VISUAL IMPACT ASSESSMENT

REPORT FOR THE PROPOSED

VIRGINIA PHASE 2 RENEWABLE ENERGY GENERATION PROJECT

CORONA SOLAR PARK & POWER LINE

ON THE FARMS BIDDULPH 329, DE DAM 27 & TEVREDE 361,
VENTERSBURG RD,
MATJHABENG LOCAL MUNICIPALITY,
LEJWELEPUTSWA DISTRICT MUNICIPALITY,
FREE STATE PROVINCE

May 2023
Version 00

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CORONA SOLAR PARK & POWER LINE

VIRGINIA, FREE STATE PROVINCE

Short Name:	Corona Solar Park & Power Line
Prepared for:	AGES Limpopo
Prepared by:	M. Cilliers (PrLArch.)
Document Version:	00
Date:	14 May 2023

EXPERTISE OF SPECIALIST

Name:	Mitha Catharina Cilliers
Qualification:	BLArch (UP), MA Sustainable Design (Brighton, UK)
Professional Registration:	SACLAP Reg No. 20159
Experience in Years:	16 years
Experience:	Mitha Cilliers is a registered landscape architect with 16 years' experience in the field of visual impact assessments. She has worked on projects all over South Africa as well as in Central Africa. Types of projects Mitha has worked on include: solar energy facilities, wind energy facility, hydroelectric power facility, thermal power plant, powerlines, transmission substation, industrial park, ash disposal facility, cement plant, paper mill plant, mines (coal, platinum, chrome, copper, diamond) as well as residential and township developments

SPECIALIST DECLARATION

I, Mitha Catharina Cilliers, declare that –

- I act as the independent specialist
- I will perform the work relating to the application in an objective manner, even if this results in views and findings that are not favourable to the applicant
- I declare that there are no circumstances that may compromise my objectivity in performing such work
- I have expertise in conducting the specialist report relevant to this application, including knowledge of the Act, Regulations and any guidelines that have relevance to the proposed activity
- I will comply with the National Environmental Management Act (Act 107 of 1998) (NEMA), Environmental Impact Assessment (EIA) Regulations 2010 and 2014, and all other applicable legislation
- I have no, and will not engage in, conflicting interests in the undertaking of the activity
- I undertake to disclose to the applicant and the competent authority all material information in my possession that reasonably has or may have the potential of influencing
  - any decision to be taken with respect to the application by the competent authority; and
  - the objectivity of any report, plan or document to be prepared by myself for submission to the competent authority
- all the particulars furnished by me in this report are true and correct
- I realise that a false declaration is an offence in terms of regulation 48 and is punishable in terms of section 24F of the Act

This document was prepared by Mitha C Cilliers (PrLArch). The study approach in this document is based on the Guideline for Involving Visual and Aesthetic Specialists in EIA Processes by the Provincial Government of the Western Cape. The visual impact assessment methodology is based on a methodology developed by Derek Townshend from his experiences overseas, combined with GIS and graphic expertise gained locally. All intellectual property rights and copyright associated in the compilation of this report are reserved by the author. This document may not be reproduced or used without prior written consent of the author. All due care and diligence are exercised in the preparation of this report. By receiving this document, the client indemnifies the authors from any liability for any actions, claims, demands, costs, losses, liabilities, damages and expenses arising from or in connection with the services rendered and by the use of the information contained in this document.

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Mitha C. Cilliers
PrLArch (UP)
MA Sustainable Design (Brighton, UK)

PROTECTION OF PERSONAL INFORMATION ACT

In compliance with the Protection of Personal Information Act, No. 37067 of 26 November 2013, please note and adhere to the following:

- All documentation containing personal information must be destroyed, as soon as the purpose for which the information was collected has run out
- Unless permission has been obtained from the owner of the information, no additional copies may be made of documents containing personal information

SPECIALIST REPORTING REQUIREMENTS

Specialist Reporting Requirements according to Appendix 6 of the National Environmental Management Act (Act 107 of 1998), Environmental Impact Assessment Regulation 2014	
Requirement	**Relevant section in report**
Details of the specialist who prepared the report	p iii
The expertise of the person to compile the specialist report including a curriculum vitae	p iii
A declaration that the person is independent in a form of as may be specified by the competent authority	p iv
An indication of the scope of, and the purpose of which, the report was prepared	p x
The date and season of the site investigation and the relevance of the season to the outcome of the assessment	p xiv
A description of the methodology adopted in preparing the report or carrying out the specialised process	p x-xii
The specific identified sensitivity of the site related to the activity and its associated structures and infrastructure	p 6-21
An identification of any areas to be avoided including buffers	n/a
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	p 33
A description of any assumptions made and any uncertainties or gaps in knowledge	p xiv
A description of the findings and potential implications of such findings on the impact of the proposed activity including identified alternatives on the environment	p 22-46
Any mitigation measures for inclusion in the EMPr	n/a
Any conditions for inclusion in the environmental authorisation	n/a
Any monitoring requirements for inclusion in the EMPr or environmental authorisation	n/a
Any reasons opinion as to where the activity or portions thereof should be authorised	n/a
If the opinion is that the proposed activity or portions thereof should be authorised any avoidance, management and mitigation measures that should be included in the EMPr and where applicable the closure plan	n/a
A description of any consultation process that was undertaken during the course of carrying out the study	n/a
A summary and copies of any comments that were received during any consultation process	n/a
Any other information requested by the competent authority	n/a

LEGAL REQUIREMENTS & GUIDELINES

National Guidelines

National Environmental Management Act (NEMA) (Act 107 of 1998) Environmental Impact Assessment (EIA) Regulations 2014, as amended on 7 April 2017

Appendix 6 of this act stipulates the specification on conducting specialist studies. This specialist study conforms to these specifications. Mitigation measures contained in this specialist report are in support of the Environmental Impact Assessment (EIA) can be used as part of the Environmental Management Programme (EMPr).

National Environmental Management: Protected Areas Act (Act 57 of 2003)

The identification and protection of natural landscapes are the main aim of this act. This specialist report adheres to the 2010 regulations regarding the compilation of specialist reports included in this Act.

Western Cape Department of Environmental Affairs & Development Planning: Guideline for Involving Visual and Aesthetic Specialists in EIA Process Edition 1 (CSIR, 2005)

This guideline document aims to identify instances where a visual specialist should get involved in the EIA process. Although specifically compiled for the Western Cape, it offers direction that will be appropriate for any EIA process.

RELEVANT STANDARDS

There is an ethical obligation to be as representative and accurate as possible in this assessment and in the production of photo-simulations. Visualizations can easily be manipulated and misleading in a variety of ways, which must be guarded against. In terms of adhering to standards, this report follows the *Proposed Interim Code of Ethics for Landscape Visualisation*, developed by CALP in Canada (Sheppard, S.R.J., 2005). This document therefore follows that landscape visualizations are responsible for showing:

- a full understanding of changes,
- providing an honest and neutral representation,
- avoiding bias, and
- demonstrating legitimacy in the visualization process.

Presenters should also adhere to the following, and demonstrate their 1) Access to information, 2) Accuracy, 3) Legitimacy, 4) Representativeness, 5) Visual Clarity, and 6) Interest. More specifically, this code of ethical conduct (Sheppard, S.R.J., 2005) states that the presenter should:

- Demonstrate an appropriate level of qualification and experience;
- Use visualization tools and media that are appropriate to the purpose;
- Choose the appropriate level of realism;
- Identify, collect and document supporting visual data available for, or used in, the visualization process;
- Conduct an on-site visual analysis to determine important issues and views;
- Seek community input on viewpoints and landscape issues to address in the visualizations;
- Provide the viewer with a reasonable choice of viewpoints, view directions, view angles, viewing conditions and timeframes, appropriate to the area being visualized;
- Estimate and disclose the expected degree of uncertainty, indicating areas and possible visual consequences of the uncertainties;
- Use more than one appropriate presentation mode and means of access for the affected public;
- Present important non-visual information at the same time as the visual presentation, using a neutral delivery;
- Avoid the use, or the appearance of 'sales techniques' or special effects;
- Avoid seeking a particular response from the audience;
- Provide information describing how the visualization process was conducted and how key decisions were taken.

The 2011 advice note 01/11 of the UK's Landscape Institute recommends that for landscape and visual impact assessment purposes a photomontage should:

- be reproduced at a size and level of geometric accuracy to permit impact assessment, which must include inspection at the location where the photograph was taken;
- be based on a replicable, transparent and structured process, so that the accuracy of the representation can be verified, and trust established;
- use techniques, with appropriate explanation, that in the opinion of the landscape professional best represent the scheme under consideration and its proposed environment accurately as possible;
- be easily understood, and usable by members of the public and those with a non-technical background;
- be based on a good quality photographic image taken in representative weather conditions.

BASIC METHODOLOGY*

Step 5: MITIGATION
- Determine practical mitigation measures and where these might be applied.

Step 4: RELEVANCE
- Synthesize *Sensitivity* & *Magnitude* showing most important areas for mitigation.
- Change results from mapped gradients to distinct categories for decision-making purposes.

Step 3: MAGNITUDE
- Determine Exposure Curve and gradient on map.
- Determine influence of Wholeness map (optional*).

Step 2: SENSITIVITY
- Determine Starting Sensitivity (Character)
- Determine VSR sensitivity.
  Determine Landscape Quality / Sensitivity
- Determine influence of KOPs, VCs, SoPs
- Apply calibration factor.

Step 1: ZONE of VISUAL INFLUENCE
- Determine extents of ZVI.
- Identify Visually Sensitive Receivers.
- Identify any Key Observation Points (KOPs).
- Identify any View Corridors (VCs).
- Identify any Unique Sense of Places (SoPs).

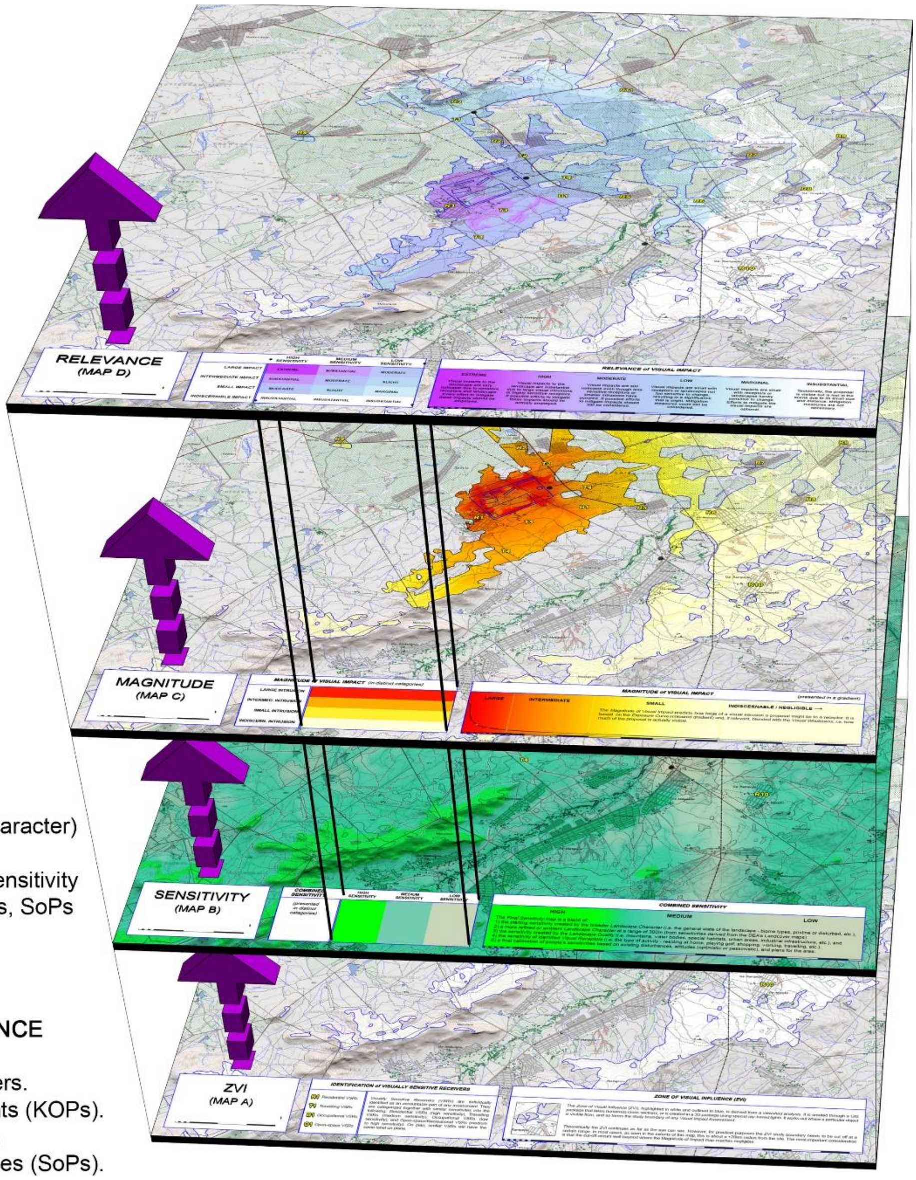


Figure A: Basic Methodology*

** the **Visual Impact Assessment Methodology** is illustrated in Appendix A. It consists of additional maps that have been used to generate the Sensitivity and Magnitude maps*

Any *Visual Analysis* begins by first identifying the area in which the proposal is visible from. This is the study boundary, or the *Zone of Visual Influence* (ZVI). The ZVI is derived through a *viewshed analysis* which is created through a GIS or 3D modelling package using special 'ray-traced' lights. Theoretically, this study area, or the ZVI, extends as far as the eye can see, but for practical purposes is further limited, if necessary, to an area 20km from the proposal.

The next step is to identify *Visually Sensitive Receivers* (VSRs) within this ZVI and to rate their inherent sensitivity (low, medium, or high) based on their activity. VSRs are broadly grouped into residential (R), travelling (T), occupational or business (B) and open space or recreational (O) users. For simplicity, similar VSRs are often grouped together. *Landscape Quality and Landscape Character* are also factors influencing the *Resultant Sensitivity*.

The *Magnitude of Visual Impact* generally refers to the size or intrusion of an object in one's view. On plan this is spatially determined (mostly using the exposure map), which takes into consideration the distances away from the proposed development, the size or area of the proposal within one's view (i.e., its height x width, often measured in square arc-minutes), and any other contrasting factors that may exaggerate the intrusion into the visual environment, such as movement or sharp glare from the proposal.

The *vanishing threshold* for the *magnitude* has been established at 8km away. This is the distance where no discernible impact is observed, even if the proposal is technically still visible. This 8km estimate is based on Hull and Bishop's 1988 study, which determined empirically from human feedback a *vanishing threshold* distance of 6km for 45m high lattice pylons spaced 400m apart. The 8km distance is estimated from past, onsite experience, Hull and Bishop's study, and what might be experienced if all of the proposal was visible. Typically, powerlines are good examples where *wholeness* maps play a major role in determining how exposed areas are to the proposal. Some areas (usually elevated) see much of a proposal, while other areas are only exposed to tiny slithers. This influence of these *wholeness maps* can significantly influence the final *magnitude* maps.

The synthesis of *sensitivity* and *magnitude* to produce a final *relevance* value is standard practice across many disciplines (ecology, noise, etc.). This approach is also adopted for numerous VIAs methodologies around the world. It is used here too but is further developed into a spatial context - i.e. it is mapped using GIS layering instead of simply being tabulated.

Table A: Relevance Engine - showing relationship between Sensitivity and Magnitude

RELEVANCE ENGINE				
		SENSITIVITY		
	RELEVANCE	High	Medium	Low
MAGNITUDE	Large	extreme	substantial	moderate
	Intermediate	substantial	moderate	slight
	Small	moderate	slight	marginal
	Negligible	insubstantial	insubstantial	insubstantial

The *Relevance of Visual Impact* results range from *extreme* to *insubstantial*. This scale highlights potential trouble-spots (in purple) and so implies where mitigation measures would be most needed. The colour scale from purple to light turquoise and white can also be seen as a scale from visually unacceptable to visually acceptable.

Note that the term *Relevance* has been used here instead of the usual *VIA Significance*, so as not to be confused with other terms in the South African EIA result which uses the *Significance* term differently.

Extreme (high sensitivity x large impact) occurs when visual impacts are very noticeable by receptors that are highly sensitive to changes in their environment. Every effort should be employed to mitigate these impacts. If mitigation is not possible AND the area of extreme is large enough then the proposal should be reviewed for no-go or critically flawed status.

Substantial (medium sensitivity x large impact OR high sensitivity x intermediate impact) occurs when impacts are distinctly noticeable but due to less sensitive receptors of smaller intrusions are not considered too significant. If important VSRs occur in this area, then all practical efforts to mitigate the proposal must be considered.

Moderate (low sensitivity x large impact OR medium sensitivity x intermediate impact OR high sensitivity x small impact) occurs when impacts are distinctly noticeable but due to less sensitive receptors or smaller intrusions are not considered too significant. If important VSRs occur in this area, then all practical efforts to mitigate the proposal should still be considered.

Slight (low sensitivity x intermediate impact OR medium sensitivity x small impact) occurs when impacts are small and / or receptors are not very sensitive to change. Mitigation measures might still be considered, depending on the importance of the VSRs.

Marginal (low sensitivity x small impact) occurs when impacts are small and receptors are not sensitive to change. Efforts to mitigate the visual impacts are optional.

Insubstantial (high OR medium OR low sensitivity x negligible impact). Technically the proposed development is visible but is lost in the scene due to its small size as a result of the great distance from the visual receptor. Mitigation measures are not necessary.

It should be noted that the entire assessment is determined by worst-case-scenarios. As such, the effect of the existing vegetation is not included in the DEM and viewshed analysis. Although it can easily be argued that existing vegetation can form a visual screen, it should be kept in mind that vegetation is not a fixed landscape entity and can vary or disappear due to seasonal variation, overgrazing, veld fires, erosion, drought, natural catastrophes, climate-change, etc. Random breaks in the vegetation lines could also possibly allow for views of the proposed development. Therefore, for the purpose of determining the worst-case-scenario the effect of the existing vegetation is omitted. However, in the final relevance discussion, the effect of existing vegetation, as identified during site investigations, is considered. Existing vegetation as a visual barrier should be considered a bonus mitigation measure. As such, it should become the responsibility of the developer of the proposal, in collaboration with the necessary authorities or landowner, to retain and maintain this resource.

PROJECT PARAMETERS

The following parameters were used for this project:

Solar panel height	4.5m
Warehouse building	6.0m
Office building	3.0m
Water treatment plant	6.0m
Substation	30.0m
Power line pylons	40.0m
Foreground	0 - 800m
Middle ground	800m – 1.5km
Background	1.5 – 4.0km
Negligible	4.0 – 20.0km
Indiscernible	20km+

ASSUMPTIONS & LIMITATIONS

- Topographical sheets (2726DC, DD, 2727CC, 2826BA, BB, BC, BD, 2827AA, AB, AC, AD) used from the Chief Director of Surveys and Mapping were all dated 2002.
- The study was undertaken during the planning phase of the project.
- Field work has been done January 2023 during the summer and therefore photographs only represent the summer seasonal conditions.
- •This report will make use of *Shapes_Layout_Corona* GIS file package and *Corona 132kV powerline 13km* as received from the environmental consultant on 22nd of March 2023.
- In terms of lighting, it is assumed both construction and decommissioning activities would be restricted to daylight hours; this project would not use of night lighting during its operational phase; and that maintenance activities would only take place at daytime.
- It is assumed that construction would last approximately 24 months, the project lifespan would be beyond ten years.

