area surrounding the proposed Igolide WEF project area is largely characterised by a mix of flat to undulating plains (Figure 7 and Figure 8) intersected by shallow river valleys. However, the elevation increases to the north of the WEF project area where more incised river valleys, steeper slopes and more prominent ridges occur. Maps showing the topography and slopes within and in the immediate vicinity of the assessment area are provided in Figure 9 and Figure 10.

Figure 7: View west across the Igolide WEF study area.

Figure 8: View northwards from Loopspruit Avenue showing relatively flat terrain in the Igolide WEF study area.

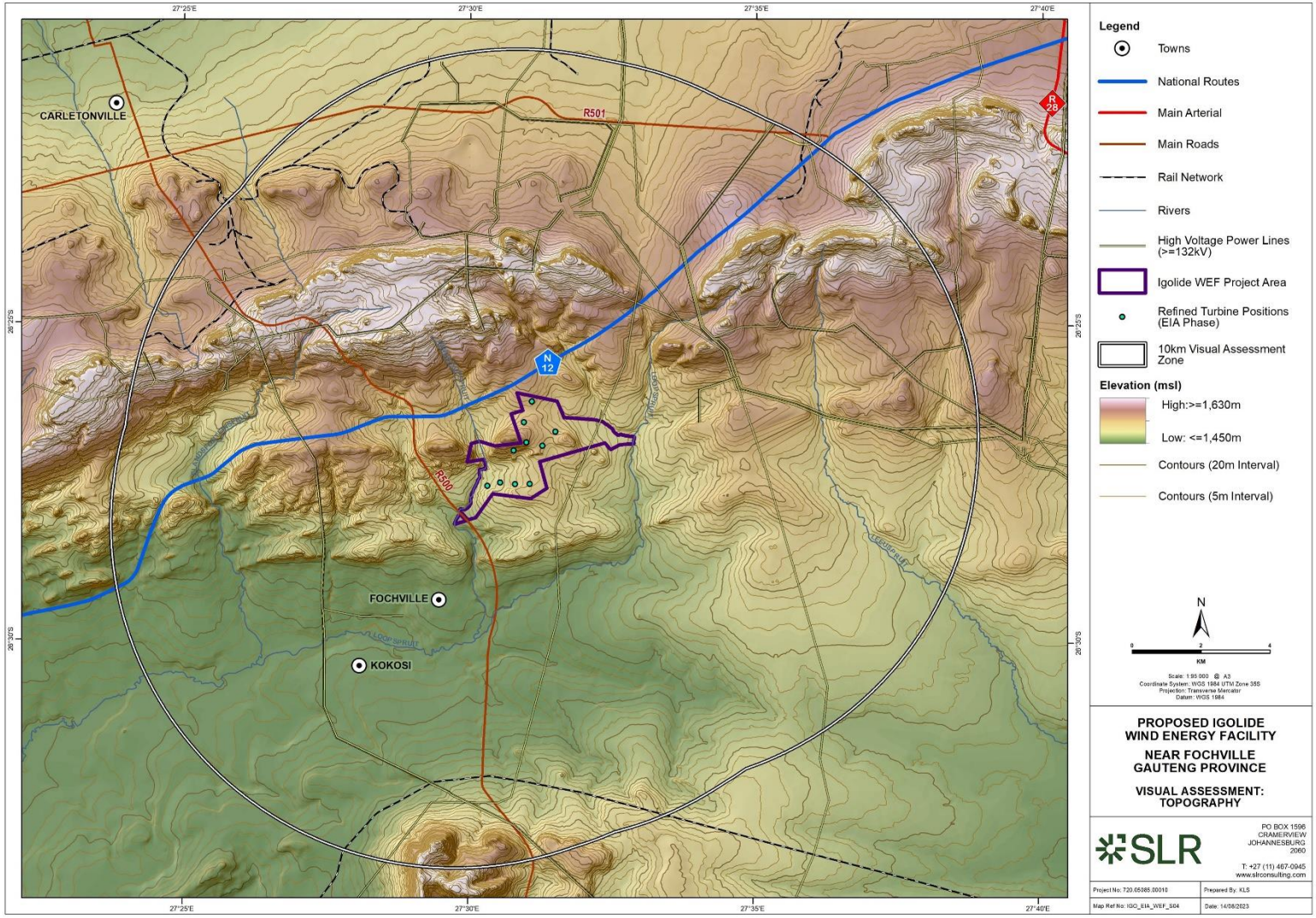

Figure 9: Topography across the Igolide WEF study area

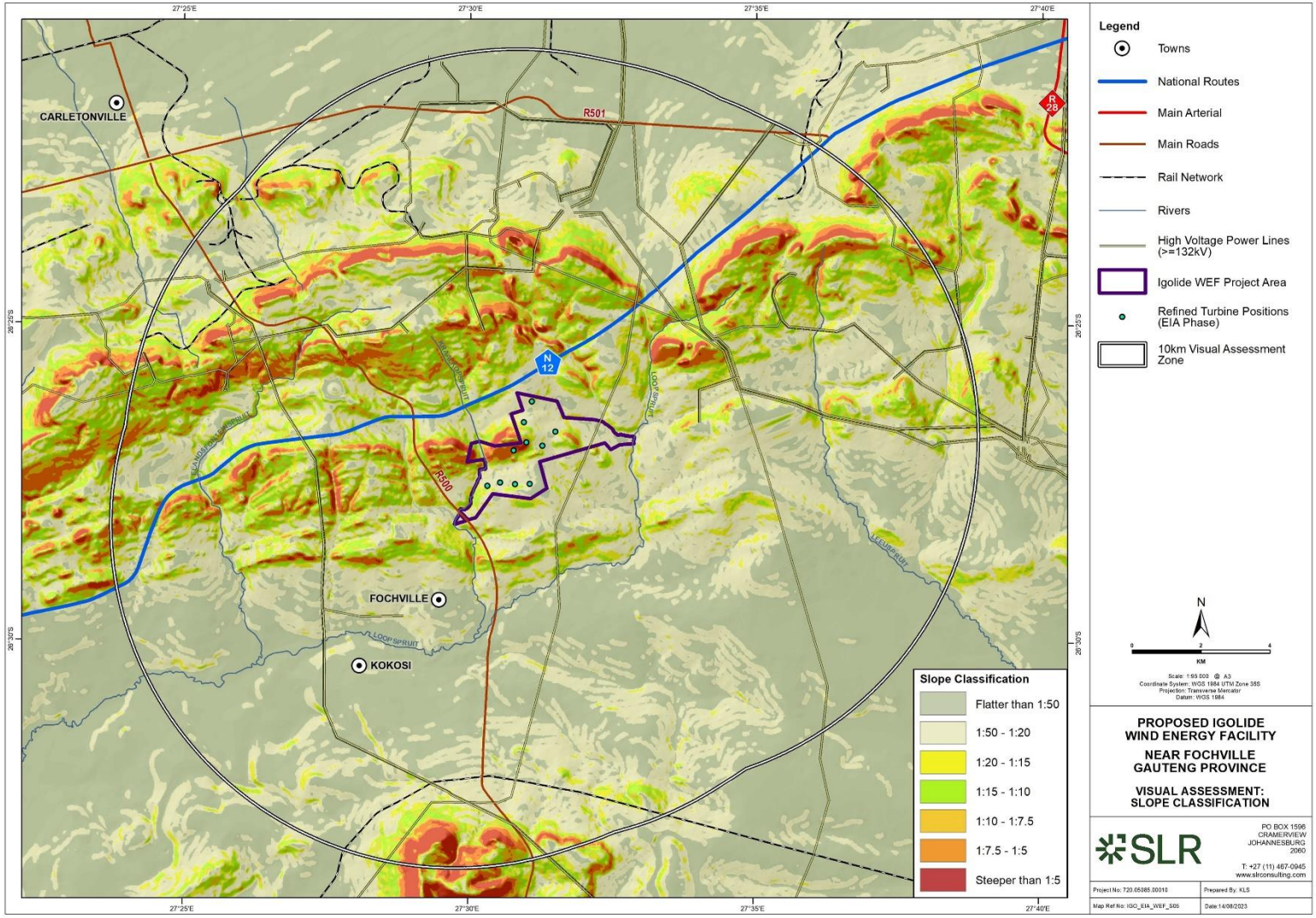

Figure 10: Slope Classification within the Igolide WEF Study Area

Visual Implications

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

GIS technology was used to undertake a preliminary visibility analysis for the proposed wind turbines based on the EIA Phase layout provided by the project developer. A worst-case scenario was assumed when undertaking the analysis, in which the proposed turbines were assigned a maximum height of 300 m (maximum height at blade tip). The resulting viewshed, as shown in Figure 11 indicates that the blade tips of wind turbines positioned in the WEF project area would be visible from most parts of the study area, although significant areas in the northern section of the study area are outside the viewshed. It should be noted however, that in some instances, only the blade tips or the upper-most sections of the turbines may be visible from certain areas because views of the lower portions of the turbine could possibly be screened by localised topographic elements, built form and / or vegetation cover. Visual impacts in these instances would thus be significantly reduced.

It is worth noting that the visibility analysis is based entirely on topography and **does not** consider any existing vegetation cover or built infrastructure which may screen views of the proposed development. 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.

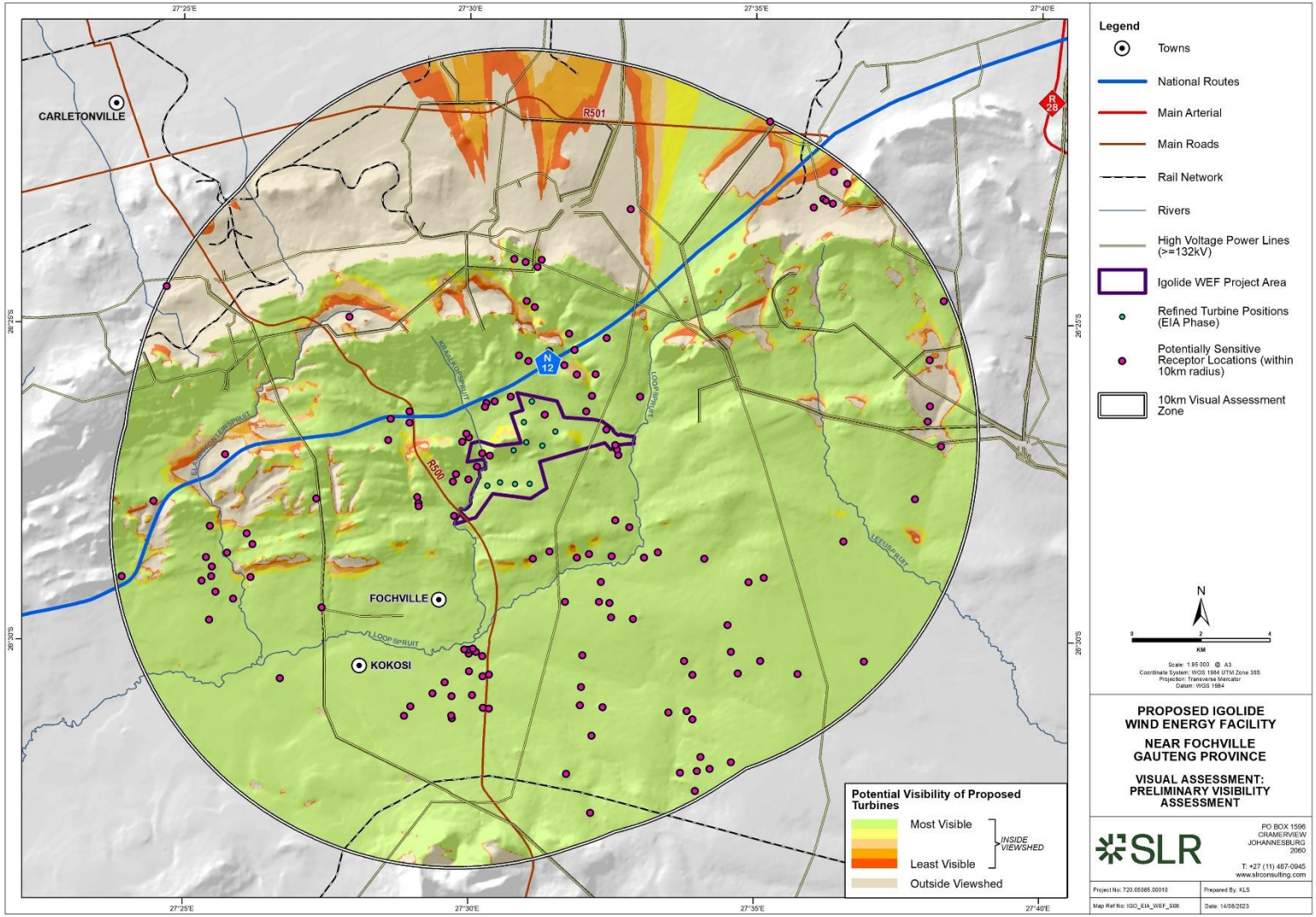

Figure 11: Potential visibility of wind turbines

10.1.2 Vegetation

According to Mucina and Rutherford (2006), much of the study area is dominated by Rand Highveld Grassland, with smaller areas of Soweto Highveld Grassland and Carletonville Dolomite Grassland in the south and north of the study area respectively. In addition, Gauteng Mountain Shale Bushveld and Andesite Mountain Bushveld occur in the hillier areas in the north and south of the study area respectively.

Accordingly, the natural vegetation can be broadly described as grassland with scattered small and medium-size trees on the plains and in the river basins, and denser shrub and tree cover on the hills and ridges (Figure 12).

Figure 12: Grassland and trees typically found in the WEF study area

Much of the natural vegetation cover has however been partly or entirely transformed by cultivation as well as mining, electricity and urban infrastructure. In addition, clusters of tall exotic trees species appear across the study area and are fairly common around farmsteads and along the roads(Figure 13).

Figure 13: Tall trees providing screening along main roads

Vegetation classification is shown in Figure 14.

Visual Implications

The dispersed shrubs, tall grasses and clumps of tall trees will provide some degree of visual screening within the receiving environment. In addition, tall trees planted around farmsteads in most instances will restrict views from receptor locations.

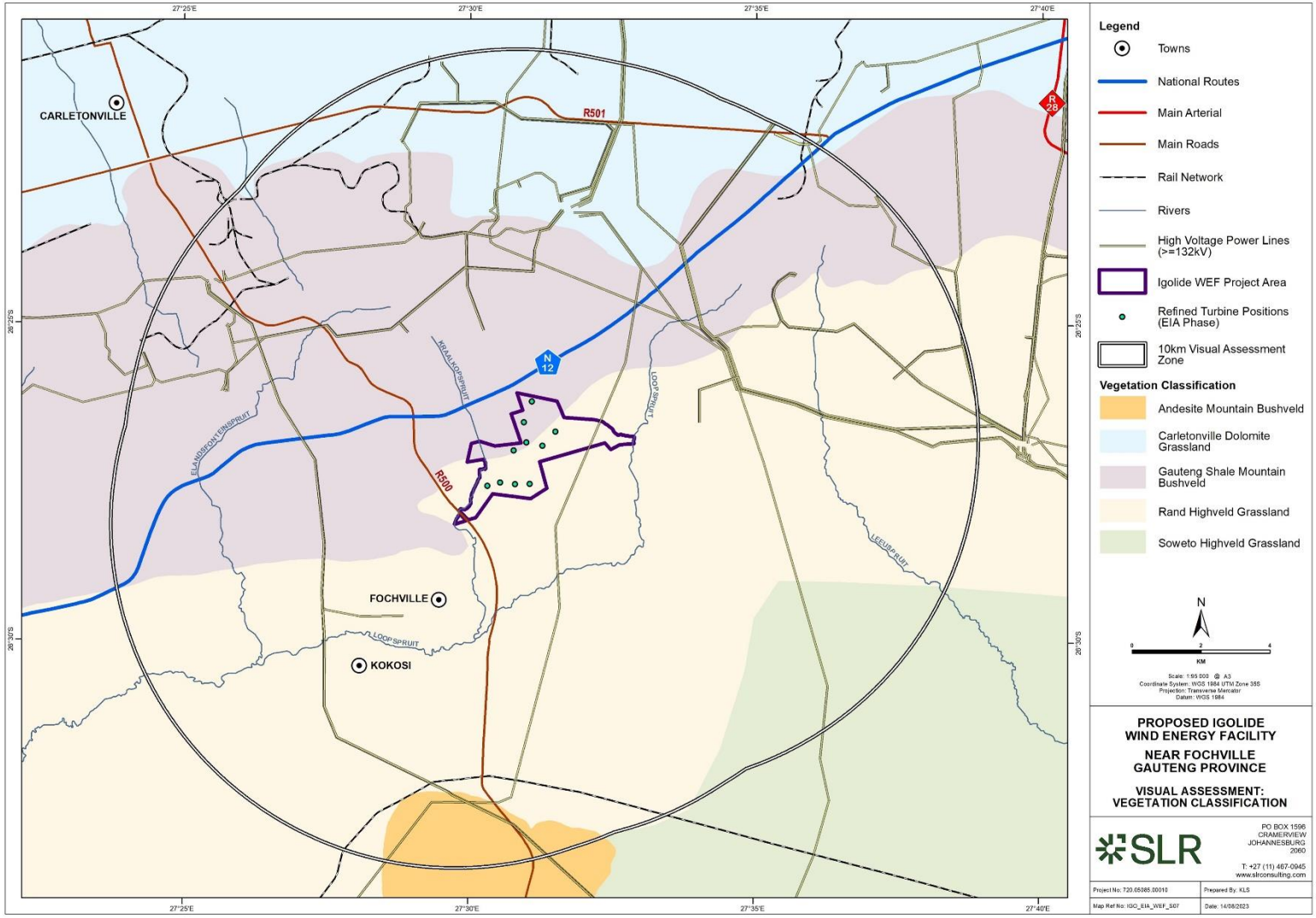

Figure 14: Vegetation Classification within the study area

10.1.3 Land Use

According to the South African National Land Cover dataset (Geoterraimage 2020), much of the visual assessment area is classified as “Cultivated Land” interspersed with significant areas of Grassland. Small tracts of forested land and numerous water bodies are scattered throughout the study area (Figure 15).

Commercial agriculture is the dominant activity in the study area, with the main focus being maize cultivation (Figure 16) with some limited livestock / dairy and game farming. There are multiple farm portions in the study area, resulting in a relatively moderate density of rural settlement with many scattered farmsteads in evidence. Built form in much of the study area comprises farmsteads, ancillary farm buildings and workers’ dwellings, grain silos, gravel access roads, power and telephone lines and fences.