ABBREVIATIONS & ACRONYMS

BLM / NEPA	Bureau of Land Management / National Environmental Policy Act (United States of America)
CALP	Collaborative for Advanced Landscape Planning (Canada)
CL	Camera Locations (see Appendix C)
CSIR	Council for Scientific and Industrial Research
DEA	Department of Environmental Affairs and Development Planning (RSA)
DEM / DTM	Digital Elevation Model / Digital Terrain Model
DoC	Degree of Contrast
DoE	Department of Energy
EIA	Environmental Impact Assessment
EMP	Environmental Management Plan
EMPr	Environmental Management Programme
GIS	Geographic Information System
KOP	Key Observation Point-
NEMA	National Environmental Management Act
m.a.m.s.l	meters above mean sea level
PS	International Finance Corporation Performance Standards
REDZ	Renewable Energy Development Zones. These are compiled in terms of section 24(3) of the National Environmental Management Act, 1998
SANBI	South African National Biodiversity Institute
SoP	Areas with a unique Sense of Place
VIA	Visual Impact Assessment
VC	View Corridor
ZPVI	Zone of Potential Visual Influence
ZVI	Zone of Visual Influence

GLOSSARY OF TERMS

Degree of Contrast (DoC)	This contrast rating is an evaluation of how different the proposal is to the receiving environment. It looks at line, colour, materials, texture, form, transparency and existing visual clutter. The *Degree of Contrast* will influence the Exposure curve / gradient or visual intrusion on plan. The *Degree of Contrast* should be read as part of the *Visual Absorption Capacity*.
Exposure (curve / gradient)	The exposure curve (gradient) illustrates the size of impacts of a proposal on scenic quality with relation to the observer's distance. It is suitably adjusted for every project and is affected by scale, contrast, visual clutter, sharp light or glare, or movement.
Key Observation Point (KOP)	These points refer to typical and/or critical places where *Visually Sensitive Receptors* views are affected. KOPs can either be a single point, a linear view along a transport route, trail, or river corridor, or an area.
Landscape Character	A combined impression of the landscape qualities, generally providing a *sense of place* that could often be more than the sum of its parts.
Landscape Quality	In the VIA context, Landscape Quality refers to elements in the landscape (hills, valleys, woods, trees, water bodies, buildings and roads) that contribute to the visual context, and play a role in the sensitivity of receivers (see Sensitivity maps).
Magnitude (of Visual Impact)	The *Magnitude of Visual Impact* is a measure of visual intrusion that an observer may experience. It is based primarily on the *gradient* and *exposure curve* but on plan may, if relevant, be further influenced by other factors such as *Visual Wholeness*.
Project / Project site / site / proposal	Corona Solar Park & Power Line Project will be located on the Farms Biddulph 329, De Dam 27 & Tevrede 361, Ventersburg RD, Free State Province.
Relevance (of Visual Impact)	In this VIA context, *Relevance* refers to the synthesis of *Sensitivity* and *Magnitude*. The result indicates the importance of impacts, and subsequently where mitigation measures might be most effectively applied. *Significance* is often the industry term used for this value, but *Relevance* is used here instead so as not to be confused with the *EIA Significance* term.
Recessive Colours	Recessive colours refers to colours and tones that do not catch the attention of the eye and do not punctuate the landscape. One tends to overlook recessive colours more easily. This principle is illustrated when driving through the suburbs. In cases where gardens have black-, grey-, brown-

	or olive-coloured fences or gates, the viewer naturally looks through these elements at the garden behind. Conversely, if these were white, cream, yellow or such, the viewer is forced to look at that element and struggles to look through it.
Sensitivity	This describes how sensitive a receptor is to changes in their environment. In this VIA context the *Resultant Sensitivity* is a blend of the *Landscape Character,* the *VSR Sensitivity,* the sensitivity created by the *Landscape Quality,* and a *Calibration factor* that incorporates attitudes and plans for the area.
Sense of Place	A description of a specific place or area that depicts the experience of the viewer.
Significance (EIA)	This is a final indication of the importance of the impact in terms of both physical extent and time scale, and therefore indicates the level of mitigation required. It is a term used for integration into the final EIA methodology of South Africa.
Study Area	An area with a radius of approximately 20km around the proposed project.
Visual Absorption Capacity	The ability of an environment to accept the proposed changes without transformation in its visual character and quality.
Viewshed Analysis	Areas where a particular object is visible from within the study area.
Visual characteristics	The forms, shapes, colours and textures that makes up the pallet of the receiving environment or of the project components.
Visual Resource	the receiving environment into which the components of the proposed project will be introduced.
Visually Sensitive Receivers (*VSRs*)	Points (individuals, groups or communities), linear (roads) or areas (farms) that would be subject / sensitive to the visual influence of a particular project. The sensitivity of VSRs is based on the activity of individuals when viewing the proposal and what their surroundings are.
Wholeness (Visual)	*Visual Wholeness* refers to the amount of the proposed project components that is visible. It ranges from seeing the whole site (complete) to seeing very little of it (a snippet). More specifically, it refers to the proportion visible against the maximum proportion ever visible. After all, one can never see all sides of a proposal. A value of 100% (or red on the wholeness maps) therefore shows areas where the maximum proportion can be seen. *Visual Proportion*, *Visual Abundance* or *Visual Frequency* are industry synonyms for this term.

Zone of Potential Visual Influence (*ZPVI*)	The area from which the proposed project would potentially be visible, normally within a 20km radius around the proposed project components. This is synonymous with the industry term '*visual catchment'* area.
Zone of Visual Influence (*ZVI*)	The area from which the proposed project would potentially be visible, derived from the *viewshed analysis*.

EXECUTIVE SUMMARY

In an effort to address South Africa's growing electricity demand through the use of renewable energy resources, Corona Energy (Pt) Ltd is assessing the feasibility of the establishment of renewable energy generation facility in the form of a Photovoltaic Power Plant with a maximum generation capacity of up to 240MW at the point of connection.

Corona Solar Park facility, with associated infrastructure and structures, is proposed to be located on the farms Biddulph 329, De Dam 27 & Tevrede 361, Ventersburg RD, approximately 20km southeast of the town of Viriginia and approximately 20km southwest of the town of Ventersburg, within the Matjhabeng and Masilonyana Municipalities, Lejweleputswa District Municipality, Free State Province. The proposal is to connect with a 132kV power line to the Eskom Theseus Main Transmission Substation (MTS) approximately 11,8km northeast of the Corona Solar Park project site. The Eskom Theseus MTS located on Portion 6 of the Farm Doorn Rivier 330 Theunissen RD, Free State Province. The Powerline Study Corridor might host up to four power lines and traverse the following farm portions depending on the final alignments.

The main characteristics of the study area includes mining, crop and livestock farming giving the study area an agro-industrial sense of place. The area where the proposed solar parks are located is dominated by agriculture and in the north is buffered by the township of Meloding and the town of Virginia from the mining activities. The powerlines also become less further away to the southeast of the study area. Tourist attractions mostly occur on the outer edges of the study area, 20km radius, with the closets being the Allemanskraal Dam, approximately 16km southeast of the nearest solar park site, on the outer edge of the visual analysis. Guest houses mostly serves the mining community. The residential component of the study area includes farmstead with associated workers housing as well as the towns of Virginia and Ventersurg and the townships of Meloding and Mmamahabane. Night-time character would mostly be characterised by lights associated by the farmsteads and a larger glow in the northern section associated with the township of Meloding, town of Virginia as well as the mines.

In the light of the mixed agro-industrial sense of place and the other characteristics of the receiving environment, the proposed project components will exhibit a *medium contrast* with the receiving environment. *No night-light impact* is anticipated. Discussions with the aviation impact consultant revealed that it is *unlikely that glint and glare from the proposed project would interfere with the Approach / Departure flight paths* for the three local airports that are located approximately 20km – 40km from the proposed project.

The Zone of Visual Influence (ZVI) for the solar panels covers 22% of the Zone of Potential Visual Influence (ZPVI) for this specific project, a 16km radius around the project components. The ZVI for the powerline is quite expansive and, almost wholly, includes the ZVI of the solar panels except for a few portions on its eastern edge. The Klipspruit, Maselspruit, Schoemanspruit and Doringspruit drainage lines cut in from the south and east. The ZVI for the powerline covers approximately 59% of the ZPVI area. The combined ZVI for the solar panels and the powerline combined covers approximately 55 % of the total ZPVI area for this project.

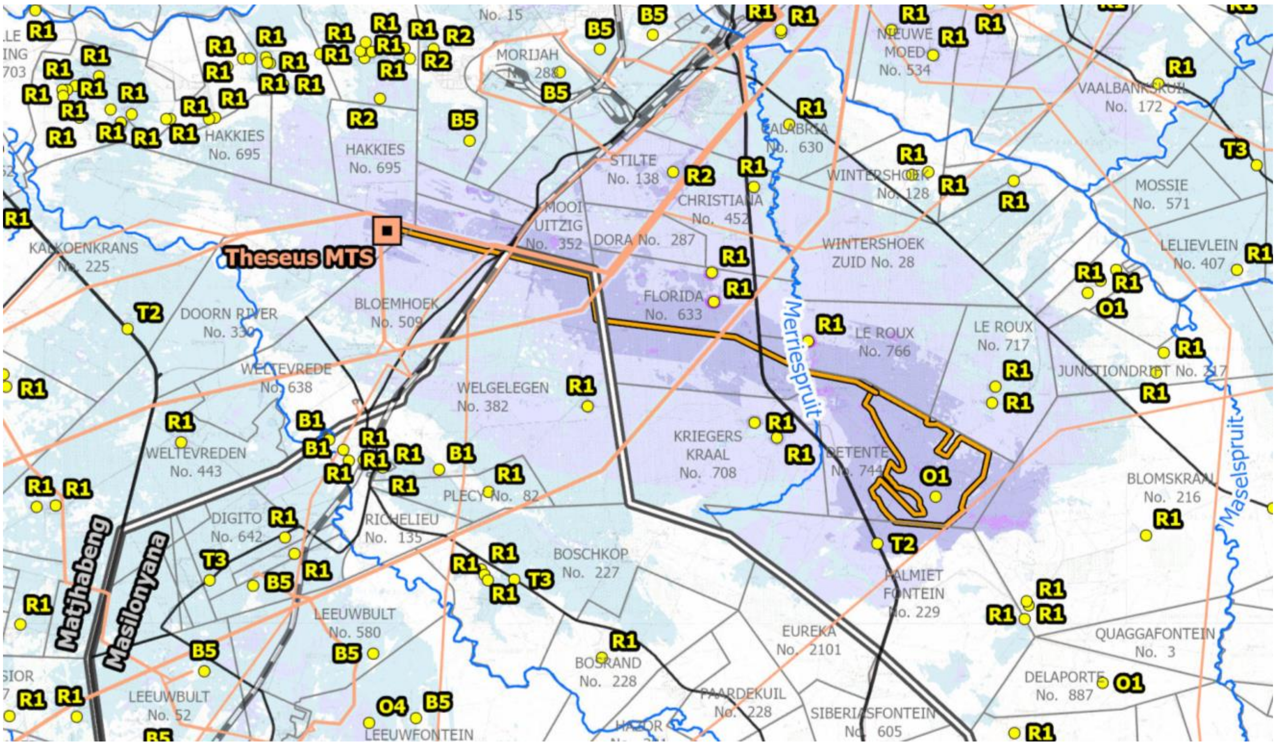
The powerline would add **cumulatively** to the visual clutter of the existing powerlines and existing mining / industrial character type of the overall sense of place. The cumulative impact from the powerline and solar park combined is anticipated to be approximately 3% more than that of the proposed Corona project.

The generalized ***Relevance*** of the visual impact on these receptors were as follows:

Residential: *marginal*
Transport: *marginal*
Business / Occupational / Industrial: *marginal*
Open Space Users / Recreational: *marginal*

VSRs with the largest anticipated impact included the residence on the farm Le Roux No. 766 which was rated as *substantial*. This rating is a result of their proximity to the proposed powerline and the portion of the solar park components that would possibly be visible to the viewer.

The proposed Corona Solar Park & Powerline would have a ***medium significance*** for all visual receptors, during all phases of the project, except for the decommissioning phase, where the rating would drop to ***low-medium***. Proposed **mitigation measures** did not have a significant effect on the *duration, extent, frequency, probability* and *compliance* of the visual impacts, rather it would add to good practice found in an Environmental Management Programme. Clustering the proposed developments is proposed measure to reduce the impact on the study area.



extract from Relevance map for Corona Solar Park & Powerline

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1.0 INTRODUCTION

1.1 Background

South Africa experiences some of the highest levels of solar radiation in the world. The daily solar radiation varies between 4.5 and 6.5 kilowatt hours per square meter. Solar energy, as a renewable energy resource, thus has an enormous potential to provide in the continued energy security of the country's future energy needs. However, to utilise this resource, considerable investments in infrastructure is required. The Department of Energy (DoE) has undertaken the objective of ensuring continued energy security in an affordable and sustainable way while minimising negative environmental impacts. A National Integrated Energy Plan (IEP) was developed and reviewed and published on an annual basis. The DoE initiated the Independent Power Producers (IPP) Procurement Programme to procure renewable energy from the private sector.

The study area falls just outside to the East of the Central Corridor and East of the Kimberley Renewable Energy Development Zones (REDZs) as compiled in terms of section 24(3) of the National Environmental Management Act, 1998. REDZ are identified geographical areas earmarked for concentrated wind and solar photovoltaic power development within South Africa.

In an effort to address South Africa's growing electricity demand through the use of renewable energy resources, Corona Energy (Pt) Ltd is assessing the feasibility of the establishment of renewable energy generation facility in the form of a Photovoltaic Power Plant with a maximum generation capacity of up to 240MW at the point of connection.

1.2 Locality

*Refer to **Figure 1** below*

Corona Solar Park facility, with associated infrastructure and structures, is proposed to be located on the farms Biddulph 329, De Dam 27 and Tevrede 361, Ventersburg RD, approximately 20km South-East of the town of Viriginia and approximately 20km South-West of the town of Ventersburg, within the Matjhabeng and Masilonyana Municipalities, Lejweleputswa District Municipality, Free State Province. The proposal is to connect the facility with a 132kV power line to the Eskom Theseus Main Transmission Substation (MTS) approximately 11,8km North-East of the Corona Solar Park project site. The Eskom Theseus MTS located on Portion 6 of the Farm Doorn Rivier 330 Theunissen RD, Free State Province. The Powerline Study Corridor might host up to four power lines and traverse the following farm portions depending on the final alignments:

Remaining Extent of the Farm Le Roux 766, Portions 1 (Remaining Extent) and 2 of the Farm Le Roux 766, Portion 1 of the farm Le Roux 717, Portions 1 and 4 of the Farm Florida 633, Portions 2, 22, 24, and 27 of the Farm Welgelegen 382, Remaining Extent, Portion 2 (Remaining Extent) and Portion 3 of the Farm Bloemhoek 509, Remaining Extent of the Farm Doorn River 330 (Portion 11 & Portion 21 unregistered), Portions 3 and 18 of Farm Hakkies 695, Registration Division Ventersburg RD and Portion 6 of the Farm Doorn River 330, Registration Division Theunissen RD.

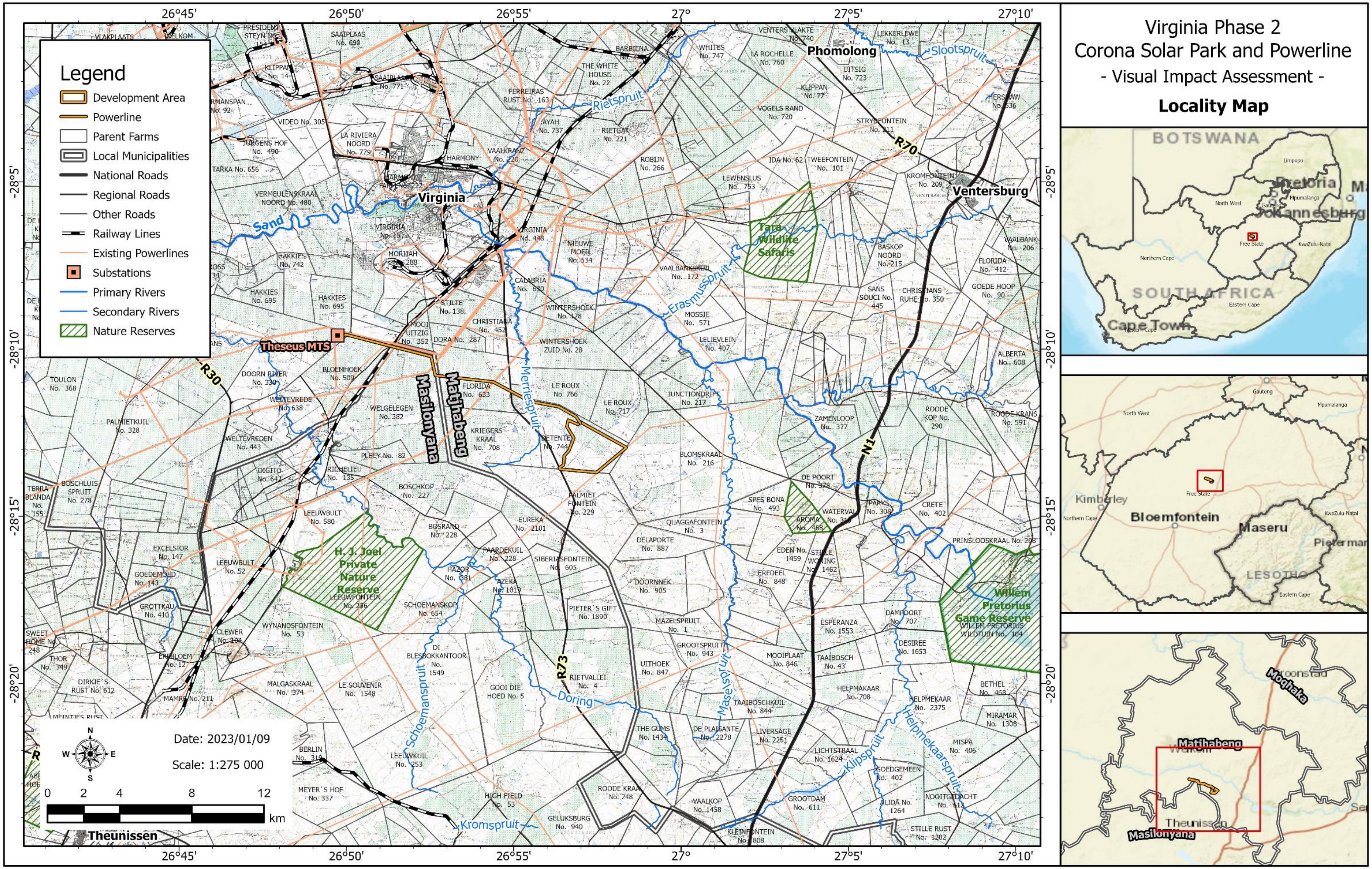

Figure 1: Locality

1.3 Project Description

*Refer to **Figures 2** below*

Corona Energy photovoltaic (PV) Solar Park will have a maximum generation capacity of up to 240MW on approximately 530ha spread over the farms Biddulph 329, De Dam 27 & Tevrede 361, Ventersburg RD. The solar park will connect to the Eskom Theseus Main Transmission Substation (MTS) located approximately 11,8km North-East of the Corona Solar Park project site.