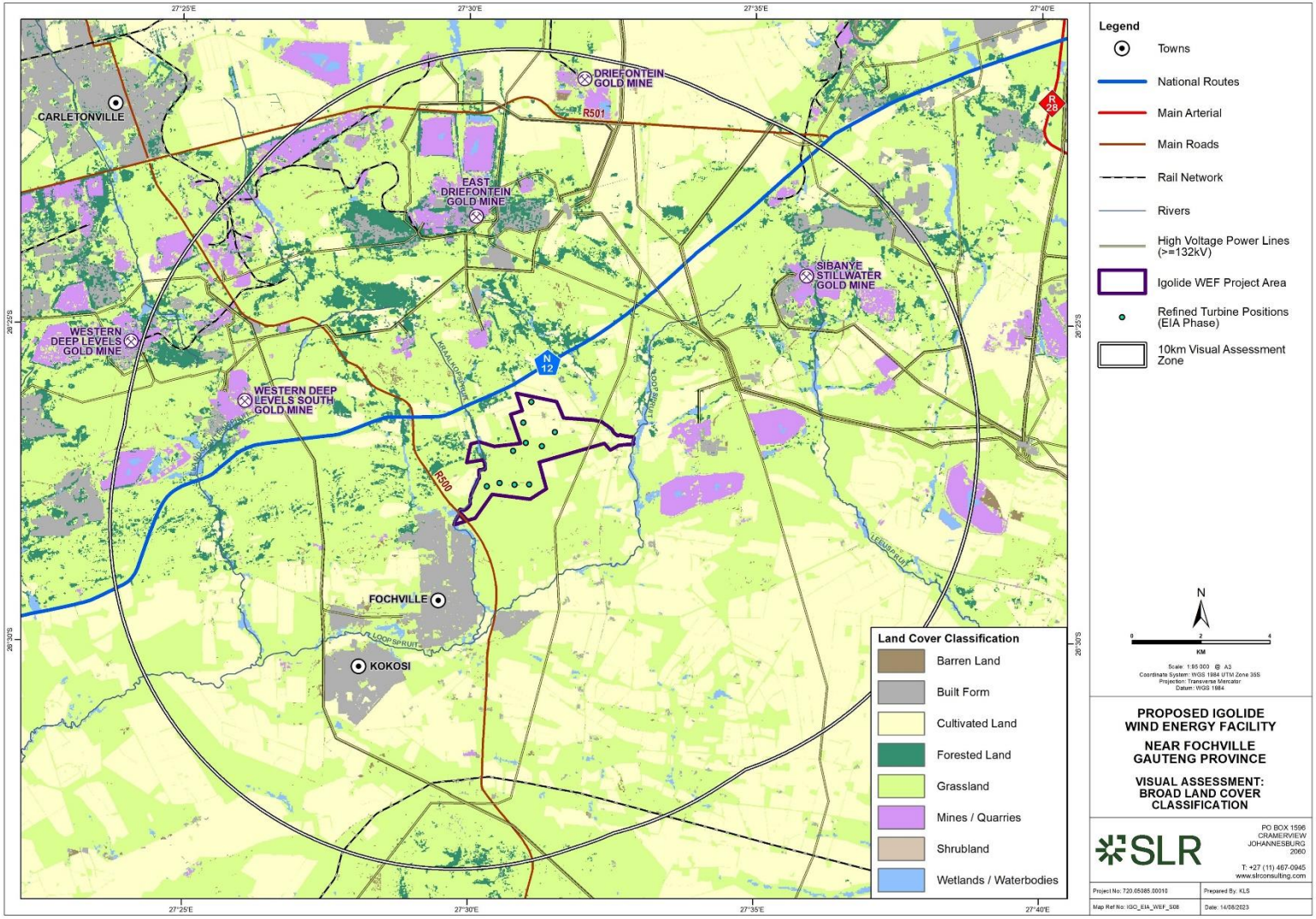

Figure 15: Land Cover Classification

Figure 16: Maize cultivation and agricultural infrastructure to the south of the Igolide WEF project area

High levels of human influence are however visible in the northern sector of the study area which is dominated by mining activity related to several large mining operations,including the Western Deep Levels, Driefontein and Sibanya Stillwater mines. Large slimes dams, mine dumps, stockpiles and other elements of mining infrastructure (including asscociated residential development) have resulted in significant transformation in the landscape (Figure 17). This mining activity forms part of the greater gold mining complex centred around Carletonville to the north-west of the study area where mining activity and associated urban and industrial development dominate the landscape. High voltage power lines, contribute further to the overall transformation of the landscape in this area, with a network of 132kV, 275kV and 400kV lines and associated substations traversing the study area.

Further transformation has occurred in and around the small town of Fochville and the adjacent Kokosi and Greenspark Townships, located south-west of the Igolide project area. Urban development and associated road and eletricity infrastructure has significantly altered the visual character of this sector of the study area (Figure 18).

Other significant anthropogenic features in the area include the N12 National Route (Figure 19) as well the R500 and R501 Main roads.

Figure 17: Sibanye Mine to the east of the Igolide WEF project area

Figure 18: View of Greenspark Township east of the R500

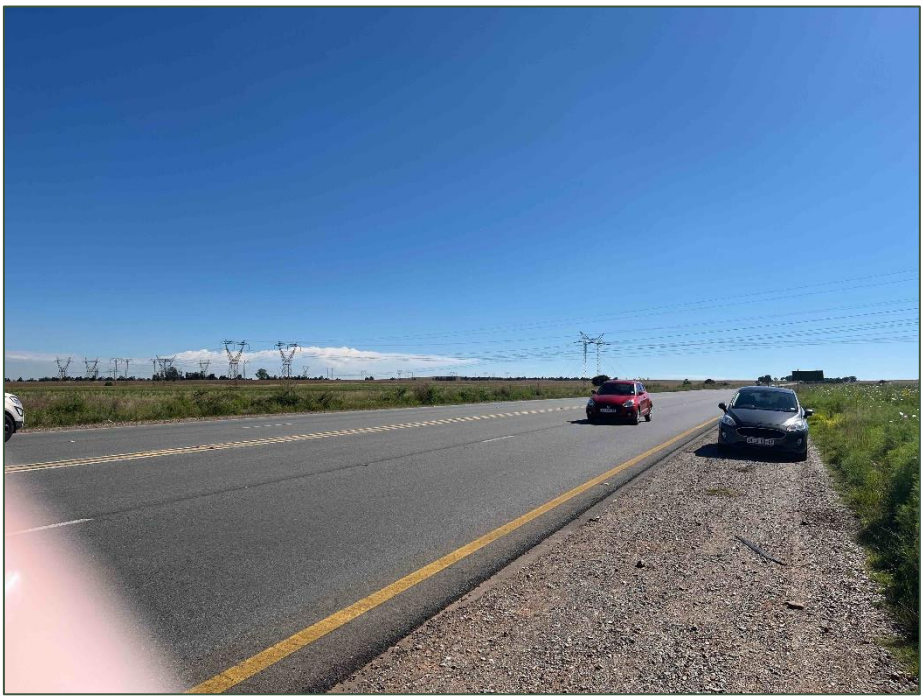

Figure 19: View south west from the N12 showing the national route and high voltage powerlines

Visual Implications

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

High levels of human transformation and visual degradation are however evident across the northern sector of the study area where mining activity and associated infrastructure dominates the landscape. In addition, urban development to the south-west and powerlines and road infrastructure have further degraded the visual character of the study area to some degree. This transformation has already altered the visual character across much of the northern sector of the study area, thus reducing the level of contrast of the proposed development.

10.2 Visual Character

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

The predominant land use in the area (maize cultivation) has significantly transformed the natural landscape across much of the study area. In addition, the landscape becomes progressively more transformed towards the northern section of the study area where mining activities and high voltage power lines have resulted in a high degree of visual degradation. The more industrial character of the landscape is an important factor in this

context, as the introduction of the proposed WEF would result in less visual contrast where other anthropogenic elements are already present, especially where the scale of those elements is similar to that of the proposed development.

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

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

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

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

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

Table 3: Environmental factors used to define visual sensitivity of the study area

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

LOW (<33)			MODERATE (34-66)				HIGH (67 – 100)		
0-10	11-20	21 -30	31 -40	41-50	51 -60	61 -70	71 -80	81-90	91 -100

Based on the above factors, the total score for the study area is 28, which according to the scale above, would result in the area being rated as having a **LOW** visual sensitivity. It should be stressed however that the concept of visual sensitivity has been utilised indicatively to provide a broad-scale indication of whether the landscape is likely to be sensitive to visual impacts and is based on the physical characteristics of the study area, economic activities and land use that predominates. An important factor contributing to the visual sensitivity of an area is the presence, or absence of visual receptors that may value the aesthetic quality of the landscape and depend on it to produce revenue and create jobs. No protected areas or sensitive receptor locations were identified in the study area (i.e., within 10 km of the WEF project area), however the presence of visual receptors is examined in more detail in **Section 12.0** of this report.

10.3.1 Specialist Sensitivity Assessment and Verification

During the Scoping Phase of the EIA process, a site sensitivity assessment was undertaken to identify any areas of the development site which should be precluded from the development footprint. From a visual perspective, sensitive areas would be areas where the placement of wind turbines would result in the greatest probability of visual impacts on potentially sensitive visual receptors. The results of the exercise undertaken in respect of the proposed Igolide WEF are provided below and the identified areas of sensitivity in relation to the Scoping and EIA phase layouts are shown in are shown in Figure 20 and Figure 21.

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 many of the identified potentially sensitive receptor locations in the study area and as such, no areas on the site are significantly more visible than the remainder of the site. However, the visual prominence of a very tall structure such as a wind turbine would be exacerbated if located on higher ridges or relatively higher-lying plateaus on the site. From a visual perspective therefore, it would be preferred if wind turbines are not located on the areas of highest elevation within the WEF development area, although it is understood that these locations are often the most suitable in terms of wind yield. Considering the low visual sensitivity of the broader area however, 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, or within 500m of, the project area. Accordingly, a 500m zone of potential visual sensitivity has been delineated around the existing residences on the application site and also around any receptors located within 500m of the site boundary. In addition, it is recommended that a 500m zone of potential sensitivity is applied on either side of the N12 National Route and the R500 Main Road.

Limiting the development of turbines in these areas will reduce visual impacts and prevent significantly adverse impacts of shadow flicker on the local residents and on passing motorists, although the full extent of these impacts can only be determined by way of a detailed Flicker Impact Assessment. 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 apply to wind 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 the WEF as a whole and as such the associated on-site infrastructure has been excluded from the sensitivity analysis.

It should be noted that turbines placements in the EIA Phase turbine layout are all outside the zones of potential visual sensitivity.

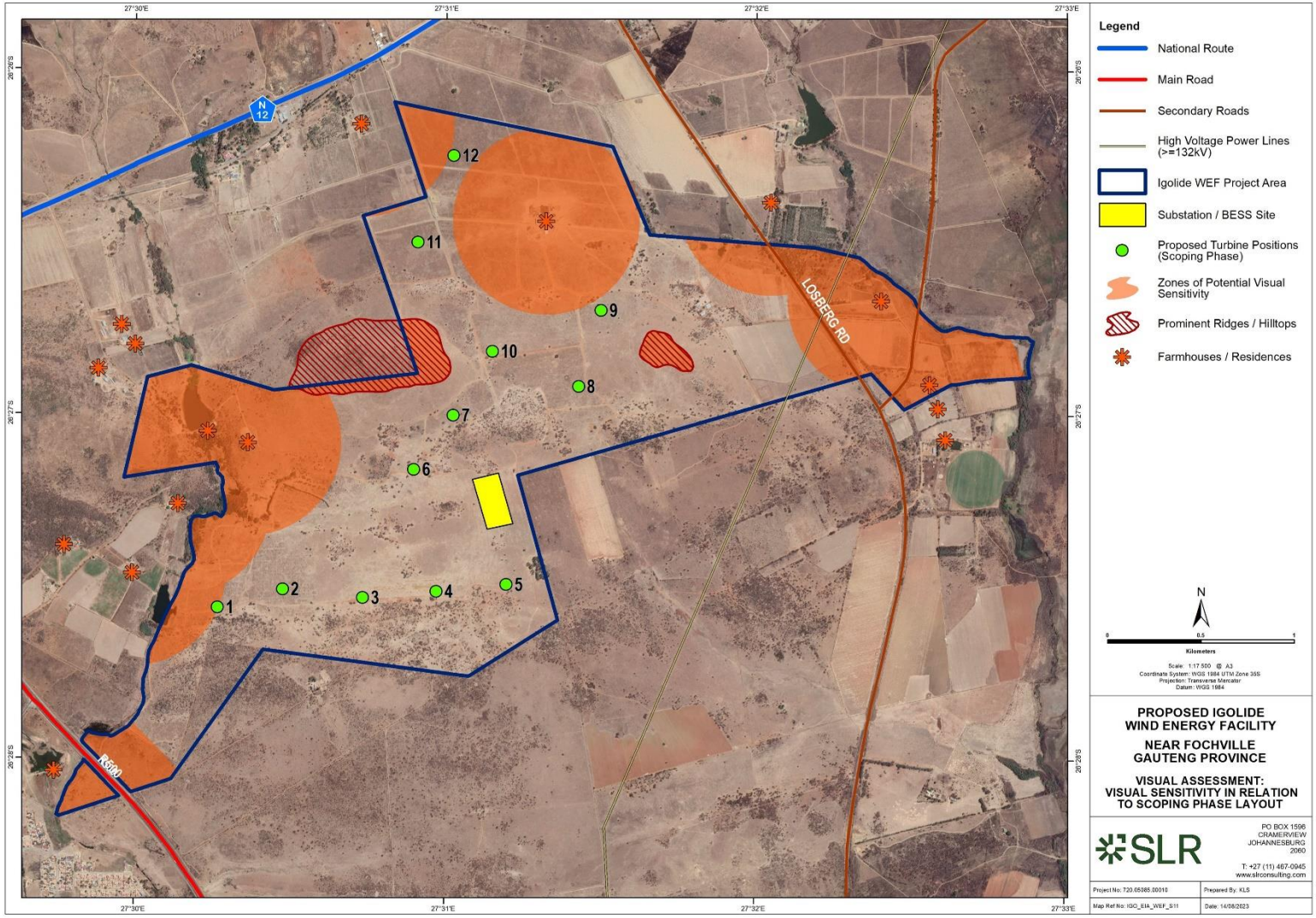

Figure 20: Potential visual sensitivity in relation to the Scoping Phase WEF layout

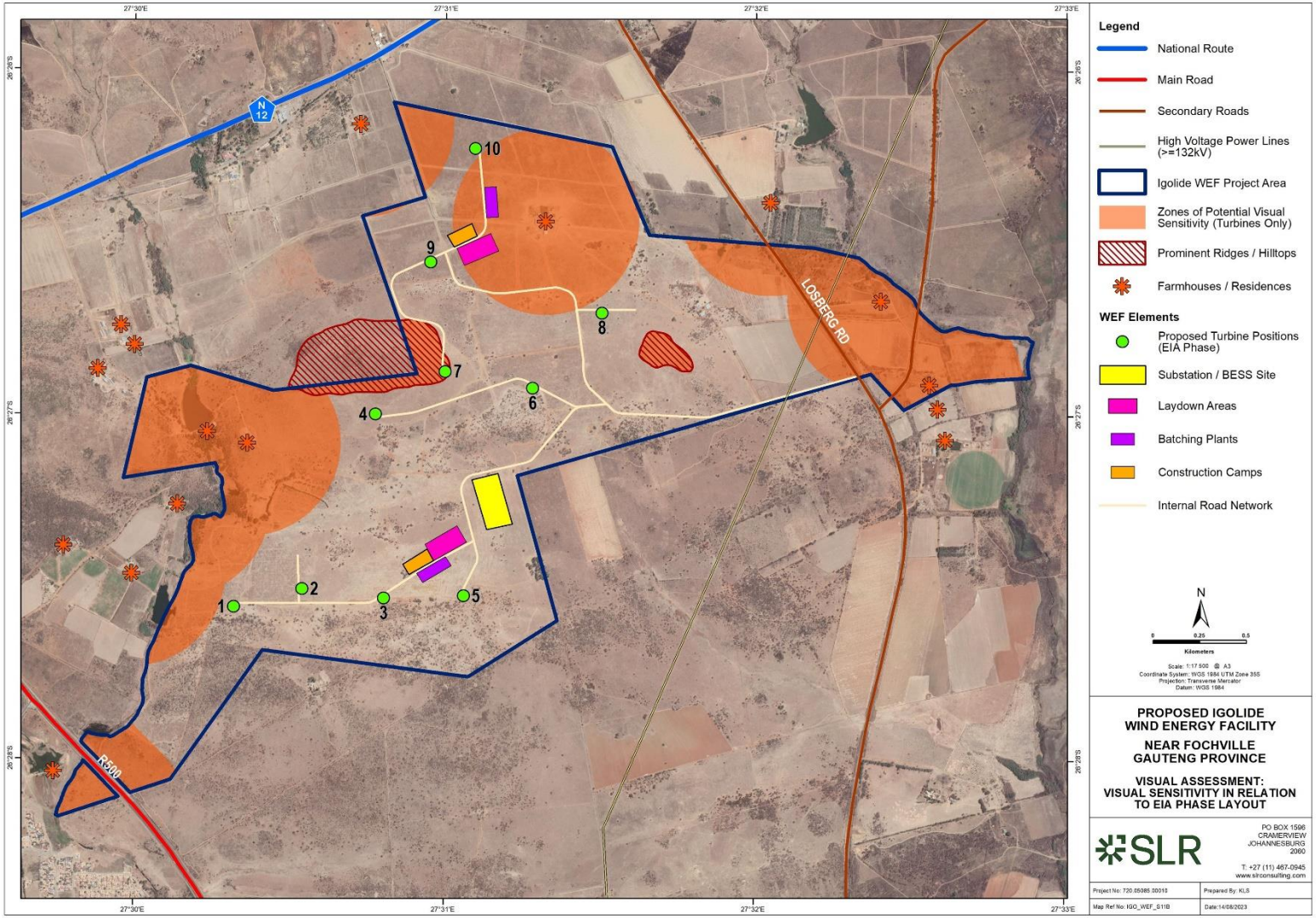

Figure 21: Potential visual sensitivity in relation to the EIA Phase WEF layout

10.3.2 Sensitivities Identified by the National Screening Tool

In accordance with GN 320 and GN 1150 of the EIA Regulations, 2014, prior to commencing with a specialist assessment, a site sensitivity verification must be undertaken to confirm the current land use and environmental sensitivity of the proposed Project area as identified by the National Web-Based Environmental Screening Tool (Screening Tool).

In assessing visual sensitivity of the proposed Igolide WEF, consideration was given to the Landscape Theme of the Screening Tool. Under the Landscape Theme, the tool identifies areas of Very High Sensitivity across the Igolide WEF project area (Figure 22). According to the Screening Tool, the high sensitivity rating is associated with “mountain tops and high ridges” and steep slopes (greater than 1:4) as well the fact that the western portion of the project area is within 2 km of a town or village. Based on these criteria, most of the project area would be ruled out for WEF development.

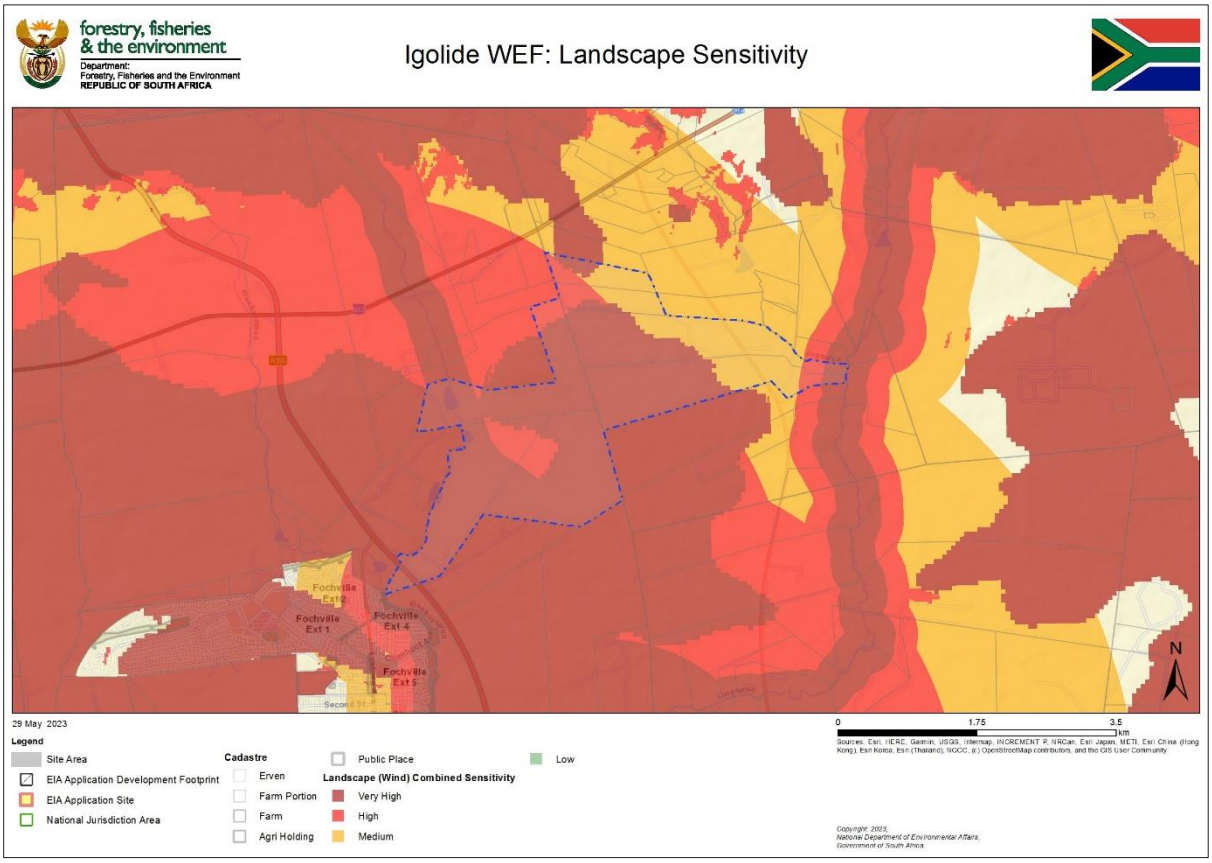

Figure 22: Relative Landscape Sensitivity (May 2023)

The flicker theme demarcates areas (1 km buffers) of sensitivity around identified receptors in the area (Figure 23. Under this theme, potential flicker receptors have been identified within the project area, or within 1 km of the site boundary. Buffers demarcated around these receptors have been assigned a “very high” sensitivity rating.