Figure 2 depicts the proposed components for the Solar Park and power line. Each solar park will consist of the following components:

- **Photovoltaic cells and photovoltaic modules**: PV cells are made in silicone and act as a semiconductor used to produce the photovoltaic effect. Individual PV cells are linked and placed behind a protective glass sheet to form a photovoltaic module. The facility will use mono/polycrystalline photovoltaic (PV) modules or bi-facial modules with high efficiency.
- **Support structures:** PV modules will be assembled on steel or aluminium frames. The preferred technical solutions for the proposed solar parks entail PV modules mounted on **single-axis horizontal trackers** or on **fixed mounting systems**, or a combination of both. Each tracker is composed by several PV arrays North-South oriented and linked by a horizontal axis, driven by a motor. The horizontal axis allows the rotation of the PV arrays toward the West and East direction, to follow the daily sun path. In the case of fixed mounting systems, each mounting frame hosts PV modules along parallel rows of PV modules placed side by side, with the position of the panels northwards and an optimized tilt angle (between 20° and 30°). The rows of PV modules are mounted horizontally one on top of the other, with an overall mounting structure height up to 4.5 meters above ground level.
- **Strings and string boxes:** the PV modules are connected in series to form PV strings, so that the string voltage fits into the voltage range of the DC/AC inverters. PV strings are devised to be connected to DC-connection boxes (string boxes) with a parallel connection solution (PV sub-field). String Boxes monitor the currents in photovoltaic modules and can promptly diagnose faults. String boxes are also designed with a general circuit breaker to disconnect the photovoltaic sub-fields from the DC/AC inverters.
- **Medium-voltage stations:** each medium-voltage station is designed to host one or more DC/AC inverters, and one or more medium-voltage power transformers. The DC/AC inverters are deemed to convert the direct current (DC) to alternating current (AC) at low voltage; subsequently the AC will pass through a medium-voltage power transformer to step-up the voltage up to 22 kV or 33 kV.
- **Medium voltage receiving station:** the energy from the medium voltage stations will be collected into one medium voltage receiving stations, linking in parallel all the PV fields of the PV generator.
- **On-site high-voltage substations and switching stations:** from the medium-voltage receiving station, the electrical energy will be delivered to one small on-site high-voltage substation with two or more high-voltage power transformers (one as spare), stepping up the voltage to the voltage of the Eskom grid (132 kV). Furthermore, the on-site high-voltage substation will be equipped with a control building and one busbar with metering and protection devices (also called “switching station”).
- **Up to 4 (four) 132 kV power lines,** approximately from 9km up to 21km long (depending on the selected location of the project footprints), for the connection of the on-site substation to the Eskom Theseus Main Transmission Substation (MTS) located on Portion 6 of the Farm Doorn Rivier, 330 Theunissen RD, Free State Province.

- **One high-voltage substation** (if required by Eskom) with 132kV/400kV step-up transformers, and with 132 kV and 400 kV busbars (switching stations) with metering and protection devices, to be located next to the Eskom Theseus MTS.
- **Battery Energy Storage Systems**, with a Maximum Export Capacity from 100MW up to 240 MW each (depending on the Maximum Export Capacity of the solar park) and up to 6-hour storage capacity (from 600 MWh up to 1440 MWh each), with a footprint from 10ha up to 20ha each, next to the on-site high-voltage substations, within the PV plant footprint / fenced area

Other key features of the project are to ensure a high level of reliability, operational and maintenance safety, low water consumption. The expected operational life of a plant is deemed to be between 30 up to 40 years. The construction and the commissioning of the PV plant is expected to last approximately 24 months.

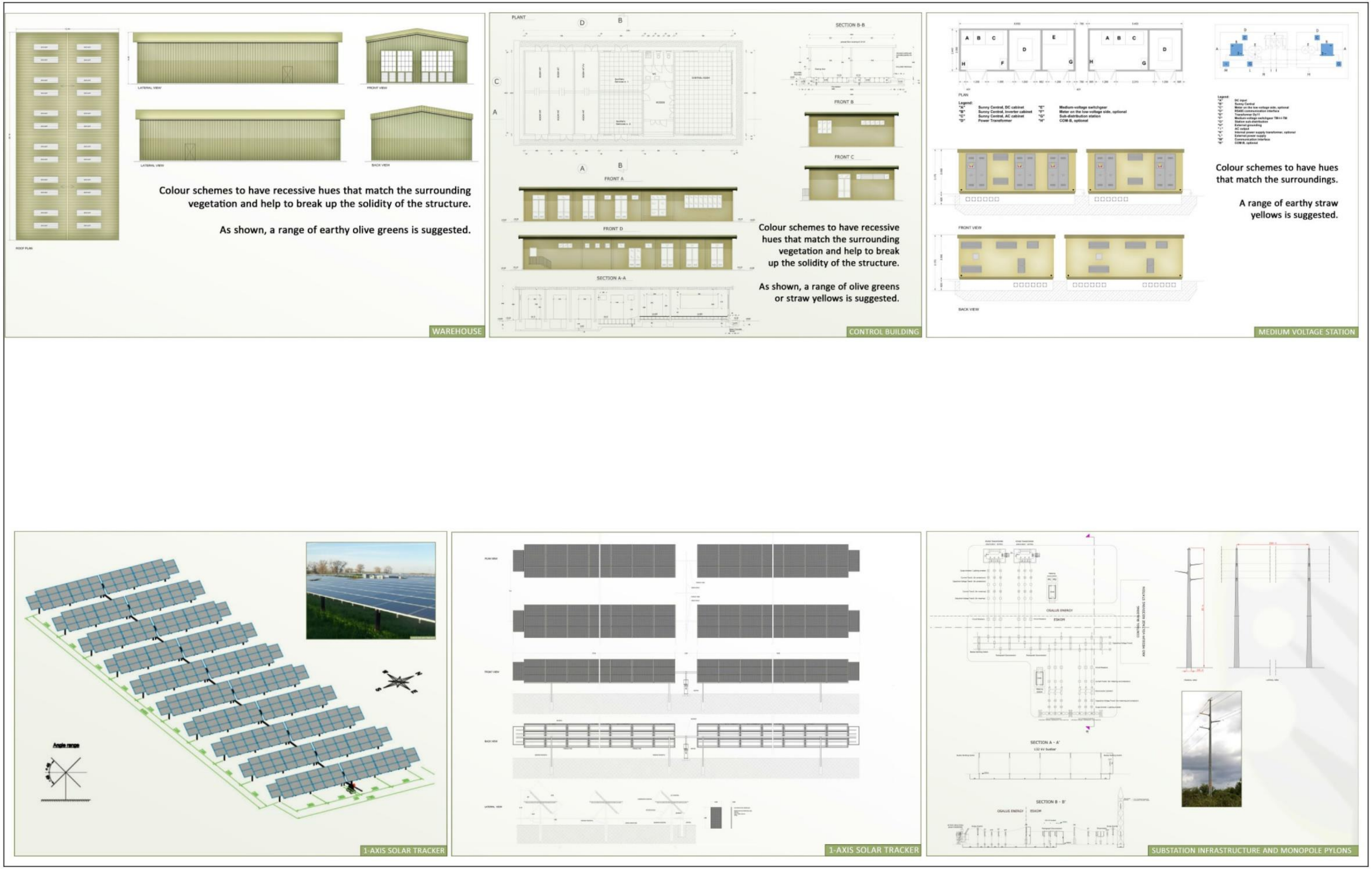

Figure 2: Project Components

2.0 RECEIVING ENVIRONMENT / VISUAL RESOURCE

*Refer to **Figures 3a** to **3k** below as well as **Appendix C**, at the end of this report, for all camera locations (CL).*

2.1 Introduction

The sensitivity of users in an area to change is affected by the following;

1. their activities,
2. their immediate surroundings,
3. their distant surroundings, and
4. their general perceptions and identity of the area, i.e. form its *sense of place* or *character*.

It is therefore necessary to fully describe these *sensitivity factors* below as the receiving environment onto which any proposal intrudes.

As all VIAs are spatial, quantifying and mapping this sensitivity (even though qualitative in nature) is desirable and useful for further analysis and assessment. This is covered in the methodology and following chapters.

This section will cover the description of the receiving environment / visual recourse for all for the project sites since they are on the same farm portion and in such close proximity to each other.

2.2 Biophysical

*Refer to **Figure 3a** below*

The study area is situated within the summer and autumn rainfall region with very dry winters. The mean annual precipitation for the study area is approximately 560mm. The mean annual temperature for the area is 15.2°C with frequent frost that occurs during the colder winter months. January and December are the warmest months with an average high of 30ºC whereas June and July are the coldest months with an average low of 6ºC.

The study area is located within the Grassland Biome of South Africa as classified by Mucina & Rutherford (2006). The vegetation units are dominated by Central Free State Grassland in the South-eastern half and the Vaal-Vet Sandy Grassland in the North-western half. Scattered areas of Winburg Grassy Shrubland, Eastern Free State Clay Grassland and Bloemfontein Karroid Shrubland occur in the South-eastern half and Scattered areas of Highveld Alluvial Vegetation, Highveld Salt Pans and Western Free State Clay Grassland occurs in the North-western half. Woody plants absent or rare and usually comprise of low to medium-sized shrubs confined to specific habitats.

Grassland areas are characterised by a wide spectrum of fertile soil types, in this case red soils, based on a geology comprising of shale, mudstone and sandstone Ecca and Beaufort Groups. The topography dominated by scattered, slightly irregular, undulating plains and hills with drainage channels and wetlands bisecting the area.

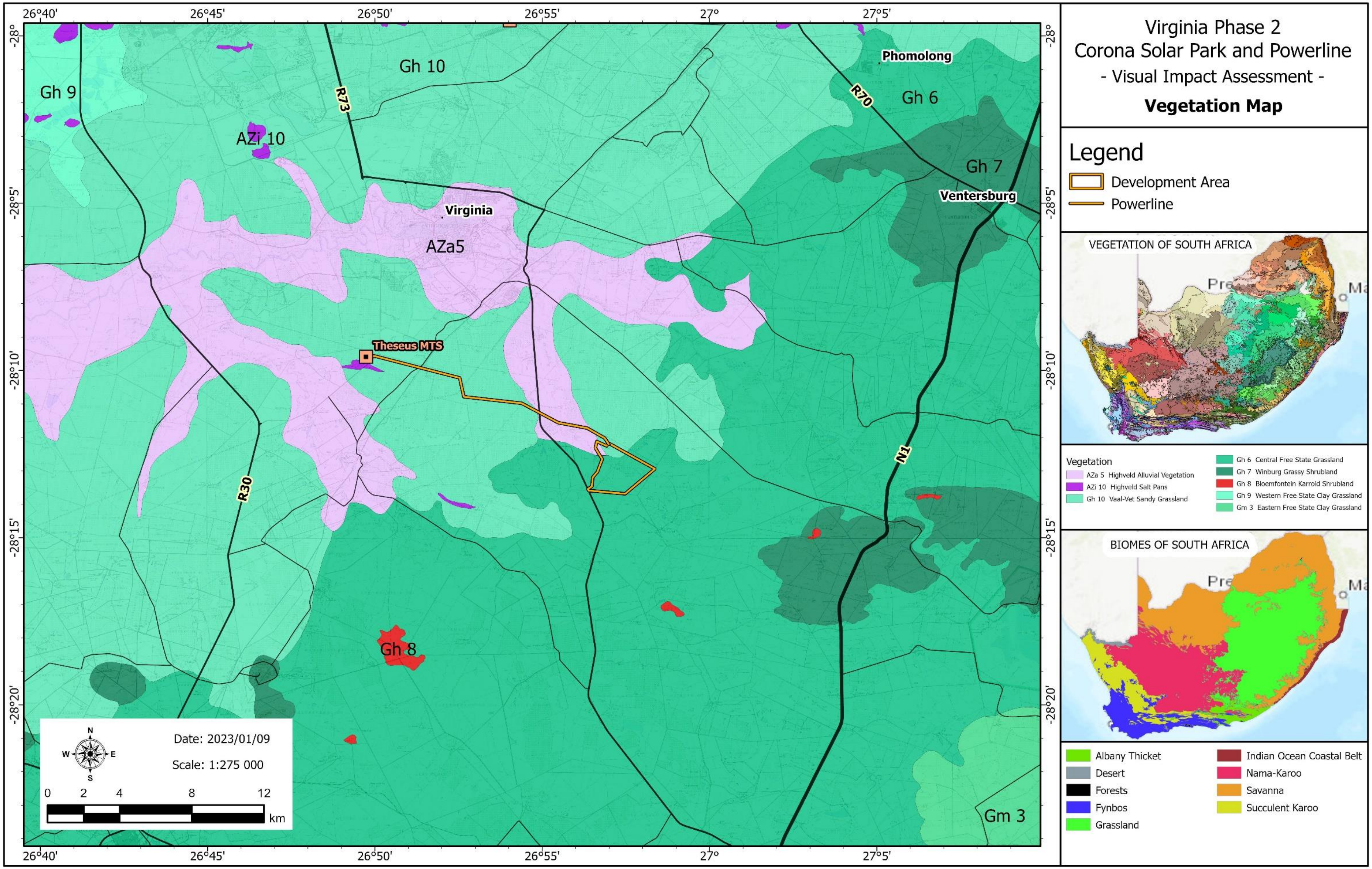

Figure 3a: Vegetation Map

2.3 Land Use

Refer to ***Figures 3b & c*** below

As stated above, the proposed project is located near the towns of Virginia and Ventersburg. Virginia has its origin from the gold rush in the earlier history of South Africa and is situated within some of the largest gold fields in the Free State. Due to its origin, Virginia was located along the main railway line between Bloemfontein and Johannesburg. The area is also known for some of the deepest pipe-mines in the world. Major local economic sectors include mining, gold-extraction plants, sulfuric acid manufacturing as by-product from gold mining as well as commercial farming which includes livestock and crop (maize / corn) farming.

The residential component of the study area includes farmstead with associated workers housing as well as the towns of Virginia and Ventersurg and the townships of Meloding and Mmamahabane.

Transport includes the local farm roads, the North-South running R30 approximately 20,1km North-West of the project site, the North-South running R730 approximately 20,9km West of the project site, the North-South running R73 between Virginina and the project site, the N1 between Ventersburg and the project site as well as railway line running between Johannesburg and Bloemfontein.

Tourism includes historical aspects of the towns of Virginia and Ventersburg as well as fishing and nature viewing at locations including the Goldfields Game Ranch, Willem Pretorius Game Reserve and Allemanskraal Dam, the nearest of these, located approximately 18,7km South-East of the project site.