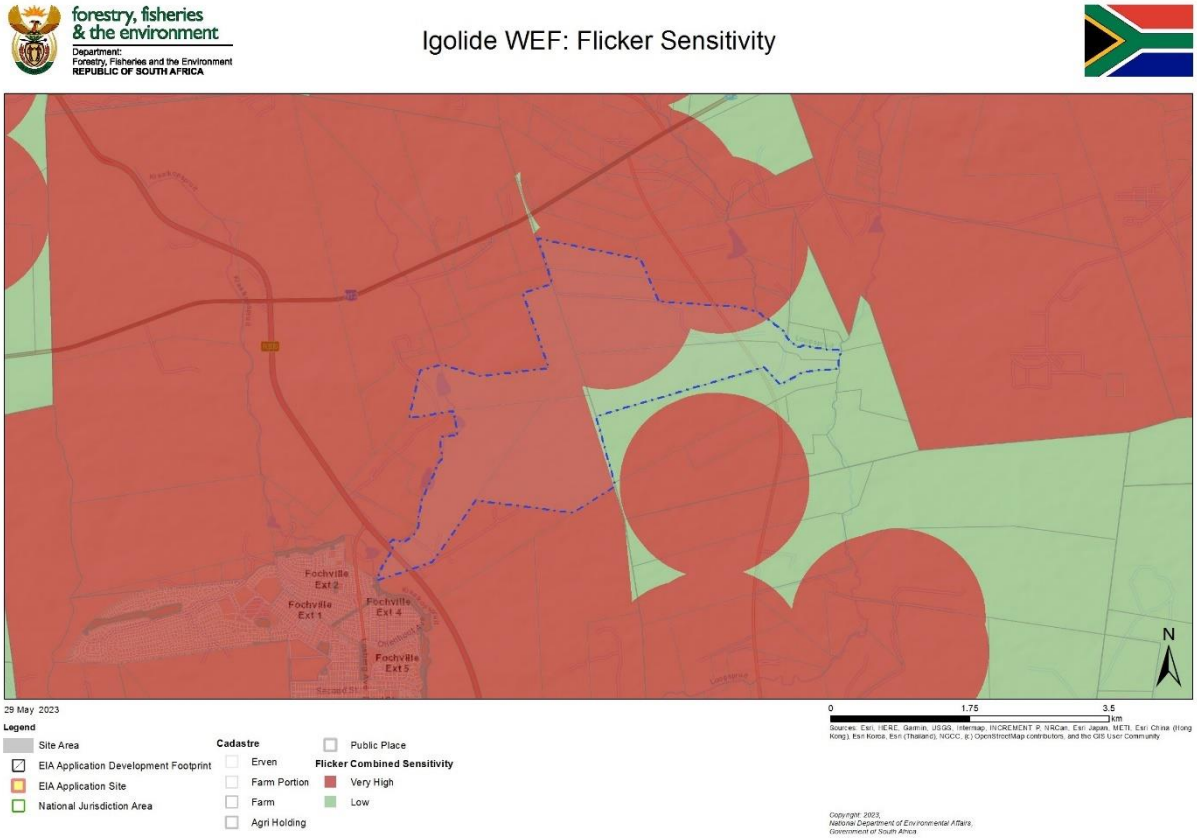

Figure 23: Flicker Sensitivity (May 2023)

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.

10.3.3 Sensitivity Analysis Summary

Although the Screening Tool identifies significant areas of very high landscape and flicker sensitivity, the site sensitivity verification exercise conducted in respect of this VIA (Appendix B) found little evidence to support this sensitivity rating. Desktop terrain analysis, confirmed by the field investigation, did not indicate the presence of mountain tops or high ridges within the project area and although there are some distinct hills with steep slopes, these are fairly isolated and the average slopes across the remainder of the project area are relatively flat.

The sensitivity rating for the project area is also influenced by its proximity to the town of Fochville. Considering the level of landscape transformation and degradation associated the town and its surrounds however, there is little evidence of very high levels of landscape sensitivity within a 2 km radius of the town.

The presence of receptors, either within the Igolide WEF project area, or within 500m of the project area 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 Screening Tool. The remaining (confirmed) receptors were factored into the sensitivity analysis, together with a 500m buffer which is considered sufficient to reduce any adverse effects of shadow flicker. The identified areas of potential visual sensitivity have been excluded from the EIA phase turbine layout for Igolide WEF.

10.4 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.

Although the undulating topography and the areas of cultivation and grassland would reduce the visual absorption capacity, this would be offset to some degree by the presence of mining activity and urban and infrastructural development in the vicinity of the proposed Igolide WEF project.

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

11.0 Typical Visual Impacts Associated with Wind Energy Facilities

In this section, the typical visual issues related to the establishment of a WEF 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 section of the report can only make assumptions as to the likely generic impacts associated with WEFs.

11.1 Wind Energy Facilities

At this stage it is anticipated that the proposed project will consist of up to 10 wind turbines with a total generation capacity of up to approximately 100MW. The wind turbines will have a hub height of up to 200m and a rotor diameter of up to 200m. The height of the turbines would result in the development typically being visible from a great distance as per the example shown in Figure 24. 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.

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.

Figure 24: Wind turbines at Loeriesfontein 2 WEF in the Northern Cape Province

11.1.1 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 rotor blades 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.

11.1.2 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).

11.2 Associated On-Site Infrastructure

Typical impacts associated with the proposed on-site infrastructure (Section 2.1Done) are outlined below.

Substations 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 powerlines, may result in the visual environment being considered to be 'degraded' and thus the introduction of a substation into this setting may be less of a visual impact than if there was no existing built infrastructure visible. In this instance, the substation is intended to serve the proposed Igolide 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 (Section 13.2.6).

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" on the WEF site 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.

12.0 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 I&APs, 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 (Section 9.4), 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 development. 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 character of the surrounding area.

12.1 Receptor Identification

Preliminary desktop assessment of the study area for the proposed Igolide WEF did not identify any formal protected areas or leisure-based tourism activities in the study area for the proposed Igolide WEF. Although several accommodation / restaurant / wedding venue facilities were identified in the study area, these were not considered sensitive due to the type of services being offered and the location of the facilities in relation to areas of existing transformation.

Multiple farmsteads and residences were however identified within a ten km radius of the Igolide WEF project area. In general, farmsteads and residences could be regarded as potentially sensitive visual receptors as they are located within a mostly rural setting with pastoral / natural vistas that will likely be altered by the proposed development. However, given the sheer number of farmsteads in the study area, the level of transformation and the fact that local sentiments toward the proposed development are unknown at this stage, the receptor assessment in respect of the WEF has only included only those farmsteads within 5 km of the nearest turbine in the EIA Phase layout for Igolide WEF. As a result, the receptor assessment includes seventy-three potentially sensitive receptor locations, all but one of which are inside the viewshed for the proposed WEF. Five receptor locations are located within the Igolide WEF project area and it is known that these landowners have signed agreements with Igolide regarding the establishment of the proposed WEF. ***None of these receptor locations was found to be sensitive.***

It was noted that residential areas within and adjacent to the town of Fochville and also the residential areas of Glenharvie and East Village are located within the Igolide WEF study area. While these could be considered as receptors, they are not considered to be sensitive due to their location within built-up, heavily transformed areas.

In many cases, roads along which people travel, are regarded as sensitive receptors. The primary thoroughfares in the study area are the N12 National Route and the R500 and R501 Main Roads. The N12 is a major route, linking Johannesburg in the east with Kimberley in the west, before travelling south to the Western Cape Province. The R500 traverses the study area in a north-south direction, linking Carletonville with Parys to the south, while the R501 traverses the northern section of the study area, linking Carletonville with the N12 National Route.

The sections of these roads traversing the study area are not considered part of designated scenic routes, although these routes are important links and are likely to be utilised, to some extent, by tourists en route to the Northern Cape or to the resorts located in Parys or along the Vaal River. As a result, they are considered to be potentially sensitive receptor roads – i.e., roads 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, including the Losberg Road and Loopspruit Avenue are primarily used as local access roads and do not form part of any scenic tourist routes. These roads are not specifically valued or utilised for their scenic or tourism potential and are therefore not regarded as visually sensitive.

The potentially sensitive visual receptor locations identified within the study area for the proposed Igolide WEF are indicated in Figure 25.