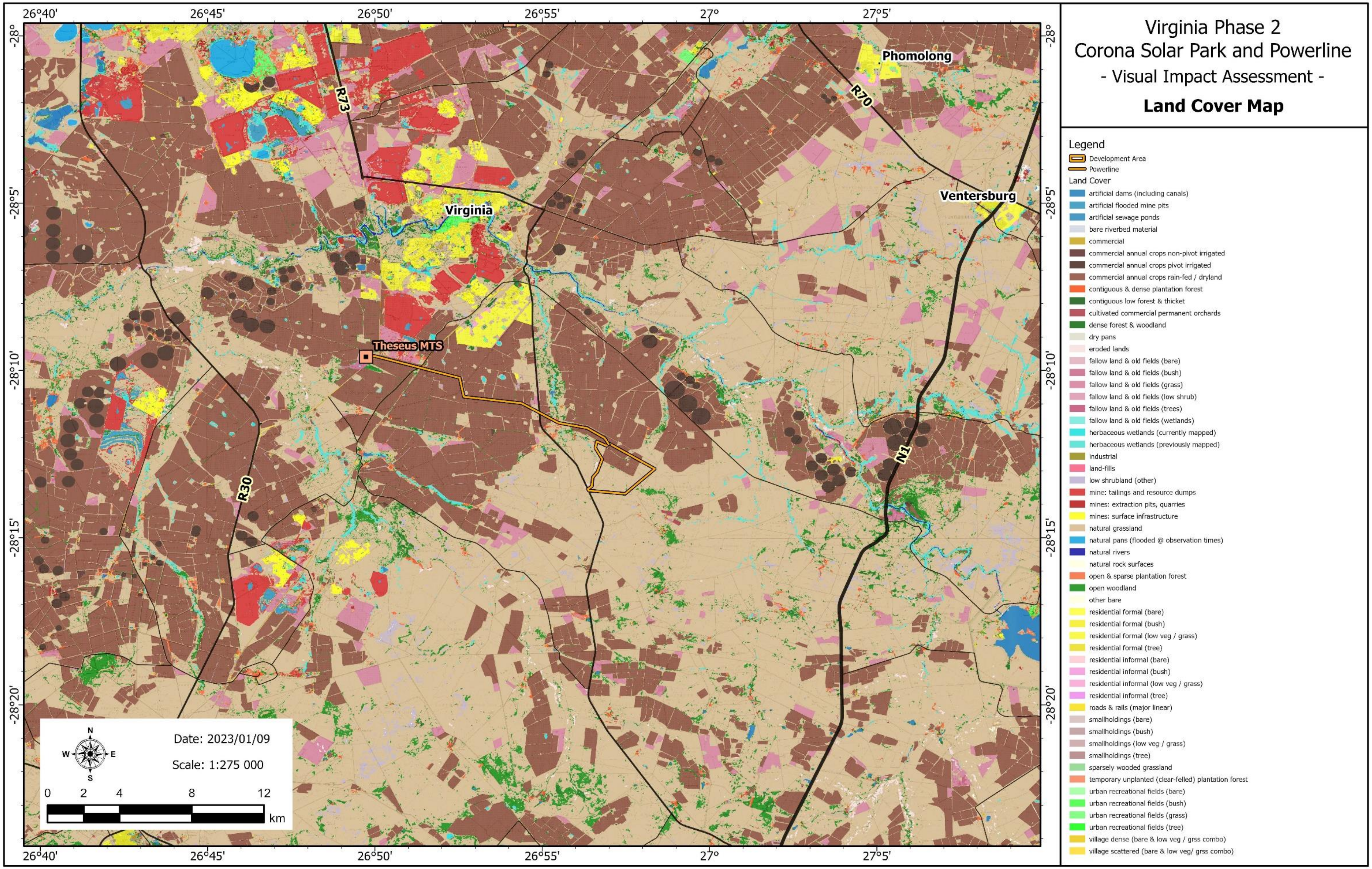

Figure 3b: Land Cover Map

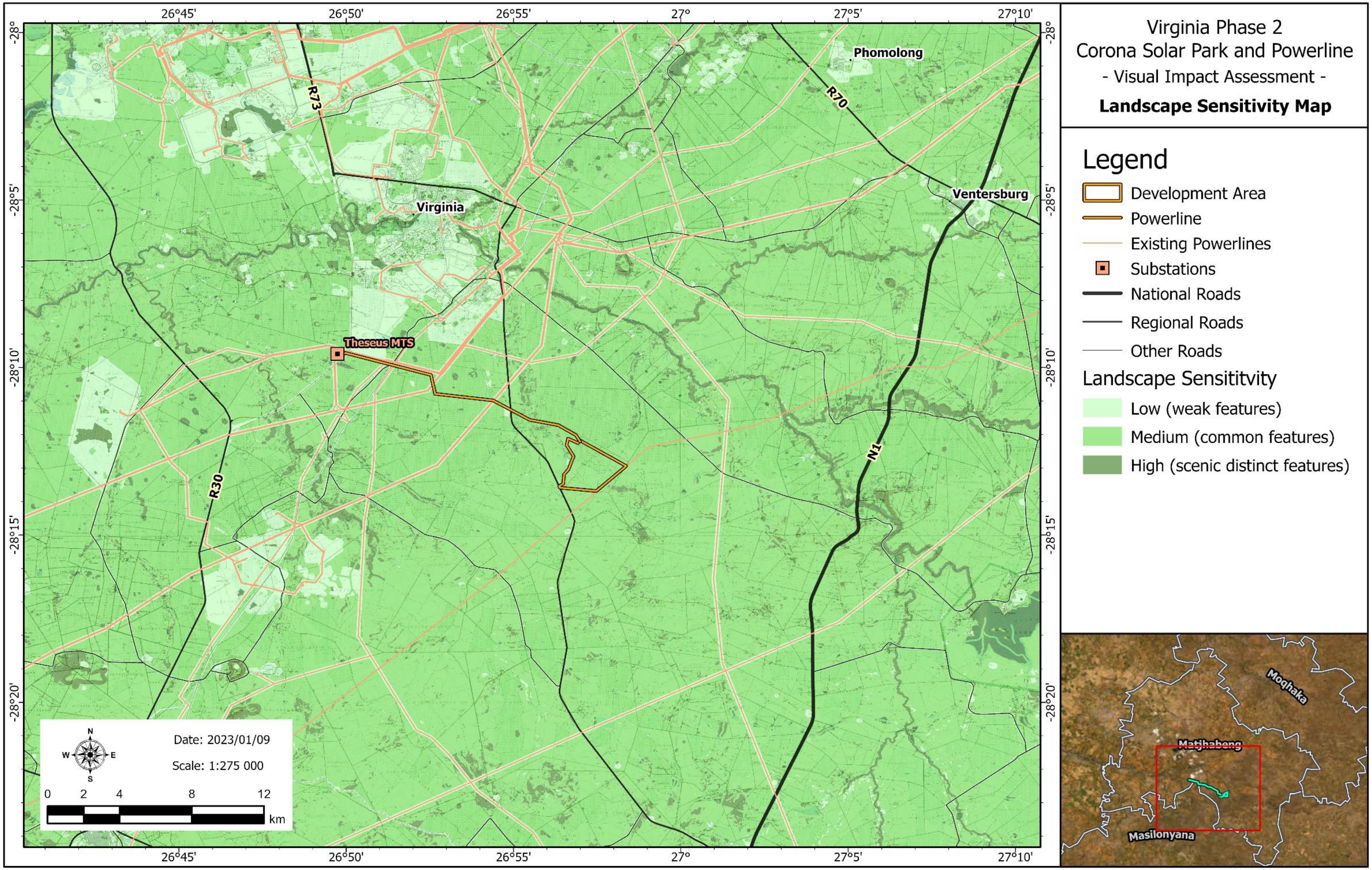

Figure 3c: Landscape Sensitivity Map

2.4 Landscape Character / Sense of Place

Refer to ***Figures 3d to 3k*** below

Virginia has its origin from the gold rush in the earlier history of South Africa and is situated within some of the largest gold fields in the Free State. Due to its origin, Virginia was located along the main railway line between Bloemfontein and Johannesburg. The area is also known for some of the deepest pipe-mines in the world. Major local economic sectors include mining, gold-extraction plants, sulfuric acid manufacturing as by-product from gold mining as well as commercial farming which includes livestock and crop (maize / corn) farming.

The study area has agro-industrial sense of place. The area where the solar parks are located is dominated by agriculture and in the north is buffered by the township of Meloding and the town of Virginia from the mining activities. This is similar the powerline corridor as well which become less dense towards the southeast of the study area.

Colours are seasonal dependant and vary mostly according to the agricultural activities at that time as well as the status of the grassland vegetation at a specific time. Colours vary from creamy green grass lands in the summer with large areas of red exposed soils in early summer. During growth season the crops portray round fields of leafy greens. Winter months are characterised by dull creamy colours of the grass species. Textures of exposed soils, crops and grassland vegetation appear smooth rather than textured. Texture in the landscape comes from built structures with their associated planting scattered throughout the study area. Lines are mostly in the horizontal plane and originate from the undulating topography. Because of the relatively flat and mildly undulating topography the study area has a relatively low visual absorption capacity.

Night-time character would consist mostly of lights associated by the farmsteads and a larger glow in the northern section associated with the township of Meloding, town of Virginia as well as the mines.

CL 207 along the road between Virginia & Ventersburg, view of the south-western section of the study area and location of Quagga and Virginia 4 solar parks
note the expansive, rolling landscape with agricultural crops as well as man-made structures including power infrastructure, the railway line, mining structures and residential structures

CL 249 along R730, northbound, view of the north-eastern section of the study area and location of Florida and Corona solar parks
note the expansive, rolling landscape with grazing fields and agricultural crops as well as man-made structures including power infrastructure, mining structures and residential structures

CL 263 along R730, northbound, view of the Eskom Theseus Main Transmission Substation, on the left
note the existing powerlines running to the substation in the fore- and backgrounds. The project powerline will run in the same corridor as the existing powerlines in the background.

Figure 3d: Landscape Character

CL 235 Aldam Holiday Resort & Conference Centre and Willem Pretorius Game Reserve, located approximately 18km southeast of the proposed Corona solar park projects

CL 208 cattle grazing along the road between the towns of Virginia and Ventersburg, note the mixed grassland shrub land vegetation, undulating topography, powerlines as well as mining structures in the background

CL 213 game grazing in the northeastern section of the study area. Note the grassland and shrub land vegetation, undulating topography with ridge lines in the far background and various types of powerlines

Figure 3e: Landscape Character

CL 202 looking south from Marculem Guest Farm, approximately 6,6km north of the Theseus Main Transmission Station. Note the undulating topography, farming activities and structures, farming residential and outbuildings, crop lands, livestock, mining structures, to the left, are hidden by the topography and clusters of large exotic trees

CL 274 Adamsonsvlei Intermediate Farm School, approximately 11,8km northwest of the Theseus Main Transmission Station

CL 274 zoomed view from Adamsonsvlei Intermediate Farm School, note the undulating topography, farming, mining and power infrastructure

Figure 3f: Landscape Character

CL 237 looking northeast from the entrance to the township of Meloding, note the undulating topography, mixed grassland and shrub land vegetation, powerlines and mining structures

CL 237 looking northwest towards the existing substation at the entrance to the township of Meloding

CL 267 looking south from the edge of the residential area, Kitty, approximately 3km north of the Theseus Main Transmission Station. Note the MTS with associated powerlines on the horizon, these are all partially screened by the horizon line. The proposed powerline will follow the route of the existing powerlines coming in from the left

Figure 3g: Landscape Character

CL 250 looking north along the R73, note the undulating topography, mix of grassland and shrub land vegetation, cattle grazing, powerline and mining structures. From this viewer location the Corona solar park would be wholly hidden by the topography. The powerline would however be partially visible against the backdrop of the residential and mining infrastructure.

CL 277 looking west when driving along the road between Virginia and Willem Pretorius Nature Reserve. Note the undulating topography, ridge line to the left, crop lands in the foreground as well as the powerlines

CL 245 view of the location of the proposed Corona solar park in the middle- and background to the left of the R73 regional road. Note the undulating topography, ridge lines, mix between grassland and shrub land vegetation. Also note the existing powerlines, these would cross the proposed Corona powerline.

Figure 3h: Landscape Character

CL 21 along road from N1 to Virginia, Virginia Train Control Station.


CL 34 along S484, looking South. Note: Senwest Grainlink agricultural silos.

Figure 3i: Landscape Character

Dutch Reformed Church, Virginia

Dutch Reformed Church, Ventersburg

Theseus Main Transmission Station

Figure 3j: Landscape Character

Premiere Milling, Ventersburg depot

Reformed Church, Ventersburg

South African Police Department Museum, Ventersburg

Figure 3k: Landscape Character

2.5 Visually Sensitive Receptors (VSRs)

*Refer to **Table 1** and **Figure 3l** below*

It should be remembered that the visual analysis was run on a digital elevation model with interpolated 5m contours. This means that the screening effect of smaller nuances in the topography as well as the existing vegetation might not be reflected in the result of the analysis. The result from the analysis therefore indicates the worst-case scenario of the visual impact. Figure 3b: Land Cover MapOften, existing vegetation around *VSRs*, especially residential VSRs, screen views of a project at least partially if not wholly. ***Table1*** (*VSR Identification Table*) below, captures and rates identified VSRs within the whole study area.

Table 1: VSR Identification Table

Label	Description	Rating
Residential		
R01	Farmsteads with associated residences and outbuildings	***high***
R02	Towns & townships	***high***
R03	Agricultural holdings / clusters of residences / other small communities	***high***
Transport		
T01	N1 national road	***high***
T02	Regional roads	*medium*
T03	Other roads	*medium*
T04	Railway	*low*
Business/Occupational/Industrial		
B01	Tourist attractions / events locations	***high***
B02	Adamsonvlei Primary School	*medium*
B03	Agricultural silos	*low*
B04	Business agricultural / industrial	*low*
B05	Mining	*low*
Open Space Users/Recreational		
O1	Agriculture / grazing	*low*
O2	Historical landmark – Sandrivier Convention Memorial Stone	***high***
O4	Nature and Game Reserves	*medium*

Table 1 above can be summarised as follows:

- all **Residential** VSRs (R) were rated with a ***high*** sensitivity,
- all Transport VSRs (T) with a *medium* sensitivity, except for the **N1 national road** has a ***high*** sensitivity and the railway line a *low* sensitivity
- all Business / Occupational / Industrial VSRs (B) were rated as *low*, except for tourist attractions / events locations that were rated ***high*** and the Adamson Vlei Primary School that was rated *medium*,
- Open Space Users / Recreational VSRs (O) included agricultural fields, grazing and all other open areas. These were rated *low*. The Sandrivier Convention Memorial Stone historical landmark was rated ***high*** and the nature / game reserve areas as *medium.*

For ease of reference, the locations of the *VSR*s were indicated on all the analysis maps.

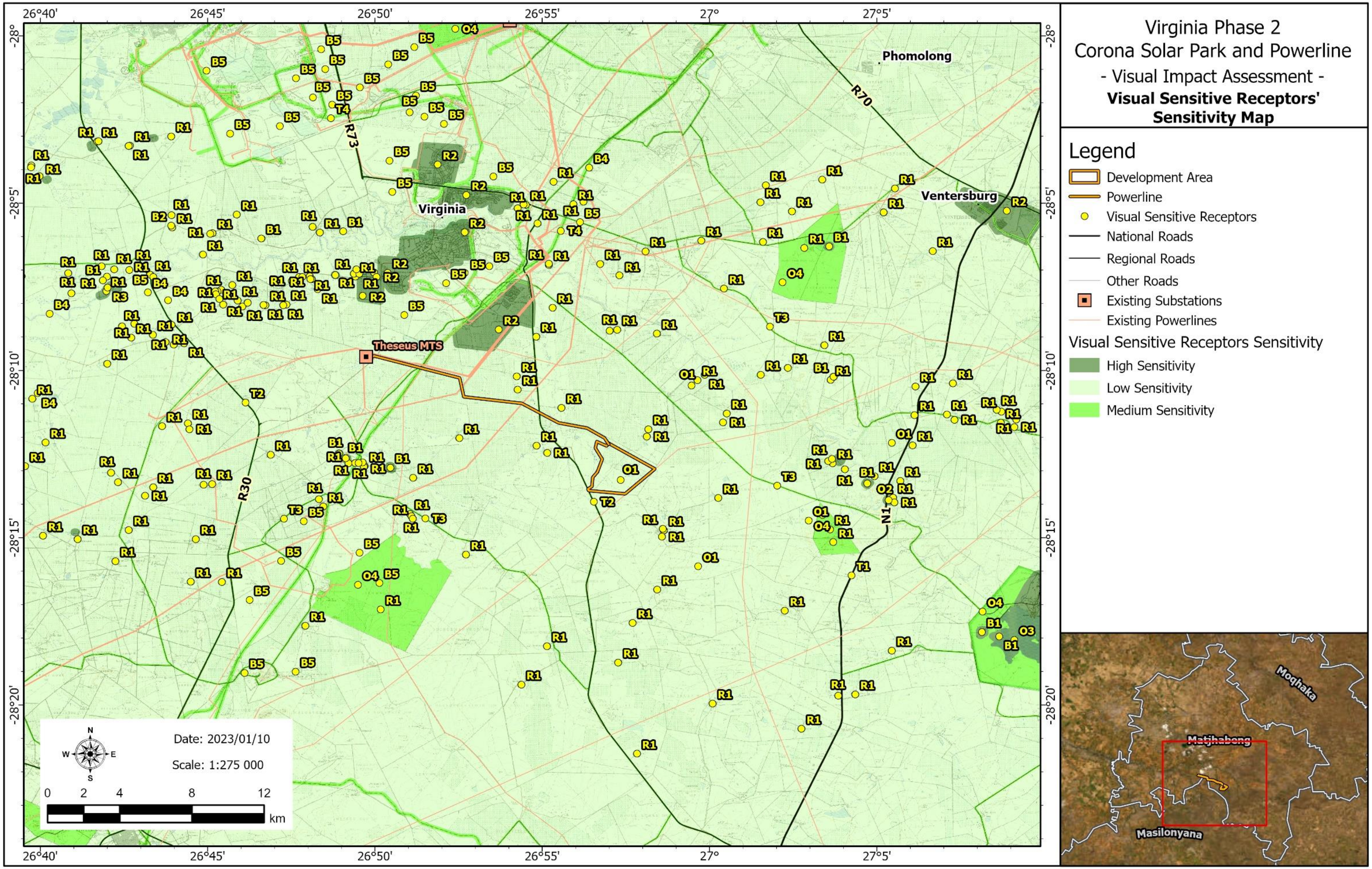

Figure 3l: Visually Sensitive Receptors' Sensitivity Map

3.0 VISUAL ANALYSIS

*Refer to **Figures 4a** to **4d** as well as **Tables 2** and **3** below*

The analysis in this section refers to the *Methodology* as described in the prologue of this report (p x – xii). The analysis is summarised in ***Table 3*** below the analysis maps, ***Figures 4a to 4d***, depicting the GIS component and result the analysis.

Additional notes:

Zone of Visual Influence (ZVI): due to the differences in heights and spread of the structures the *ZVI* was run separately for the solar panels (4,5m) (indicated with a coloured, diagonal hatch pattern) and combined for the higher / single building structures (indicated in a grey, solid hatch) including the warehouse building (6,0m), office building (3.0m), water treatment plant (6,0m), substation (30,0m) powerline pylons (40,0m). The combined *ZVI* (patterned + solid hatched areas) was then used for further analysis purposes.

Night-Light Impacts: as stated under *Assumptions & Limitations* (p. xiv) in the prologue to this report, it is assumed that both construction and decommissioning activities would be restricted to daylight hours; this project would not use of night lighting during its operational phase; and that maintenance activities would only take place at daytime. No *Night-Light Impact* were thus assessed as **no *Night-Light impact* is anticipated**.

Photomontages: an artistic impression of the project within the receiving environment, is included under each subsection. This is based on 3D modelling and Photoshop rendering of photos taken during the field work phase. Refer to **Appendix C** for all camera locations.

3.1 Visual Characteristics of the Project Components

*Refer to **Figure 2***, project components, *above and **Table 1**, Degree of Contrast, below*

The visual characteristics (form, shape, colour, texture) of the proposed project would be a dark black-blue band when viewing the PV side of the panels, and a galvanised metal for the rest of the frame and the back. New frames of zinc steel or aluminium would be bright at first, but after 3 months they would become oxidized and duller.

These colours would appear as a narrow band or planes in the horizontal plane. As one moves further away from the project the individual characteristics of the panel would fade into a fine texture and eventually into a single block.

During overcast skies PV panels often pick up on the white of the clouds above, appearing lighter in colour and contrasting in the scene a bit more than the usual black-blue band which is more recessive and less obvious. This effect should not be confused with possible glare reflected off the shiny surface at critical times and angles. The PV panels are designed to absorb as much sunlight as possible and are therefore covered in high transmission tempered glass with anti-reflective (AR) coating limiting the reflected light to less than 2%.

The workshops & warehouses, Battery Energy Storage Systems as well as the pre-fabricated buildings during construction, will introduce a solid, rectangular blocks of colour as well as strong angular and vertical lines.

The proposed substation structures and security fence would introduce a see-through, greyish element of finely textured lines. The transparency of this component, and its use of recessive colours, would make it less noticeable and allow it to fade away quickly with distance.

In terms of night-time impact, it is assumed that, as with most solar park developments, this project will also make use of a video-surveillance system. These systems use infra-red or micro-wave video-cameras, which do not need a lighting system. Only small internal streetlamps will then be lit during the operational phase of this project. It is assumed that both construction and decommissioning activities would be restricted to daylight hours. Security lighting will only be activated during illegal intrusion to the property. It is assumed that no maintenance activities will take place at night-time.

Table 2: Degree of Contrast

Existing / Receiving Environment	
 *Image of typical character of receiving environment*	
Note: comparative images show contrasts as seen in the immediate vicinity	
Proposed Development Structures	
 *Image of typical photo voltaic solar panels*	
Existing / Receiving Environment	**Proposed Development Structures**
Line	
The very low vegetation height combined with the slightly undulating plains and the mountains in the far background result in lines within the scenes being mostly in the horizontal plane except where interrupted by the few small koppies.	Individually, solar panels are uniformly angled, however, the entire development follows the horizontal line of the terrain, which could be argued the lines are not too dissimilar to those of the receiving environment.
	Conclusion: Low contrast

continue…

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Colour & Materials	
Vegetation colour varies throughout the year with seasonal changes. Natural grassland vegetation is lighter and duller creamy-white colour during the drier months and agricultural croplands take on the colours of the crops, dark lush greens varied by the flowers of the crops or red soils when crops have been harvested and the soil is exposed.	Solar panels units are made up of bare galvanized metal with a metallic blue surface on the active face, which is extremely different to the receiving environment.
	Conclusion: High contrast
Texture	
Scattered shrubs create a dappled to coarse texture underlain by the finer texture of the grassland vegetation.	Solar panels are flat and smooth which is a very different texture to that of the surrounding vegetation.
	Conclusion: High contrast
Form	
Shrubs are rounded and irregular.	PV panels are uniform and linear.
	Conclusion: High contrast
Visual Clutter & Uniformity	
The natural surrounds of the project, although mottle, are uniform and rational to the viewer.	Although uniform within its own context, solar panels are incongruous with this environment and will add an element of unpredictability or visual clutter to the study area. The powerlines will add to the visual clutter of the existing powerlines within the study area.
	Conclusion: medium contrast
Ridgelines	
Scattered, slightly irregular, undulating plains and hills with drainage channels and wetlands forms unexpected, irregular ridge lines within the study area.	The solar panels, of this project, do not break any distinct natural ridge lines.
	Conclusion: Low contrast
Transparency	
The low grassland species spotted with shrubs crate some sort of transparency in the vegetative cover, albeit in a very low height above ground level.	Solar panels are totally solid and therefore allow no views through the project components, except for the substation which has a lattice transparency.
	Conclusion: High contrast
	Overall Degree of Contrast: Medium contrast

3.2 Glint & Glare

*Refer to **Figure 4a** below*

'Glint and Glare' is caused by sunlight reflecting off shiny surfaces. Solar panels are therefore often covered with an anti-reflective coating. However, studies have shown that this preventative measure does not totally eliminate the occurrence of glint and glare from direct reflections of the sunlight. In the light of this further investigation was done in this regard.

There are three airports were identified within the extended study area, 40km, for this project. Welkom Airport (FAWM), being the furthest at approximately 42km to the northwest, Harmony Mine Airport (FAHA) at approximately 23km to the northwest and the nearest being Beatrix Mine Airport (FABX) at approximately 20km to the west of the proposed project. According to the Aviation Assessment for this project as prepared by Tappas Aviation Consultant (PTY) Ltd., "all three airports still operate although only a few aircraft, approximately one aircraft a week, make use of FAHA and FABX". Discussions with this consultant revealed that it is very unlikely that glint and glare from the proposed project would interfere with any of the Approach / Departure flight paths for these airports.

3.3 Zone of Visual Influence (ZVI)

*Refer to **Figure 4b** below*

The ZVI for the solar panels is quite contained despite the openness of the topography and lack in taller vegetation. Ridgelines contains the ZVI to the eastern half of the Zone of Potential Visual Influence (ZPVI). Drainage channels bisecting the study area cuts into the ZVI from the west and southeast. The ZVI for the solar panels covers 22% of the ZPVI for this specific project, a 16km radius around the project components. The ZVI for the powerline is quite expansive and, almost wholly, includes the ZVI of the solar panels except for a few portions on its eastern edge. The Klipspruit, Maselspruit, Schoemanspruit and Doringspruit drainage lines cut in from the south and east. The ZVI for the powerline covers approximately 59% of the ZPVI area. The combined ZVI for the solar panels and the powerline combined covers approximately 55 % of the total ZPVI area for this project.

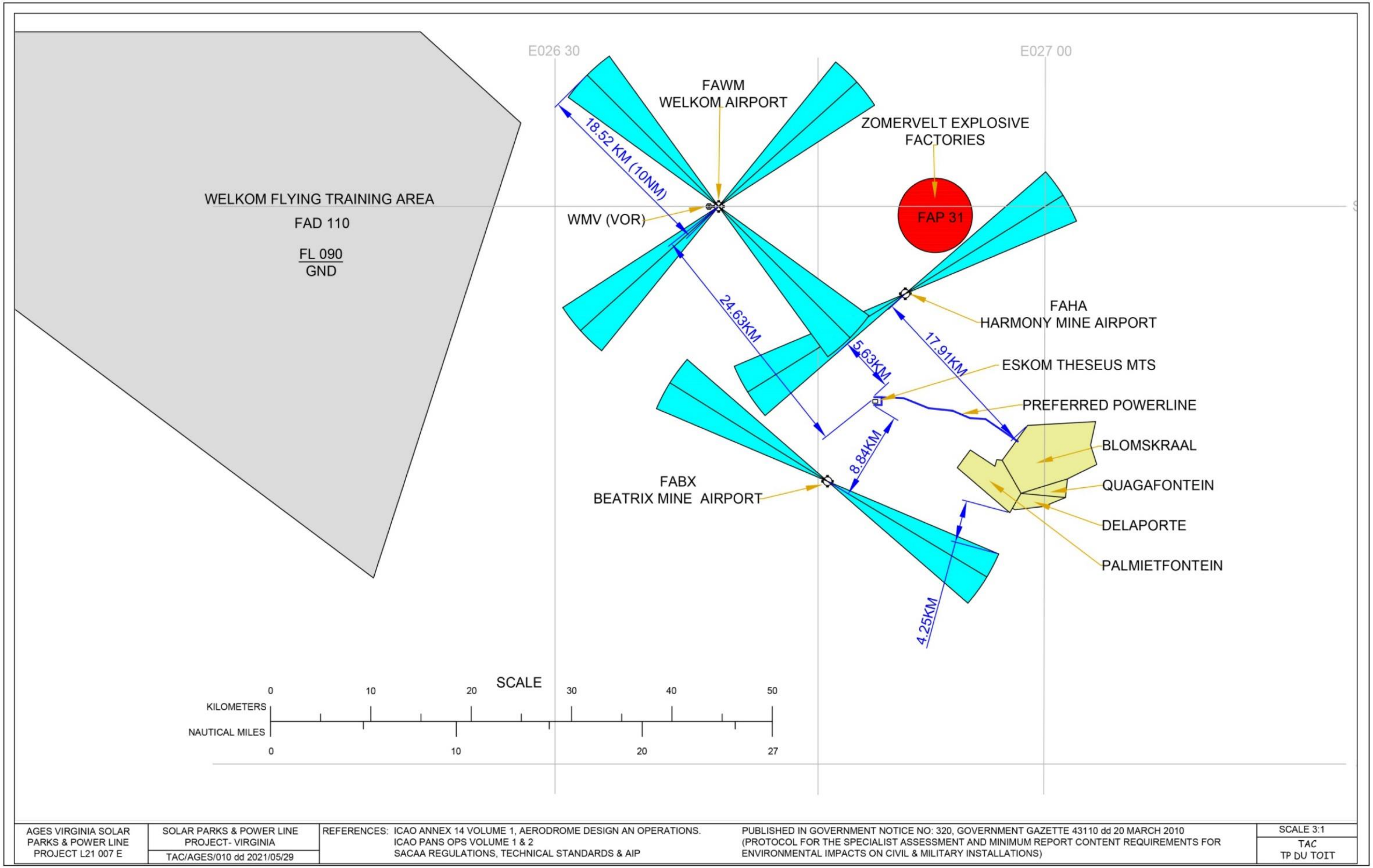


Figure 4a: Aviation Approach & Departure Surfaces Map

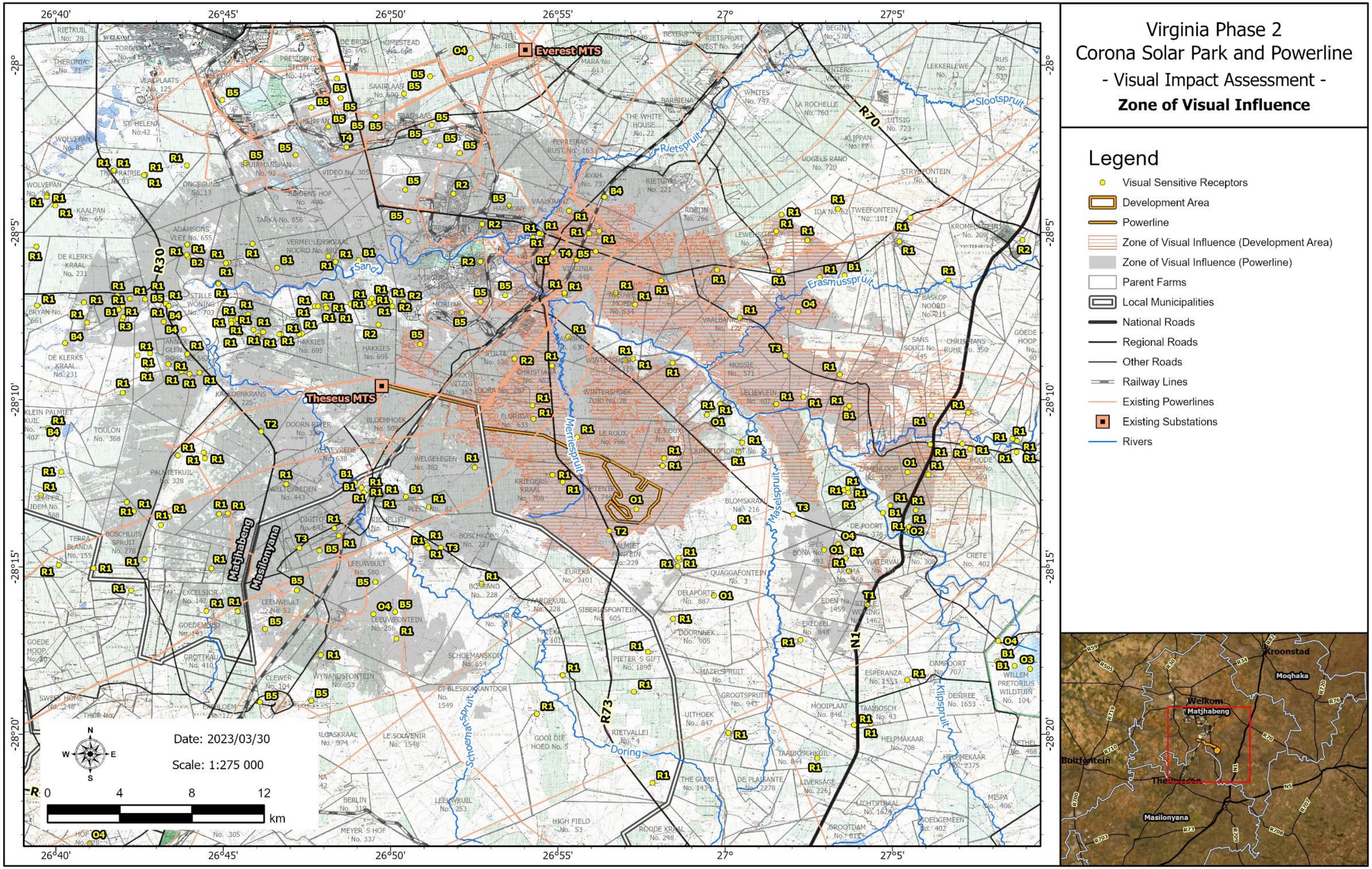


Figure 4b: Zone of Visual Influence

3.4 Impact Analysis – Magnitude & Relevance

*Refer to **Table 3, Figures 4c** to **4g** below*

As explained in the Methodology, ***Magnitude*** is the result of the combination of the factors *Exposure* (viewer distance from the proposed project) and *Wholeness* (size / area / portion of the proposed project within one's view). The synthesis of S*ensitivity* and *Magnitude* produce the final ***Relevance*** value of the impact of the proposed development.

As explained in the methodology, in the prologue of this report, the analysis is done based on an elevation model and does not take the screening effect of the existing vegetation and current built structures into account. To include this screening effect, the *Wholeness* rating was adjusted to a lower level before the *Magnitude* was determined. Due to the powerline being placed inside and existing powerline corridor, the proposed powerline exhibited a *low contrast* with the receiving landscape.

Table 3 below captures the analysis for the visual impact and ***Figures 4c, Magnitude***, and ***4d, Relevance***, below portray the anticipated impact from the implementation of the proposed project. ***Figures 4e*** and ***4f*** are photomontages of artist impressions of views along the R73, between Virginia and Venterburg, CL207 approximately 12km north of the proposed Corona solar park, and CL249, along the R73 between Theunissen and Virginia, approximately 900m southwest of the proposed Corona solar park. ***Figure 4g*** portrays a section of the power line near the Main Transmission Substation, as viewed when driving northbound on the R730 (CL263.)

The result from the Visual Assessment Analysis as captured in ***Table 3*** below can be summarised as follows:

- The generalised ***Relevance*** for all **Residential VSRs (R)** was ***marginal***
  The average *Sensitivity* was *high,* and the average *Magnitude* was *small*
- The generalised ***Relevance*** for all **Transport VSRs (T)** was ***marginal***
  The average *Sensitivity* was *medium,* and the average *Magnitude* was *small*
- The generalised ***Relevance*** for all **Business VSRs (B)** was ***marginal***
  The average *Sensitivity* was *low,* and the average *Magnitude* was *small*
- The generalised ***Relevance*** for all **Open Space Users / Recreational VSRs (O)** was ***marginal***
  The average *Sensitivity* was *medium,* and the average *Magnitude* was *small*

Table 3: Visual Impact Assessment Summary Table

Label	Description	Sensitivity Rating	Magnitude	Relevance
Residential				
R01	Farmsteads with associated residences The residence on the farm Le Roux No. 776 is located approximately 2,0km northeast of the proposed solar panels and at its nearest point approximately 700m northeast of the proposed associated powerline. The panels would thus appear in the middle ground of views towards them and the powerline on the further foreground edge. When taking *wholeness* into consideration, this viewer would be exposed to 41-70% of the proposed project components. For the residence on the farm Le Roux No. 776, the resulting *magnitude* will be *large,* and the anticipated *relevance* of the impact would be *substantial*. Out of 179 residential VSRs, the average rating for ***magnitude*** is *small* and the average rating in terms of the ***relevance*** of the visual impact is *marginal.*	***high***	*small*	*marginal*
R02	Towns & townships All of these VSR's are further than 4,0km from the proposed powerline and solar park and thus appearing in the background of viewer incidences. The average in terms of ***magnitude*** is *small*. Views will already include existing powerlines in the study area which reduces viewer sensitivity towards an additional powerline. This is especially evident in views from Meloding. The average impact in terms of ***relevance*** is *marginal*. It is highly probable that potential viewer incidences would be screened by the existing built structures within the surrounding area, especially for residences not located along the periphery of the township.	***high***	*small*	*marginal*
R03	Agricultural holdings / clusters of residences / other small communities This VSR represents a residential development along the banks of the Sandrivier located on the edge of the ZVI. The ***magnitude*** of the impact was rated as *small* and the ***relevance*** of this viewer incidence as *slight.* This would be the worst case scenario as it is highly probable that views from this VSR would be, if not wholly screened by existing structures within the landscape, a least be more than 80% screened by topography alone.	***high***	*small*	*slight*
	Generalised Rating for all Residential VSRs	***high***	***small***	***marginal***
Transport				
T01	N1 national road The N1 national road is the main feeder road not only between the Northern and Southern ends of South Africa, but also the connection to the rest of Africa all the way op the most Northern end. A *negligible* impact in terms of ***magnitude*** is expected and an *insubstantial* ***relevance*** anticipated impact.	***high***	*negligible*	*insubstantial*
T02	Regional roads	*medium*	*intermediate*	*slight*

	At its nearest, the solar park development is located just over 400m to the east of the R73. The resulting *relevance* at this section in the road would be *moderate*. For all the regional roads, the general result for the ***magnitude*** the impact is anticipated to range between *small* and *large* with an average of *intermediate*. ***Relevance*** is anticipated to be *slight.*			
T03	Other roads This VSR represents all other roads within the study area. The anticipated ***magnitude*** of the impact is *small*. The anticipated ***relevance*** of the impact ranges from *insubstantial* to *marginal* with the average being *marginal*.	*medium*	*small*	*marginal*
	Generalised Rating for all Transport VSRs	***medium***	***small***	***marginal***
Business / Occupational / Industrial				
B01	Tourist attractions / events locations This VSR represents tourist attractions and events locations including The Wedding Barn, accommodation on the various nature and game reserves including Tshepang Game Lodge, Goldfields Game Range. The general ***magnitude*** of the impact for these VSRs combined was *negligible* and the ***relevance*** *marginal.*	***high***	*negligible*	*marginal*
B02	Adamson Vlei Primary School This VSR is located approximately 12km northwest of the Theseus MTS and approximately 30km northwest of the proposed solar panels. The ***magnitude*** of the impact was rated as *small* and the ***relevance*** of the impact as *marginal.*	*medium*	*small*	*marginal*
B03	Agricultural silos At the nearest point the silos are located approximately 6,0km from the powerline and outside of the ZVI for the solar panels. The ***magnitude*** of the impact was rated as *small* and the ***relevance*** of the impact as *marginal.*	*low*	*small*	*marginal*
B04	Business agricultural / industrial This VSR represents various agricultural and industrial related businesses scattered throughout the study area. The ***magnitude*** of the impact on all of these was *small*. The ***relevance*** ranged from *insubstantial* to *marginal* with a resulting relevance as *marginal*.	*low*	*small*	*marginal*
B05	Mining The ***magnitude*** of the impact on this VSR ranged from *negligible* to *intermediate* with the average being *small*. The ***relevance*** of the impact ranged from *insubstantial* to *marginal* with the average being *marginal.*	*low*	*small*	*marginal*
	Generalised Rating for all Business / Occupational / Industrial VSRs	***low***	***small***	***marginal***
Open Space Users / Recreational				
O1	Agriculture / grazing This VSR represents all areas that are utilised for agricultural purposes including grazing of livestock as well as all other open areas. The ***magnitude*** of the impact on this VSR ranged from *negligible* to *large* with the average being *small*. The ***relevance*** of the impact ranged from *insubstantial* to *moderate* with the average being *marginal.*	*low*	*small*	*marginal*
O2	Historical landmark – Sandrivier Convention Memorial Stone	***high***	*n/a*	*n/a*

	This VSR is located approximately 12,5km to the Southeast of the proposed development but falls outside the ZVI for this project.			
O4	Nature and Game Reserves These include the Willem Pretorius Game Reserve, LM Safaris Nature Reserve, Thabong Game Ranch, HJ Joel Private Nature Reserve, Vegcor Safaris, Tara Wildlife Safaris, Gouritz Game Farm and Bundu River Lodge. The ***magnitude*** of the impact on this VSR was rated as *small*. The ***relevance*** of the impact ranged from *insubstantial* to *slight* with the average being *marginal.*	*medium*	*small*	*marginal*
	Generalised Rating for all Open Space Users / Recreational VSRs	***medium***	***small***	***marginal***