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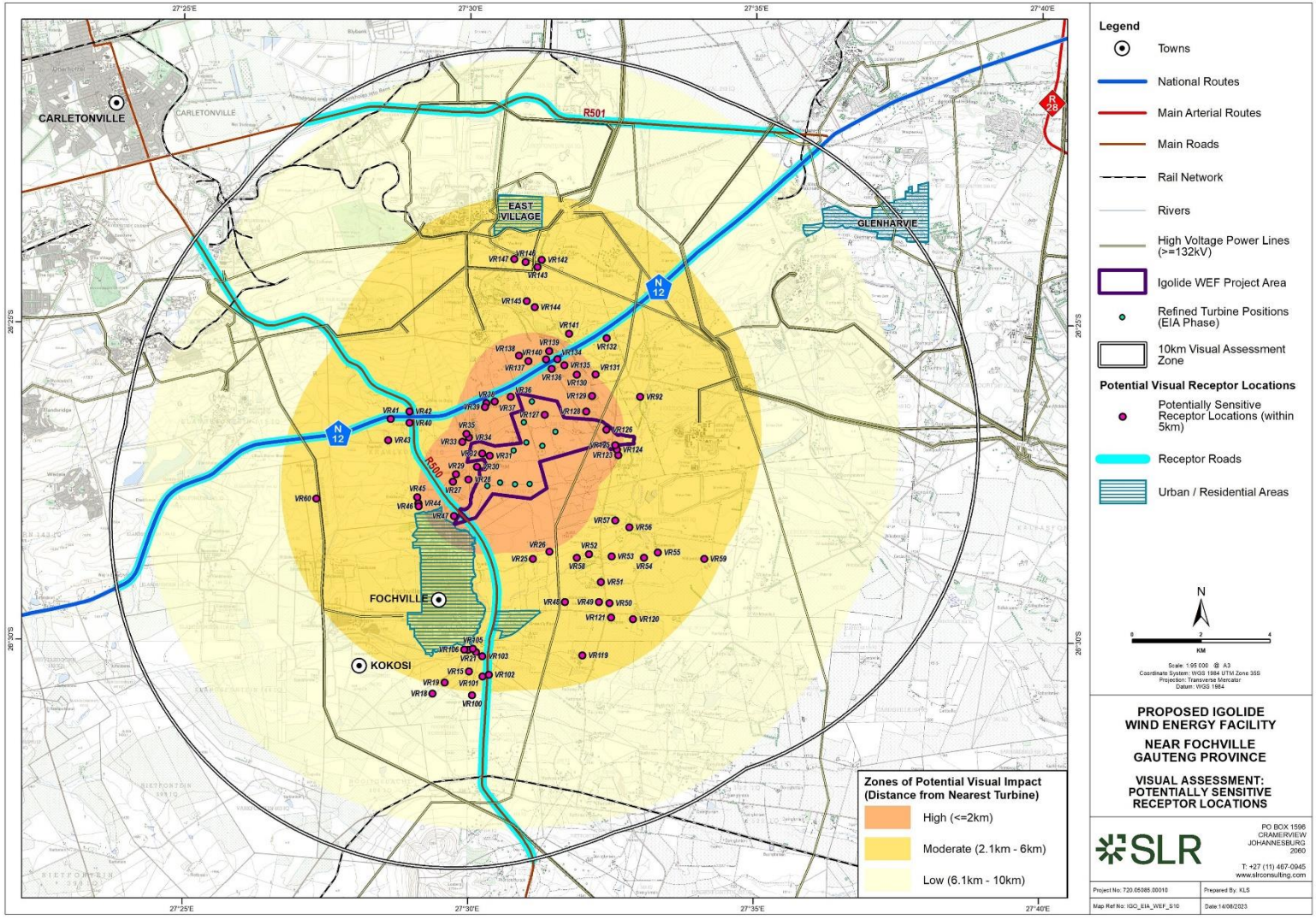

Figure 25: Potentially sensitive receptor locations affected by the Igolide WEF

13.0 Impact Assessment

13.1 Receptor Impact Rating

In order to assess the impact of the proposed WEF on the identified potentially sensitive receptor locations, a matrix that takes into account a number of factors has been developed and is applied to each receptor location.

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.

13.1.1 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 located within 2 km of the WEF project area. The visual impact of a WEF diminishes beyond 10 km as the development would appear to merge with the elements on the horizon. Any visual receptor locations beyond these distance limits 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 in the EIA Phase layout for Igolide WEF. Based on the height and scale of the project, the distance intervals chosen for the zones of visual impact, as shown in Figure 25 are as follows:

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

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

13.1.3 Visual Contrast

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

In order to determine the likely visual compatibility of the proposed development, the study area was classified into the following zones of visual contrast (Figure 26):

- **High –** undeveloped / natural / rural areas.
- Moderate –
    - areas within 500m of existing power lines (>=132kV);
    - areas within 500m of main roads;
    - areas within 500m of railway infrastructure;
    - areas within 500m of cultivated land, commercial forest plantations and urban smallholdings.
- **Low** –
    - areas within 500m of urban / industrial / built-up areas; and
    - areas within 500m of mines / quarries etc

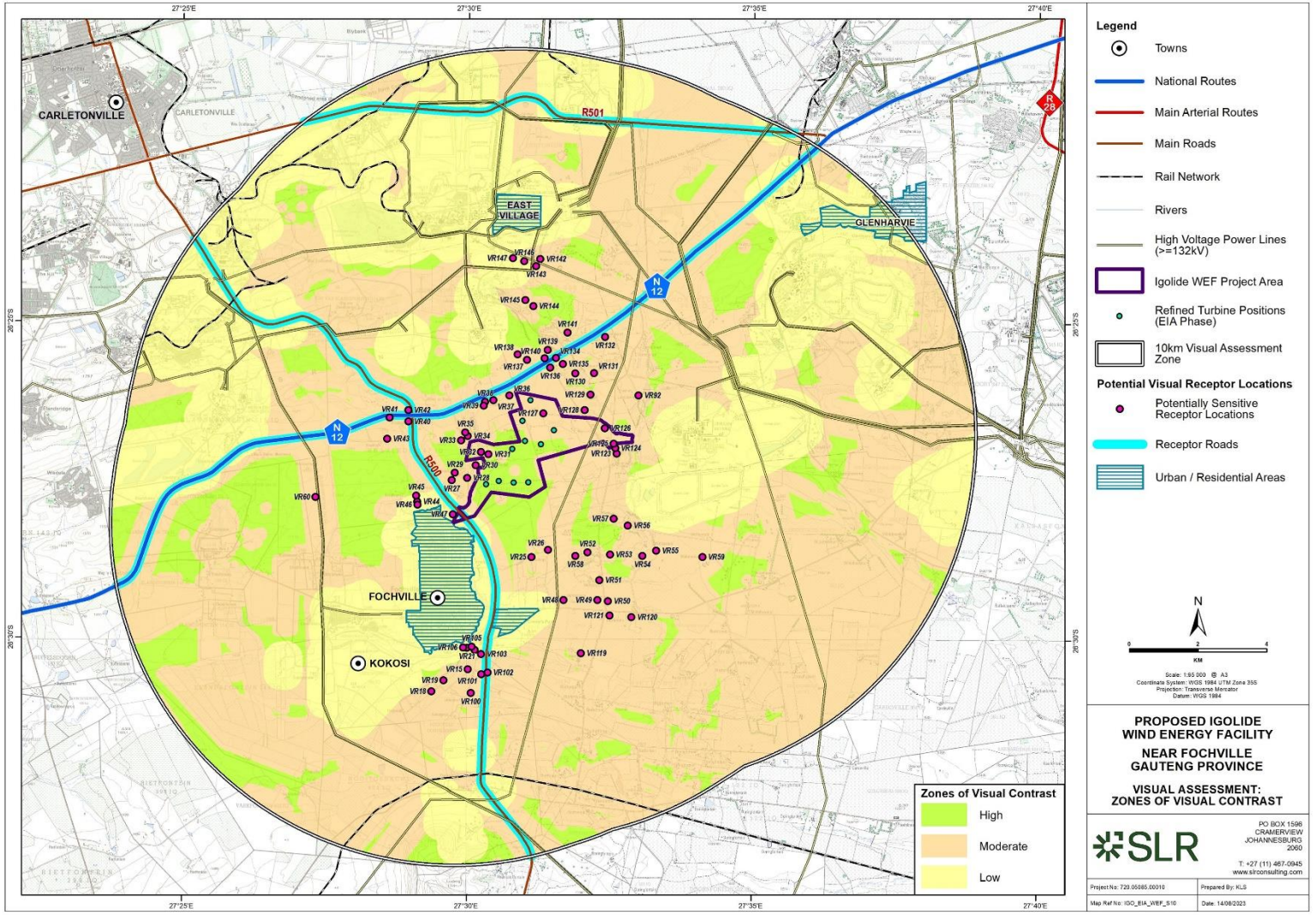

Figure 26: Zones of visual contrast within the study area

13.1.4 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 4) below.

Table 4: 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 5 below.

Table 5: Visual assessment matrix used to rate the impact of the proposed development on potentially sensitive receptors

	Visual Impact Rating			
Visual Factor	**High**	**Moderate**	**Low**	**<u>Overriding Factor</u>: Negligible**
Distance of receptor away from proposed development	WEF: <= 2 km **Score 3**	WEF: 2 km - 6 km **Score 2**	WEF: 6 km - 10 km **Score 1**	WEF: > 10 km
Presence of screening factors	No / almost no screening factors – development highly visible **Score 3**	Screening factors partially obscure the development **Score 2**	Screening factors obscure most of the development **Score 1**	Screening factors completely block any views towards the development, i.e. the development is not within the viewshed
Visual Contrast	**High contrast** with the pattern and form of the natural landscape elements (vegetation and landform), 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 landform), typical land use and/or human elements (infrastructural form) **Score 2**	**Corresponds** with the pattern and form of the natural landscape elements (vegetation and landform), typical land use and/or human elements (infrastructural form) **Score 1**	

The full receptor impact rating for the Igolide WEF is provided in Appendix C. However Table 6 below presents a summary of the overall visual impacts of the proposed WEF on each of the potentially sensitive visual receptor locations identified within 5 kms of the nearest turbine in the EIA Phase layout for Igolide WEF.

Table 6: Summary receptor impact rating for the proposed Igolide WEF

OVERALL IMPACT RATING	NUMBER OF SENSITIVE RECEPTORS	NUMBER OF POTENTIALLY SENSITIVE RECEPTORS
HIGH	0	2
MODERATE	0	67
LOW	0	3
TOTAL INCLUDED IN ASSESSMENT	**0**	**72**
OUTSIDE VIEWSHED	*0*	*1*

Table 6 shows that only two of the identified receptors could potentially experience high levels of visual impact, namely VR34 and VR36. Impacts are however expected to be reduced by the proximity of these farmsteads to major road infrastructure in the area. Sixty-seven receptor locations are expected to experience moderate levels of visual impact, while the remaining three receptor locations will only be subjected to low levels of impact.

As stated above, the N12 National Route and the R500 and R501 main roads could be considered as potentially sensitive receptor roads. Although much of the R501 is outside the viewshed for the wind turbines, turbines are expected to be highly visible to motorists travelling along the N12 and the R500. The likely visual impacts of the proposed development on motorists would however be reduced by the level of transformation and landscape degradation, especially to the north of the WEF project area. In light of this, visual impacts affecting the N12 and R500 are rated as moderate.

It should be noted that the proposed WEF comprises only ten wind turbines and it is anticipated that this factor would further reduce the visual impacts experienced by the identified receptors.

13.2 Photomontages

Photomontages (visual simulations) have been compiled to provide an indication of how the proposed Igolide 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 Igolide EIA Phase turbine layout onto photographs taken within the study area.

Limitations associated with this exercise are outlined below.

- Fieldwork was undertaken in the early phases of the project and as such it was not possible to identify a good range of suitable viewpoints relevant to the EIA Phase layout. Accordingly, photographs have been extracted from Google Earth Street View where necessary.

- 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 Igolide 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.

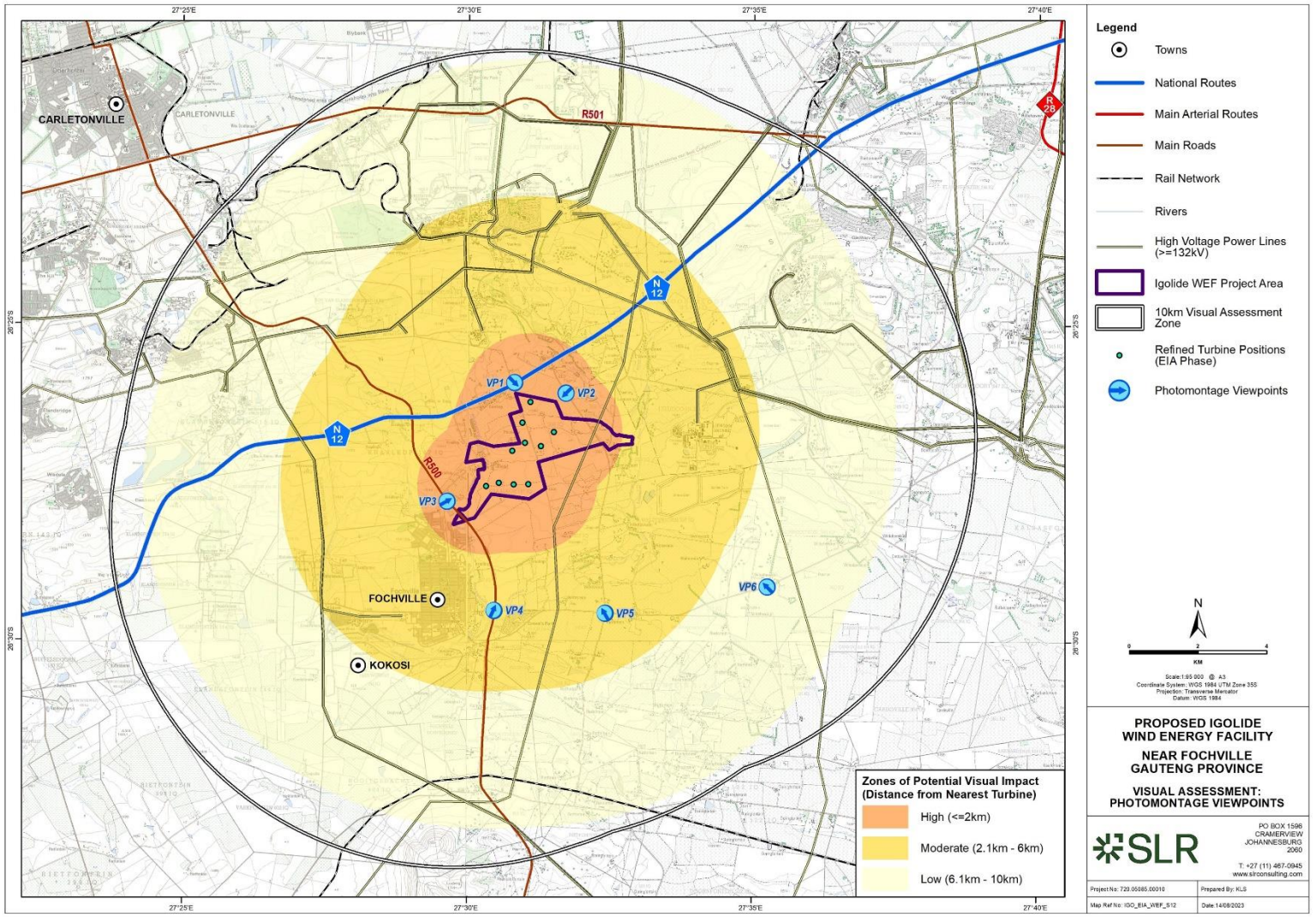

Figure 27: Photomontage Viewpoints

13.2.1 Viewpoint VP1

This viewpoint is located on the N12 National Route, close to the north-western boundary of the Igolide WEF project area. This point is some 730m from the nearest turbine and as such it is in a zone of high visual impact. Turbines are expected to be highly visible from this location (Figure 29) and hence also from this section of the N12.

Figure 28: View south-south-east from N12 National Route towards Igolide WEF Project Area (Pre-Construction). *(Extracted from Google Earth Street View)*

Figure 29: View south-south-east from N12 National Route towards Igolide WEF Project Area (Post-Construction). *(Extracted from Google Earth Street View)*

13.2.2 Viewpoint VP2

This viewpoint is located on Losberg Road, some 430m north-west of the Igolide WEF project area. This point is approximately 1 km from the nearest turbine and as such it is in a zone of high visual impact. Turbines are expected to be highly visible from this location (Figure 31) and hence also from this section of Losberg Road.

Figure 30: View south-south-west from Losberg Road towards Igolide WEF Project Area (Pre-Construction).

Figure 31: View south-south-west from Losberg Road towards Igolide WEF Project Area (Post-Construction).

13.2.3 Viewpoint VP3

This viewpoint is located on the R500 Main Road, just north of Fochville and some 400m from the south-western boundary of the Igolide WEF project area. This point is approximately 1.4 km from the nearest turbine and as such it is in a zone of high visual impact. Turbines are expected to be highly visible from this location (Figure 33) and hence also from this section of the R500. Figure 33 also provides an indication of the degree of visual impact likely to be experienced from receptors on the north-eastern periphery of Fochville. Views from receptors located in the remainder of the town are expected to be somewhat constrained by the surrounding buildings and tall trees within the urban landscape.

It should be noted that the prevailing atmospheric conditions evident in Figure 32 and Figure 33, have reduced the visual impacts of the turbines experienced from receptor locations near this point.

Figure 32: View east-north-east from the R500 towards Igolide WEF Project Area (Pre-Construction). ***(Extracted from Google Earth Street View)***

Figure 33: View east-north-east from the R500 towards Igolide WEF Project Area (Post-Construction). *(Extracted from Google Earth Street View)*

13.2.4 Viewpoint VP4

This viewpoint is located on the R500 Main Road, just east of Fochville, and 150m from the north-eastern boundary of Green's Park residential area. This point is approximately 3.6 km from the nearest turbine and as such it is in a zone of moderate visual impact. Turbines are expected to be visible from this location (Figure 35) and hence also from receptors on the northern periphery of Green's Park.

Figure 34: View north-north-east from the R500 towards Igolide WEF Project Area (Pre-Construction).

Figure 35: View north-north-east from the R500 towards Igolide WEF Project Area (Post-Construction).

13.2.5 Viewpoint 5

This viewpoint is located at the intersection of Losberg Road and Loopspruit Lane, some 4 km south of the Igolide WEF project area. This point is approximately 4.3 km from the nearest turbine and as such it is in a zone of moderate visual impact. Turbines are expected to be visible from this location, although visibility will be reduced at this distance (Figure 37).

Figure 36: View north-north-west from Loopspruit Lane towards Igolide WEF Project Area (Pre-Construction). ***(Extracted from Google Earth Street View)***

Figure 37: View north-north-west from Loopspruit Lane towards Igolide WEF Project Area (Pre-Construction). ***(Extracted from Google Earth Street View)***

13.2.6 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.

The town of Fochville, located approximately 3 km south-west of the Igolide WEF project area, together with the adjacent townships of Greenspark and Kokosi are the main source of light within the study area. In addition, the large mining operations and associated residential areas to the north of the Igolide WEF project area, are expected to have a significant impact on the night scene in the northern sector of the study area.

Other lightspill in the broader area would largely emanate from the many farmsteads dotted across the study area, and also from vehicles travelling along the main roads.

Overall, the visual character of the night environment within the study area is considered to be moderately ‘polluted’ and will therefore not be regarded as pristine. While the operational and security lighting required for the proposed WEF project is likely to intrude on the nightscape and create some glare, the impact of the additional lighting is expected to be reduced by the presence of a significant amount of light already present within the surrounding area at night.

However, farmsteads located in areas characterised by lower levels of disturbance / transformation would be moderately sensitive to the impact of additional lighting.

13.3 Cumulative Impacts

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

- existing mining / quarrying activities, and
- other existing / proposed renewable energy facilities within a 30km radius.

Existing mining / quarrying and associated industrial development have already resulted in large scale visual impacts, especially to the north and east of the Igolide WEF project area. These developments have significantly altered the sense of place and visual character in the broader region.

Renewable energy facilities have the potential to cause large-scale visual impacts, and although the level of transformation already present in the landscape will reduce the contrast and overall visual impact of the new development, the incremental change in the landscape will be increased and the visual impacts on surrounding visual receptors would be exacerbated. The South African Renewable Energy EIA Application Database from DFFE (REEA_OR_2023_Q1) records only one approved renewable energy project within 30kms of the Igolide WEF project area, this being a 200MW Solar Photovoltaic (PV) facility located adjacent to Sibanye Gold Mine. This project is however located some 6.5 km north-east of the Igolide WEF project area, in close proximity to extensive, well-established mining developments and as such it is not anticipated that this development will result in any significant cumulative impacts affecting the landscape or the visual receptors within the visual assessment zone for the Igolide WEF.

It should be noted that this cumulative assessment does not include the proposed electrical grid connection for Igolide WEF as the route alignment has not yet been determined.