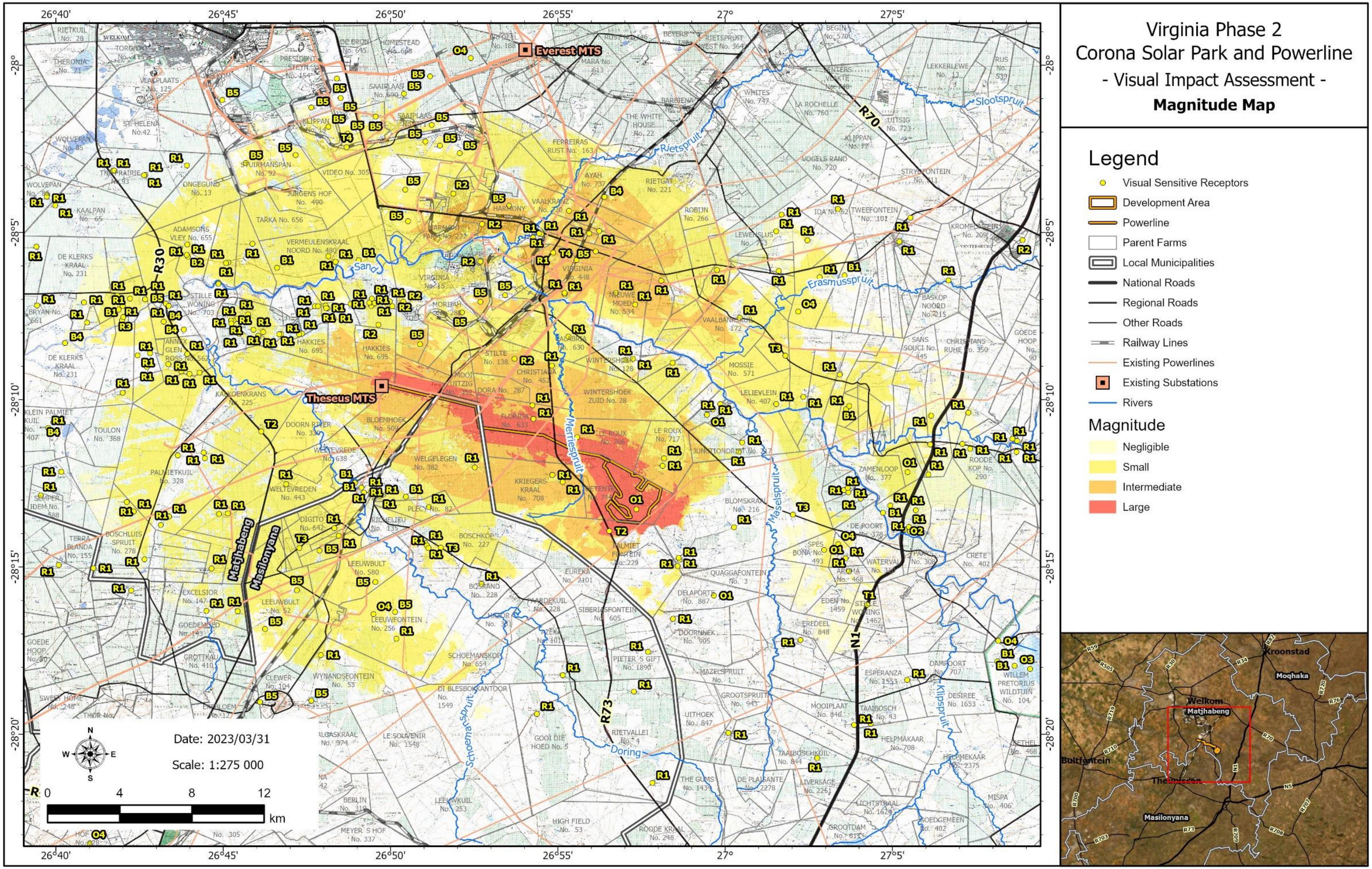


Figure 4c: Magnitude

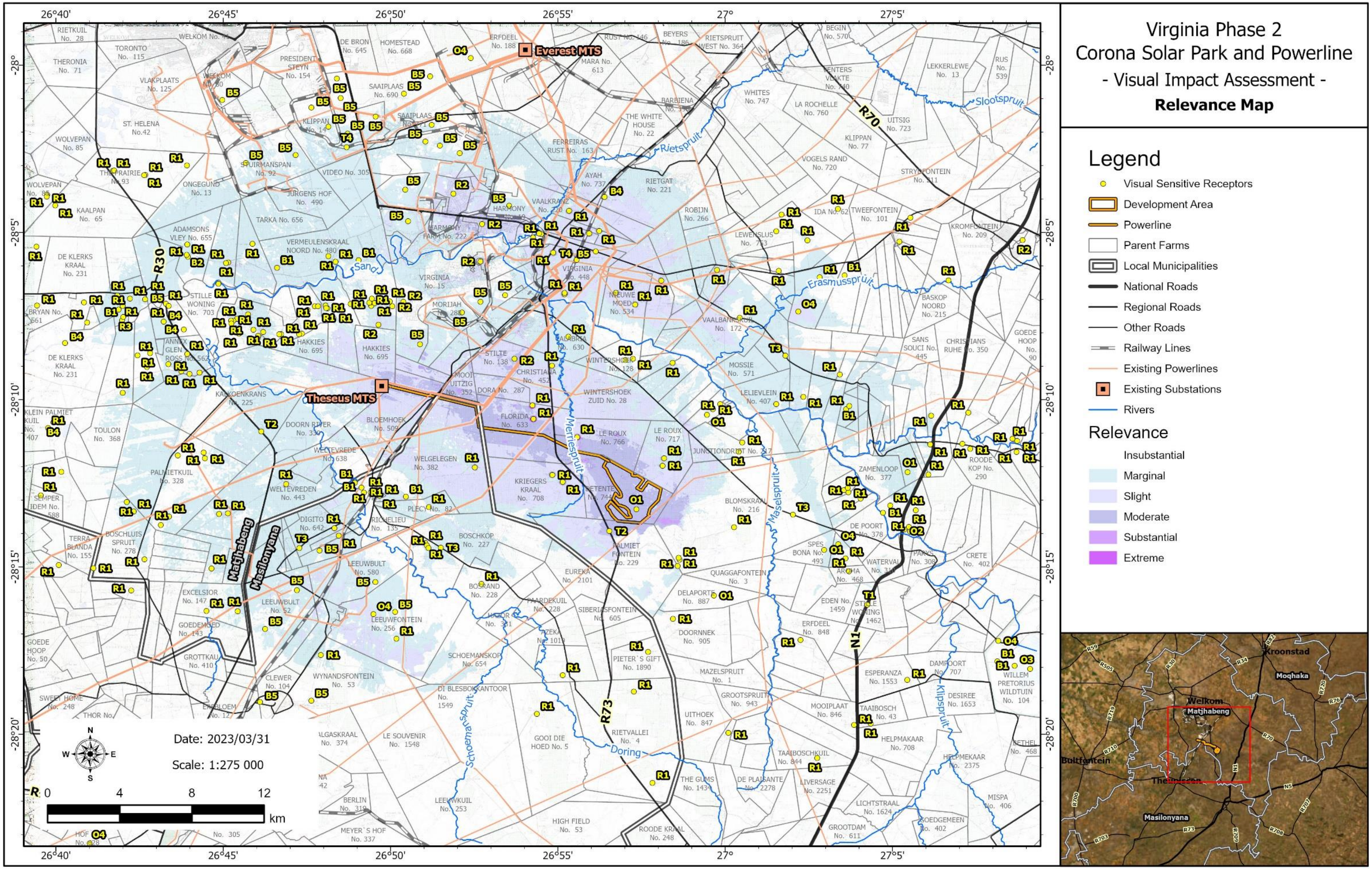


Figure 4d: Relevance

CL 207 at the railway line crossing, looking southwest when driving along the R73 between Virginia and Ventersburg. Corona solar park is located approximately 12km south of the viewpoint. Note the undulating topography and ridges, crop lands, various types of powerlines as well as railway line.

CL 207 photomontage of Corona Solar Park, approximately 12km from viewer location

CL 207 zoomed in area, solar park components mostly hidden by topography from this viewer location

Figure 4e: Photomontage CL207

CL 249 view of study area and location of Corona solar park when driving northbound along the R73 regional road. Note the undulating topography, ridge lines, mix of grassland and shrub land vegetation, mining structures and powerlines.

CL 249 photomontage of Corona solar park, approximately 1,5km from the viewer location

CL 249 zoomed in area, solar park components partially hidden by topography

Figure 4f: Photomontage CL249

CL 263 driving northbound along the R73, approximately 600m southwest of the Theseus Main Transmission Station. Note the power infrastructure, undulating topography, ridge lines, grassland vegetation and crop lands,.

CL 263 photomontage of Corona powerline approximately 900m from this view point following in the corridor of the existing powerlines.

CL 263 zoomed in area

Figure 4g: Photomontage CL263

3.5 Cumulative Impact

Refer to ***Figures 5a*** to ***5f*** *below*

The developer proposes four solar park developments in this area. It should be noted that the study area already contains a transmission substation and a network of powerlines consisting of a range of pylon sizes. These are however, mostly located north of the proposed solar park developments. The powerlines for the proposed developments will all follow along the same route and only divert off to tie into their respective solar park developments. This strategy aims to reduce the anticipated impacts from the powerlines. Each of the proposed powerlines would contribute cumulatively to the effect of the existing powerlines within the context of the receiving environment. The proposed pylons are however smaller than the pylons of the existing powerlines.

The proposed powerline for this project would follow alongside existing powerlines for approximately a 12km, and then terminate at the proposed Corona solar park. Along its route, it will cross 2 other powerlines and run parallel to other existing powerlines for the last 4,5km before it reaches the Theseus MTS. A third powerline will border the south-eastern side of the proposed solar panels. The ZVI for the Corona powerline covers approximately 59% of the ZPVI for this powerline whereas the combined ZVI for all four powerlines would cover approximately 65% of the ZPVI. Individually and cumulatively the impact from the powerline can be rated as *intermediate* (70 - 41%). The cumulative impact for this powerline would be marginally larger than the ZVI for the proposed Corona powerline.

There are no other solar parks within the current context / study area. However, the study area has a mixed mining / industrial / pastoral sense of place. As stated above, this project is one of four solar park development projects proposed by the developer as a second phase of a previous round of proposed solar park developments within the same study area. The solar parks are all clustered together, this strategy reduces the overall / cumulative visual impact albeit adding to the mining / industrial sense of place.

The ZVI from the proposed solar park would cover approximately 22% of the ZPVI. Cumulatively, the combined ZVI's of the four proposed solar park projects would cover 29% of the ZPVI for the study area. Both individually and cumulatively, this can be rated as *small* impact (40 – 11%). The ZVI for this solar park is a third of the cumulative ZVI for the solar parks combined.

The combined ZVI for the powerline and solar park would be approximately 55% of the ZPVI. The cumulative impact of all four projects is anticipated to be 58% of the ZPVI. The cumulative impact would be incrementally larger than the individual ZVI.

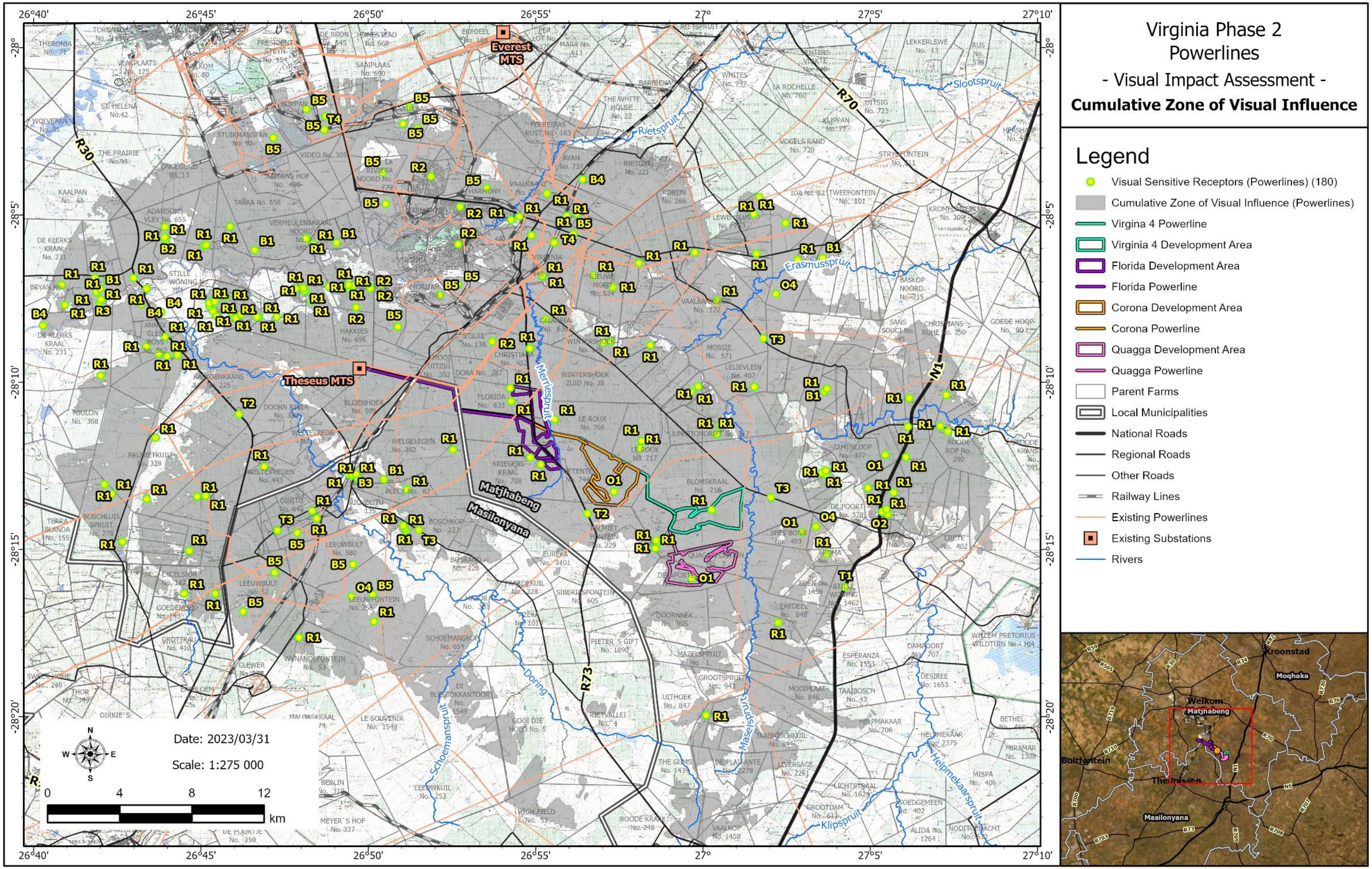


Figure 5a: Cumulative Zone of Visual Influence - Powerlines

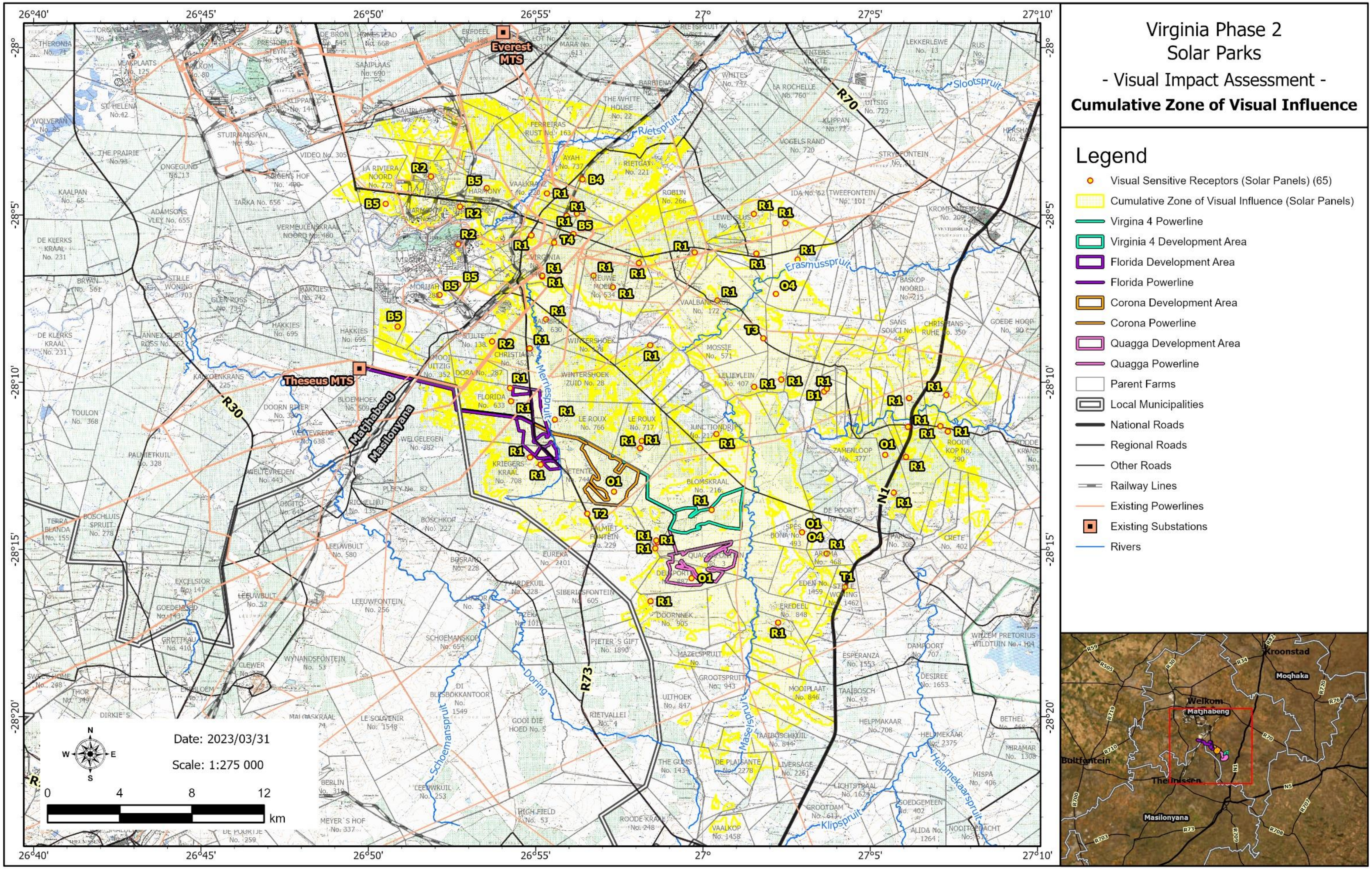


Figure 5b: Cumulative Zone of Visual Influence - Solar Parks

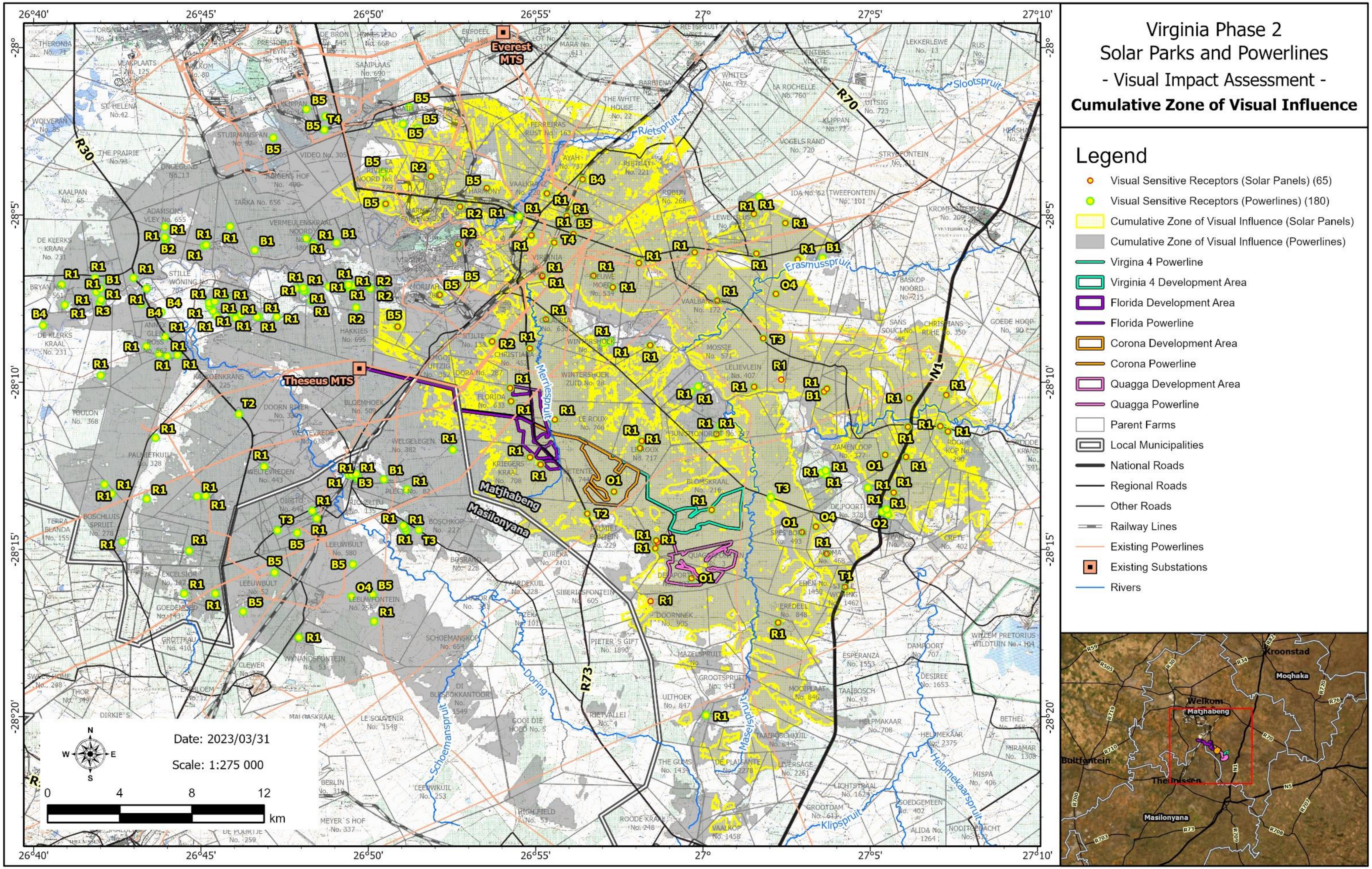
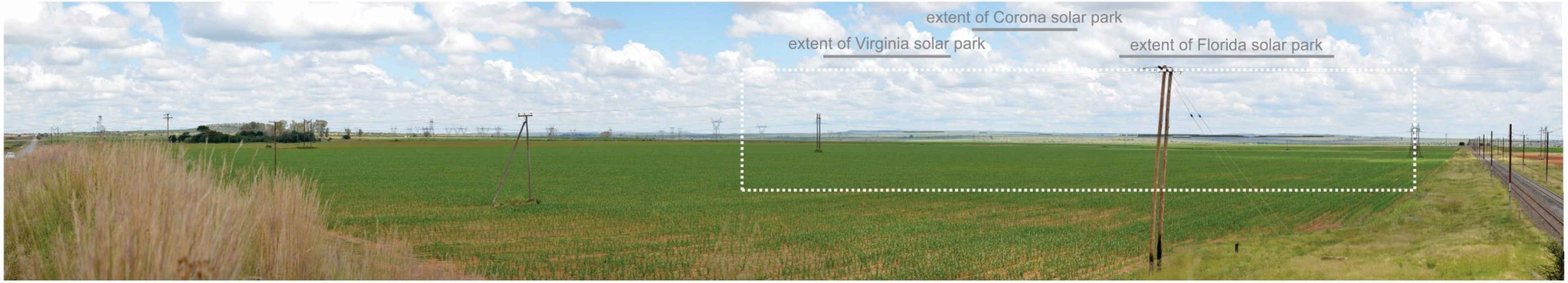


Figure 5c: Cumulative Zone of Visual Influence - Combined

CL 207 at the railway line crossing, looking southwest when driving along the R73 between Virginia and Ventersburg. Note the undulating topography and ridges, crop lands, various types of powerlines as well as railway line.