From a visual perspective, the concentration of renewable energy facilities in close proximity to existing mining development as proposed will further change the visual character of the area on the periphery of Fochville and alter the inherent sense of place, extending an increasingly industrial character into the broader area, and resulting in significant cumulative impacts. It is however anticipated that these impacts could be mitigated to acceptable levels with the implementation of the recommended mitigation measures.

14.0 Summary Of Potential Impacts

Potential visual issues / impacts resulting from the proposed Igolide WEF are outlined below.

14.1 Construction Phase

- Potential visual intrusion resulting from large construction vehicles and equipment;
- Potential visual effect of construction laydown areas and material stockpiles.
- Potential impacts of increased dust emissions from construction activities and related traffic;
- Potential visual scarring of the landscape as a result of site clearance and earthworks; and
- Potential visual pollution resulting from littering on the construction site.

14.2 Operational Phase

- Potential alteration of the visual character of the area;
- Potential visual intrusion resulting from the presence of wind turbines, particularly in more natural undisturbed settings;
- Potential visual clutter caused by substation and other associated infrastructure on-site;
- Potential flicker impacts on surrounding farmsteads;
- Dust emissions and dust plumes from maintenance vehicles accessing the site via gravel roads may evoke negative sentiments from surrounding viewers, and
- Potential alteration of the night time visual environment as a result of operational and security lighting as well as navigational lighting on top of the wind turbines.

14.3 Decommissioning Phase

- Potential visual intrusion resulting from vehicles and equipment involved in the decommissioning process;
- Potential impacts of increased dust emissions from decommissioning activities and related traffic; and
- Potential visual intrusion of any remaining infrastructure on the site.

14.4 Cumulative Impact

- Combined visual impacts from renewable energy development and associated grid connection infrastructure in the broader area could potentially alter the sense of place and visual character of the area; and
- Combined visual impacts from renewable energy development and associated grid connection infrastructure in the broader area could potentially exacerbate visual impacts on visual receptors.

15.0 Overall Visual Impact Rating

The EIA Regulations, 2014 require that an overall rating for visual impact is provided to allow the visual impact to be assessed alongside other environmental parameters. The impact matrices for visual impacts associated with the proposed construction, operation and decommissioning of the proposed Igolide WEF are presented below together with recommended mitigation measures. The mitigation measures have been determined based on best practice and literature reviews.

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

15.1 Direct Visual Impacts during Construction

Table 7: Impact Rating for the Igolide WEF during the construction phase

CONSTRUCTION PHASE: DIRECT IMPACTS																		
Impact number	**Aspect**	**Description**	**Stage**	**Character**	**Ease of Mitigation**	**Pre-Mitigation**							**Post-Mitigation**						
						(M+	**E+**	**R+**	**D)x**	**P=**	**S**	**Rating**	**(M+**	**E+**	**R+**	**D)x**	**P=**	**S**	**Rating**
Impact 1:	Visual impacts	▪ 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. ▪ 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. ▪ 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. ▪ Potential visual pollution resulting from littering on the construction site.	Construction	Negative	Moderate	3	2	3	4	3	**40**	**N3**	2	2	3	2	2	**18**	**N2**
					Significance	**N3- Moderate**							**N2 - Low**						

15.2 Construction Phase Mitigation Measures

- Carefully plan to minimise the construction period and avoid construction delays.
- Where possible, restrict construction activities to daylight hours in order to negate or reduce the visual impacts associated with lighting.
- Inform receptors within 1km of the WEF development area of the construction programme and schedules.
- Maintain a neat construction site by removing rubble, litter and waste materials regularly.
- Minimise vegetation clearing and rehabilitate cleared areas as soon as possible.
- Position storage / stockpile areas in unobtrusive positions in the landscape, where possible.
- 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 access roads;
  - in all areas where vegetation clearing has taken place;
  - on all soil stockpiles.

15.3 Direct Visual Impacts during Operation

Table 8: Impact Rating for the Igolide WEF during the operation phase

OPERATION PHASE: DIRECT IMPACTS																		
Impact number	**Aspect**	**Description**	**Stage**	**Character**	**Ease of Mitigation**	**Pre-Mitigation**							**Post-Mitigation**						
						(M+	**E+**	**R+**	**D)x**	**P=**	**S**	**Rating**	**(M+**	**E+**	**R+**	**D)x**	**P=**	**S**	**Rating**
Impact 1:	Visual impacts	▪ 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. ▪ Shadow flicker may impact nearby receptors. ▪ 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.	Operation	Negative	Moderate	3	3	3	4	4	**52**	**N3**	3	3	3	4	4	**52**	**N3**
					Significance	**N3- Moderate**							**N3 - Moderate**						

15.4 Operation Phase Mitigation / Management Measures

- Turbine colours should adhere to CAA requirements. Logos on the turbines should be kept to a minimum and turbine towers should be painted in neutral colours such as white or grey.
- 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 turbines of similar 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 (whilst adhering to relevant safety standards).
- 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 whilst adhering to relevant safety standards.
- 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.
- Where possible, the operation and maintenance buildings should be consolidated to reduce visual clutter.
- Non-reflective surfaces should be used where possible.

15.5 Direct Visual Impacts during Decommissioning

Table 9: Impact Rating for the Igolide WEF during the decommissioning phase

DECOMMISSIONING PHASE: DIRECT IMPACTS																		
Impact number	**Aspect**	**Description**	**Stage**	**Character**	**Ease of Mitigation**	**Pre-Mitigation**							**Post-Mitigation**						
						(M+	**E+**	**R+**	**D)x**	**P=**	**S**	**Rating**	**(M+**	**E+**	**R+**	**D)x**	**P=**	**S**	**Rating**
Impact 1:	Visual impacts	▪ 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 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 decommissioning may alter the flat landscape. Wind blowing over these disturbed areas could result in dust which would have a visual impact. ▪ Decommissioned infrastructure left on the site may be visually intrusive.	Decommissioning	Negative	Moderate	3	2	3	4	3	**40**	**N3**	2	2	3	2	2	**18**	**N2**
					Significance	**N3- Moderate**							**N2 - Low**						

15.6 Decommissioning Phase Mitigation Measures

- 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.
- Position storage / stockpile areas in unobtrusive positions in the landscape, where possible.
- Ensure that dust suppression procedures are maintained on all gravel access roads throughout the decommissioning phase.
- All cleared areas should be rehabilitated as soon as possible.

15.7 Cumulative Impacts

Table 10: Cumulative Impacts

CUMULATIVE IMPACTS																		
Impact number	**Aspect**	**Description**	**Stage**	**Character**	**Ease of Mitigation**	**Pre-Mitigation**							**Post-Mitigation**						
						(M+	**E+**	**R+**	**D)x**	**P=**	**S**	**Rating**	**(M+**	**E+**	**R+**	**D)x**	**P=**	**S**	**Rating**
Impact 1:	Visual impacts	▪ Additional renewable energy developments in the broader area will alter the natural character of the study area towards a more industrial landscape and expose a greater number of receptors to visual impacts. ▪ Visual intrusion of multiple renewable energy developments may be exacerbated, particularly in more natural undisturbed settings. ▪ Additional 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.	All stages	Negative	Moderate	4	3	3	4	4	**56**	**N3**	4	3	3	4	4	**56**	**N3**
					Significance	**N3- Moderate**							**N3 - Moderate**						

15.8 Cumulative Impact Mitigation / Management Measures

- Implementation of the mitigation measures as recommended above.

16.0 Impact Assessment Summary

An impact assessment summary is provided in Table 11 below.

Table 11: Overall Impact Significance (Post Mitigation)

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

17.0 EIA Phase Layout

Subsequent to the completion of all specialist studies during the Scoping Phase of the EIA process, the Proponent has refined the proposed Igolide WEF layout in line with the recommendations of the various specialists. The refined layout as shown in Figure 5 has been assessed from a visual perspective and it has been concluded that these amendments do not change the findings of this VIA.

18.0 Conclusion

A visual study was conducted to assess the magnitude and significance of the potential visual impacts associated with the development of the proposed Igolide WEF near Fochville in Gauteng Province. The VIA has demonstrated that the study area has a somewhat mixed visual character, transitioning from the heavily transformed mining landscape in the north to a more rural / pastoral character across the remainder of the study area. Hence, although a WEF development would alter the visual character and contrast with this rural / pastoral character, the location of the proposed WEF in relatively close proximity to the gold mining complex will significantly reduce the level of contrast.

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

A total of seventy-three potentially sensitive receptor locations were identified within 5 km of the nearest turbine in the EIA Phase layout for Igolide WEF, all but one of which are inside the viewshed for the proposed WEF. Five receptor locations are however located within the Igolide WEF project area and it is known that these landowners have signed agreements with Igolide regarding the establishment of the proposed WEF. ***None of these receptor locations was found to be sensitive.***

Most of the receptor locations within the 5 km radius are assumed to be farmsteads and residences which could be regarded as potentially sensitive visual receptors as they are located within a mostly rural setting with pastoral / natural vistas that will likely be altered by the proposed development. Although several accommodation / restaurant / wedding venue facilities were identified in the study area, these were not considered sensitive as the type of facilities provided are not expected to be detrimentally affected by changes in the landscape.

Only two of the identified receptors could potentially experience high levels of visual impact, namely VR34 and VR36. Impacts are however expected to be reduced by the proximity of these farmsteads to major road infrastructure in the area. Impacts are expected to be further reduced by the fact that there are relatively few turbines (10) proposed for this development, although local sentiments towards the proposed development are not yet known.

Sixty-seven receptor locations are expected to experience moderate levels of visual impact, while the remaining three receptor locations will only be subjected to low levels of impact.

Although the N12 and the R500 receptor roads traverse the study area, motorists travelling along these routes are only expected to experience moderate impacts from the proposed Igolide WEF. Impacts on the R501 receptor road are expected to be minimal as most sections of this road are outside the viewshed for the proposed turbines.

A preliminary assessment of overall impacts revealed that impacts associated with the proposed Igolide WEF (post mitigation) are of LOW significance during both construction and decommissioning phases. During operation however, visual impacts from the WEF would be of MODERATE significance with relatively few mitigation / management measures available to reduce the visual impact.

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

18.1 Visual Impact Statement

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

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