CL 207 photomontage: Virginia solar park at approximately 16,5km, Corona solar park at approximately 11,8km and Florida solar park at approximately 8,8km

CL 207 zoomed in area

Figure 5d: Photomontage cumulative CL207

CL 249 view of study area and location of Corona solar park when driving northbound along the R73 regional road. Note the undulating topography, ridge lines, mix of grassland and shrub land vegetation, mining structures and powerlines.

CL 249 photomontage cumulative, Corona solar park approximately 800m from the view point and Florida solar park approximately 3,1km from the view point

Figure 5e: Photomontage cumulative CL249

CL 220 looking southwest along a local dirt road, the S309, not the undulating topography, mix between grassland and shrub land vegetation as well as existing powerlines and the residential elements within the study area, farmsteads and the township of Meloding

CL 220 photomontage - cumulative

CL 220 photomontage - zoomed area

Figure 5f: Photomontage cumulative CL220

4.0 MITIGATION MEASURES

*Refer to **Table 4** below*

The following mitigation measures are proposed for construction, operational and decommissioning phases.

Table 4: Proposed Mitigation Measures

Anticipated Impact	Proposed Mitigation Measure
	Construction Phase
Timing	Plan construction activities when vegetation is dormant to minimise impacts on wetlands and sensitive plants.
Dust clouds from construction activities and where existing vegetation has been cleared in order to install the power plant and associated components.	Ensure that dust suppressing techniques are in place at all times. These could include the regular wetting of the soil or the application of dust suppressing agents.
Clearing of vegetation for the construction camp, access roads and project footprint.	During the field work and impact assessment it was noted that the existing vegetation would play a minimal role in screening the proposed project components from VSRs. However, care should still be taken to: • Retain as much of the existing vegetation as possible. • Where vegetation is cleared, a rehabilitation plan should be implemented. This should be done in conjunction with the Vegetation, Visual Impact and any other relevant specialists.
Erosion control	Even though this is a dry climate It is still good practice to minimise the clearance of existing vegetation so as to minimise the need for re-vegetating efforts, and exposed surface soil. Implement correct and effective storm-water management measures that would reduce the potential and amount of erosion around the project components. This would also result in reducing the loss of valuable topsoil and vegetation habitat.
Lighting	It is assumed that construction activities would be limited to daylight hours. With regards to the construction camp: • Refrain from causing 'light spillage' beyond the construction camp by installing light fixtures with directional illumination. • Keep lighting to a minimum by installing low-level bollard type lights instead of post top lights along walkways between buildings. • Where possible avoid high flood lights, and instead use lower locally lit installations. • In general, lighting should be carefully directed and only be used where absolutely necessary. Should construction activities extend during night-time, adhere to the same recommendations as for the construction camp.
	Operational Phase
Dust clouds	Keep travelling speeds along unpaved roads within the site work area as low as possible so as to avoid creating dust clouds.
Lighting	Refer to lighting recommendations for Construction Phase with regards to maintenance activities during the operational phase.

Decommissioning Phase	
Dust clouds from decommissioning activities and where structures, cabling and road surfaces had been dismantled and / or removed.	Refer to the discussions related to dust control mitigation measures above.
Exposing of soil due to the removal of the project structures and components.	Rehabilitate and re-vegetate exposed soil areas, with indigenous planting, as soon as possible. A vegetation specialist should be consulted in this regard.
Erosion control	Minimise the clearance of existing vegetation, the need for re-vegetating, and exposed surfaces. Implement correct and effective storm-water management measures that would reduce the potential for erosion.
Lighting	It is assumed that decommissioning activities would be restricted to daylight hours with no lighting requirements. However, if lighting is needed, refer to the mitigation measures proposed above.

The proposed mitigation measures align with mitigation measures as generally found in a typical Environmental Management Programme (EMPr). The proposed mitigation measures are more effective during the construction and decommissioning phases and within the immediate surrounds. Even though the proposed measures may not result in a change in the *Significance* rating., it is good practice, mostly doubles up with other specialist mitigation measures and will encourage a good working relationship with neighbours which could prove to be valuable, especially in the current challenging times. Clustering the proposed developments is another mitigation measure that can reduce the impact on the receiving environment. Existing vegetation is considered to be a bonus existing mitigation measure for which the developer / end user is responsible for maintaining.

5.0 EIA SIGNIFICANCE

*Refer to **Table 5** below*

From the Visual Impact Assessment in Section 3 above, *Relevance* is further qualified by the application of *extent*, *duration, intensity, frequency* and *probability* criteria as found in the Significance Impact Assessment Methodology based on DEAT's Guideline Document: EIA Regulations (1998) (Appendix B).

Table 5: EIA Significance Rating Table

Phase	Mitigation	Residential VSRs	Transport VSRs	Business / Occupational / Industrial VSRs	Open Space Users / Recreational VSRs
Construction	without	medium	medium	medium	medium
	with	medium	medium	medium	medium
Operational	without	medium	medium	medium	medium
	with	medium	medium	medium	medium
Decommissioning	without	medium	medium	medium	medium
	with	low-medium	low-medium	low-medium	low-medium

From the visual impact analysis and the tables above, it is clear that the implementation of the proposed Corona Solar Park & Powerline, would have a ***medium significance*** for all visual receptors, during all phases of the project, with or without the correct and effective implementation of the proposed mitigation measures except when mitigation measures are implemented correctly and effectively in the decommissioning phase, then the rating would drop to ***low-medium***. This is due to the duration and frequency of the exposure to the impact, i.e. where there are views of the proposed project components, they will 'always' be visible for the duration of the project life time.

6.0 CONCLUSION

From the discussions in the preceding sections the following conclusion can be drawn.

Visually Sensitive Receptors within the study area with a **high sensitivity** comprised of *residential* type receptors including: farmsteads with associated residences, the town of Virginia and the township of Meloding, agricultural holdings, clusters of residences and other small communities; *tourist attractions* including game farms, of which the Willem Pretorius game reserve is the largest, guest houses and events locations as well as historical landmarks including the Sandrivier Convention Memorial Stone as well as the N1 National road due to its prominence as a national road linking the Southernmost tip of Africa to the rest of the continent.

The generalized ***Relevance*** of the visual impact on these receptors were as follows:
Residential: *marginal*
Transport: *marginal*
Business / Occupational / Industrial: *marginal*
Open Space Users / Recreational: *marginal*
VSRs with the largest anticipated impact included the residence on the farm Le Roux No. 776 which was rated as *substantial*. This rating is a result of their proximity to the proposed powerline and the portion of the solar park components that would possibly be visible to the viewer.

The powerline would add **cumulatively** to the visual clutter of the existing *powerlines* within the study area. Should all four the proposed developments be implemented, the impact from the powerline would increase incrementally just over 5% more than the impact from the Corona solar park individually. Currently there are no *solar parks* within the study area. The proposed solar park would however add cumulatively to the existing mining / industrial character type of the overall sense of place. The cumulative impact would be just over 5% more than the impact from the Corona solar park individually. In terms of the powerline and solar park *combined*, the cumulative impact is approximately 3% more than that of the proposed Corona project.

Proposed **mitigation measures** did not have a significant effect on the *duration, extent, frequency, probability* and *compliance* of the visual impacts, rather it would add to good practice found in an Environmental Management Programme. Clustering the proposed developments is proposed measure to reduce the impact on the study area.

The proposed Corona Solar Park & Powerline would have a ***medium significance*** for all visual receptors, during all phases of the project, with or without the correct and effective implementation of the proposed mitigation measures except when mitigation measures are implemented correctly and effectively in the decommissioning phase, then the rating would drop to ***low-medium***. This is due to the duration and frequency of the exposure to the impact, i.e. where there are views of the proposed project components, they will 'always' be visible for the duration of the project life time.

***

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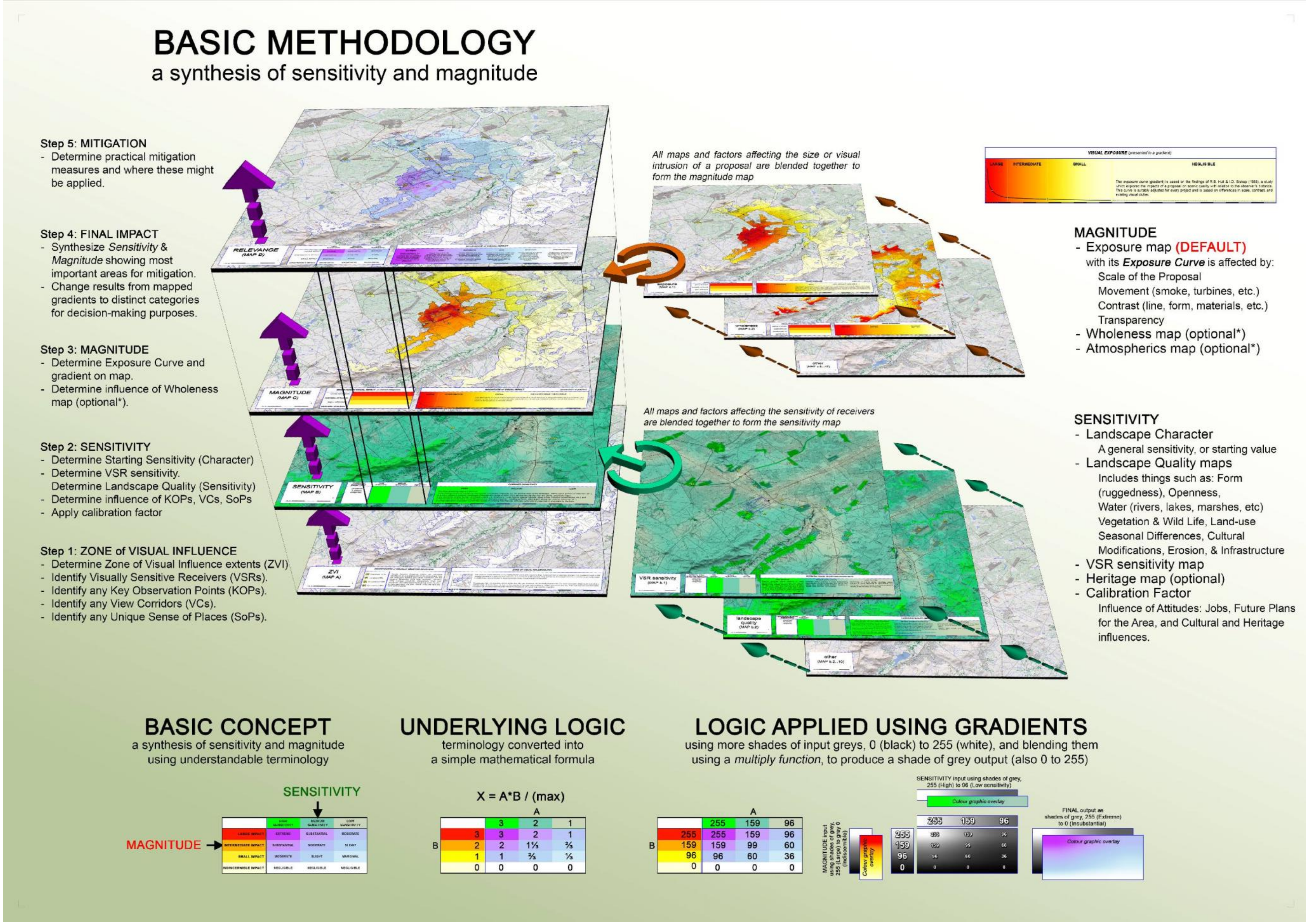
APPENDIX A – VISUAL IMPACT ASSESSMENT METHODOLOGY


BASIC METHODOLOGY
a synthesis of sensitivity and magnitude
Step 5: MITIGATION
- Determine practical mitigation measures and where these might be applied.
Step 4: FINAL IMPACT
- Synthesize Sensitivity & Magnitude showing most important areas for mitigation.
- Change results from mapped gradients to distinct categories for decision-making purposes.
Step 3: MAGNITUDE
- Determine Exposure Curve and gradient on map.
- Determine influence of Wholeness map (optional*).
Step 2: SENSITIVITY
- Determine Starting Sensitivity (Character)
- Determine VSR sensitivity. Determine Landscape Quality (Sensitivity)
- Determine influence of KOPs, VCs, SoPs
- Apply calibration factor
Step 1: ZONE of VISUAL INFLUENCE
- Determine Zone of Visual Influence extents (ZVI)
- Identify Visually Sensitive Receivers (VSRs).
- Identify any Key Observation Points (KOPs).
- Identify any View Corridors (VCs).
- Identify any Unique Sense of Places (SoPs).
RELEVANCE (MAP D)
MAGNITUDE (MAP C)
SENSITIVITY (MAP B)
ZVI (MAP A)
All maps and factors affecting the size or visual intrusion of a proposal are blended together to form the magnitude map
VISUAL EXPOSURE
LARGE
INTERMEDIATE
SMALL
NEGLIGIBLE
MAGNITUDE
- Exposure map (DEFAULT)
with its Exposure Curve is affected by:
Scale of the Proposal
Movement (smoke, turbines, etc.)
Contrast (line, form, materials, etc.)
Transparency
- Wholeness map (optional*)
- Atmospherics map (optional*)
All maps and factors affecting the sensitivity of receivers are blended together to form the sensitivity map
SENSITIVITY
- Landscape Character
A general sensitivity, or starting value
- Landscape Quality maps
Includes things such as: Form (ruggedness), Openness, Water (rivers, lakes, marshes, etc) Vegetation & Wild Life, Land-use Seasonal Differences, Cultural Modifications, Erosion, & Infrastructure
- VSR sensitivity map
- Heritage map (optional)
- Calibration Factor
Influence of Attitudes: Jobs, Future Plans for the Area, and Cultural and Heritage influences.
VSR sensitivity (MAP b.1)
landscape quality (MAP b.2)
other (MAP b.2...10)
BASIC CONCEPT
a synthesis of sensitivity and magnitude using understandable terminology
SENSITIVITY
MAGNITUDE
UNDERLYING LOGIC
terminology converted into a simple mathematical formula
X = A*B / (max)
LOGIC APPLIED USING GRADIENTS
using more shades of input greys, 0 (black) to 255 (white), and blending them using a multiply function, to produce a shade of grey output (also 0 to 255)
SENSITIVITY input using shades of grey, 255 (High) to 96 (Low sensitivity)
Colour graphic overlay
MAGNITUDE input using shades of grey, 255 (Large) to grey 0 (Indiscernible)
FINAL output as shades of grey, 255 (Extreme) to 0 (Insubstantial)

APPENDIX B – ENVIRONMENTAL IMPACT DETERMINATION AND EVALUATION

The following impact assessment methodology is as described by the EAP.

An environmental impact is defined as a change in the environment, be it the physical/chemical, biological, cultural and or socio-economic environment. Any impact can be related to certain aspects of human activities in this environment and this impact can be either positive or negative. It could also affect the environment directly or indirectly and the effect of it can be cumulative.

1. METHODOLOGY TO ASSESS THE IMPACTS

To assess the impacts on the environment, the process will be divided into two main phases namely the Construction phase and the Operational phase. The activities, products and services present in these two phases will be studied to identify and predict all possible impacts.

In any process of identifying and recognising impacts, one must recognise that the determination of impact significance is inherently an anthropocentric concept. Duinker and Beanlands, (1986) in DEAT 2002. Thompson (1988), (1990) in DEAT 2002 stated that the significance of an impact is an expression of the cost or value of an impact to society.

However, the tendency is always towards a system of quantifying the significance of the impacts so that it is a true representation of the existing situation on site. This will be done by using where ever possible, legal and scientific standards which are applicable

The significance of the aspects/impacts of the process will be rated by using a matrix derived from *Plomp* (2004) and adapted to some extent to fit this process. These matrixes use the consequence and the likelihood of the different aspects and associated impacts to determine the significance of the impacts.

The consequence matrix use parameters like severity, duration and extent of impact as well as compliance to standards. Values of 1-5 are assigned to the parameters that are added and averaged to determine the overall consequence. The same process is followed with the likelihood that consists of two parameters namely frequency and probability. The overall consequence and the overall likelihood are then multiplied to give values ranging from 1 to 25. These values as shown in the following table are then used to rank the significance. It must be said however that in the end, a subjective judging of an impact can still be done, but the reasons for doing so must be qualified.

Table 6: Significance Ratings (Plomp 2004)

Significance	Low -	Low-Medium -	Medium -	Medium-High -	High -
Overall Consequence X Overall Likelihood	1-4.9	5-9.9	10-14.9	15-19.9	20-25

Significance	Low +	Low-Medium +	Medium +	Medium-High +	High +
Overall Consequence X Overall Likelihood	1-4.9	5-9.9	10-14.9	15-19.9	20-25

DESCRIPTION OF THE PARAMETERS USED IN THE MATRIXES

Severity:

Low	Low cost/high potential to mitigate. Impacts easily reversible, non-harmful insignificant change/deterioration or disturbance to natural environments
Low-medium	Low cost to mitigate Small/ potentially harmful Moderate change/deterioration or disturbance to natural environment.
Medium	Substantial cost to mitigate. Potential to mitigate and potential to reverse impact. Harmful Significant change/ deterioration or disturbance to natural environment
Medium-high	High cost to mitigate. Possible to mitigate Great / Very Harmful Very significant change/deterioration or disturbance to natural environment
High	Prohibitive cost to mitigate. Little or no mechanism to mitigate. Irreversible. Extremely Harmful Disastrous change/deterioration or disturbance to natural environment

Duration:

Low	Up to one month
Low-medium	One month to three months
Medium	Three months to one year
Medium-high	One to ten years
High	Beyond ten years

Extent:

Low	Within footprint area
Low-medium	Whole of site
Medium	Adjacent properties
Medium-high	Communities around site
High	Greater Letaba Municipality area

Frequency:

Low	Once/more a year or once/more during operation
Low-medium	Once/more in 6 months
Medium	Once/more a month
Medium-high	Once/more a week
High	Daily

Probability:

Low	Almost never/almost impossible
Low-medium	Very seldom/highly unlikely
Medium	Infrequent/unlikely/seldom
Medium-high	Often/Regularly/Likely/Possible
High	Daily/Highly likely/definitely

Compliance:

The following criteria are used during the rating of possible impacts.

Low	Best Practise
Low-medium	Compliance
Medium	Non-compliance/conformance to policies etc. - internal
Medium-high	Non-compliance/conformance to legislation etc. - external
High	Directive, prosecution of closure or potential for non-renewal of licences or rights

2. ASSESSMENT CRITERIA

Table 7: Impact Assessment Criteria

Nature of impact This is an appraisal of the type of effect the proposed activity would have on the affected environmental component. The description should include what's being affected and how.		
Extent		
The physical and spatial size of the impact.	**Site**	The impact could affect the whole, or a measurable portion of the above-mentioned properties.
	Local	The impacted area extends only as far as the activity, e.g. a footprint.
	Regional	The impact could affect the area including the neighbouring farms, the transport routes and the adjoining towns.
Duration		
The lifetime of the impact; this is measured in the context of the lifetime of the base.	**Short term**	The impact will either disappear with mitigation or will be mitigated through natural process in a span shorter than any of the phases.
	Medium term	The impact will last up to the end of the phases, where after it will be entirely negated.
	Long term	The impact will continue or last for the entire operational life of the development but will be mitigated by direct human action or by natural processes thereafter.
	Permanent	The only class of impact, which will be non-transitory. Mitigation either by man or natural process will not occur in such a way or in such a time span that the impact can be considered transient.
Intensity		
	Low	The impact alters the affected environment in such a way that the natural processes or functions are not affected.
	Medium	The affected environment is altered, but function and process continue, albeit in a modified way.
	High	Function or process of the affected environment is disturbed to the extent where it temporarily or permanently ceases.

Probability		
The likelihood of impacts occurring. Impact may occur for any length of time during the life cycle of activity and not at any given time.	**Improbable**	The possibility of the impact occurring is very low, due either to the circumstances, design or experience.
	Probable	There is a possibility that the impact will occur to the extent that provisions must be made therefore.
	Highly probable	It is most likely that the impacts will occur at some or other stage of the development. Plans must be drawn up before the undertaking of the activity.
	Definite	The impact will take place regardless of prevention plans, and there can only be relied on mitigation actions or contingency plans to contain the effect.
Determination of Significance		
Significance is determined through a synthesis of impact characteristics. Significance is an indication of the importance of the impact in terms of both physical extent and time scale, and therefore indicates the level of mitigation required.	**No significance**	The impact is not substantial and does not require any mitigation action.
	Low	The impact is of little importance, but may require limited mitigation.
	Medium	The impact is of importance and therefore considered to have a negative impact. Mitigation is required to reduce the negative impacts to acceptable levels.
	High	The impact is of great importance. Failure to mitigate, with the objective of reducing the impact to acceptable levels, could render the entire development option or entire project proposal unacceptable. Mitigation is therefore essential.

The general approach to this study has been guided by the principles of Integrated Environmental Management (IEM). In accordance with the IEM Guidelines issued by the DEA, an open, approach, which encourages accountable decision-making, was adopted.

The principles of the IEM require:

- informed decision-making;
- accountability for information on which decisions are made;
- a broad interpretation of the term “environment”;
- an open participatory approach in the planning of proposals;
- consultation with I&APs;
- due consideration of alternatives;

- an attempt to mitigate negative impacts and enhance positive impacts of proposals;
- an attempt to ensure that social costs of developments are outweighed by the social benefits;
- democratic regard for individual rights and obligations;
- compliance with these principles during all stages of the planning, implementation and decommissioning of proposals; and
- the opportunity for public and specialist input in the decision-making process.

The study is also guided by the requirements of the EIA Regulations in terms of the NEMA. The NEMA EIA Regulations, which are more specific in their focus than the IEM principles, define the detailed approach to the EIA process.

APPENDIX C – ADDITIONAL MAPS

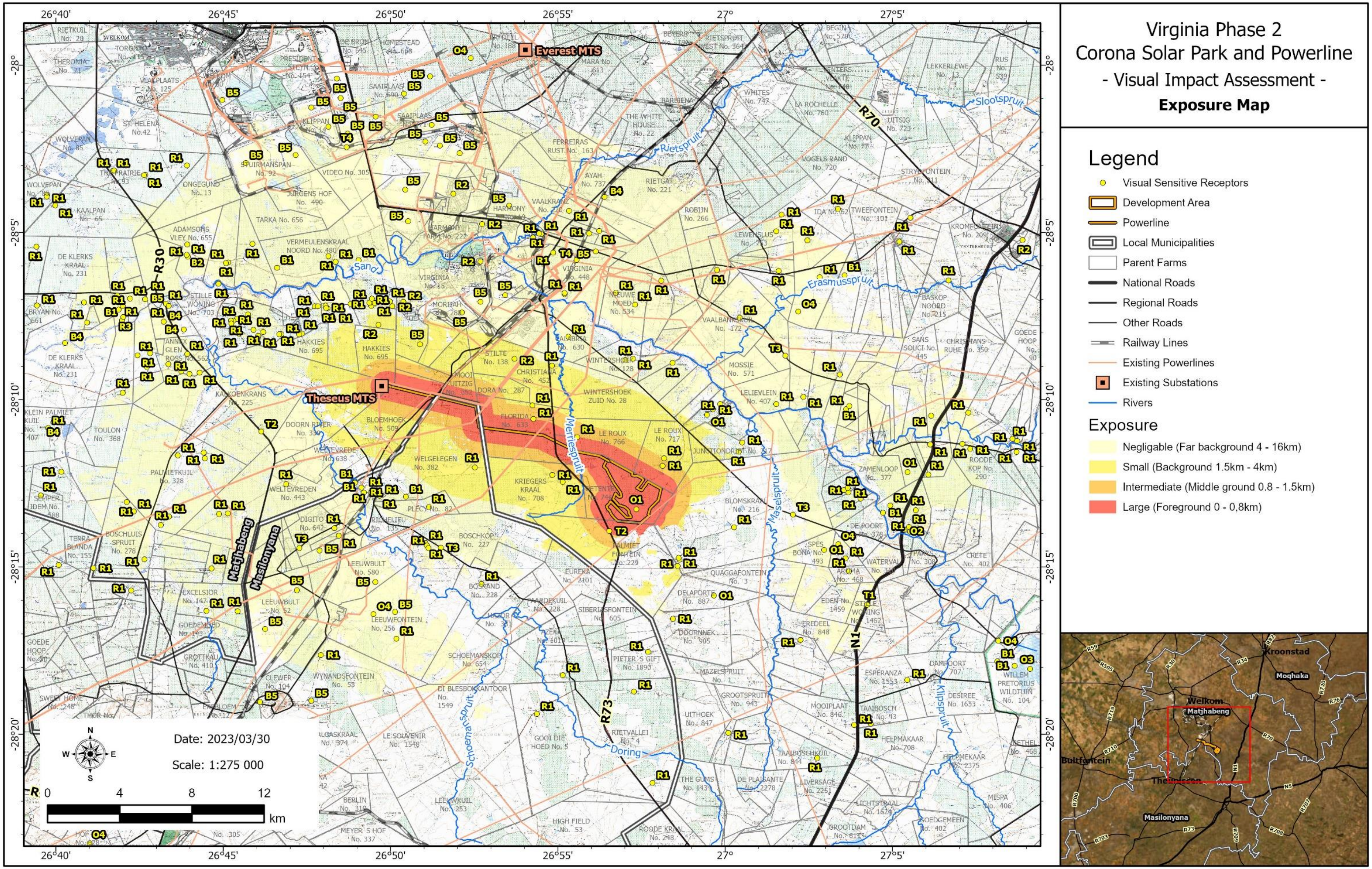


Figure B Exposure Map

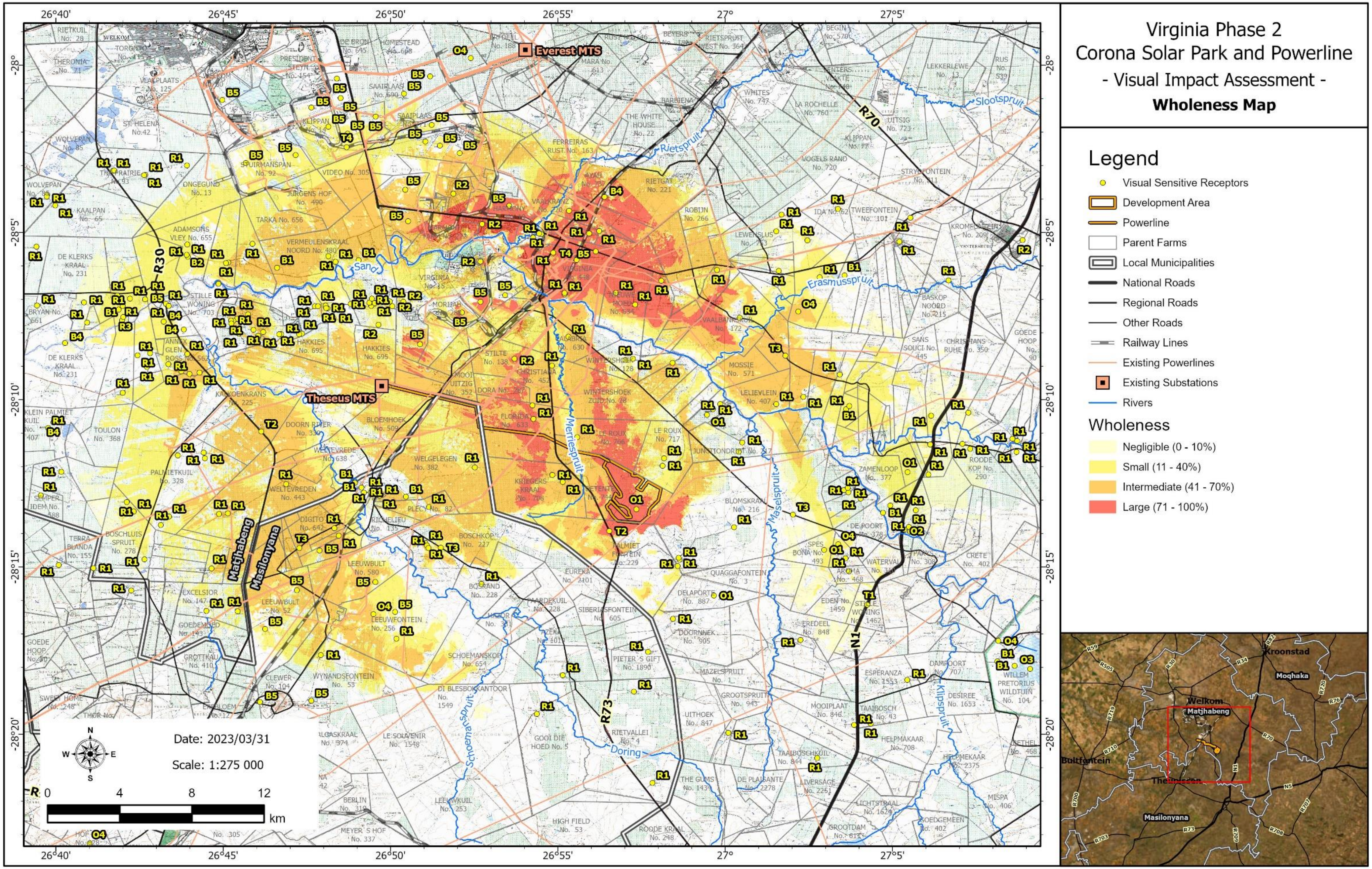


Figure C Wholeness Map

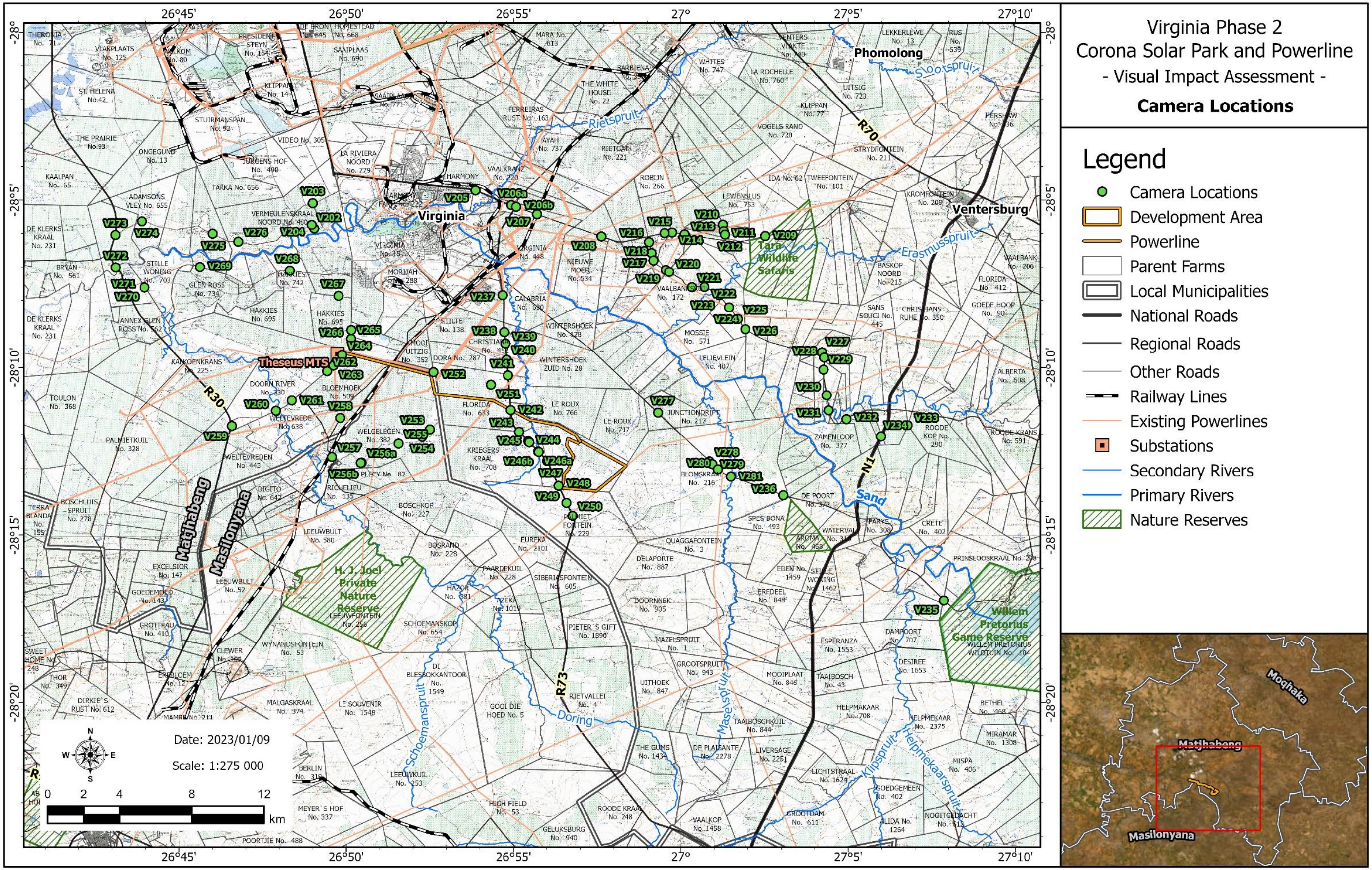


Figure D Camera Locations Phase 2

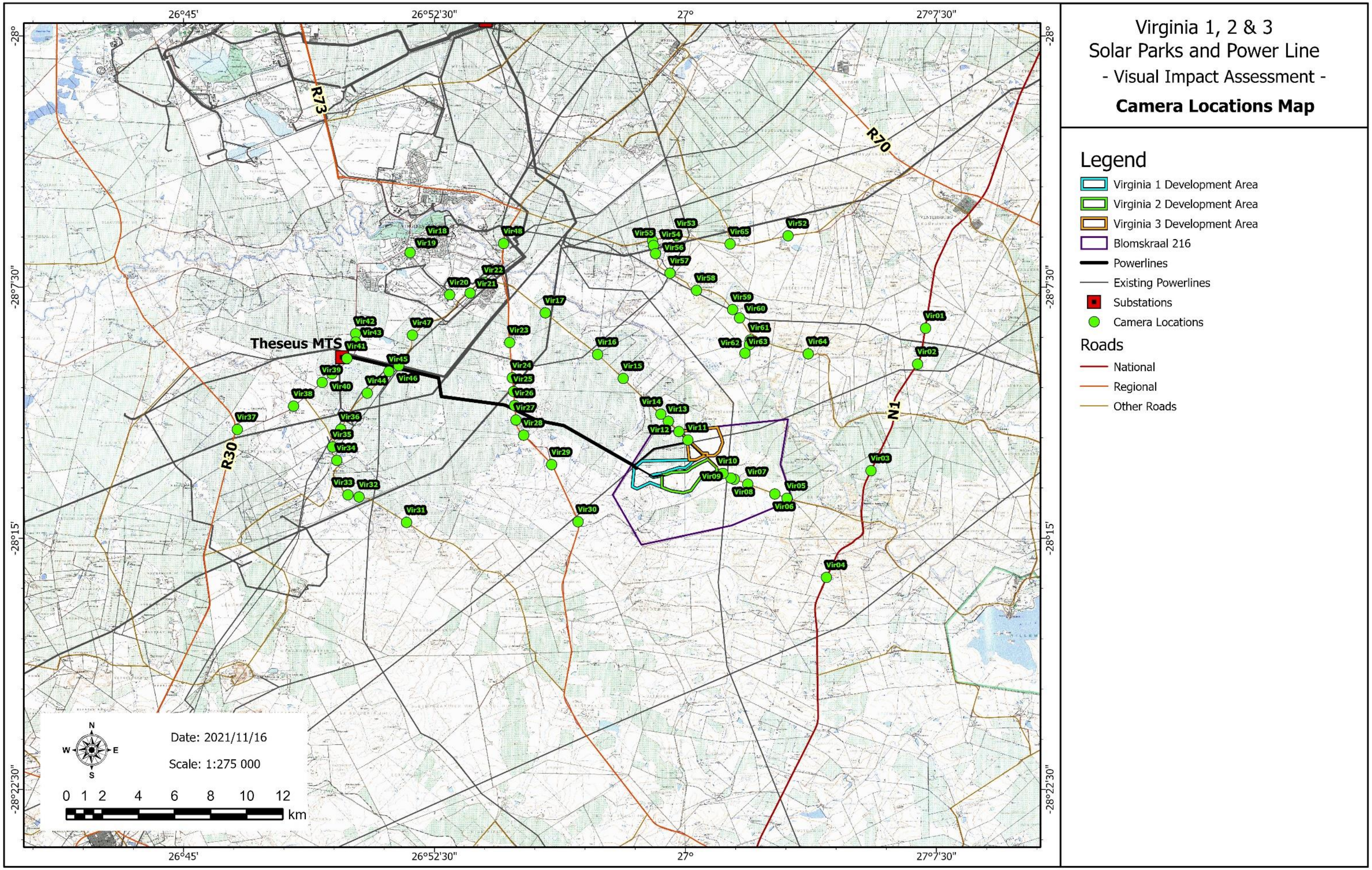


Figure E Camera Locations Phase 1